Titan Education

EXPLORING PASS

Physical Activity & Sports Studies for Years 9–10



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The following digital resources are available to complement this textbook.

Access to TitanOnline internet activities

Internet activities throughout this textbook direct the reader to log in to TitanOnline, Titan Education's digital learning activity platform. These activities supplement the text and engage students in critical thinking, research and analysis. By offering these activities online, any links and references which may change after publication, or become outdated, can be revised to remain current and relevant.

Digital textbook

The PDF version of this textbook is ideal for viewing on tablets and computers.

Alternate digital chapters

This textbook uses a case-study approach for the following syllabus areas.

Chapter 9: Physical activity and sport for specific groups

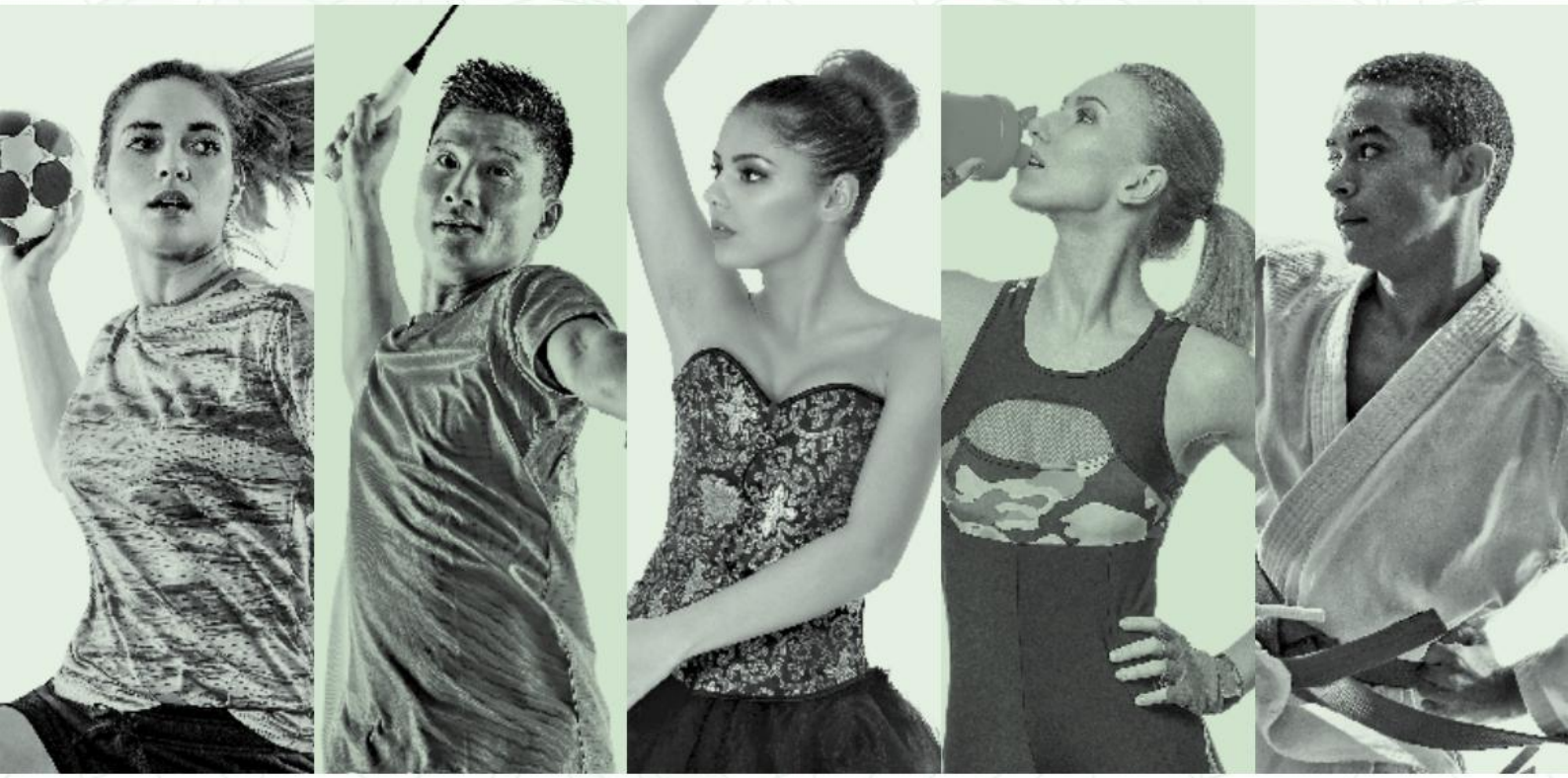
- People with disability (covered in printed text, from page 217)
- Aboriginal and Torres Strait Islander peoples (alternate digital chapter)
- Young people (alternate digital chapter)

Chapter 11: Issues in physical activity and sport

- Drugs in sport (covered in printed text, from page 255)
- Gender (alternate digital chapter)

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AREA OF STUDY 1

Foundations of physical activity

- Body systems and energy for physical activity
- Physical activity for health
- Physical fitness
- Fundamentals of movement skill development
- Nutrition and physical activity
- Participating with safety

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CHAPTER 1

Body systems and energy for physical activity

This module examines energy production and the roles and contributions of body systems to efficient movement.

The body consists of complex structures that are made up of many parts, and each part has its own specific role. Four of the systems have an important role in sport and physical activity: the skeletal system, the muscular system, the respiratory system and the cardiovascular system.

Athletic performance depends on the body's ability to take in oxygen, transport it to the working muscles, use it at the working muscles, and remove carbon dioxide.

To create movement for physical activity, the body uses chemical energy that is taken into the body in three forms of food: carbohydrate, fat and protein. Each form of energy comes from different foods, has different uses in the body, and fuels different types of activities. Food, or chemical energy, is taken into the body and is transformed into mechanical and heat energy. Water is also important for movement and performance because it aids all cell functions, regulates temperature, and transports nutrients and waste.

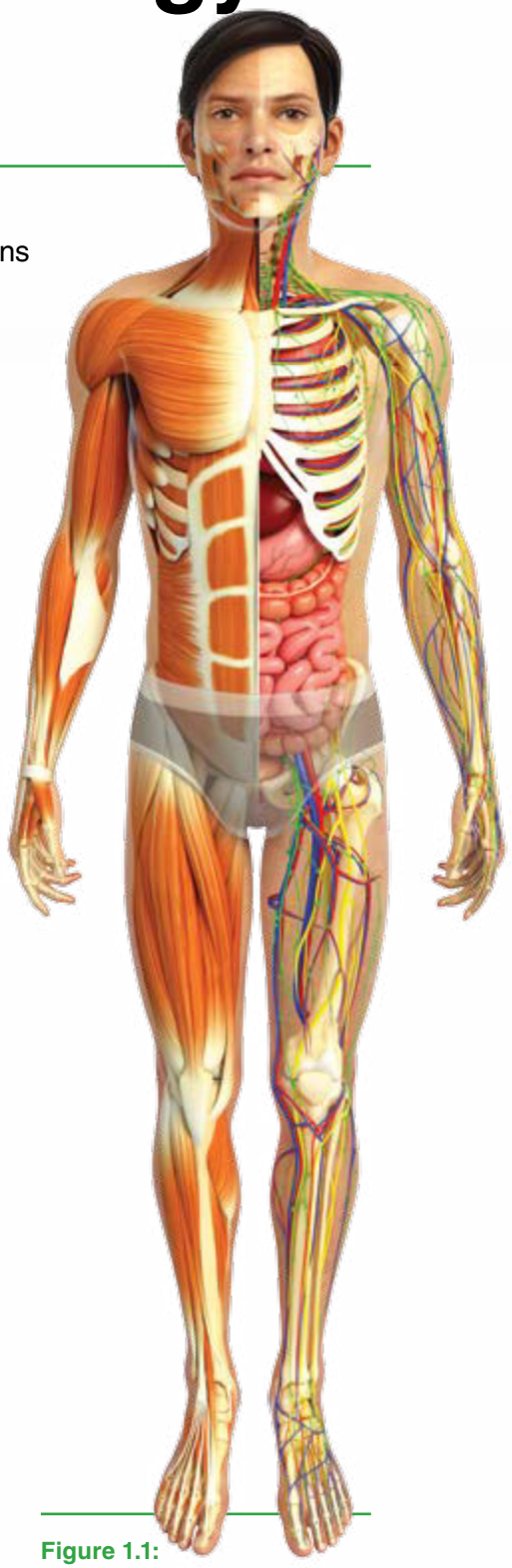


Figure 1.1:
Each of the body's complex structures has a specific role.

Outcomes

A student:

- discusses factors that limit and enhance the capacity to move and perform (PASS5-1)
- analyses the benefits of participation and performance in physical activity and sport (PASS5-2)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- The contribution of body systems to efficient movement
- Energy production and hydration during physical activity

The contribution of body systems to efficient movement

The body consists of complex structures that make up different systems in the body. Four of these systems – the skeletal system, muscular system, respiratory system and cardiovascular system – all combine to produce efficient movement.

The skeletal system provides a framework for muscles to attach. The muscular system facilitates movement through contraction and relaxation of muscles. In the cardiovascular system, the heart pumps blood around the body to allow the transportation of oxygen and the removal of carbon dioxide, nutrients and waste. The respiratory system supplies oxygen to the blood and removes carbon dioxide.

The skeletal system

Structure of the skeletal system

The structure of the skeletal system is vital in creating support, stability and mobility for the human body. The skeletal system is comprised of 206 bones and associated connective tissues such as cartilage, ligaments and tendons, which stabilise and connect bones and skeletal muscles. This relationship between bones and muscles within the skeletal system allows for control over everyday posture and mobility.

The human skeleton system is divided into two main classifications: the axial skeleton and the appendicular skeleton.

The axial skeleton forms the long axis of the body and is structured to protect, store and support the head, neck and chest areas of the body. The axial skeleton consists of 80 bones and includes the bones of the skull, vertebral column and rib cage, which serve to protect vital organs including the brain, spinal cord, heart and lungs. Like all bones, the axial skeleton also provides a stable platform for many movements such as bending, twisting and nodding to occur.

The appendicular skeleton consists of all bones and connective tissue of the upper and lower limbs. The structure of the appendicular skeleton provides a platform for attachment of limbs to the axial skeleton and facilitating movement of the body. The major function of the appendicular skeleton is to act as a framework for movement of the limbs (such as walking and running) and to store and manufacture blood cells.

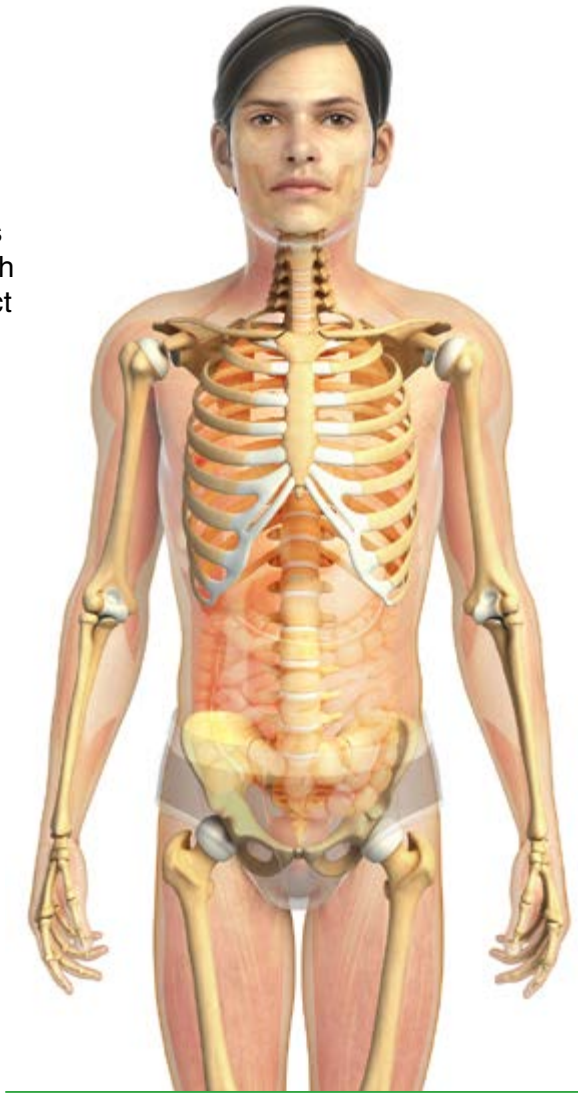


Figure 1.2:
The skeletal system.

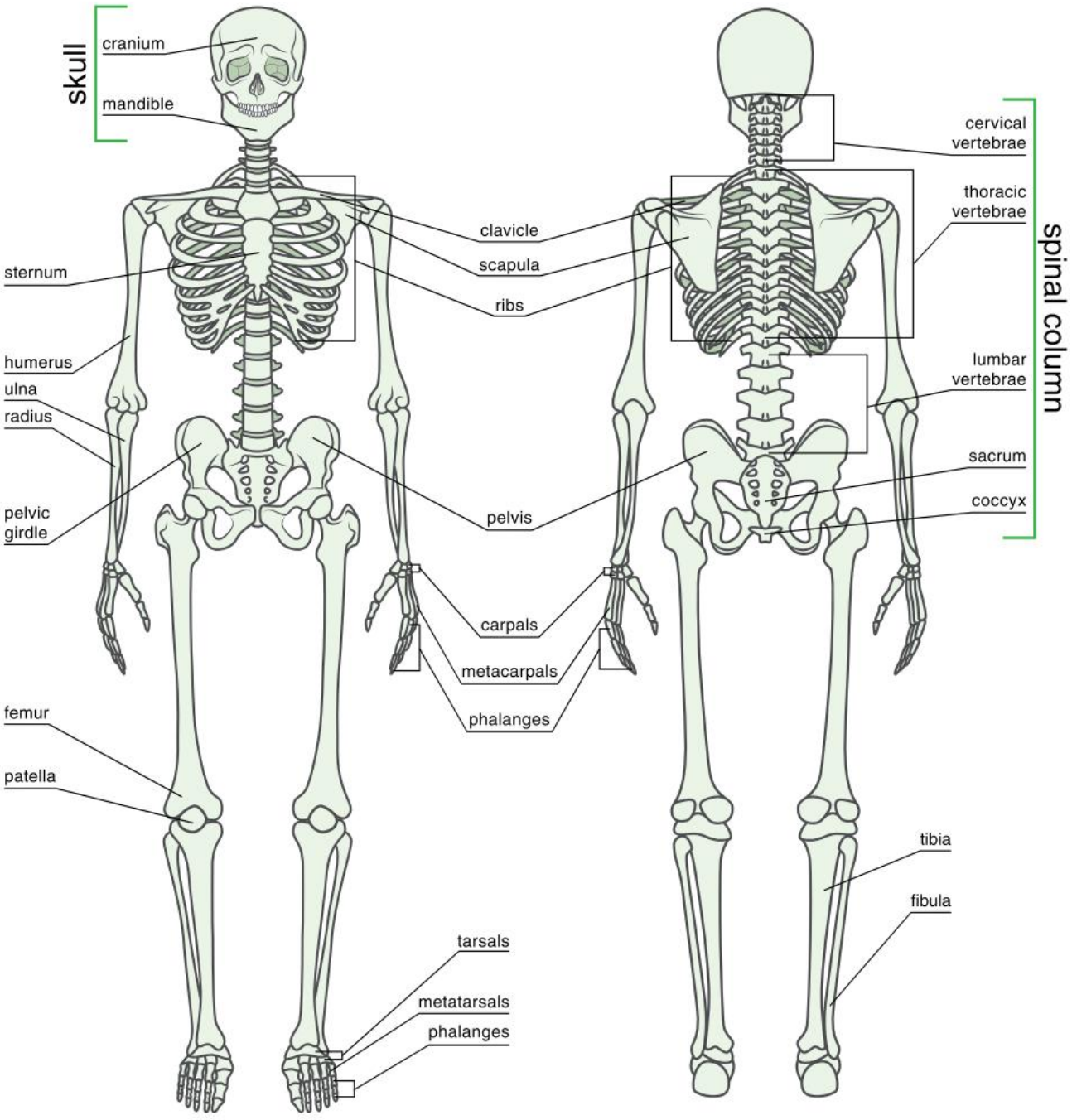


Figure 1.3:
The bones of the skeletal system.

Types of bones

The skeleton is not only divided into two sections, it consists of various types of bone. Bones are classified according to their shape, as shown in Table 1.1.

Did you know?

Humans are born with around 300 bones, but over time some fuse together, leaving adults with 206 bones.

Table 1.1: Bone types and their functions, and examples.

Bone type	Function/s	Examples
Long bone: a dense and relatively large bone that is longer than it is wide.	To be a rigid rod for muscle attachment and to facilitate a wide range of movement.	The thigh bone (femur) and the inner shin bone (tibia).
Short bone: small axis bones that are as long as they are wide.	To facilitate stability and support, with little movement.	The wrist bones (carpals), the ankle bones (tarsals) and the kneecap (patella).
Flat bone: bones with a broad surface, often thin, flat and curved.	Mainly to protect the vital organs and act as an attachment for muscles.	The ribs, the breastbone (sternum), the collarbone (clavicle), the shoulder blade (scapula) and the skull.
Irregular bone: these bones have a unique and complex shape.	Various functions depending on where the bone is located.	The hip bones (pelvis) and the vertebral column (vertebrae).
Sesamoid bones: small, often rounded bones embedded within tendons.	Minimise friction, increase the strength of associated muscles, and support tendons from the wear and stress of movement.	The knee cap (patella).

Types of joints

A joint is a place at which two or more bones meet. Almost every bone in the body has formed at least one joint with another bone. Joints can facilitate not only movement but stability. There are three types of joints: fixed (immovable) joints; cartilaginous (slightly movable) joints; and synovial (freely movable) joints.

Fixed joints

These are joints where no movement is possible. Despite being the meeting of two bones, there is no connective tissue like ligaments or tendons to create movement. An example is the joints between the bones of the skull (sutures), with their role being to protect the brain.

Cartilaginous joints

Cartilaginous joints demonstrate small and limited movements of bones, with the main example being the vertebral column. The vertebral column is the joining of vertebra through fibrous cartilage, called vertebral discs, in an S shape to protect the spinal cord.



Figure 1.4:
Lunges use hip, knee and ankle joints.

Movement is possible because the discs can compress slightly so that one bone can move in relation to the other. The amount of movement that actually takes place at each joint is minimal, but because of the combined movement, the spine is considerably flexible when performing movements such as bending over.

Synovial joints

Synovial joints allow maximum movement, and are most noticeable in everyday movement. Examples of synovial joints are the hip, knee and elbow joints. This type of joint varies in shape, and the variability in turn affects the movements that are possible. Synovial joints do, however, have a number of common features. They:

- have a membrane that lines the outside of the joint and encloses the synovial fluid
- contain synovial fluid, which is within the joint capsule to absorb shock and reduce friction
- rely on ligaments, being the fibrous straps through which bones are attached to bones at the joints, to hold the bones together and prevent dislocation
- include cartilage, which is a hard, rubbery substance and which has the function of preventing the bones from rubbing together.



Figure 1.5:
The joints of the skull fuse to protect the brain (just like a bike helmet).

The body has six types of synovial joints: ball and socket, hinge, condyloid, saddle, pivot and gliding, outlined as follows.

Ball-and-socket joint

Ball-and-socket joints facilitate the movements of flexion, extension, adduction, abduction, rotation and circumduction; examples are the joints in the hips and shoulders.

Hinge joint

Hinge joints facilitate the movements of flexion and extension; examples are the joints in the elbows, knees and fingers.

Condyloid joint

Condyloid joints facilitate the movements of flexion, extension, adduction, abduction and circumduction; an example is the joint in the wrist.

Saddle joint

Saddle joints facilitate the movements of flexion, extension, adduction, abduction and circumduction; an example is the joint where the thumb joins the hand.

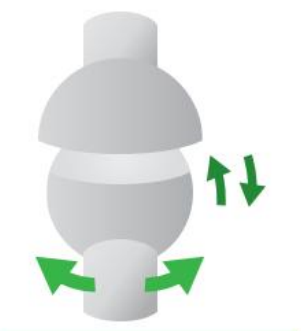


Figure 1.6:
A ball-and-socket joint.

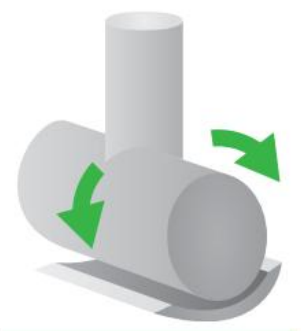


Figure 1.7:
A hinge joint.



Figure 1.8:
A condyloid joint.



Figure 1.9:
A saddle joint.

Pivot joint
Pivot joints facilitate the movement of rotation; examples are the atlas and axis joints in the neck and the radius and ulna in the forearm.

Gliding joint
Gliding joints facilitate a slight sliding movement; examples are the bones of the wrist and the bones between the vertebrae.

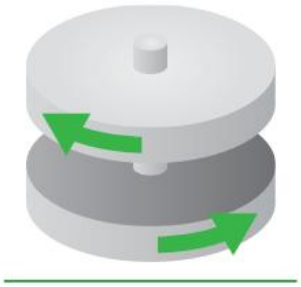


Figure 1.10:
A pivot joint.

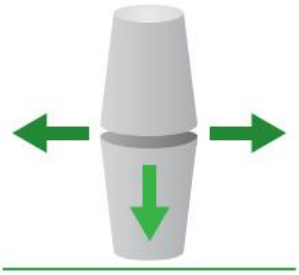


Figure 1.11:
A gliding joint.

Role of the skeletal system

The appendicular and axial skeletons have a significant role in the function of the whole body. In particular, the skeletal system has five fundamental functions: three external and two internal. The external functions are structure, movement and protection; and the internal functions are blood cell production and storage.

The skeletal system acts as a framework, supporting the body and maintaining its shape. Similar to that of the frame and steel beams that hold a building together, the components of the skeletal system – bones, cartilage, ligaments and tissues – support our body structure. Without this framework, the body would be a limp mass of organs and tissues. Within the skeletal system, the skeleton and muscles also work together to allow movement.

Movement is ultimately initiated through the muscular system; however, the skeletal system provides levers and anchors for muscles to pull against. The muscles, connective tissues and bones form part of a movement relationship, allowing the body to move in controlled and predictable movement patterns; for example, running and throwing.

The skeletal system provides protection for vital organs; for example, the skull protects the brain, and the rib cage protects the heart and lungs. The shock-absorbing, flexible and deliberately shaped bone structures ensure fundamental bodily functions are maintained.



Figure 1.12:
Bones work with muscles to allow the body to move.

Blood cell production occurs within the bone marrow of bones, where red and white blood cells are created to aid bodily functions. Red blood cells are used to transport oxygen and other important nutrients to organs and tissues, and white blood cells are used to help fight disease and infection.

Bones within the skeletal system store essential supplies of calcium. Calcium maintains bone density, and allows blood to clot and muscles to contract. When the body is calcium deficient, it relies on the calcium stored in bones to replenish levels in the bloodstream.

Learning activity

1. Distinguish between the structure and function of the axial skeleton and the appendicular skeleton.
2. Identify the main functions of the skeletal system.
3. Outline the various bone types and their functions, and give an example of each bone type.
4. On a diagram of the human skeleton, label the major bones.

Internet activity

Log on to TitanOnline and complete Activity 1.1 – labelling the skeletal system.

The muscular system

Structure of the muscular system

The structure of the muscular system includes muscles, tendons and ligaments. These elements work in coordination to create observable and unobservable bodily movements.

Each muscle within the body is specifically structured to facilitate conscious and unconscious movements. For example, individuals can control when they want to take a step to walk, or turn their head to look left and right. However, actions like breathing, digestion of food and movement of blood around the body are out of an individual's control.

Ultimately, each of these movements is enabled through three different types of muscles, each with their own unique role.

Types of muscles

The body has three types of muscle: smooth muscle, cardiac muscle and skeletal muscle.

Smooth muscle

Smooth muscles are located in the walls of blood vessels and the digestive system. Because these muscles cannot be controlled, they are known as involuntary muscles.

Cardiac muscle

This type of muscle is located solely in the heart. The cardiac muscle contracts and relaxes, causing the heart to beat, and it, too, is an involuntary muscle.



Figure 1.13:
The muscular system.

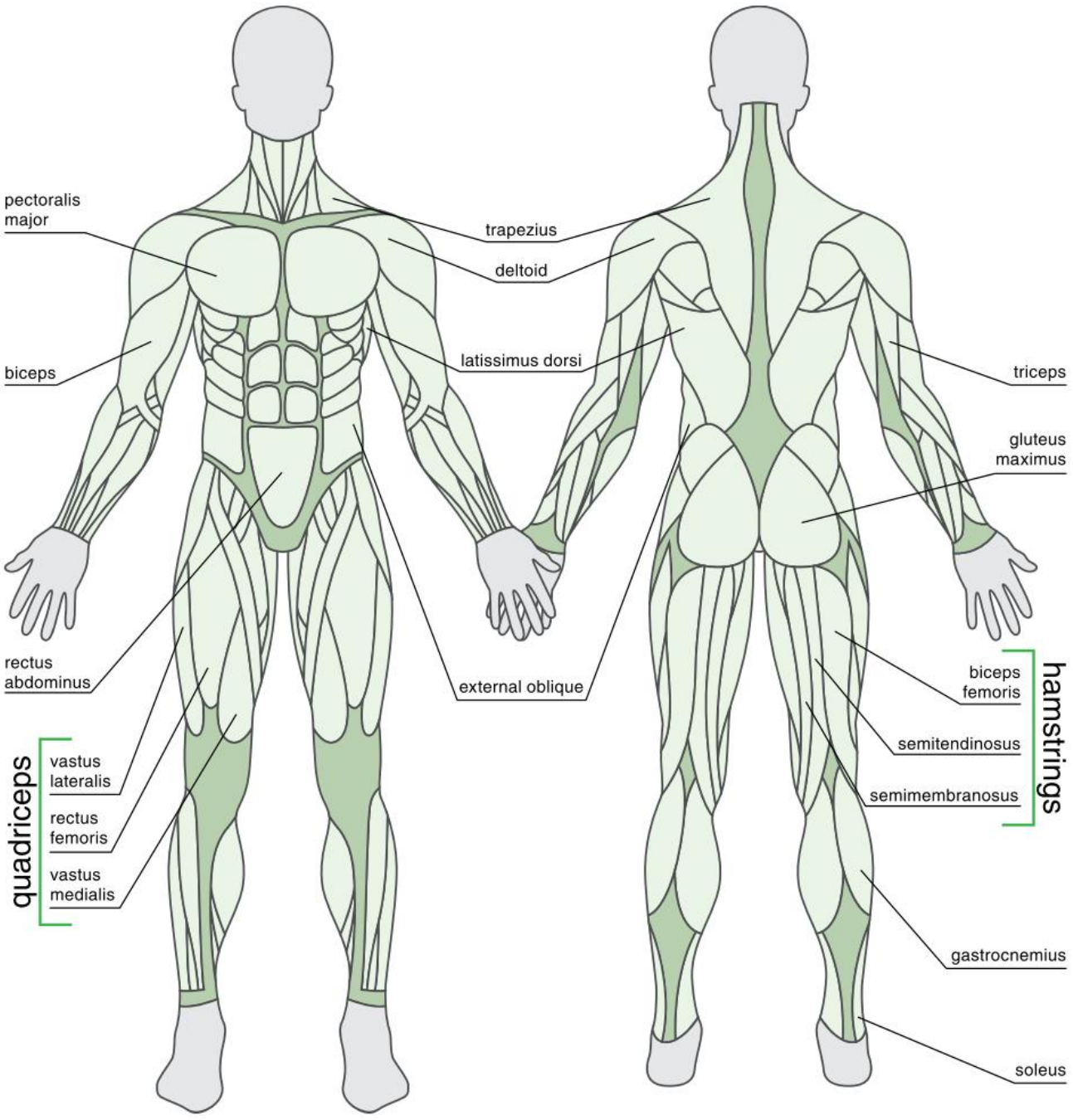


Figure 1.14:
Major muscles of the muscular system.

Skeletal muscle

These muscles are attached to the skeleton, and cause movement when they contract and relax. They are generally under conscious control and are therefore known as voluntary muscles.

Did you know?

The busiest muscles are those controlling our eyes and the hardest working muscles are those of the heart.

Skeletal muscle cells are long and thin, and contain fibres. Each fibre is about as thick as a hair but is many times stronger. The fibres slide over each other when the muscle contracts. The muscle fibres are arranged in groups within the muscle, and there are two basic types: slow-twitch fibres and fast-twitch fibres.

Every person has both types of muscle fibre but the proportion of each fibre type that is present in each muscle tends to be inherited. People who are born with a higher percentage of slow-twitch muscle fibres in their legs might well be better suited to endurance events, whereas people who are born with a higher percentage of fast-twitch fibres might be better suited to explosive-type events such as sprinting.

Although muscle contraction does not always result in movement, without muscle contraction, controlled movement would not occur.



Figure 1.15:
People with a higher percentage of slow-twitch muscle fibres are suited to endurance events such as marathons.

Role of the muscular system

The muscular system has several roles in the human body. It is essential for:

- locomotion, balance and posture
- absorption of shock and heat
- breathing
- protection of the body's internal organs
- digestion of food.

These important functions that the muscular system performs allow people to move and breathe, and allow the heart to circulate blood throughout the body. Without the muscular system, these important functions would not occur.

Muscle movement

Skeletal muscles are arranged in pairs around joints, so that one muscle moves the joint in one direction and the other moves it back. For a muscle to move a joint, it must span the joint, and that means it must be attached to the bones on both sides of the joint; for example, a muscle that moves the elbow must be attached to the lower arm as well as to the upper arm or shoulder. Muscles are attached to bones by way of tendons.

Did you know?

The body's strongest muscle is the gluteus maximus, more commonly known as the buttocks. The strongest muscle based on weight is the masseter, located in your jaw.

Movement terms

The body is capable of the following movements.

Flexion

Flexion means bending or decreasing the angle at a joint. An example of this type of movement is flexing the elbow during the upward phase of a biceps curl.

Extension

Extension means straightening or increasing the angle at a joint. An example of this type of movement is straightening the knee when kicking a ball.

Dorsiflexion

Dorsiflexion means moving the toes towards the shin bone. An example of this type of movement is pulling the toes towards the tibia when performing a hamstring stretch.

Plantarflexion

Plantarflexion means moving the toes away from the shin bone. An example of this type of movement is pointing the toes towards the ground.

Adduction

Adduction means moving a body part towards the midline or centre of the body. An example of this type of movement is bringing the legs together in the second part of a star jump.

Abduction

Abduction means moving a body part away from the midline of the body. An example of this is moving the legs apart during a star jump.

Circumduction

Circumduction means moving a joint in a circular motion, and can occur at joints that flex, extend, adduct and abduct. Two examples of this type of movement are the action of the arms when swimming freestyle, and when bowling during a cricket game.

Rotation

Rotation means turning or twisting a bone along its axis. An example of this type of movement is when a ballet dancer is performing a pirouette.



Figure 1.16: Flexion.



Figure 1.17: Extension.



Figure 1.18: Dorsiflexion.



Figure 1.19: Plantarflexion.

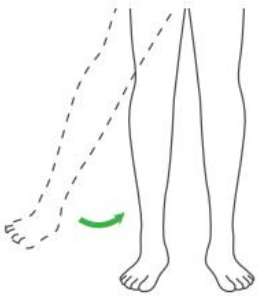


Figure 1.20: Adduction.

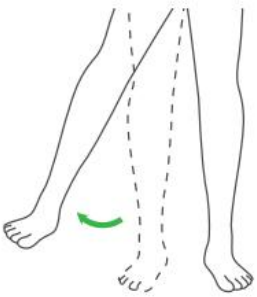


Figure 1.21: Abduction.

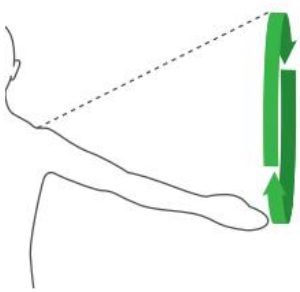


Figure 1.22: Circumduction.

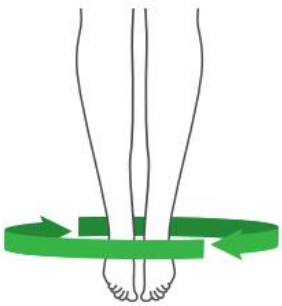


Figure 1.23: Rotation.

Posture

When the body is standing, postural muscles are constantly contracting and relaxing to keep the body balanced. Think of what happens when falling asleep while sitting – the head doesn't stay upright!

The postural muscles are also extremely important in sporting performance. They might work to keep one part of the body still while another part is moving; for example, the postural muscles of the back and stomach keep the body still and straight during a push-up. They may also contract to stabilise joints and to aid absorption of force; for example, when playing football.



Figure 1.24:
Postural muscles contract and relax in order to keep the body balanced.

Production of efficient movement by the skeletal and muscular systems

The human skeleton mainly moves via a system of levers and axes. In the skeletal system, the bones are usually the levers, and the joints are the axes, or pivot points, on which the levers move.

It is through the partnership of the skeletal system and the muscular system that movement is efficiently produced. The only way for a bone to move is through the contraction or release of an attached muscle. That is, the muscular system helps the skeletal system in its function of movement. From the other perspective, muscles cannot make the body move on their own, therefore they need the structure of the skeletal system to facilitate movement.

Muscles are arranged in pairs to create a dynamic movement that can move body parts in one direction and then move them back to their original position. The elbow joint, for example, presents the biceps and the triceps as a pair. The biceps muscle is positioned at the front of the upper arm and the triceps muscle is positioned at the back of the upper arm.

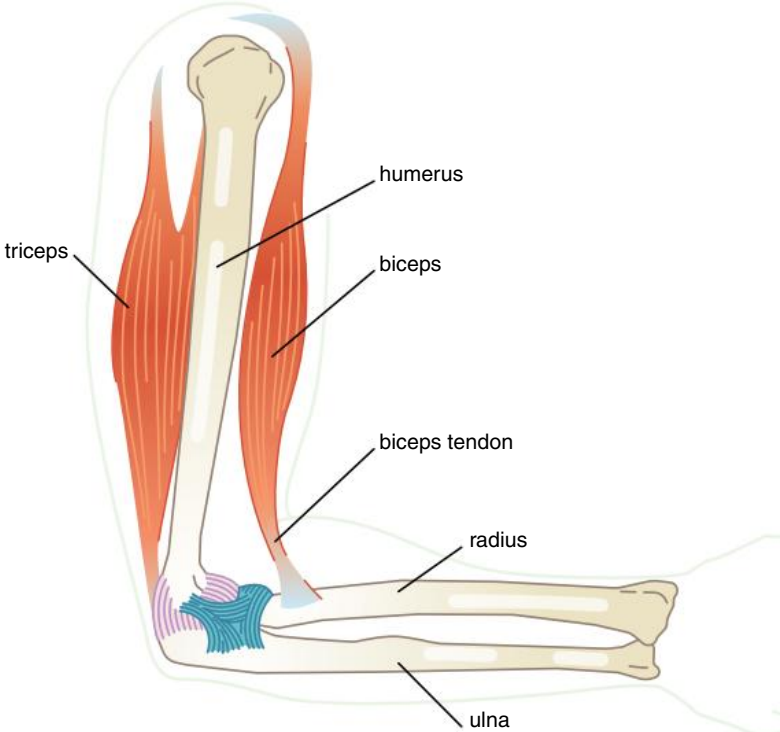


Figure 1.25:
The elbow joint's agonist and antagonist muscles.

The two muscles work as a pair to generate flexion (biceps contract and triceps relax) and produce an extension (triceps contract and biceps relax). In the first movement, the biceps is the agonist, or prime mover, and the triceps is the antagonist. For the second action, the triceps is the agonist and the biceps is the antagonist.

- **Agonist:** the muscle that is causing the movement.
- **Antagonist:** the muscle that relaxes so that movement can occur.

Through the function of joints, everyday and sport-specific movements are successfully facilitated. For example, when comparing the movements of a gymnast, tennis player, weightlifter and sailor, there is an appreciation for the combination of the skeletal and muscular system and its contribution to movement and sporting performance.

Learning activity

1. Describe how the skeletal and muscular systems interact to produce efficient movement.
2. Identify one of the body's ball-and-socket joints and the movement it facilitates.
3. Identify one of the body's hinge joints and the movement it facilitates.
4. Outline the function of:
   a. tendons b. ligaments c. cartilage.
5. Outline the difference between flexion and extension, and give examples.

Practical activity

Perform each of the following actions, and state the agonist and antagonist muscles. You will find it helpful to feel and observe the muscle!

- From a sitting position, extend one knee.
- In a sitting position, raise one arm to the side.
- In a standing position, rise onto your toes.
- In a standing position, lift your leg backwards.
- Perform the upward stage of a sit-up.

For muscles to perform their main job of moving the skeleton, they must have the following characteristics:

- **Excitability:** the muscle will respond to a stimulus.
- **Extensibility:** the muscle can change in length.
- **Contractibility:** the muscle will tighten so a force can be produced.
- **Elasticity:** the muscle will return to its original length.

When an impulse is sent from the brain to the muscle, the muscle will respond to the stimulus, causing contraction.



Figure 1.26:
Planks can be used to strengthen muscles in the body's core.

The three types of contraction are isometric, isotonic and isokinetic, outlined as follows.

Isometric contraction

In this type of contraction, the muscle develops tension but there is no change in the length of the muscle; an example is when you are pushing against a closed door.

Isotonic contraction

In this type of contraction, the muscle develops tension and there is a change in the length of the muscle; an example is when you are performing a biceps curl. The two types of isotonic contraction are eccentric contractions and concentric contractions, outlined as follows:

- **Concentric contractions:** These occur when the muscle shortens; an example is the upward phase of a biceps curl.
- **Eccentric contractions:** These occur when the muscle lengthens; an example is the downward phase of a biceps curl.

Isokinetic contraction

In this type of contraction, the muscle develops tension and there is a change in the length of the muscle. The tension remains constant through the full range of movement. For this type of contraction, you need special equipment to constantly maintain the tension through the full range of movement.



Figure 1.27:
Biceps curls use isotonic contraction.

Learning activity

1. Identify the difference between fast-twitch and slow-twitch muscle fibres. Give examples of sports or activities that are suited to people who have a high percentage of fast-twitch muscle fibres and people who have a high percentage of slow-twitch muscle fibres.
2. Identify a range of sports or activities in which isometric strength is important.
3. Describe the difference between agonist and antagonist muscles.
4. Identify three bodily movements and the agonist and antagonist muscles that facilitate the movement.
5. Outline the four characteristics of muscles that occur when the skeleton is moving.

Internet activity

Log on to TitanOnline and complete Activity 1.2 – labelling the muscular system.

The circulatory system

Structure of the circulatory system

The structure of the circulatory system consists of the heart and blood vessels (arteries, veins and capillaries). The heart consists of two muscular pumps known as the left and right ventricles, which pump blood throughout the body. The blood vessels are intricate networks of hollow tubes that transport blood throughout the entire body. The function of the human circulatory system is to transport blood around the body. At rest, the average heart pumps about five litres of blood throughout the body every minute.

Major components of the circulatory system

The major components of the circulatory system are the heart, blood and blood vessels. Each play a significant role in the structure and function of the circulatory system to maintain bodily functions.

The heart is a major organ in the circulatory system. It is about the size of a fist, and lies beneath the sternum, slightly to the left. It consists of four chambers, and as assisted through cardiac muscles, the heart pumps oxygenated blood around the body and deoxygenated blood back to the lungs. The blood first receives deoxygenated blood through the superior and inferior vena cava after this blood has travelled through the body delivering nutrients and removing wastes. After being pumped through the right atrium and right ventricle, this blood is sent to the lungs to be oxygenated through the pulmonary artery. This oxygen-rich blood is returned to the heart via the pulmonary vein, processed through the left atrium and left ventricle, and finally pumped through the aorta to once again deliver oxygen and nutrients to the body.

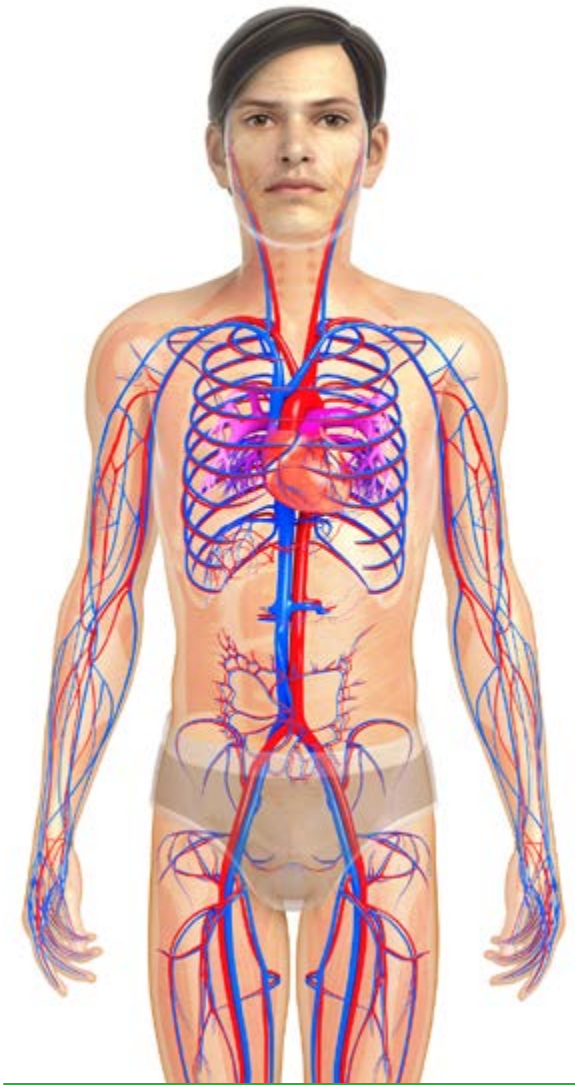


Figure 1.28:
The circulatory system.

Blood is also a major component in the circulatory system. It consists of four significant structures: red blood cells to carry the oxygen in haemoglobin, white blood cells to form part of the immune system, platelets to be used for blood clotting (for example, forming a scab when the skin has a cut) and plasma to carry these components plus other nutrients and wastes in a liquid.

The blood vessels allow this blood to be transported to all cells in the body. There are three types of blood vessels: arteries, veins and capillaries. Once the blood has been pumped out of the heart through the aorta, it travels first through arteries and is continually pumped, as a result of heart contractions, all over the body. The blood then arrives at various networks of capillaries, which are the smallest blood vessels, and is distributed in various pathways to arrive at cells for nutrient transfer. Capillaries are also connected to veins, so waste from cells are also transferred into blood simultaneously. Veins carry wastes back to the heart to be sent to the lungs to be re-oxygenated.

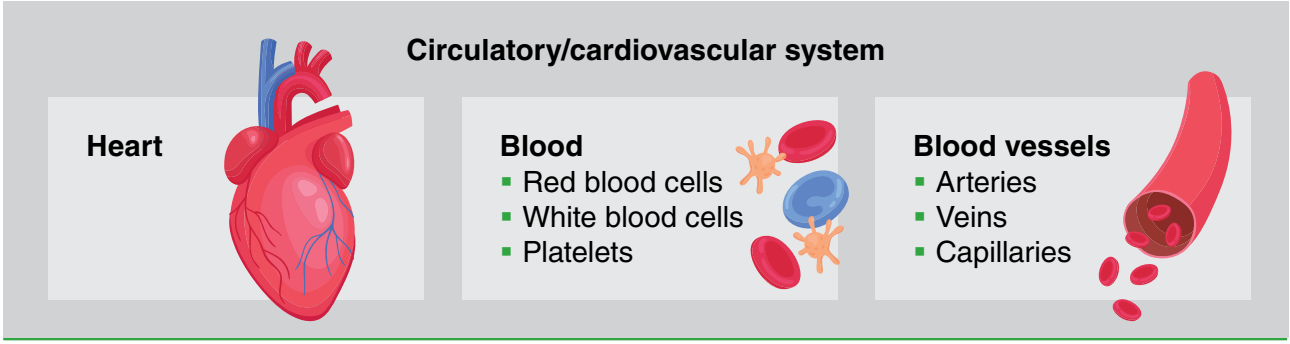


Figure 1.29:
Components of the circulatory system.

Function of the circulatory system

The circulatory system works with other body systems to enable the following:

- **Respiration** – delivers oxygen to the cells and removes carbon dioxide from them.
- **Nutrient transportation** – carries digested food substances to the cells of the body.
- **Waste removal** – disposal of waste products and poisons that would harm the body if they accumulated.
- **Immunity** – helps protect the body from disease.
- **Cellular communication** – the circulatory system provides a mode of transport for hormones.
- **Thermoregulation** – the circulatory system transports heat (to warm and cool the body).

The heart pumps blood through vessels that travel to every cell in the body. The blood carries oxygen and dissolves nutrients on its way to the cell, and on the return journey it carries carbon dioxide and waste products. The transport of nutrients and wastes is essential for cell function, and the circulatory system plays a significant role in ensuring this occurs.

Also, the distribution of blood flow to various parts of the body changes depending on the current need or circumstance of the body. For example, hypothermia is when the core body temperature drops below 35 °C. In this case, blood flow would focus on vital organs in the centre of the body rather than maintaining the temperature in the body's extremities such as hands and feet. Alternatively, if the body is getting very hot, the blood will be directed to the skin to cool the body through perspiration.

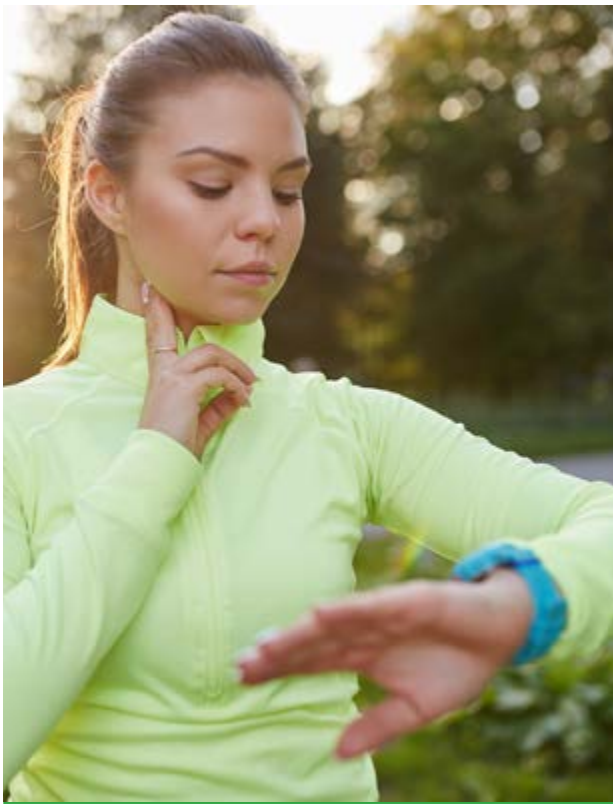


Figure 1.30:
The carotid pulse is one of the easiest waves of blood to locate and feel.

Did you know?

Your heart beats about 100,000 times every day. If you live for 100 years, that's over 35 million heartbeats!

Production of efficient movement

Ultimately, movement needs to be efficient so the body doesn't fatigue or overload components of body systems unnecessarily. Within the circulatory system, ensuring blood can be pumped to all parts of the body without placing undue stress on the heart is essential. In particular, when exercising, cells within the body produce more carbon dioxide waste and, in turn, need more oxygen. Therefore, the blood needs to quicken its return to the heart and the lungs to continue this transport process. The physiological response of the body is for the heart to beat faster and more strongly. To explain the amount of blood pumped by the heart, the following equation has been developed: **heart rate (HR) × stroke volume (SV) = cardiac output (CO)**.

This formula details the effect heart rate and stroke volume has on cardiac output. Heart rate is the number of beats per minute, stroke volume is the amount of blood pumped out of the left ventricle per beat (measured in millilitres) and cardiac output is the amount of blood pumped per minute (measured in litres).



Figure 1.31:
Athletes may use smart watches to monitor and record their heart rate throughout their event.

The more times the heat beats per minute, the more blood that will be pumped out. However, the strength of the single beat influences and helps determine how much blood is pumped.

For example, an elite athlete would have a lower heart rate and a higher stroke volume compared to a sedentary person, who would have a higher heart rate and a lower stroke volume. This is due to the athlete having stronger, more conditioned cardiac muscles, resulting in more blood being pumped out per contraction, therefore requiring the heart to beat less often at rest. Contrastingly, a sedentary person would have a lower stroke volume, requiring the heart to beat more frequently to pump the required blood out to the body. However, at rest, the elite athlete and the sedentary person would have very similar cardiac outputs, as the higher and lower heart rates and stroke volumes counteract each other.

For efficiency, having a lower heart rate and a higher stroke volume is better for the circulatory system. With cardiac muscles being stronger to create a higher stroke volume, during exercise the heart rate can remain relatively low but still supply the blood flow the body needs. Therefore, muscle fatigue is delayed, and the person can participate in the demands of exercise for longer and still accommodate for the body's needs, effectively producing more efficient movement.

Internet activity

Log on to TitanOnline and complete Activity 1.3 – listening to the audio file on the circulatory system.

Learning activity

1. Explain why the blood flowing to the surface of the skin will aid the body in cooling down.
2. Identify the four chambers of the heart.
3. Identify the vessels in which blood is supplied to the heart.
4. Identify the vessels in which blood is removed from the heart.
5. Identify and describe the factors that affect a person's pulse rate.
6. Explain the physiological changes that occur in the body as the pulse rate increases.
7. Calculate your maximum heart rate using the following formula:
   220 – your age = [your maximum rate].
8. Write down your resting heart rate. Then run continuously for two minutes and write down your heart rate again. Draw the results on a line graph.

The respiratory system

Structure of the respiratory system

A constant flow of oxygen is critical in keeping the body's cells working. Just as importantly, wastes such as carbon dioxide, which can be lethal if allowed to accumulate, need to be removed. These two functions are achieved through breathing; that is, through the respiratory system's structure by which oxygen is consumed and carbon dioxide is expelled.

The three major parts of the respiratory system are the airway, the lungs and the muscles of respiration. The airway, which includes the nose, mouth, pharynx, larynx, trachea, bronchi and bronchioles, carries air down to the lungs, through the support of the muscles of respiration like the diaphragm, and is diffused into the bloodstream to be transported to cells. In the reverse action, carbon dioxide is transferred from the bloodstream and sent back through the airways into the atmosphere.

The functions of the human respiratory system are to transport air into the lungs, to facilitate diffusion of oxygen into the bloodstream, to receive the waste product carbon dioxide from the blood, and to exhale the carbon dioxide.

Did you know?

If you were to spread out an adult's alveoli, they would cover a tennis court!

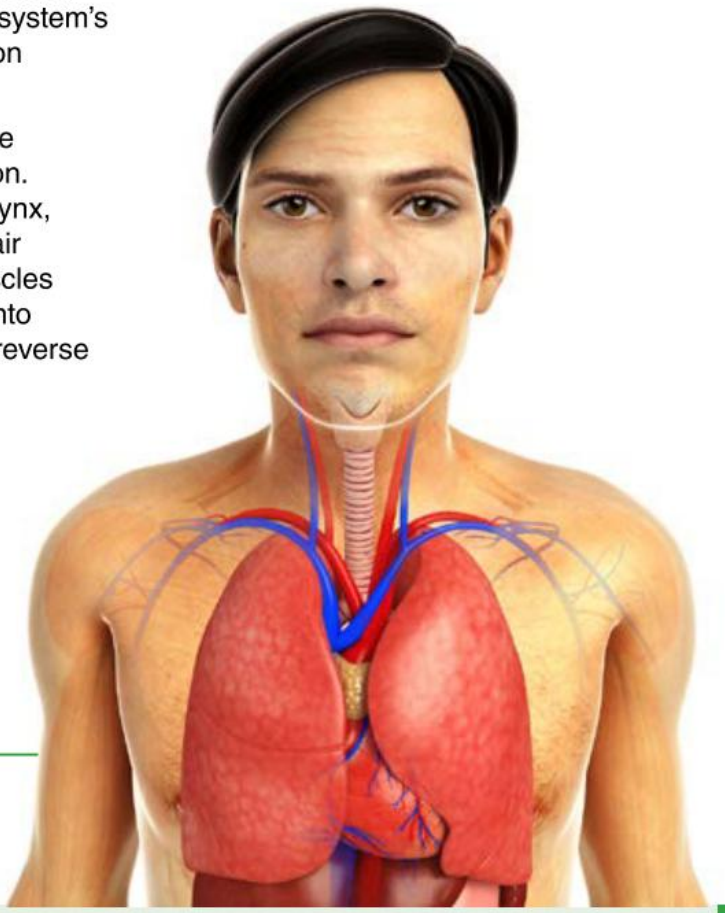


Figure 1.32:
The respiratory system.

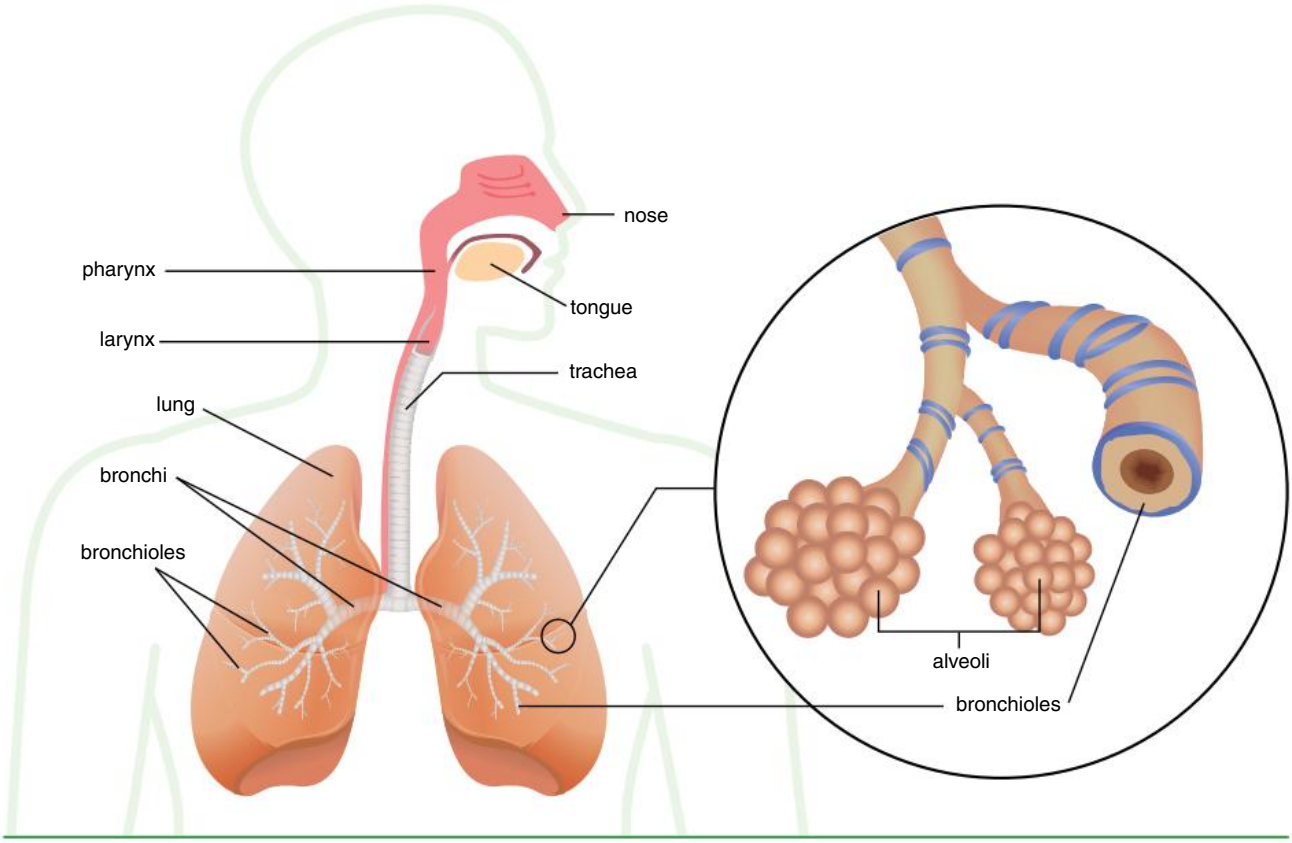


Figure 1.33:
Components of the respiratory system.

Major components of the respiratory system

The major components of the respiratory system are labelled on the diagram in Figure 1.33. The respiratory system relies on the skeletal and muscular systems to perform the function of breathing. The lungs are attached to the ribs by way of suction. The sequence of events is set out in the flowchart in Figure 1.34.

The diaphragm has a vital role in the function of breathing. It is a round sheet of muscle that encloses the bottom of the rib cage. When the diaphragm receives an impulse, it contracts and flattens, and the size of the lungs increases. Both events are contributory factors in the function of breathing in, which is known as inspiration.

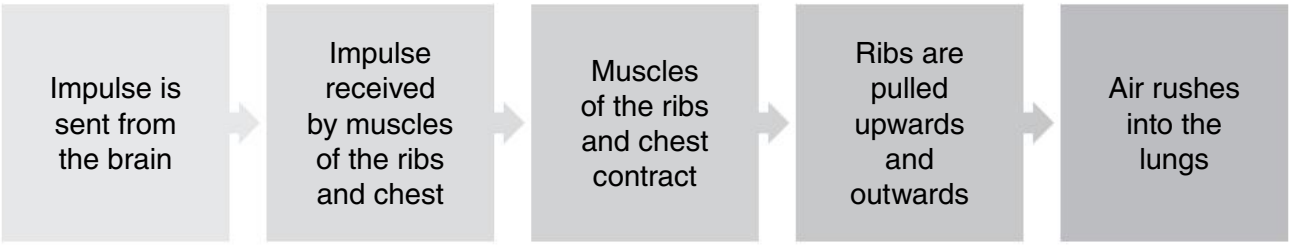


Figure 1.34:
How the respiratory system works.

The function of breathing out, or expiration, is a result of the relaxation of the diaphragm and the muscles of the ribs. The relaxation causes the ribs to lower and the diaphragm to return to its dome shape. The air inside the lungs is squeezed out through the nose and mouth, in the same way that air is squeezed out of a deflating balloon.

The breathing rate changes when exercising. When the body is at rest, an individual will breathe about 12 times per minute and take in about half a litre of air. The following equation highlights how much air is ventilated (breathed in and out) in one minute: **12 breaths per minute × 0.5 litre = 6 litres ventilated per minute**.

During exercise, the rate and the depth of breathing increase significantly.

Learning activity

1. Explain the terms 'inspiration' and 'expiration'.
2. Draw a flow diagram of the sequence of events that occurs during expiration.
3. Draw and label the major components of the respiratory system.
4. Explain the effect that the size of the lungs has on the movement of air into and out of the lungs.

When air enters the lungs, it travels down the bronchus, which divides, like a tree, into tiny branches, or bronchioles, which get smaller and smaller. At the end of each bronchiole is a structure called an alveolus, which is like a little balloon or air sac.

Alveoli are full of oxygen-rich air that has been drawn into the lungs during inspiration. The oxygen has to get into the blood so that the cardiovascular system can perform its function of transporting the oxygen to the working cells. This movement of oxygen occurs in the alveoli, where a capillary can always be found close by, and the oxygen can move from one place to the other, that is, from the lungs into the blood.

The capillary that is close to the alveoli is carrying blood that has been pumped from the body via the heart. It is carrying a lot of carbon dioxide. The carbon dioxide moves from the blood into the alveoli at the same time that the oxygen is moving in the other direction, in a process known as gaseous exchange.

The movement of oxygen from the alveoli to the blood can be less efficient if people are suffering from a respiratory disease and have mucus built up in their lungs.



Figure 1.35:
Conditions such as asthma may interfere with the normal function of the respiratory system.

Function of the respiratory system

The respiratory system works with the cardiovascular system to transport oxygen to every cell of the body and to remove carbon dioxide. For these functions to be performed, the body must take air in from the environment.

Air enters the respiratory system through the nose and mouth and then passes down the windpipe, or trachea, into the lungs. On the way to the lungs, the air is warmed, filtered and moistened. The trachea splits into two bronchi, which carry the air into the lungs. In the lungs, gases are exchanged, whereby oxygen can enter the bloodstream and waste products can leave the bloodstream.

Production of efficient movement

The partnership of the circulatory and respiratory systems is essential in efficiently delivering oxygen around the body. It is critical especially during physical activity to keep the body functioning and muscles working efficiently. Enduring the demands of exercise and minimising the physiological effects, including muscle fatigue and lactic acid build-up, is an essential role of the respiratory system.



Figure 1.36:
Without oxygen, the body cannot sustain effort in long-distance events like cross-country skiing.

Oxygen enables cell function that ultimately generates energy for muscles to contract. However, when energy is created in these cells, wastes such as carbon dioxide are also created. The wastes need to be expired from the body through the respiratory system.

Without oxygen, the body cannot sustain effort in long-distance events like a marathon or cross-country skiing. For endurance events, if wastes are not removed from the cells, and oxygen is not frequently delivered, cells tire and muscles fatigue and no longer produce efficient movement. Despite being able to do explosive events like shot put or long jump without initially using oxygen, it is still required for the muscles to recover to their pre-exercise state.

Efficient movement in sport performance is facilitated by the respiratory system in the way oxygen is utilised within the body during exercise demands. For endurance athletes, the more oxygen the body can consume and uptake, the greater the increase in energy production and improved performance. Endurance performance ultimately depends on the body's ability to take in oxygen, transport it to the working muscles, use it at the working muscles, and remove carbon dioxide.

The ability to use oxygen efficiently is known and measured as maximal oxygen uptake: VO_2 max. To get an accurate measurement of VO_2 max, specialised equipment is required for gas analysis. However, there are several tests that can be used to estimate VO_2 max; for example, the multistage fitness test, the '12-minute run' test, the cycle test and the step test.

Internet activity

Log on to TitanOnline and complete Activity 1.4 – follow the instructions to make a working model of the lungs.

Practical activity

The practical experiment detailed as follows is designed for investigating the changes that are observed in the cardiovascular and respiratory systems during rest and during varying intensities of exercise. Working in pairs, one person is the subject and the other person records the results.

Read through the instructions before you start the investigation. Design a table to record the results. Practise taking your partner's pulse before you start.

1. Record your partner's pulse rate over one minute when they are sitting.
2. Count the number of normal breaths your partner takes per minute.
3. Time your partner while he or she is briskly walking for five minutes.
4. Record your partner's pulse rate for the first 15 seconds after the activity ceases. Multiply the figure by four to work out the number of beats per minute.
5. Ask your partner to count his or her breaths for the minute immediately following the activity.
6. Repeat steps 4 and 5 after two minutes.
7. Supervise your partner jogging for five minutes.
8. Record your partner's pulse rate for the first 15 seconds after the activity ceases. Multiply the figure by four to work out the number of beats per minute.
9. Ask your partner to count his or her breaths for the minute immediately following the activity.
10. Repeat steps 8 and 9 after two minutes.
11. Swap roles, and repeat steps 1 to 10.

Learning activity

1. Describe how the circulatory and respiratory systems contribute to efficient movement.
2. Identify the structures that oxygen passes on its route from the atmosphere to the alveoli. Present your answer as a flow diagram.
3. Describe what VO_2 max is and why it is a good indicator of aerobic fitness.
4. Explain the respiratory system's response to exercise.
5. Explain the respiratory system's adaptation to exercise.
6. Explain the function of the:
   a. pharynx
   b. larynx
   c. trachea
   d. alveoli
   e. bronchi
   f. bronchioles
   g. nose.



Figure 1.37:
Road cyclists have high levels of aerobic fitness.

Interrelationships between the body systems

The skeletal, muscular, nervous, respiratory and cardiovascular systems are the main body systems that work together to enable efficient movement. During physical activity, these body systems support each other in the demands of exercise to create efficient energy production and effective movement.

It is the individual structure and function of each body system, and each system's interaction with other body systems, that effectively produces movement. For instance, energy needed for muscle contraction and movement cannot be generated without the delivery of oxygen to cells through the bloodstream.

Each body system significantly contributes to movement, including consumption and transportation of oxygen, muscle contraction, and providing a structure to support muscles. During physical activity, for example when running, the body's increased heart rate and ventilation rate is a sign of muscles being under stress. They need an increasing amount of oxygen to continue working efficiently.

Energy production and hydration during physical activity

Various forms of energy exist in the environment. Energy cannot be created or destroyed but it can change from one form to another.

When exercising, the body is constantly working to supply muscles with enough energy to keep contracting, but the way energy is made available to the muscles changes depending on the specific intensity and duration of the exercise.

There are three energy systems the body can utilise and each requires an energy source for muscle contraction to occur. The energy produced in the body is provided by the food an individual eats.

Water is necessary for all cell functions, temperature regulation, and transportation of nutrients and waste. Water is lost as sweat, during its evaporation from the lungs and by way of excretion. In the body, a lack of water is known as dehydration, and can be life threatening because so many of the body's vital processes need water. The recommended daily fluid intake varies depending on age, the temperature and levels of exercise, but two litres of fluid, preferably water, is suggested for adults.



Figure 1.38:
Lack of fluid intake can lead to dehydration and poor performance.

Energy production

Role of food as a fuel

Chemical energy is taken into the body in three forms of food: carbohydrate, fat and protein.

Carbohydrate

All carbohydrates are broken down into glucose, which is the body's primary energy source. This includes starch, dietary fibre and sugar.

Simple carbohydrates

Simple carbohydrates have a quick digestion time, providing a quick source of energy. They are refined sugars and are the source of extra nutrients such as fibre and vitamins.

Complex carbohydrates

Complex carbohydrates take longer to break down so provide a more sustained source of energy. They are found in bread, grain, cereal and vegetables, and include starch and fibre – more filling sources of food. Food is still broken down into glucose molecules during digestion.



Figure 1.39:
Energy is provided by the food we eat.

Fat

Fats and oils belong to the chemical family known as lipids and are an important source of energy. Despite only needing a small amount of fat in the diet, all types of fats are a source of essential fatty acids, protect vital organs, and insulate the body against extreme temperatures.

Saturated fats

Saturated fats are in animal products such as cheese. They are linked to an increase in cholesterol and a higher risk of heart disease so it is important to eat these sparingly.

Monounsaturated fats

Monounsaturated fats are in avocado, nuts, olives, oils (canola and olive oils) and chicken.

Polyunsaturated fats

Polyunsaturated fats are in fish, nuts, soybeans and polyunsaturated margarine.

According to scientific evidence, monounsaturated and polyunsaturated fats are an aid to lowering the body's level of cholesterol.



Figure 1.40:
Monounsaturated and polyunsaturated fats are an important source of energy.

Protein

Protein is necessary for growth, healing, and fighting disease and infection. It is an aid to development of antibodies and provision of energy. Examples of animal-derived sources of protein are meat, fish, chicken and eggs, and examples of plant-derived sources are nuts, kidney beans, lentils and textured vegetable protein.

Each form of energy comes from different foods, has different uses in the body, and fuels different types of activity, as outlined in Table 1.2.

Table 1.2: Food as an energy source.

Food type	Example	Use in the body	Type of activity
Carbohydrate	Bread, pasta, potato, banana	Primary energy source	Simple – short and high-intensity activities. Complex – long and low-intensity activities
Fat	Cheese, nuts, oils	Energy source used after carbohydrate sources are exhausted	Low-intensity aerobic activities like jogging
Protein	Meat, eggs and nuts	Final source of energy (rarely used)	Low-intensity activities of very long duration

Energy that is taken into the body in the form of food is measured in kilojoules. The amount of energy that is required, or the number of kilojoules that are required, depends on the person's size, body composition, metabolic rate and exercise level.

Energy input versus energy output

Food, or chemical energy, is taken into the body and is transformed into mechanical and heat energy.

- If the amount of energy entering the body equals the amount being converted to movement and heat, the individual's weight will remain stable.
- If the amount of energy entering the body exceeds the amount being used, the excess will be stored as fat and the individual will gain weight.
- If the amount of energy entering the body is less than the amount being used, the individual will lose weight.



Figure 1.41: If the amount of energy entering the body equals the amount being used, a person's weight will remain stable.

Aerobic and anaerobic energy production

The aerobic and anaerobic energy systems are pathways for energy production for efficient movement. This energy production is enabled through the molecule ATP, which utilises foods to create chemical energy. This molecule converts carbohydrates, fats and proteins into energy to generate movement.

ATP stands for 'adenosine tri-phosphate', and consists of one molecule of adenosine and three phosphate molecules. The body's muscles have limited ATP stores. When energy is needed to cause muscle contraction, ATP breaks down into ADP, which stands for 'adenosine di-phosphate' and consists of one molecule of adenosine and two molecules of phosphate. In this way, energy is produced for muscular contraction, and the body continues this process to keep moving.



Figure 1.42:
Complex carbohydrates help you feel fuller for longer.

The aerobic energy system

The slow production of energy is provided by way of the aerobic energy system, in which oxygen, along with stored carbohydrates and fats, is used to resynthesise ATP. The oxygen in the cell breaks down carbohydrates and fats to form a source of fuel: ATP. This system of energy production can go on for an extended period of time, for example a 10-kilometre run, as long as the activity level is low.

Internet activity

Log on to TitanOnline and complete Activity 1.5 by investigating the energy systems that are mainly used in a range of sports.

The two anaerobic energy systems

Energy is also provided by way of the following two anaerobic energy systems.

ATP–PC system

In the ATP–PC system, another chemical that is stored in the muscles, phosphocreatine, or PC, is used to resynthesise ATP. Because phosphocreatine exists in the muscle, it is immediately available to rebuild ATP, and can do so very rapidly. This system can therefore be a source of maximum energy, but for only about 10 seconds, because the limited phosphocreatine stores are rapidly depleted. For example, the ATP–PC energy system can adequately fuel activities like throwing a javelin and 50-metre sprint.

Lactic acid system

In the lactic acid system, carbohydrate is broken down into glucose to provide the energy for resynthesising ATP. The breakdown of glucose to form ATP leads to the formation of lactic acid, a waste product produced in the working muscles. The build-up of lactic acid leads to muscle fatigue and exhaustion, therefore limiting the energy system's effectiveness to medium-high intensity activities with a duration of about two to three minutes.

The following is a summary of the energy systems.

Fuel

- **ATP–PC system:** phosphocreatine is used.
- **Lactic acid system:** carbohydrate is broken down into muscle glycogen and is the only fuel source.
- **Aerobic system:** carbohydrates are the main fuel source. Fats and, to a limited extent, protein can also be used.

The amount of energy supplied

- **ATP–PC system:** a very limited amount of energy is supplied.
- **Lactic acid system:** a limited amount of energy is supplied.
- **Aerobic system:** an unlimited amount of energy is supplied at low intensity.

Duration

- **ATP–PC system:** at between 95 per cent and 100 per cent of maximum effort, the system will last for between only 10 and 12 seconds.
- **Lactic acid system:** depending on the level of intensity, the system will last for between 30 seconds and two to three minutes. At between 90 per cent and 95 per cent of maximum effort, the system will last for about 30 seconds.
- **Aerobic system:** at low intensity, the system will last for a virtually unlimited length of time.

Causes of fatigue

- **ATP–PC system:** phosphocreatine is exhausted after about 10 to 12 seconds.
- **Lactic acid system:** lactic acid, which is a waste product, builds up in the muscles, leading to fatigue and exhaustion.
- **Aerobic system:** this system will continue until the body has used muscle glycogen or stored energy in the form of carbohydrate, fats and protein.



Figure 1.43:
A build-up of lactic acid may cause muscle cramps.

Waste products

- **ATP–PC system:** no waste products are produced.
- **Lactic acid system:** lactic acid is produced.
- **Aerobic system:** carbon dioxide and water are produced.

Recovery time

- **ATP–PC system:** recovery time is between 30 seconds and two minutes.
- **Lactic acid system:** recovery time is between 20 minutes and two hours, depending on the exercise's intensity and duration.
- **Aerobic system:** sufficient time – up to 24 hours – is required so that diminished fuel supplies can be replaced.

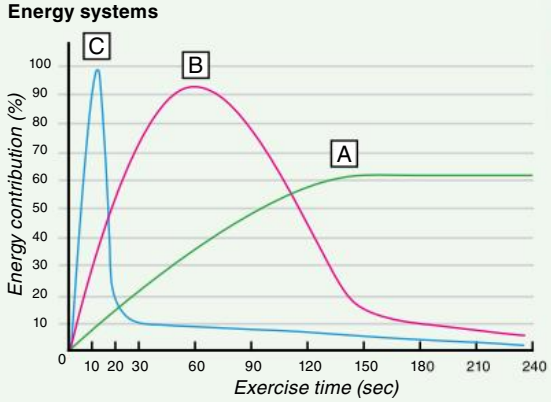
Sports in which each energy system is mainly used

- **ATP–PC system:** 100-metre sprint, javelin, long jump and weightlifting.
- **Lactic acid system:** 100-metre swimming, 400-metre running and the 'cycling 1 kilometre' time trial.
- **Aerobic system:** triathlon, marathon running, 1500-metre swimming and the cycling road race.

The three energy systems rarely work alone; and considerable overlap occurs between them. Generally, all three systems are contributory factors in production of energy in all activities, to varying extents.

Learning activity

1. Analyse how the interrelationship between the body systems is important during physical activity.
2. Outline the role of food as a fuel source for a range of physical activities.
3. Explain how ATP is re-synthesised.
4. Outline the influence of energy production on performance.
5. Explain how lactic acid is removed from the body.
6. Identify how quickly lactic acid is removed from the body.
7. Describe the types of activity in which the aerobic system is mainly used.
8. Identify three sporting performances in which the ATP–PC system is mainly used.
9. Identify two track events in which the lactic acid system is mainly used.
10. For each of the following activities, determine which energy system would mainly be used:
    a. A 100-metre sprint.
    b. A 5000-metre running race.
    c. A hockey game.
    d. Batting during a cricket game.
    e. A marathon.
    f. An 800-metre running race.
    g. Javelin.
    h. A dance routine.
    i. Lifting weights.
    j. A 1000-metre cycling time trial.
11. Label the three energy systems on the following graph.



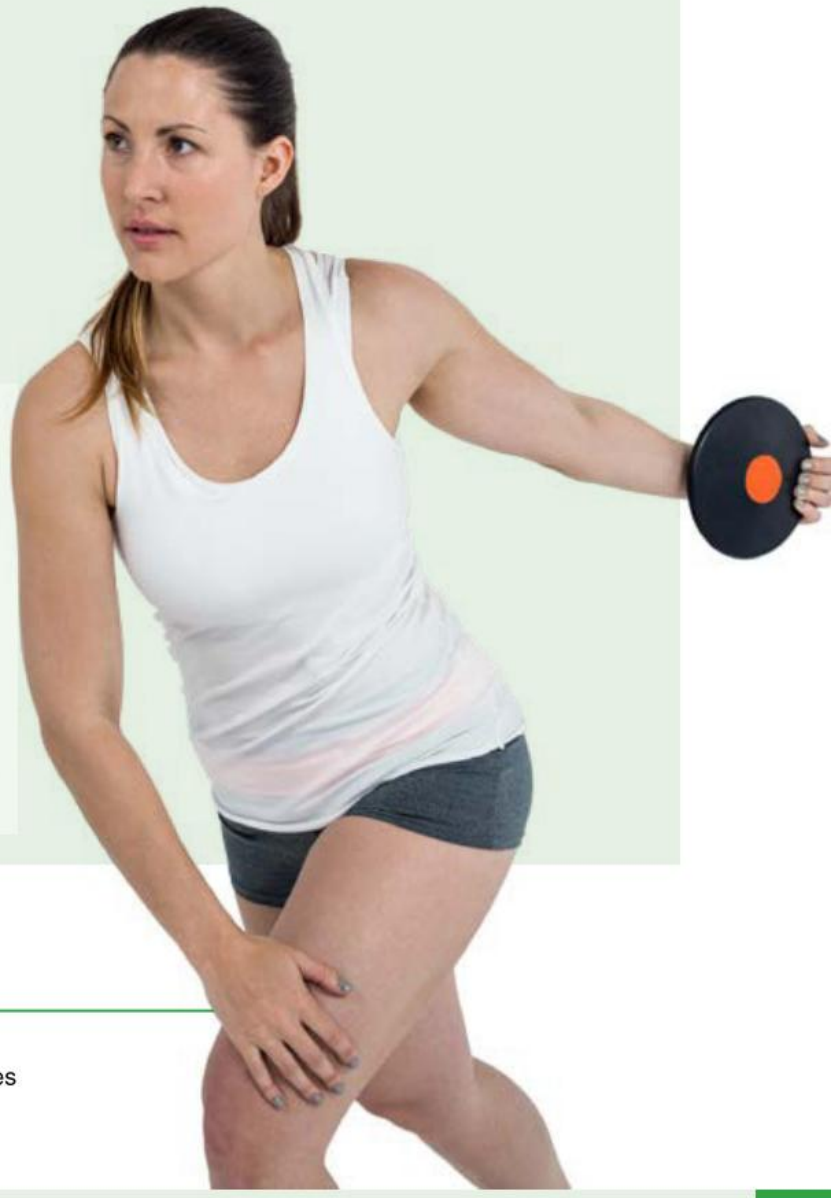


Figure 1.44:
The ATP–PC energy system can adequately fuel activities like throwing a discus.



Figure 1.45:
During physical activity, due to an increased body temperature and a higher heart rate, more fluid is lost as sweat.

Hydration

Fluid loss during physical activity

Water is necessary for all cell functions, temperature regulation, and transportation of nutrients and waste. In the body, the lack of water is known as dehydration and can be life threatening because so many of the body's vital processes occur in water.

Water is lost as sweat, during its evaporation from the lungs, and by way of excretion. When water is lost, it is important to replenish water levels by drinking plenty of water throughout the day as part of hydration maintenance. Lack of fluid intake can lead to dehydration, which in turn can lead to poor performance, and sometimes health problems associated with heat exhaustion and heat stroke.

During physical activity, due to an increased body temperature and a higher heart rate, more fluid is lost as sweat and through respiration. It is vital that this extra fluid loss is replaced. The amount of fluid lost, and therefore the amount to be replaced, will depend on the following factors.

Length of activity

The longer the activity, the greater time the body has a higher respiration rate and body temperature, therefore a greater time for fluid loss.

Intensity of activity

Activities that are more intense result in a greater rise in body temperature, which causes more sweating, so the athlete has to replace more fluid.

Temperature
When the ambient temperature is high, the athlete will sweat more because the sweat does not cool the skin as quickly, so they will have to consume more water.

Conversely, the ventilation rate increases in low ambient temperatures, therefore more fluid is lost through evaporation from the lungs. Think of the mist-like water vapour that is visible when you are breathing out on a cold morning.

Humidity level
When the level of humidity is high, sweat does not evaporate from the skin as quickly, so again, the athlete will have to replace more fluid.

Body size
A larger body has a greater surface area for fluid loss, so a large athlete will need more fluid than a small athlete. People who have more body fat might lose more fluid through sweating, because fat acts as an insulator and keeps the body temperature raised, even on a warm day.

Sources of hydration
The body needs to be continually hydrated, and this can be achieved through drinking water, which is the best source of hydration. However, many people only drink water when they are thirsty, which is an initial sign of dehydration. It is important to consume fluids regularly, including drinking water before exercising, drinking small amounts during exercise, and continuing to drink post-exercise to aid recovery.

Rather than hydrate the body, alcoholic drinks work as diuretics, which means they promote fluid loss. Increased unnecessary fluid loss can quickly lead to dehydration. It is important for people who are drinking alcohol to drink a glass of water for every unit of alcohol they consume. Athletes should not drink alcohol for at least 24 hours before training or competition.

Sports drinks are also a good source of hydration, because they contain glucose, which quickly fuels exercise, and sodium, which aids fluid retention. Sports drinks are purposeful and have their greatest effect for endurance events.

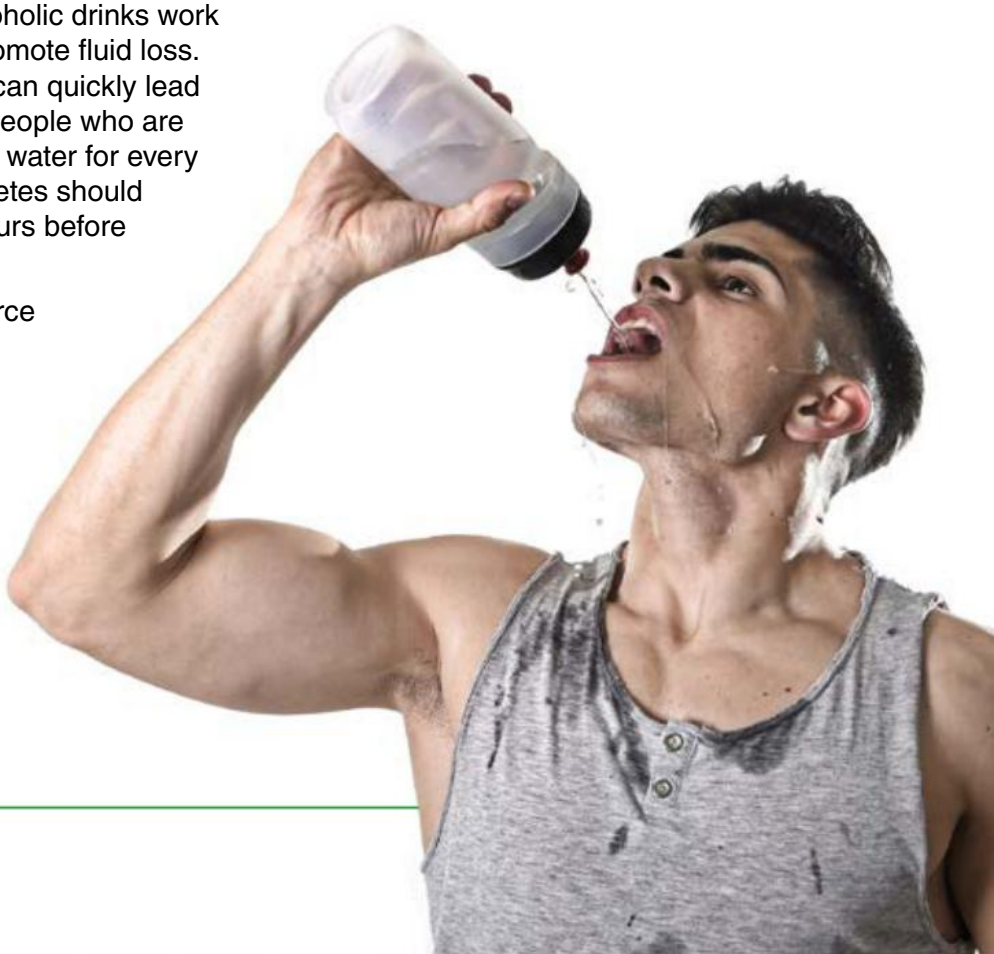


Figure 1.46:
Water is the best source of hydration.

Each of the three main types of sports drink on the market has a specific purpose, as outlined in the following text.

Isotonic drinks

Isotonic drinks are the most common sports drinks. These types of drink are designed to quickly replace fluids lost during exercise but with an increase of carbohydrate. They can be helpful for athletes who are exercising at a high intensity for 60 minutes or longer. It is not necessary to replace losses of sodium, potassium and other electrolytes during exercise, as it is unlikely that the body's stores of those minerals would be depleted during normal training. If, however, an athlete is exercising in extreme conditions over three or five hours, for example in a marathon, an Ironman event or an ultra-marathon, choosing to add a sports drink that contains electrolytes can be beneficial.

Hypertonic drinks

Hypertonic drinks generally contain carbohydrates and are mainly intended to supply maximum energy; the thirst-quenching effect is secondary. Compared with water, hypertonic sports drinks are taken up by the body more slowly, and they are suited to endurance athletes.



Figure 1.47:
Sports drinks are a common source of hydration for athletes.

Hypotonic drinks

Hypotonic types of drink generally contain fewer than four grams of sugar (carbohydrates) per 100 millilitres and are intended to quench thirst. Compared with hypertonic drinks, they have a very low carbohydrate content. For the athlete, hypotonic drinks are the source of little energy, in the form of sugars, to quickly replace fluids lost during exercise. Compared with water, hypotonic sports drinks are taken up by the body more quickly, and they are suitable for recreational sports and for exertion that is shorter or less strenuous.

Learning activity

1. Describe the factors that contribute to rapid fluid loss during physical activity and examine the consequences of dehydration.
2. Describe the hydration considerations for an endurance athlete pre-event, during the event and post-event.
3. Explain why two athletes might need different amounts of fluid replacement, despite the fact that they are participating in the same activity.
4. Suggest times during training sessions, games and competitions when athletes should be encouraged to take fluids.
5. Explain the consequences of drinking too much water, or over-hydration.
6. Investigate one sports drink that is currently being promoted.
7. Identify various sources of hydration and evaluate the claims made by beverage companies who market products as effective for hydration.

Case studies

Murray is a 25-year-old recreational runner preparing to compete in his second marathon. He has had a lot of conflicting advice from other runners in his club and information he has read online about preparing for such an endurance event. During his last marathon run, Murray failed to reach the finish line, fainting from heat stroke at the 30-kilometre mark. He is now looking for reliable advice that will help him remain properly hydrated throughout the race to maximise his performance.



Lucy is 14 years old and often gets an intense headache after playing her Saturday game of netball. She plays at 12.30 pm each week on an outdoor, unshaded court. She often forgets to drink water during the game's breaks because she is always keen to talk to her friends about the game. When she gets home, she usually goes straight to bed to try and sleep the headache off.



1. Outline a nutritional / hydration plan that would inform Murray of:
   a. What to eat before, during and after the event, including advice about the timing of food intake.
   b. What to drink before, during and after the event, including advice about the timing of fluid intake.
2. What factors are likely to be causing Lucy's headaches and what advice would you give her to address the issue?

Revision questions

1. Outline the structure and function of the following body systems:
   a. Skeletal system.
   b. Muscular system.
   c. Respiratory system.
   d. Cardiovascular system.
2. Compare and contrast the structure and function of the appendicular skeleton and the axial skeleton.
3. Describe and provide an example for each of the following bone types:
   a. Long bones.
   b. Short bones.
   c. Flat bones.
   d. Irregular bones.
4. Identify the body's three types of joint, and explain the function of each.
5. Describe how the body produces heat.
6. Describe the different roles of agonist and antagonist muscles, using a specific movement to illustrate their actions.
7. Distinguish between isometric, isotonic and isokinetic muscular contractions.
8. Explain the following terms:
   a. Concentric contraction.
   b. Eccentric contraction.
9. Compare and contrast smooth muscle, skeletal muscle and cardiac muscle.
10. Identify the three forms of chemical energy that the body uses to create movement.
11. Outline the role, fuel and duration of the three energy systems.
12. Outline three strategies to maintain appropriate hydration during an endurance event.
13. Explain the process that can lead to an accumulation of lactic acid and how this impacts the performance of an athlete.
14. Which of the following are components of the circulatory system?
    a. Heart and kidney.
    b. Arteries and lungs.
    c. Brain and hormones.
    d. Veins and arteries.

CHAPTER 2

Physical activity for health

Historically, emphasis was placed on having people regularly participate in structured exercise and fitness activities to bring about health improvements. It is now recognised that regular physical activity, involving movement of any kind, is just as important for the maintenance of good health.

According to the current guidelines, children and adolescents should participate in moderate- or high-intensity physical activity for at least one hour every day. They should incorporate a variety of activities and find something they enjoy doing. They can do more activity than recommended and, if they choose to, they can make up the hour by doing several shorter sessions. It is recommended that adults aim to be active for at least 30 minutes a day, five days a week. By incorporating physical activity in their daily routine, adults are more likely to start and then regularly participate in a physical-activity program.

A number of factors influence the amount or choice of physical activity a person does, including family, peers, cultural groups, work, school and place of residence. Gender issues are closely linked to cultural influences, especially in relation to men's and women's varying perceptions of their engagement in physical activity. Genetic make-up, body weight, existing activity level and physical fitness also influence the types of physical activity that people choose to participate in.



Figure 2.1:
Men's and women's perceptions of their engagement in physical activity vary.

Outcomes

A student:

- discusses factors that limit and enhance the capacity to move and perform (PASS5-1)
- analyses the benefits of participation and performance in physical activity and sport (PASS5-2)
- demonstrates actions and strategies that contribute to active participation and skilful performance (PASS5-5)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Models of physical activity and fitness
- Influences of physical activity choices
- Physical activity and improved quality of life

Models of physical activity and fitness

Individuals move for a variety of different reasons depending on their own perspectives of health and physical activity. Individual abilities, views of physical activity and fitness will vary, and continue to change throughout the lifespan.

In previous centuries, employment typically consisted of laborious tasks that required significant physical involvement, such as carpentry and construction. In today's society, employment opportunities largely comprise jobs using computers which require little movement.

Today, it is recommended that individuals incorporate physical activity into their lifestyle, rather than segmenting specific time throughout their week to formally participate in an activity. The significant shift towards the importance of living active lifestyles has arisen from research closely aligning physical inactivity with disease such as cancer and heart disease.

Ideas about physical activity, fitness and exercise

Physical activity

The term 'physical activity' means any movement in which energy is expended. The movement does not have to be in the form of exercises such as sit-ups or push-ups, although those two forms are considered to be examples of physical activity. For many of us, physical activity is simply the activities that happen as we go about our everyday lives, such as walking to the bus stop or mowing the lawns.

The way in which people think about physical activity and how they engage in it has changed considerably over time. Much of the physical activity that was done in the past as part of everyday living is now done by machinery. For young people, smartphone technology has surpassed all other timesaving inventions, facilitating 24/7 communication, engagement with friends by way of social media, entertainment and online access – all without the need for physical activity.

Physical fitness

The term 'fitness' means the body's ability to perform physical activity for work and leisure. Physical fitness is planned, structured, repetitive and purposeful, in the sense that the objective of it is improvement or maintenance of one or more fitness components.



Figure 2.2:
Jobs in construction require significant physical involvement.

Did you know?
You use over 200 muscles each step you take and the average person takes 7500 steps a day!

Exercise

'Exercise' is defined as being a type of physical activity that is planned and structured and that includes repetitive body movement.

In the past, for promotion of good health, the focus was on the need for regular, formal exercise to bring about health improvements, whereas today, the emphasis has been shifted in recognition of the fact that all types of physical activity, not just formal exercise, can be a contributing factor to good health.

Internet activity

Log on to TitanOnline and complete Activity 2.1 by investigating the most popular organised sports for young people in Australia and the impact technology has had on physical activity levels.

Learning activity

1. Distinguish between physical activity and physical fitness.
2. Explain why the model for physical activity has changed.
3. Analyse the benefits of regular physical activity for health and wellbeing.

Changing knowledge and attitudes about physical activity and fitness

An individual's beliefs about physical activity and fitness are challenged by the ever-changing world surrounding them. Technology has a significant impact on the way individuals perceive their physical activity and fitness in positive and negative ways. The media has enabled information to be extensively shared on a global scale and to fuel short-term growth of trends. Despite the younger population being involved in an extensive variety of activities which includes physical education lessons at school, children and adolescents are also spending significant amounts of time every day in sedentary behaviours such as playing computer games and using social media. The decrease in physical activity and fitness participation continues to decline into adulthood, as external commitments such as providing for families and work begin to take priority.

In Australia, just under three-quarters of individuals aged 15–17 participate in some type of physical activity, which is the highest percentage recorded among all age groups. This rate steadily declines as age increases, with less than half the over 65 year age group participating in regular physical activity and fitness. The most favoured activity by young people is walking. Other popular forms of physical activity and fitness include gymnasium-style activities, such as fitness classes, golf and cycling.



Figure 2.3:
Children are spending significant amounts of time every day playing computer games.

About one-quarter of people aged 15 or older participate in organised sports. These have the potential for greater individual involvement as they offer a variety of options to members of the community. For example, many community sports not only require players but coaches, umpires, administration personnel and instructors, which all encourage individuals to participate in physical activity to varying degrees.

Learning activity

1. From the following results, give reasons for the trend that is evident in the relationship between age and participation rate in physical activity:
   - 15–24 years: 86.9 per cent
   - 25–34 years: 84.2 per cent
   - 35–44 years: 83.4 per cent
   - 45–54 years: 81.2 per cent
   - 55–64 years: 77.3 per cent
   - 65 and older: 72.9 per cent.

   Source: NSW Office of Sport
2. Suggest ways in which activity choices can be influenced by injury, lifestyle changes or age.
3. Propose strategies for increasing the number of young people participating in organised sport and physical activity.
4. Suggest why more boys than girls participate in organised sport and physical activity.
5. Predict how the types of activity that people participate in change as people get older. Justify your response.

Recommended guidelines for physical activity

Research highlights the benefits of participating in regular physical activity. Physical activity not only improves physical fitness, it also has many benefits for health and wellbeing. However, meeting the recommended guidelines by participating in vigorous exercise at least three times a week will ensure that improvements occur in the health indicators such as an individual's blood pressure, cholesterol and body weight. Participation in lower intensity exercise will also assist improvements in the health indicators but they will be less noticeable. Exercises such as gardening, mowing the lawn and leisurely paced swimming or brisk walking are classified as moderate physical activities and should be done for a least 10 minutes at a time. Therefore, to achieve the total amount of physical activity in the recommended guidelines, individuals need to participate in a combination of activities each day to accumulate the sufficient total number of minutes.



Figure 2.4:
Mowing the lawn is a moderate-intensity activity.

Children and adolescents

Sixty minutes of high-intensity physical activity is the recommended minimum level of physical activity that children and adolescents aged between five and 17 should be participating in daily. In addition to this recommended minimum amount, children and adolescents will continue to receive health benefits if they participate in more than 60 minutes of activity per day. It is also encouraged that three days a week, the 60 minutes of activity involves strengthening exercises or activities to encourage muscle and bone development. Strength activities are best recommended to be only body weight focused, such as push-ups, star jumps, lunges and leg lifts. As children and adolescents within this age range are still developing, the activities they do should vary, as focusing on one specific sport can be detrimental and cause muscular imbalances.

In addition to formally organised sporting activities such as basketball training or a netball game after school, walking the family dog or swimming at the beach with friends are types of physical activity that will still contribute positively to the health and wellbeing of the individual. A combination of activities within a week could include one yoga session, swimming at the beach, two sessions of soccer training plus a weekend game, three lessons of physical education lessons at school, cycling to and from school three times and walking the dog twice.



Figure 2.5:
Walking the family dog can contribute positively to the health and wellbeing of adolescents.

Adults

The minimum recommended level of physical activity for adults aged between 18 and 65 is at least 150 minutes of moderate-intensity exercise per week, preferably around 30 minutes per day. Depending on the activity, the recommended amount can vary. For example, if an individual accumulates 75 minutes of vigorous running throughout a week, they will adequately reach the minimum recommended amount of physical activity. However, if only light activities and exercises are completed throughout the week such as hanging out washing or gardening, then adults should be trying to engage in at least five hours of these tasks as they only require minimal to low energy expenditure. To maintain the muscular and bone development that occurs throughout childhood and adolescence, strength activities should still be included at least two times a week as part of an individual's weekly physical activity.

As well as playing in organised team competitions or participating in training sessions, extra forms of physical activity that adults can include among their daily life commitments include carrying groceries instead of pushing them in a trolley, washing the car, cycling to work and taking the stairs instead of a lift.

Older Australians

Older Australians are classified as those who are older than 65. Like younger adults, they too should be aiming to participate in at least 150 minutes of moderate-intensity physical activity a week. The same variation in the recommended time needed, depending on the intensity of activity (as outlined in the previous section), applies to older adults as well.

Individuals who are unable to engage in vigorous activities but can complete moderate-intensity exercises should aim to continue to spend around five hours a week doing them. Older Australians will start to need more specialised and focused exercise plans tailored to their individual needs. Their participation should be reflective of any professionally diagnosed requirements. For example, instead of ensuring an older person participates in strengthening exercises such as walking or aqua aerobics, the individual may require more improvement in their leg stability and therefore should engage in balance-enhancing exercises such as yoga classes or tai chi. It is extremely important that older Australians start their involvement in exercise and physical activity very slowly and consult a healthcare professional such as a physiotherapist or occupational therapist before starting any new exercise programs. Like children and adolescents, older Australians should aim to engage in a wide variety of activities rather than specialising in one specific sport or activity.



Figure 2.6:
Tai chi can help older Australians to improve their core stability.

Benefits of regular physical activity for health and wellbeing

Participation in physical activity is beneficial to all individuals regardless of their age or ability. Regular involvement is best, irrespective of the type of activity. By progressively engaging in a range of planned and unplanned exercise activities it is possible to consistently achieve and exceed the recommended physical-activity participation guidelines. This leads to improvements in the physical, social, emotional, cognitive and spiritual components of health.

A primary benefit of participating in regular physical activity is the improvement of the physical functions of the body. After participating in exercise for a substantial period of time, starting around six weeks, the individual will see improvements in their muscular strength and endurance; for example, they will be able to lift heavier weights and complete more repetitions. Improvements are relatively specific to the type of exercise completed; for example, regular interval training is likely to promote increases in cardiorespiratory fitness and aerobic capacity.

Furthermore, exercise promotes improvements in a variety of elements that assist effective functioning within everyday life such as coordination, balance and flexibility. Exercise similarly is a contributing factor to decreasing the prevalence of diseases such as coronary heart disease, stroke, diabetes and some cancers. Developing bone and muscular strength with exercise can also reduce the risk of significant damage to the body when individuals experience accidents or falls. Finally, exercise assists the body to maintain an appropriate body weight and blood pressure.

Participating in grouped activities or planned team sporting events such as being involved with a tennis club or swimming team promotes the development of interpersonal social skills. When doing activities with others, external support and motivation can help to increase self-confidence, self-esteem and willingness to try different forms of physical activity. Also, it is fun to do team activities and train weekly with people of similar interests. Therefore, physical activity can help to reduce feelings of stress and anguish. This can be due to physical activity facilitating enhanced sleep patterns, which potentially increase the energy individuals have to expend on physical activity. Increased sleep also promotes better concentration and relaxation. For the older population, increased movement encourages greater blood flow around the body, enabling it to supply oxygen-rich blood to bones and muscles to decrease the pain experienced with some joint movements. Individuals of all ages meeting the recommended guidelines are less likely to need to have regular visits to healthcare professionals and take expensive medications.



Figure 2.7:
Participating in grouped activities promotes the development of interpersonal social skills.

Learning activity

1. Analyse and describe the benefits of regular physical activity for health and wellbeing.
2. Outline why it is necessary to have a set of physical-activity guidelines.
3. Explain why there is a decline in activity rates throughout adolescence.
4. Account for the difference in the recommended amounts of physical activity for children and adults.
5. Outline your physical-activity recommendations for a 40-year-old female who has the following profile: smoker; works in a desk job for up to 60 hours a week; married with two children; sedentary lifestyle; slightly overweight.

Low, moderate and vigorous levels of physical activity

Determining the intensity of the physical activities individuals participate in is just as important as participating in the activities. Physical activities can be grouped into three categories: low, moderate or vigorous intensity. Categorising physical activities enables individuals to determine energy expended during participation.

Physical activities that can be considered as low in intensity include walking at a slow pace, cycling slowly on a flat surface, playing darts, fishing and vacuuming. These activities can be categorised as low-intensity physical activities as no recovery period is required after completing the activity and the individual could do it comfortably for a long period of time before noticing signs of fatigue.

When individuals can talk but often need periods of rest, the physical activity can be classified as moderate intensity. Examples include social dancing, recreational swimming and weight training.

High-intensity vigorous physical activities include playing tennis, running and doing circuit training. Physical activities are vigorous when individuals cannot have a comfortable conversation while doing the activity and need significant recovery sessions or rest afterwards to regain energy.

Although these categories provide general classifications of different physical activities, intensity depends on the individual. Children and young adults should aim to regularly participate in moderate to vigorous physical activities. Sedentary and older individuals should start participating in lower intensity physical activities and gradually progress to comfortably do more intense physical activities. All involvement in physical activities promotes short- and long-term health benefits and helps to decrease the prevalence of diseases and illnesses such as type 2 diabetes, high blood pressure and stroke.



Figure 2.8:
Vacuuming is a low-intensity activity.



Figure 2.9:
Tennis is a high-intensity vigorous activity.

Practical activity

1. Design a 30-minute physical-activity session in which you incorporate a progression of exercise intensities (low, moderate and vigorous). Teach or present the activity to your class.
2. Apply your knowledge of the physical activity guidelines to design a five-week program involving participation in a range of group physical activities.
3. Use current recommended guidelines for physical activity to set a personal goal for yourself.

Physical activity for health and physical activity for fitness

People participate in physical activity for a variety of reasons. Some to improve their health, others to improve their fitness.

Common reasons that individuals participate in physical activity, for both health and fitness, include the potential for them to be involved in exercise that is formally structured; for example, team activities such as Oztag; or individual activities such as yoga. However, there are also differences between physical activity for health and physical activity for fitness. Bodily movement can differ in intensity and regularity.

Physical activity to improve or maintain health may involve doing simple household tasks such as vacuuming or walking up stairs instead of using a lift. These particular activities may not significantly improve the muscular strength or agility of an individual; however, they contribute towards an individual completing the recommended amount of daily physical activity.

Individuals who participate in physical activity for fitness reasons aim to improve physiological functions of the body such as muscular strength or aerobic endurance. There is a direct purpose behind the individual's participation and the activity is unlikely to be incidental. For example, an individual working towards improving their cardiorespiratory endurance may regularly run and cycle for extended periods of time. Both physical activities involve participating for fitness reasons.



Figure 2.10:
Yoga promotes relaxation as well as physical-health benefits.

Factors influencing the intensity of physical activity for health

There are a range of factors that influence the intensity of physical activity. These factors are outlined as follows.

Age

Throughout the lifespan, different activities with varying intensities become appropriate and inappropriate for different individuals to participate in. As young children and adolescents are still developing, the length of time recommended for participating in physical activity is less than for adults. For example, weekend sporting tournaments usually consist of 10- to 20-minute quarters, which ensures young children have adequate breaks to rehydrate, interchange team members and change player positions if required. As individuals progress to adulthood, their physiologically matured bodies allow involvement in prolonged physical activities with reduced need for rest breaks. In contrast, older Australians will often decide to participate in lower intensity physical activities that have limited impact on the body; for example, aqua aerobics is done in an aquatic environment, which increases the body's buoyancy and reduces impact on joints.

Previous history and experience

An individual's previous experience in physical activity will impact how they begin their participation. Sedentary individuals, especially those who are overweight, with limited to no previous experience, should start participating in low-intensity activities. Any increase in intensity should occur at a slow rate, as sudden increases may cause injury or worsen predisposing medical conditions. Individuals already participating in vigorous levels of physical activity should aim to make continual improvements so fitness levels do not plateau.

Illness or injury

Individuals who have medical conditions such as arthritis, diabetes and heart disease must consider the intensity of exercise that they will do. Before participating in any physical activity they should consult a medical professional. Professional healthcare personnel will help to assess individual circumstances and give specialist guidance to help the individual to safely begin participating in physical activity. Individuals returning to physical activity from an injury, for example an ankle break or sprain, should reduce their intensity so that further damage is not caused to predisposing injuries.

Disability

The physical environment can directly influence the accessibility of sport and physical activities for individuals with physical disability. Individuals who need wheelchair access might be excluded from participating in various types of exercise in some environments. For example, pools without ramps or beaches without specialised transportation may limit access to an activity such as swimming. Involvement in activities is possible; however, it involves less spontaneity of the participant as significant planning and extra equipment are often needed. Also, for people with sensory disability such as autism, the variety and intensity of sports they are able to be involved in is reduced. For example, due to decreased reaction time and coordination, individuals with autism may not be able to participate in contact sports such as Australian football or soccer without significant moderations to the rules, equipment used, time in game play and number of players on the field at one time.

Did you know?

Research shows that more than two hours of screen time a day affects a person's health status.

Internet activity

Log on to TitanOnline and complete Activity 2.2 by investigating the range of methods for determining exercise intensity.

Learning activity

1. Outline the similarities and differences between physical activity for health and physical activity for fitness.
2. Explain the exercise intensity that would be most appropriate for a person who wanted to lose weight. Justify your response.
3. Describe the relationship between age, fitness and exercise intensity.
4. Investigate how older people benefit from regularly engaging in physical activity.
5. If someone is 'unfit', is he or she 'unhealthy'? Justify your response.



Figure 2.11:
Physically active parents are role models and encourage their children to participate in healthy levels of physical activity.

Influences on physical activity choices

The average health of the Australian population is continuing to improve; however, there are still factors that continue to impact on participation rates and the type of physical activities engaged in. Such factors include social, financial, cultural, age, gender and ability determinants.

Factors that impact participation rates

Social determinants

External factors that are out of the control of an individual are social determinants. These impact on the physical activities individuals choose to do.

Parents can have a significant influence, negatively or positively, on their children's involvement in and perceptions of physical activity. The physical activities that children participate in and the time they spend is often decided by their parents. Children are likely to continue in a lifetime of physical activity when they are introduced to it by their parents at a young age. Physically active parents are role models and encourage their children to participate in healthy levels of physical activity. In contrast, sedentary parents (or those who have limited money to spend on physical activities for their children) are likely to influence their children in a negative way, causing their children to be inactive individuals.

Peers who have similar interests also have an influence on the physical activities group members may choose to participate in, although this influence is relatively small in younger children. Individuals are likely to continue participating in activities such as team sports when they develop positive connections to others who enjoy the same activity. Childhood friendship groups increase in influence as individuals age, especially for adolescents.

Financial determinants

The amount of money an individual has or is able to access is called their socioeconomic status. Socioeconomic status is classified into three groups: high, medium and low. It is an indication of the money that individuals or families have to spend after essentials such as tax, rent, food and education have been paid. Low socioeconomic status restricts the range of physical activity that individuals may be able to participate in because they have limited or no disposable income. Having a high socioeconomic status enables individuals to participate in a greater amount or range of physical activities.

Organised group physical-activity expenses vary, ranging from requirements such as uniforms and registration fees to the purchase of appropriate footwear. Further costs that can influence sports or activities chosen include the cost of tickets for family members to watch the game or performances. Unorganised physical-activity expenses can also significantly vary; for example, playing at the local park is much cheaper than a family holidaying at the snowfields. There are also hidden costs associated with involvement in physical activity; for example, the cost of transportation to various venues as well as time spent off work to attend tournaments.

Socioeconomic status changes according to a variety of factors and can fluctuate depending on the employment status of the individual or family members as well as the economy of the area they live in.

Cultural determinants

Physical activity can also be influenced by a person's culture. Culture refers to the various values and beliefs and practices that are upheld by an individual and which usually form a community of people. Religions are examples of cultures. Individuals who follow a specific religion share the same set of values, rules and beliefs as each other. Sometimes, culture can be passed down through generations of families.

Australian prides itself as having a sport-loving culture, matched by a love of the outdoor lifestyle and all the great opportunities for physical activity that the Australian environment offers. Australia's society is very culturally diverse however, and different cultures have different perceptions of and views on physical activity. In some cultures, physical activity is viewed as an extremely important part of lifestyle. Other cultural groups place less importance on physical activity and some actively restrict who is able to participate in organised and unorganised activities or competitions.



Figure 2.12:
Australia's society is culturally diverse.

Age determinants

There are a range of physical activities that individuals can choose to participate in throughout the lifespan. However, at different ages, individuals become inclined to either increase or decrease their involvement. Muscle mass and energy levels can decrease as age increases, which can prohibit involvement in physical activity. Reduced muscle mass can negatively influence strength and balance and therefore as older individuals experience difficulties participating in some activities, their involvement decreases.

In contrast, some older Australians increase their participation in activities as health professionals encourage them to be physically active to maintain bone density and reduce the possibility of osteoporosis. Also, frequent aerobic activity can help to reduce the risk of older Australians developing high blood pressure or cardiovascular disease. Older Australians are encouraged to maintain involvement in physical activity because it has a significant positive influence on multiple aspects of an individual's health and wellbeing including emotional and physical health.

Gender determinants

Males and females have physiological differences such as varied muscle mass, which is determined by their genetic make-up. These differences can influence factors such as strength and power, which can influence the types of physical activities undertaken by the individual. Research suggests that females are more likely to participate in low-intensity physical activities more regularly than their male counterparts. Males reportedly participate in more vigorous physical activity than females, but less often.

Pregnancy also influences the type and intensity of physical activity that women will choose to participate in. Due to significant bodily changes occurring, such as hormonal changes and an increase in body weight, pregnant women should consult healthcare professionals to recommend the best activities to continue to participate in. Pregnant women will likely be advised to reduce their involvement in contact sports to limit the chances of complications occurring during pregnancy and childbirth.

Did you know?

Women were not allowed to participate in the first modern Olympic Games in 1896.

Ability determinants

An individual's current skill level influences the types of physical activities they will do. When trialling a range of new physical activities, individuals usually continue those they find most enjoyable, easy to complete and feel most comfortable doing. Individuals participate more frequently in physical activities that they enjoy.

Sporting ability allows individuals to further improve other aspects of physical activity. These include teamwork and tactical positioning.



Figure 2.13:
Pregnancy influences the type and intensity of physical activity that women will choose to participate in.

Learning activity

1. Define the following terms:
   a. Culture.
   b. Cultural diversity.
   c. Influence.
   d. Values.
   e. Gender.
2. Explain why gender is an important cultural issue in relation to participation in physical activity.
3. Propose reasons why more men than women participate in organised sport.
4. Identify an activity or sport that people participate in equally, regardless of gender, and an activity or sport that they do not participate in equally. Account for the differences.
5. Participate in a range of activities that people engage in in Australia that originated in another country. After you have participated in each activity, record a journal entry for the activity's advantages and disadvantages.
6. In pairs, investigate a sport, an activity or a dance that is popular among the members of another culture (ancient or modern). State:
   a. how it is played or performed
   b. the rules
   c. any equipment used
   d. who participates or participated
   e. why it is/was played.

   Teach the sport, activity or dance to the rest of the class.

Aboriginal and Torres Strait Islander physical activity and school sports programs

Aboriginal and Torres Strait Islander people's participation levels in physical activity are in general lower than for other Australians. Physical inactivity is often associated with potentially preventable diseases and illnesses that are experienced by Aboriginal and Torres Strait Islander people, and there has been an increase in the number of Indigenous people with chronic disease in recent decades.

Due to the significant correlation between physical activity and improved health, improving the health of young Aboriginal and Torres Strait Islander people is a priority focus area for communities and schools. School programs encourage multiple engagements over sustained periods of time in different physical activities, and enable participation by students who are restricted outside of school to participate in physical activities. Some programs have also focused on addressing low school attendance rates by Aboriginal and Torres Strait Islander students, especially those living in rural and remote locations. The majority of the programs foster positive relationships, with many different community stakeholders being involved in a collaborative process. For example, police, media, charities and local workplaces may help program facilitation.

Internet activity

Log on to TitanOnline and complete Activity 2.3 by researching three traditional Indigenous games. Introduce one game to a practical lesson.

- The **John Moriarty Football** program has provided students with football training and development opportunities with further aims to promote a more positive image of sport and athletes to the community.
- The **National Aboriginal Sporting Chance Academy** not only provides additional sporting and cultural programs for Aboriginal and Torres Strait Islander students but also motivates students to enhance their school attendance.
- Similarly, **Red Dust Role Models Healthy Living Program** provides schools with positive role models and workshops for students to become involved in learning about substance abuse, physical activity and nutrition.
- The **Cathy Freeman Foundation** activities program aims to increase academic engagement and sport participation for Aboriginal and Torres Strait Islander students while fostering social behaviour and healthy lifestyles.
- **Move It Mob Style** television program was established to promote cultural dance and music as fundamental ways Aboriginal and Torres Strait Islander students could participate in culturally significant physical activity.

Did you know?

Indigenous Australians make up less than 3% of the population but make up more than 10% of contracted players in NRL and AFL competitions.

Barriers to physical activity

A range of barriers exist that limit people in their participation in physical activity. These include:

- lack of time as a result of work, study and family commitments
- lack of interest
- lack of motivation
- low or poor physical ability or skills
- limited access to resources
- climatic conditions
- access to facilities for people with disability.

People are more likely to be active if they enjoy what they are doing. Everyone has a range of options to consider. By planning carefully, including incorporating activity into the daily routine whenever possible, people have an increased chance of maintaining their physical-activity levels and subsequently enjoying the associated health benefits.



Figure 2.14:
Climatic conditions such as storms can create barriers to physical activity.

Learning activity

1. Explain why members of some groups are more likely to engage in regular physical activity than others, despite the benefits being widely known.
2. Outline the sports and physical activity you participate in with your family. Compare them with a partner's, noting the similarities and differences.
3. Identify a range of barriers to families' participation in physical activity. Suggest strategies for overcoming each barrier.
4. Identify the barriers that adolescents encounter in relation to increased amounts of physical activity.
5. Propose ways of overcoming the barriers so that physical activity and leisure time can be accommodated.
6. Identify physical-activity options in your local area. Identify the options that are available for a family whose disposable income is limited.
7. Explain how the following factors can influence physical-activity choices:
   a. Peers.
   b. Age.
   c. Gender.
   d. Family.
   e. Geographical location.
8. Propose ways to incorporate physical activity in a typical day for the following people:
   a. Jessica is 52 and a full-time teacher. She works five days a week, from 8 am to 4 pm. She is of average weight, drinks alcohol and does not smoke. She spends her week managing her household, caring for her two young children, preparing lessons and marking assignments. She sleeps five hours a night, and often complains that she is tired. On the weekend, she watches her children play sport.
   b. Robert is 49 and a full-time computer programmer with a major software company. He is married, and the couple have three teenage children. He leaves for work at 7 am and does not get home until after dark. He often works during his lunch hour. He is overweight, drinks alcohol but does not smoke. On the weekend, he spends a lot of time transporting his children to sporting and social events.
   c. Blake is a 15-year-old student who lives with his mother on the fifth floor of a block of units. He does not participate in organised sport, and does not like PE lessons at school because he is teased about his lack of coordination.
9. In pairs, construct a questionnaire to determine young people's leisure patterns that occur between 3.30 pm and 6 pm. In your questionnaire, aim to:
   a. identify the physical-activity levels
   b. analyse influences on participation and choice of leisure activities
   c. formulate strategies for increasing participation in active leisure pursuits.



Figure 2.15:
Dancing is not only fun, but great for physical and mental health.

Case study – physical activity for people with disability

Madison de Rozario is an Australian Paralympic athlete who has won numerous international medals from competing in Disability Class T53 distance racing events. She was born in Perth in 1993. Madison's journey to competing on the world stage involved numerous challenges and setbacks.



Figure 2.16:
Madison de Rozario.

Madison was an avid dancer who at age four fell ill during rehearsals for a dance concert. During her recovery, Madison's body started to respond negatively towards itself and she was diagnosed with a rare autoimmune disease. The disease primarily affected her lower body and spinal cord, which resulted in her becoming paraplegic and returning home from hospital in a wheelchair. After returning home, her very sport-orientated family tried to continue to include her in all activities and sports that her family and sisters continued to play. For example, she would remain the goalkeeper in family soccer games.

Madison's disability began to significantly challenge her throughout her teenage years as she started to discover significant physical differences between herself and her peers. As these arose, she started to grapple with her body image. Along with her paraplegia, Madison also had scoliosis of her spine and would wear extremely large clothing to help hide her spinal curvature. She also struggled to find suitable clothes to fit her small frame.

Initially, she was unenthusiastic about becoming involved in wheelchair sports. Madison trialled numerous sports but at first found it difficult to adapt to the different requirements of sports in her wheelchair. However, after trialling athletics, Madison became extremely committed to her newfound sport. After two years of hard work and guidance from Frank Ponta, she found herself at the 2008 Beijing Paralympics.

Since the 2008 Paralympics, Madison has attended three Paralympic Games, won medals in the 4 x 100-metre relay, 800 metres, 5000 metres and 4 x 400-metre relay at different international competitions and won the London Marathon.

After many years of hardship, Madison has overcome multiple challenges to achieve her current successes. It has taken time but now she is comfortable embracing her body's physically different capabilities.

Image source: Australian Paralympic Committee (www.paralympic.org.au)

1. Outline some of the barriers you expect Madison de Rozario and other athletes with disability would have to overcome to participate in their sports.
2. Investigate strategies that have the potential to overcome the barriers to participation.

Physical activity and improved quality of life

If you are regularly physically active, you tend to:

- feel better due to the release of endorphins during exercise
- have more energy to do everyday tasks with ease
- feel more relaxed
- have increased levels of happiness
- sleep better
- have a lower risk of heart attack
- manage your weight better
- have a lower blood-cholesterol level
- lower your risk of developing type 2 diabetes and some cancers
- have lower blood pressure
- have stronger bones, muscles and joints and a lower the risk of developing osteoporosis
- recover better from illness.

Health benefits related to health priority areas

Health priority areas include a range of diseases or conditions that have a considerable social and financial impact on Australians' lives. By engaging in physical activity, people can improve their quality of life in relation to many of the areas, such as cardiovascular disease, type 2 diabetes, cancer, asthma and mental health. By targeting these areas, health authorities hope to improve Australians' overall health.

Table 2.1 gives an outline of the risk factors associated with some of the health priority areas. Clearly, physical inactivity is a risk factor for type 2 diabetes as well as for coronary heart disease and stroke, both of which are cardiovascular diseases, and colorectal cancer. It is also associated with development of breast cancer in women. By regularly engaging in physical activity, people improve their health and reduce their chance of contracting these diseases. They can also help themselves treat their depression and asthma and maintain a healthy body weight.



Figure 2.17:
Regular physical activity can increase your level of happiness.

Internet activity

Log on to TitanOnline and complete Activity 2.4 – reporting on levels of physical activity in Australia and the impact it has on health status.

Table 2.1: Risk factors associated with a range of health priority areas.

Priority areas	Risk factor					
	Tobacco smoking	Physical inactivity	Poor diet / nutrition	Excess weight	High blood pressure	High blood cholesterol
Type 2 diabetes		+	+	+		
Asthma	+					
Coronary heart disease	+	+	+	+	+	+
Stroke	+	+	+	+	+	+
Lung cancer	+					
Colorectal cancer		+	+	+		
Osteoarthritis		+		+		
Osteoporosis	+	+				

Priority areas

Type 2 diabetes

Being overweight or obese is a significant risk factor for type 2 diabetes, so regularly engaging in physical activity is important for the prevention of the disease. When we regularly participate in physical activities, our body uses a high level of glucose, which builds up in the blood, and helps maintain a healthy body weight.

Asthma

Asthma is associated with many triggers or risk factors, including exercise. However, being active has health benefits that are linked to a decrease in the impact of asthma symptoms. For people who find that exercise is the trigger for their asthma, the important issue is to make sure they manage the asthma properly while being active.



Figure 2.18:
30 minutes of moderate or vigorous activity each day improves heart health.

Cardiovascular disease

The term 'cardiovascular health' means the health of the heart and blood vessels. People who are physically inactive have a significantly higher risk of suffering from cardiovascular disease. When we engage in 30 minutes of moderate or vigorous activity each day, we improve our heart's health and fitness by strengthening the heart muscle and improving blood flow. A low-level activity can also lead to heart-health benefits.

Cancer

The cause of most colorectal cancers remains unknown but several risk factors, including physical inactivity, are associated with them. People who engage in physical activity reduce their chance of developing cancer because they are helping their bowel function regularly. Similarly, it is thought that physical activity aids prevention of breast cancer by causing biological changes in the body.

Arthritis and musculoskeletal conditions

Three musculoskeletal conditions that are prominent in Australia are osteoarthritis, rheumatoid arthritis and osteoporosis, and physical inactivity is a risk factor for osteoarthritis and osteoporosis.

- **Osteoarthritis** affects the joints in the hands, spine, hips, knees and ankles, and is characterised by wearing down of cartilage that acts as a cushion on the ends of bones. It causes severe pain, and mainly affects people who are older than 45.
- **Rheumatoid arthritis** is inflammation of joints, mainly in the hands. It causes pain and swelling, and can start in people who are as young as 25.
- **Osteoporosis** is characterised by loss of bone density whereby the bones become weaker and are consequently more likely to fracture. It is common in women after menopause and in women who are older than 65.

All three musculoskeletal conditions are more common in females than males.

People who regularly engage in physical activity help themselves gain relief from arthritis, by helping maintain health-related fitness components such as muscle strength and flexibility. Other benefits include reduction of joint pain, whereby the effects of fatigue are reduced and sleep is improved, and maintenance of bone strength and body weight. When people with musculoskeletal conditions are physically active, they gain emotional and social benefits because they generally feel better about themselves.

Mental health

Mental health is a significant problem in Australian society. However, it often goes undiagnosed, because of a lack of physical symptoms, a lack of understanding and the prejudice that community members often hold. Depression is a form of mental illness, and because physical activity results in benefits for self-esteem, self-image, confidence and a sense of achievement, it is increasingly being used as a form of prevention for depression. Exercise causes the body to produce endorphins, which result in a boost in mood and happiness.

Dementia

The term ‘dementia’ is associated with conditions that are characterised by impairment of a number of brain functions such as memory, language and personality. It affects one in 10 Australians who are older than 65, and more than half the residents in government-funded aged-care facilities. Physical activity has significant physical- and mental-health benefits for all people with dementia: their confidence improves, they gain a sense of achievement, the risk of a fall is reduced, their sleep is improved, their bone health is improved, their cardiovascular health is improved, and their risk of cancer is reduced.

Learning activity

1. For a selected health priority area, investigate the benefits of regularly engaging in physical activity.
2. Design a health-promotion pamphlet aimed at reducing the incidence of obesity among adolescents.
3. Explain what a lifestyle disease is and give examples.
4. Explore the relationship between physical activity and quality of life.

Other physical benefits

The immune system controls the body's healing process, and works to protect against a range of diseases such as bacterial infections, as well as against viral infections such as colds and influenza. A strong immune system is vital for overall wellbeing. When people regularly engage in physical activity, they strengthen a number of the body's systems, including the cardiovascular, muscular and skeletal systems. They also strengthen their immune system by improving their overall sense of wellbeing and health. The body's natural defences are thereby able to be more aggressive when fighting infections. Any type of regular physical activity can be of benefit to the immune system; however, yoga, Pilates and tai chi are especially beneficial because of their stress-relieving properties.



Figure 2.19:
Physical activity helps strengthen the body's immune system.

Obesity has reached epidemic proportions, especially in Western nations such as Australia, the United States and the United Kingdom, so obesity prevention is an important global issue. Health authorities are even more concerned about the increasing number of children who are now considered to be either obese or severely overweight. Although a nutritious diet is an important factor in obesity prevention, the importance of physical activity cannot be overstated. Many health authorities throughout Australia are now introducing plans for targeting the obesity problem by implementing a range of strategies throughout the country, such as:

- introducing education programs for parents, school students and staff members, and childcare workers
- implementing appropriate physical-activity programs in schools
- increasing the availability of, and access to, safe and enjoyable physical-activity opportunities
- promoting and modelling physical activity undertaken by influential people such as parents, teachers and sports stars
- having a range of health authorities, such as doctors, target people who are at risk, and supporting and monitoring physical-activity plans.

When people regularly engage in physical activity they prevent themselves from becoming obese, by expending kilojoules; maintain healthy muscles, bones and joints; and empower themselves to adopt other healthy habits such as maintaining good nutrition. They also improve their self-image and possibly prevent or reduce eating disorders associated with stress-related binge eating.

Learning activity

1. Critically evaluate the following statements:
   - **a.** An overweight, physically active person is healthier than an inactive person who has a healthy weight.
   - **b.** Compared with vigorous physical activity, moderate physical activity leads to more health benefits.
2. Investigate the relationship between physical activity and:
   - **a.** arthritis
   - **b.** obesity
   - **c.** a strong immune system.

Revision questions

1. Identify and describe the benefits of physical activity.
2. Outline the physical-activity recommendations for children and young people.
3. Describe the relationship between people's age and their participation in organised sport and physical activity.
4. Identify and describe the barriers to regularly participating in physical activity.
5. Propose strategies for overcoming each barrier.
6. Analyse the relationship between physical activity and lifestyle diseases.
7. Explain how the following factors influence participation in physical activity:
   a. Gender.
   b. Culture.
   c. Environment.
   d. Peers.
   e. Socioeconomic status.
8. Which of the following factors influences physical activity choices?
   a. Cultural.
   b. Environmental.
   c. Financial.
   d. All of the above.
9. You are part of a peer group that is involved in a wide range of physical activities. How can this positive influence on your physical activity choices be best described?
   a. Environmental influence.
   b. Physical influence.
   c. Social influence.
   d. Economic influence.
10. Which statement best describes a vigorous level of physical activity?
    a. Physical activity which makes you perspire.
    b. Physical activity that last longer than 25 minutes.
    c. Physical activity with a heart rate over 85 per cent of the maximum heart rate.
    d. Running on a treadmill.

CHAPTER 3

Physical fitness

Fitness is related to the capacity of the heart and lungs to supply oxygen-rich blood to the working muscles and the capacity of the muscles to use oxygen to produce the energy for everyday movements.

Regular engagement in exercise is a critical part of staying healthy. People that are active live longer and feel better. Regular exercise helps maintain a healthy weight and can either delay or prevent diabetes, heart disease and some cancers.

Regular participation in physical-fitness activities has a variety of health, physical, social, economic and mental-emotional benefits.

Physical fitness has 11 components, five of which are health-related: muscular strength, cardiovascular endurance, muscular endurance, flexibility and body composition. The other six components are skill-related: coordination, speed, agility, muscular power, balance and reaction time.

Outcomes

A student:

- discusses factors that limit and enhance the capacity to move and perform (PASS5-1)
- analyses the benefits of participation and performance in physical activity and sport (PASS5-2)
- evaluates the characteristics of participation and quality performance in physical activity and sport (PASS5-6)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- displays management and planning skills to achieve personal and group goals (PASS5-8)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Physical activity versus physical fitness
- Developing physical fitness
- Fitness measurement and evaluation



Figure 3.1: Badminton uses many skill-related components of fitness, particularly agility and speed.

Physical activity versus physical fitness

The daily physical activity that individuals engage in can significantly impact overall health and wellbeing. The terms 'physical activity' and 'physical fitness' are two concepts that describe the how and why people engage in activity.

Understanding the difference

Physical activity

Physical activity refers to any voluntary body movement involving action of the skeletal muscles that requires energy expenditure. Physical activity can occur in many forms, in many different contexts. For example, an individual can be physically active in everyday activities such as at home, work, walking and doing housework. They can be physically active in recreational activities that may be part of leisure, travel, active play or games. They can also be physically active by being involved in organised and non-organised sports or training at the gym.

Continual involvement in physical activity is associated with many social, emotional, intellectual and health benefits. For example, short-term and long-term health benefits such as increased cardiovascular fitness, strong muscles and bones, weight maintenance, decreased likelihood of high cholesterol and type 2 diabetes, and reduced symptoms of anxiety and depression can result from physical activity.

To achieve such health benefits, the Australian Government Department of Health has set physical activity guidelines. For young people between the ages of five and 17, irrespective of cultural background, gender or ability, it is recommended that:

- at least 60 minutes or more of moderate to vigorous activity is accumulated per day
- young people include at least three days of vigorous or muscle and bone strengthening activities per week
- sedentary time is replaced with several hours of light physical activities.



Figure 3.2:
At least 60 minutes of moderate to vigorous activity is recommended per day.

Internet activity

Log on to TitanOnline and complete Activity 3.1 by completing the online quiz to assess your sports habits.

Did you know?

According to research, more than 50% of Australian adults do not participate in enough activity to gain health benefits.

Physical fitness

Physical fitness refers to a set of attributes people have or achieve that are related to the ability to perform physical activity. Physical fitness is measurable by field-based or clinical tests such as the sit and reach or vertical jump test.

There are 11 components relating to physical fitness which will be discussed in more detail later in this chapter. Five of these are related to health: muscular strength, cardiovascular endurance, muscular endurance, body composition and flexibility. The other six components are related to skill: coordination, speed, agility, power, balance and reaction time.

Physical fitness is also associated with many social, emotional, intellectual and health benefits, as the development of physical fitness supports voluntary involvement in physical activity.

Contribution of physical fitness to participation, performance and safety

Participating and performing safely in sport and physical activities requires a combination of training, endurance, commitment and skill. Being physically fit allows confident participation in sports and increases the likelihood of engagement in a physically active lifestyle. Having a strong basis of fitness, speed, agility, endurance, coordination and skill will allow transfer of skills from one activity to another, increasing motivation, enjoyment and engagement.

Levels of individual physical fitness will affect almost all components of sports performance, from muscular strength to aerobic fitness. Being strong, fit and/or fast will allow quality and a high level of performance in a range of activities. Such components of physical fitness are likely to be practised during training sessions, leading to an increase in physical fitness and therefore performance in sporting contexts. This is due to the individual continually becoming stronger, fitter, faster, more skilled and/or coordinated, based on what is needed by the athlete in their particular sporting environment.

Physical fitness also contributes to an individual's safety. A high degree of physical fitness will allow participation, while reducing risk of a major injury. This is because the body can move efficiently and effectively, is strong and can adapt to changes in the sporting environment. Those who are physically fit are also more likely to use correct technique for exercises or skills within a game or sport, such as correct landing from a jump or correct form for a lift in the gym. Those who are physically fit are also more likely to stretch and participate in recovery from activity, further reducing the risk of overuse injury and muscle soreness and tightness. Fatigue is also a contributing factor to injuries. A fitter person will also be less fatigued when performing and reduce their chance of injury.

Learning activity

1. Analyse your own fitness levels and describe how improved fitness could impact your sporting performance.
2. Describe how physical fitness contributes to safe participation in sports and physical activity.

Benefits of vigorous physical activity on health and wellbeing

Maintaining physical fitness is a critical part of remaining healthy and can assist in living longer and feeling better. Involvement in regular vigorous physical activity has many associated benefits for health and wellbeing. Regular exercise can support maintaining a healthy weight range and prevent negative health risks such as diabetes, heart disease and several cancers. Overall, regular participation in physical-fitness activities can reduce negative health consequences, while simultaneously improving physical, social, emotional, mental and economic health, while also contributing to a higher quality of life.

Table 3.1 and Table 3.2 outline of the range of benefits associated with regular participation in vigorous physical activity.

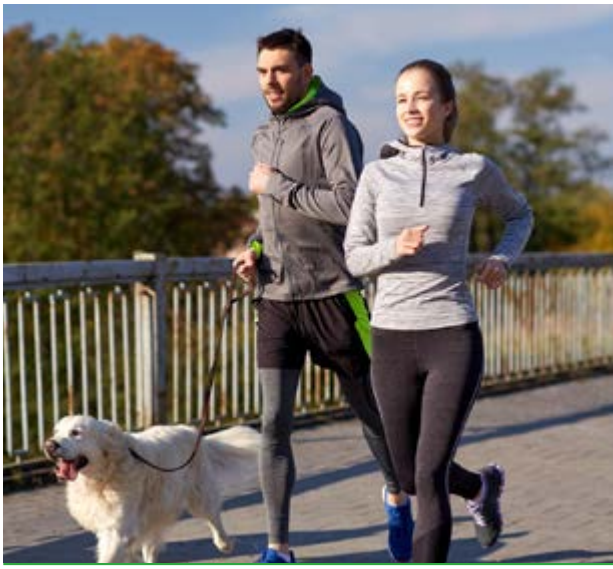


Figure 3.3:
Regular exercise can support maintaining a healthy weight range.

Table 3.1: The physical and health benefits of vigorous physical activity.

Physical benefits	General health benefits	Specific health benefits
Improved fitness	Better health	Decreased obesity
Improved endurance	More energy	Decreased risk of diabetes
Improved strength	Enhanced sleep	Decreased cancer rate
Improved flexibility	Greater life satisfaction	Improved blood pressure
Increased lean body weight	A greater sense of wellbeing	Lowered cholesterol level
Decreased percentage of body fat	Longer lifespan	Decreased risk of coronary vascular disease
Improved posture	Improved stress management	Arthritis management

Table 3.2: The economic, social and emotional benefits of vigorous physical activity.

Economic benefits	Social benefits	Mental-emotional benefits
Increased employment	Improved family relations	More confidence
Tourism	An increased number of friends	Improved self-esteem
Activity as transport	A better social life	Less anxiety
Less absenteeism	Improved mood	Less depression
Healthcare savings	Positive sporting behaviour	Less stress

Components of physical fitness

Physical fitness has 11 components, five of which are health-related: cardiovascular endurance, flexibility, muscular strength, muscular endurance and body composition. The other six components are skill-related: coordination, speed, agility, muscular power, balance and reaction time.

Health-related components of physical fitness

- **Cardiovascular endurance:** the ability of the heart and blood vessels to supply working muscles with oxygen for extended periods, and the ability of the heart and lungs to work effectively during extended periods of exercise.
- **Flexibility:** the range of motion of the body's joints, and the ability to move a joint through its full range of movement.
- **Muscular strength:** the body's ability to exert force against a resistance in one maximal effort.
- **Muscular endurance:** the muscles' ability to repeatedly contract for extended periods without fatiguing.
- **Body composition:** the relative percentage of the body's tissues, especially the amount of body fat in relation to lean body tissue.

Skill-related components of physical fitness

- **Coordination:** the ability to integrate and process messages from the senses to stimulate body movements.
- **Speed:** quickness of movement, and the ability to perform movements at speed.
- **Agility:** the skill of changing direction speedily.
- **Muscular power:** the combination of strength and speed used to create explosive movements.
- **Balance:** keeping control of the body's equilibrium while performing skills: 'static balance' means maintenance of equilibrium while stationary, and 'dynamic balance' means maintenance of equilibrium while moving.
- **Reaction time:** the time taken to acknowledge stimuli and respond appropriately to them.



Figure 3.4:
Swimming is an activity that improves all health-related components of physical fitness.

Learning activity

1. Explain the difference between the health- and skill-related components of fitness.
2. Describe how the status of a person's health-related components of fitness affect sport performance, using a sport of your choice as an example.
3. Describe how the status of a person's skill-related components of fitness affect sport performance, using a sport of your choice as an example.
4. Outline the importance of flexibility in training programs.
5. Design a pamphlet for promoting the benefits of regular participation in physical-fitness activities.
6. Consider a range of sports or physical activities you regularly engage in. Create a table in your notebook, similar to Table 3.3. For each sport or physical activity, indicate the health- and skill-related fitness components you need if you are to be successful.

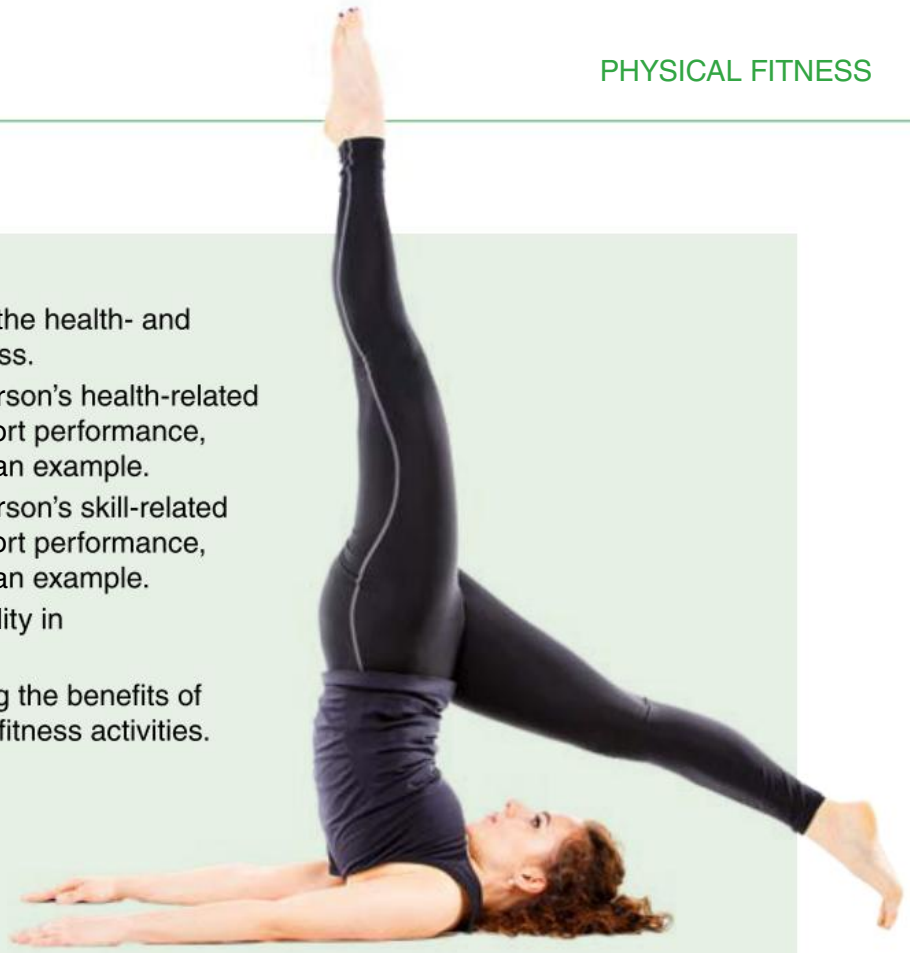


Figure 3.5:
Pilates can be used to improve muscular strength.

Table 3.3: The health- and skill-related fitness components you need if you are to be successful at your sports or physical activities.

Fitness component	e.g. Pilates	Sport/activity	Sport/activity	Sport/activity
Cardiovascular endurance				
Flexibility	✖			
Muscular strength	✖			
Muscular endurance	✖			
Body composition	✖			
Coordination	✖			
Speed				
Agility				
Muscular power				
Balance	✖			
Reaction time				

Developing physical fitness

Physical fitness has many components that together define how well the body performs. For general fitness and weight management, the most important components relate to cardiovascular endurance, muscular strength, muscular endurance and flexibility. The types of activities to develop these include aerobic training, strength training – also called resistance training – and flexibility exercises. Developing these components of fitness will positively impact fitness levels and improve a range of health benefits associated with regular participation in vigorous physical activity, as mentioned previously.

A good exercise program for the non-specialist sportsperson will include all these aspects of training. These training programs should be flexible, and aim to improve or maintain fitness levels. Ideally, a physical-fitness training program should involve moderate physical activity most days of the week. At least three days should involve 20 to 30 minutes of vigorous activity or strength training, and one or two rest days for recovery. Before people start any fitness program, they should consult a health professional.

As many people live a busy lifestyle, it is often difficult to find the time to train. Many find it easier to maintain a fitness program if it is included in daily routines and performed at similar times each day. Training can also be more enjoyable when training with a partner, or a variety of training and personal interests are considered and included.



Figure 3.6:
Skipping at home can be accessible for many people as it requires minimal equipment.

Ways to be active in the home

Many people often find themselves too busy to participate in physical activity every day. However, there are many ways to be physically active within and around the home, where household objects can be used as equipment to exercise. Simple activities such as cleaning, gardening and walking the dog are great ways to increase daily activity levels. Using the stairs, skipping, dancing or playing outside also require an increase in activity levels, and can provide health benefits. These activities are often free, need minimal equipment, and can be accessible for many people.

Another way to be active in the home is using online fitness videos that can be played on laptops or televisions. These allow workouts to be done using various objects such as tinned beans or milk cartons as weights if they are needed and strength training equipment is not available.



Figure 3.7:
Cycling helps a person to develop aerobic fitness by elevating the heart rate.

The FITT principle

The FITT principle outlines a set of guidelines that can be used to formulate an exercise program to gain a 'training effect'. The fitness programs can be for elite athletes or people who simply want to improve their fitness level. Although the principle is mainly aimed at development of aerobic fitness, it can also be used in strength, flexibility and anaerobic training.

The acronym 'FITT' stands for the following four things:

- **Frequency:** the number of times a person exercises each week. The recommendation is a minimum of three times a week for beginners through to six times a week for more advanced exercisers such as athletes. In determining the frequency of an exercise program, a balance has to be struck between providing just enough stress for the body to adapt and giving the body enough time to rest and heal.
- **Intensity:** the level of effort a person uses while exercising; defined as being the amount of effort a person should invest in during a training program or any one session. If the aim is to develop aerobic fitness, the person's heart rate is used to measure intensity. The recommended level is for people to work at between 65 and 80 per cent of their maximum heart rate (MHR). Variations of that percentage include beginners, who should work at about 60 per cent of MHR, and advanced athletes, who can work at a level of up to 85 per cent of MHR.
- **Time:** the length of time a person exercises for. If the aim is to develop aerobic fitness, the recommended minimum time for the heart rate to be elevated is 20 minutes. Athletes and fitter people would train for between 30 and 60 minutes, often at a higher intensity.
- **Type:** the type of activity a person does. If the aim is to develop aerobic fitness, the person engages in activities in which he or she uses large-muscle groups, whereby the heart rate is elevated; three examples are running, cycling and swimming. If the aim is to develop strength, flexibility or anaerobic fitness, the type of activity would be changed. For example, a person who was aiming to develop strength would engage in resistance training, for example by lifting weights.

Table 3.4 is an outline of the FITT principle for a person who wants to improve their cardiovascular endurance and strength.

Table 3.4: The FITT principle.

Principle	Cardiovascular endurance	Strength
Frequency	Three to six times a week	Three to six times a week
Intensity	Moderate to vigorous intensity at 65 per cent to 80 per cent of MHR	Three sets of between 10 and 15 reps per muscle group
Time	20 to 60 minutes	30 to 60 minutes
Type	Cardiovascular-endurance activities such as running, cycling and swimming	Resistance training such as free weights

Learning activity

1. Examine ways to be active in the home setting using available equipment such as stairs, skipping ropes and online videos. Participate in these activities and evaluate their effectiveness.
2. Explain how the FITT principle could be used to overload the body during training. Use a specific example to support your answer.
3. Apply the FITT principle to a flexibility program.
4. Two swimmers, a 15-year-old male and an 18-year-old female, both start a weight-training program. Explain their programs' similarities and differences.

Designing training programs

Before program designers can design a training program for someone, they have to consider the following factors:

- analysis of the person who will be following the program
- the general training principles that are applicable to all fitness programs
- the types of training that can be used in the program.

When planning an individual program, the program designer and the person should investigate and take into account the following factors, because each can affect the type of program to be designed, the amount of time to be spent doing it and the level of difficulty involved.



Figure 3.8:
Previous exercise experience should be considered when planning a training program.

- **Preference:** For an individual program, the person's likes and dislikes should be taken into account. People are much more likely to continue exercising and achieve fitness improvements if they enjoy the activities they are participating in.
- **Goals:** A person's program should be tailored to his or her specific short- and long-term goals. For example, if a female wants to increase her strength, her program would be different from the one she would follow if she wanted to lose weight and increase her lean body mass.
- **Ability:** Undergoing a preliminary fitness test is a good way to determine a person's fitness level and be the basis for the programming. People who are new to physical activity should start at a low level of intensity.
- **Exercise history:** The person's previous exercise experience or training background should be considered when their program is being planned. Each person has a different training background, and new participants will notice significant changes in their body in six to eight weeks' time whereas people who exercise regularly might see little improvement during that period.
- **Age:** In general, children and adolescents – people younger than 16 – should not embark on a high-stress or repetitive exercise program such as ultra-marathon running or a high-load, low-repetition weight-training program. The reason is that they need to prevent themselves from damaging the growth plates in their bones. The body is at its physical peak between the ages of 20 and 30, after which a decline in performance is evident, so anyone's program should be tailored accordingly.
- **Gender:** Males and females demonstrate variances in physical ability as a result of differences in body composition and hormones. Males exhibit greater cardiovascular endurance and more strength whereas females are more flexible and are likely to carry a higher percentage of body fat. These differences should be reflected in the person's individual program.



Figure 3.9:
A person's program should be tailored to specific short- and long-term goals.



Figure 3.10:
Many people prefer training activities that are fun, challenging and include elements of teamwork.

Training principles

A range of training principles underpin all effective training programs, including the principles of warm-up, cool-down, progressive overload, reversibility, specificity, variety and training thresholds.

- A **warm-up** should be done at the beginning of each training session. It should involve whole-body movement and stretching exercises so the athlete is mentally prepared, an increase in core body temperature, an increase in blood supply to the muscles, promotion of flexibility and reduction of the chance of injury.
- The purposes of the **cool-down** at the end of the session are to remove lactic acid, to enable the heart rate to gradually return to normal and to stretch the muscles.
- The principle of **overload** exists in recognition of the fact that the body changes and adapts to cope with exercise that is more intense or difficult than the body is used to. By overloading their body, people increase their level of fitness. Once the body has adapted to the new, increased workload, the workload should be increased again so the person gains more improvements. Knowing when to make the adjustment to the workload is crucial to the exercise program's success. If there is too little overload, the person will not fulfil their potential whereas if there is too much overload, they will suffer fatigue or injury or have reduced motivation.
- The principle of **reversibility** exists in recognition of the fact that a decrease in training will result in a decrease in the training effect.
- The principle of **specificity** exists in recognition of the fact that the body adapts to training in specific ways and that the greatest gains in sporting performance occur when the movements that are involved in the training are similar to the movements involved in the person's chosen sport or activity. Training is planned around the body's systems and structures that the person wants to improve. For example, jogging will not result in improvement in strength, and resistance training will not result in improvement of flexibility. Similarly, in applying the principle of specificity, an elite swimmer should engage in swimming and technique training rather than go for a run.
- The person should use a **variety** of training types, activities and organisation to maintain motivation and alleviate boredom.
- The term **training threshold** means the training intensity that is relevant to the chosen sport. For example, if a person is training for an aerobic event, the training program should include exercises for maintaining aerobic fitness.

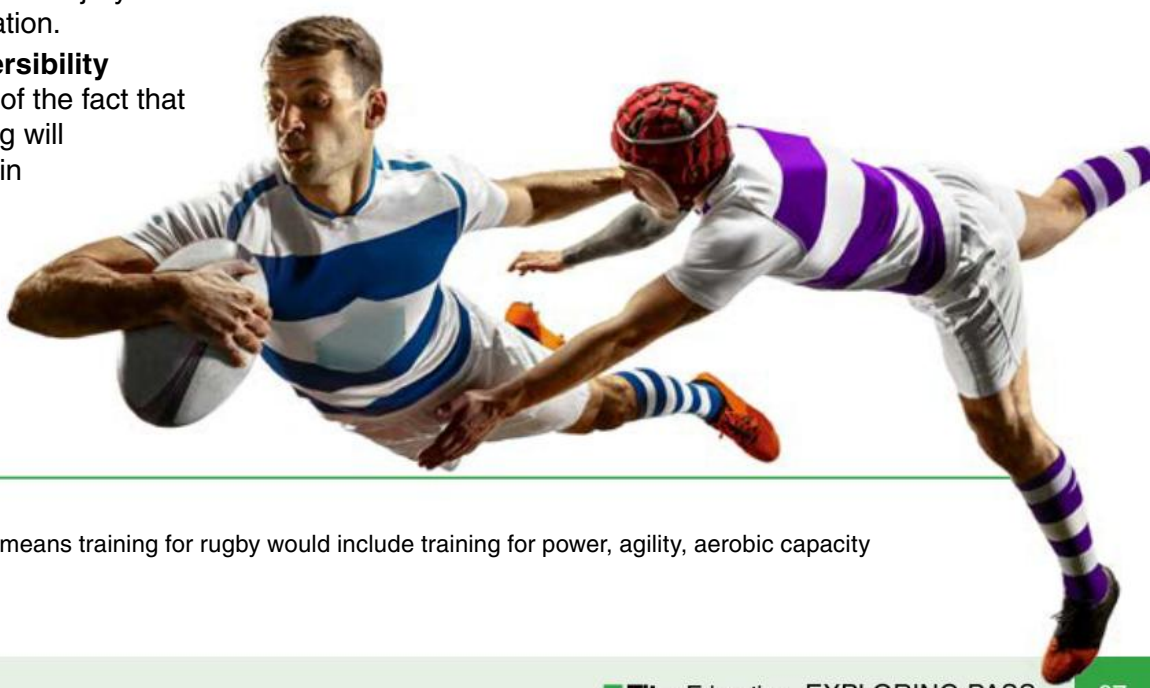


Figure 3.11:
The principle of specificity means training for rugby would include training for power, agility, aerobic capacity and dynamic flexibility.

Types of training

The four main types of training are aerobic training, anaerobic training, strength training and flexibility training.

Aerobic training

Aerobic training has the following four functions:

- To increase the efficiency of your aerobic energy system.
- To increase your body's ability to deliver and use oxygen.
- To reduce the chance you will develop heart disease.
- To aid maintenance of your ideal body weight.

Types of aerobic training include continuous, interval, circuit and fartlek.



Figure 3.12:
Aerobic training increase the body's ability to deliver and use oxygen.

Anaerobic training

Anaerobic training occurs when your body is exercising at a rate such that your blood cannot supply oxygen to your muscles fast enough. Anaerobic training is essentially exercise without oxygen.

Anaerobic training occurs during high-intensity exercises and cannot be done for long periods.

A product that is generated when a muscle is exercised in an oxygen-deprived environment is large amounts of lactic acid. Lactic acid begins building up inside the muscle at a rate that is faster than the rate at which it can be cleared, whereby muscle failure is caused.

With anaerobic training, the muscle still receives oxygen, but the supply of it is insufficient for meeting the demands of the activity.

One of the best ways to improve anaerobic fitness is to do interval training. Interval training is built on alternating short, high-intensity bursts of speed with slower, recovery phases throughout a single workout.



Figure 3.13:
One of the best ways to improve anaerobic fitness is to do interval training.

Strength training

Strength training is an integral part of most effective training programs designed for improved performance. The goals of a well-developed program should be to:

- develop correct exercise technique to avoid injury and maximise the training effect
- improve the athlete's strength base
- individualise programs to identify specific strengths and address specific weaknesses
- individualise programs to meet sport-specific strength needs.

In strength programs, a range of equipment can be used, including free weights, fixed weight machines, hydraulic machines and elastic bands, as well as the athlete's own body weight. The choice of equipment might be based on availability, cost, the athlete's training abilities and/or the athlete's sport-specific strength needs.

Flexibility training

The aim of flexibility training is to improve flexibility, which is the range of movement or motion about a joint. An athlete's level of flexibility can be affected by a range of factors, including the following:

- **Age:** as a person gets older, their flexibility naturally decreases.
- **Gender:** females tend to be more flexible than males.
- **Temperature:** air temperature and body temperature affect flexibility.
- **Exercise history**: people who have previously engaged in flexibility training will have greater flexibility.

Types of flexibility training include static stretching, ballistic stretching and 'proprioceptive neuromuscular facilitation' (PNF) stretching.



Figure 3.14:
Females tend to be more flexible than males.

Practical activity

Working in pairs, follow these instructions to demonstrate one activity that could be used in a PNF stretching program:

1. Do a warm-up to increase your heart rate, and follow it with gentle leg stretches.
2. Sit on the floor, your legs straight, and reach forward as far as possible.
3. Have your partner gently push on your back to increase the stretch. Hold the position for seven seconds.
4. Push back against your partner for seven seconds, and have your partner resist any movement.
5. Relax, take the stretch a bit further and hold it for another seven seconds.
6. Repeat steps 1 to 5 three times, and swap with your partner.
7. The only time that flexibility training should be done is after a warm-up. PNF stretching can lead to an increase in your range of movement by up to 20 per cent.

Linking programs to specific components of fitness

As stated in the principle of specificity, a training program is most effective when it is designed so that specific aspects of the athlete's chosen sport are targeted. Each sport can be analysed to determine which fitness components are most relevant to the athlete's effective performance. A marathon runner, for example, would need to focus their training on muscular endurance and cardiovascular endurance, because they are the two fitness components that enable the athlete to compete successfully. Although the individual will need to maintain flexibility, appropriate body fat and strength, these fitness components are less related to success in marathon running.

Learning activity

1. Explain how the following principles can be applied to circuit training:
   a. Overload.
   b. Specificity.
2. Calculate your maximum heart rate and determine what your training zone would be if you wanted to improve your aerobic fitness.
3. If you wanted to improve your muscular endurance in your arms and shoulders, what type of training would you choose, and what specific activities would you include?
4. Using only the facilities or equipment available in your local park, identify a range of exercises or activities a person could participate in so they could become physically active.
5. Outline the advantages and disadvantages of PNF stretching.

Safety considerations to prevent injury

When designing and implementing training programs, athlete safety and injury prevention is vital. Involvement in physical-fitness training will lead to fatigue of the athlete, which is the time injury is most likely to occur. Being physically fit can delay fatigue and therefore prevent injury. Compared with sitting at rest, there are more risks involved in exercise; however, the benefits of being physically active far outweigh the risks. To prevent risk of injury during exercise, several designated safety procedures should be followed carefully.

Safety checklist

- Before starting any exercise program, a medical check-up is suggested. If joining a gym or health club, a pre-exercise screening questionnaire should be completed to assess fitness levels and training needs.
- Wear the clothing and footwear that are appropriate for the activity.
- Stay hydrated by taking a bottle of water to training sessions and by sipping the water often.
- Analyse technique to identify any errors when using equipment.
- Use protective equipment, if appropriate, and do not use faulty pieces of equipment.
- Warm up before engaging in any strenuous activity to reduce the chance of sustaining a soft-tissue injury.
- Abide by the activity's rules, and listen to the officials.
- Work at a sensible pace, do not try to compete with other people, and set individual goals.
- Cool down after the activity to enable the body to slowly return to its pre-exercise state and to reduce muscular soreness.
- Stop exercising if you are hurt, become dizzy, feel sick or experience undue fatigue.

Internet activity

Log on to TitanOnline and complete Activity 3.2 by researching the type of injuries that are common in a sport of your choice. Outline the first aid treatment for these injuries.

Warm-up and cool-down

A warm-up prepares the body and mind for the activity ahead. Warming up is an essential safety requirement in all sports, to reduce the chance of injuring muscles, tendons or ligaments. A warm-up should include activities that increase heart rate, mobilisation and stretching, as well as a sport-specific activity.

A cool-down should slowly lower the heart rate, respiratory rate and body temperature. The aim of the cool-down is to remove lactic acid and reduce muscular soreness that may be experienced in the days following rigorous training or exercise. To conclude every session, low-intensity activity such as a walk or light jog followed by some gentle stretching should be done. Many athletes now incorporate massage and ice baths as part of their cool-down routine.

Safe exercises

To prevent injury, safe exercise selection should be a priority, for the athlete and coach. Exercises and activities that have been proven to place unnecessary strain on the body and lead to injury are known as contra-indicated exercises. These exercises should be replaced with alternative activities that entail less risk of injury.

Examples of contra-indicated exercises are ballistic movements, straight-leg lifts, highly repetitive training, rolling or rotating of the neck, excessive arching of the back and overtraining of muscle groups.

Safe techniques

Athletes sometimes sacrifice correct technique in an effort to increase the number of repetitions performed or the amount of weight lifted. Three examples of this are push-ups in which the athlete does not lower to the floor or return to straight elbows, chin-ups achieved by swinging and jerking the legs, and biceps curls performed by using the back and legs to initiate momentum.

These are all examples of poor practice that should not be promoted. During strength and endurance training, the muscle should be exercised over its full range of movement. Jerky movements during exercise can lead to soft-tissue injuries in other parts of the body.

Athletes often incur injuries by attempting to lift weights that are too heavy for them or by using an incorrect technique when lifting or breathing. To prevent injuries, there should always be a competent observer, or spotter, supervising while an athlete is using free weights.



Figure 3.15:
Warming up is an essential safety requirement in all sports.



Figure 3.16:
To prevent injuries, there should always be a spotter supervising while an athlete is using free weights.

Internet activity

Log on to TitanOnline and complete Activity 3.3 by watching the video and summarising the safety tips for weight training.

Learning activity

1. Identify why injuries are more likely to occur when an athlete is fatigued.
2. List the implications of neglecting to:
   a. warm-up before exercise
   b. cool-down after exercise.
3. Propose a sample warm-up and cool-down for a team sport of your choice.

Strategies and products to develop physical fitness

The fitness industry is a multi-million-dollar industry, crowded with health clubs, personal trainers, supplements and 'quick fixes'. Marketing within the industry is very strategic, often spreading misinformation or instilling unfounded fears about health, wellbeing and fitness. Products are often advertised as being able to rapidly and effectively develop physical fitness, muscle gain or weight loss, appealing to many people looking for a quick fix.

These strategies and products are commonly related to diet, supplements and workouts. Food-related products marketed to assist in developing physical fitness often include diet/protein shakes, diets, supplements, pills, sports drinks and juice cleanses. Although there can sometimes be value in certain diets, supplements or shakes, these often have negative health effects. Falling victim to strategic marketing can lead to adverse effects such as fatigue, nutritional deficiencies, mood swings and several other health issues. This is because the body is denied the essential nutrients and energy it needs to function properly, and may be taking in unnecessary and harmful ingredients in products. Products marketed as a 'quick fix' can be expensive, can cause a distorted view of healthy food and a balanced diet, and increase disappointment when promised results are not achieved.



Figure 3.17:
Be wary of supplements or weight-loss products that offer quick fixes or extreme results.

Clever fitness industry marketing ploys may also be behind expensive exercise equipment, workout suits and exercise programs promising rapid and effective physical-fitness results. Specific controversial examples include wobble boards and workout suits that promise spot-reduced weight loss, muscle gain, lowered blood sugar levels and/or increased aerobic fitness. There may be some truth to certain claims made by the producers of such products; however, they often lack evidence-based scientific research to support and back up such claims. These products are often presented on infomercials encouraging consumers to buy direct from producers.

The strategies and products marketed as rapid and effective in developing physical fitness can be successful due to careful selection of celebrities and well-known 'influencers' to promote products on television and social media. These well-known people are very persuasive in their use of social media marketing and target vulnerable and misinformed people. Consumers must be aware of manipulative marketing that preys on emotional triggers. Many strategies and products are controversial and the consumer needs to be informed of the advantages and disadvantages through research supporting the claim. If something sounds too good to be true, then it probably is.

Improving physical fitness does not have to be costly or complicated. Being involved in activities that bring enjoyment, creating a routine, making it a lifestyle habit, eating what makes the body feel good, quality sleep and spending time outside will help develop physical fitness in a healthy way.

Learning activity

1. Explain why people want a 'quick-fix' solution when it comes to losing weight.
2. Use the internet to investigate advertisements in which quick-fix fitness products are offered. Critically analyse the products and the claims for their effectiveness. Make sure you read the 'small print' and the suggestions for how to use the products.
3. Write a newspaper article in which you reject the concept of miracle cures for weight loss.
4. a. Use the internet to investigate and identify the contents of three leading sports drinks.
   b. Record the claims the manufacturers make in relation to improving performance and recovery time.
   c. Locate the results of independent research into each of the products and their effectiveness.

Fitness measurement and evaluation

Fitness tests, also referred to as fitness evaluations or fitness assessments, comprise a series of fitness measurements. These measurements help in determining an individual's health status and level of physical fitness.

Trainers and coaches have many tests and measurements to choose from. Key criteria are that tests must be repeatable, easy to conduct and follow given protocols.

Fitness tests determine an individual's baseline fitness level and are often the starting point for a trainer to design an appropriate exercise program. The specific tests the trainer uses in the assessment are dependent on the person's health and fitness goals, their experience and the types of workout routine the person is doing.

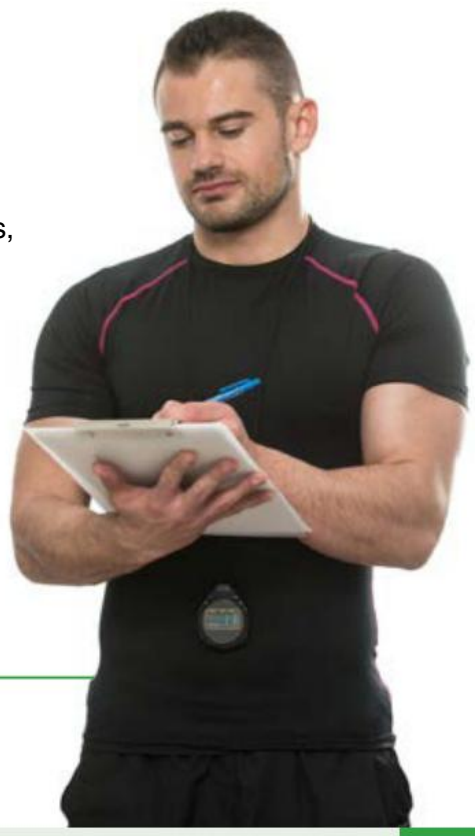


Figure 3.18:
Fitness tests are often the starting point for a trainer to design an exercise program.

Purpose of physical-fitness measurement

The reasons that trainers measure a person's physical fitness are as follows.

- **To have a starting point when they are designing an individual training program.** Trainers need to have a starting point so they can ensure they place overload on the athlete during training while also making sure that the training is not too hard.
- **To identify the person's strengths and weaknesses in relation to fitness.** By identifying strengths and weaknesses, an athlete or coach can prioritise training. For example, the athlete might have good endurance and flexibility and excellent agility but below-average strength and speed.
- **To monitor the training's progress and effectiveness.** Comparing a person's results with the figures in 'norms' tables, although interesting, is not nearly as important or valuable as looking at the person's performances and progress. Re-testing leads to compilation of valuable information about the training's effectiveness, and the information is an indicator of the athlete's improvement.
- **To motivate or encourage the athlete.** If athletes can see improvements in their fitness level, they are likely to continue training and performing at an optimal level.
- **To obtain data.** By having data available, athletes who are returning from injury are able to compare their current fitness level with their pre-injury fitness level.
- **To aid identification of talent.** Athletes whose fitness test profile matches the typical profile of elite athletes in specific sports are able to be identified.

Did you know?

An average vertical jump for a 15-year-old boy is 40 cm, while the unofficial world record stands at 150 cm.

Positive and negative effects of measurement

Measurement and testing of fitness levels may have positive and negative effects, which can influence participation in physical activity and sport.

Positive outcomes

- People who achieve good results from fitness testing usually enjoy the experience of undergoing the test.
- The results can lead to increased motivation.
- People are able to chart their improvements.
- Comparisons can be made when people are returning from injury.
- Vital information about people's specific fitness needs is provided.



Figure 3.19:
Fitness tests can help athletes identify weaknesses after returning from injury.

Negative outcomes

- People who achieve poor results from their fitness test usually do not enjoy the experience of undergoing the test.
- The results can lead to decreased motivation.
- People who lack confidence and/or ability can find the testing to be stressful and unpleasant.
- Many adolescents and adults do not like undergoing body-composition tests.
- It is difficult to monitor many types of improvement by way of fitness testing.
- People sometimes do not perform well in tests.

It must be remembered that testing is only one small aspect of the overall fitness picture and that it must always be done in an understanding and supportive way. It is important that the reasons and results of the testing be explained to the person to avoid any misunderstanding.



Figure 3.20:
It's important to respect a person's privacy when testing for body-composition, to avoid embarrassment.

Using fitness measurement results

Athletes and support staff such as coaches, trainers and physiotherapists can use fitness measurement and evaluation during injury rehabilitation. Such testing allows identification of imbalances within the body. This aids in the development of strategies to achieve short-term and long-term rehabilitation goals. This will help the athlete recover from their injury and return to an optimal state.

The results of fitness measurements and evaluations can be interpreted by professionals and used to develop personalised programs. These programs are administered to achieve injury recovery and rehabilitation, to prevent further injury. Such programs should be specific to the athlete's interests and guide rehabilitation and entry back into daily activities, training programs and sport.

Support staff may also repeat certain testing to track athlete progression through rehabilitation by using screenings. These screenings identify muscular and neural tightness, strength deficits and stability issues that give insight into how the body is progressing. For example, a swimmer with an overuse shoulder injury should include using relevant strength, rotation and flexibility testing to assess pain-free range of motion, bilateral strength and power that indicate readiness to return to normal training and progression through the rehabilitation program.

Internet activity

Log on to TitanOnline and complete Activity 3.4. Compare the aerobic capacity of athletes from a variety of team sports. Account for the differences between the aerobic capacity of the male and female athletes.

When coaches, clubs or selection committees are undergoing a team selection process, they will often use fitness measurements and evaluations alongside performance in games or competition. The results of fitness tests provide vital information about athletes in individual and team sports, their level of skill- and health-related components of physical fitness. This information is crucial for selection processes, as it gives insight into physical strengths and weaknesses of athletes, and the potential to be a positive asset to the club for team positions in play and performance.

Fitness measurements and evaluations also guide team selection processes as they present an athlete's potential for development and progression, as well as their risk of injury, which can burden a team. Ultimately, selectors will be looking to identify athletes suitable for specific roles; athletes who possess required skill levels, fitness or strength for specific roles; and their potential to develop.

In team selections, fitness measurements and evaluations are used across a variety of sports and will be specific to sporting context and role required. Within the Australian Football League (AFL), for example, a draft combine occurs annually. Before the draft, prospective AFL athletes are involved in several fitness, physical and psychomotor tests that are specific to the sport. Such tests include aerobic endurance tests such as the yo-yo test, a specific AFL agility test, the vertical jump measuring leg power, skin-fold tests, lower back and hamstring flexibility, reaction time tests, AFL skill-related tests, and many other tests addressing key health- and skill-related components of physical fitness. This information gives clubs vital data on prospective players so that clubs can make informed decisions on the suitability of future players within their team.



Figure 3.21:
Before the AFL draft, players are involved in several fitness tests.

When an athlete is in rehabilitation from an injury, support staff may further compare pre-season fitness results with current measurements of the athlete. This allows support staff to assess components such as athlete pain-free range of motion, strength, power and/or flexibility, from pre-season to progression through rehabilitation. Such comparison of results will determine readiness of the athlete to resume competition.

Learning activity

1. Interview some of your class mates and determine the positive and negative effects of fitness measurement on participation.
2. Analyse how fitness testing could be useful during injury rehabilitation.
3. Analyse how effective fitness testing is for team selection processes.

Internet activity

Log on to TitanOnline and complete Activity 3.5 involving fitness tests other than those described in the following section.

Measuring physical fitness levels

Cardiovascular endurance

Multi-stage fitness test

- Measure a 20 metre distance and mark with tape or markers at each end.
- Check tape, CD and player.
- Start the cadence tape
- Instruct the student/s (can be done in groups) to run to the opposite end and place one foot beyond the line by the time the next beep sounds on the tape. If they arrive before the beep they should pivot and wait for the signal, then run to the back to the opposite line to reach this line before the next beep.
- At the end of each minute, the time interval between each beep is decreased, thereby running speed becomes progressively faster.
- Ensure that each student reaches the end line each time and does not turn short. Emphasise to the student to pivot and turn, rather than make an arc which tends to take more time.
- Each student continues running for as long as possible until he/she can no longer keep up with the beeps on the tape. The criterion for eliminating a student is two lengths in row where they are more than two steps from the end once the beep sounds.
- Record the last level and shuttle the student successfully completed.

Table 3.5: Multi-stage fitness test ratings.

Rating	Female	Male
Poor	< 3	< 4
Fair	3–4	4–5
Average	5–6	6–7
Good	7–8	8–9
Excellent	> 8	> 9

1.6km run

- Measure out either 1.6 km or four laps of a standard running 400 m track.
- The student starts in a standing position and attempts to complete the distance in the shortest possible time.
- The timer should remind the student how many laps they have to go and also have the option to ring a bell in a final lap.
- Emphasise that the student is to not attempt to sprint the entire race as this is not possible.
- Record the final time in both minutes and seconds.
- Check all medical conditions such as asthma and take necessary precautions.
- Water should be made available to student after and during run if desired.

Table 3.6: 1.6km run ratings.

Rating	Female	Male
Poor	> 9:51	> 7:20
Average	8:15–9:51	6:20–7:20
Excellent	< 8:15	< 6:20

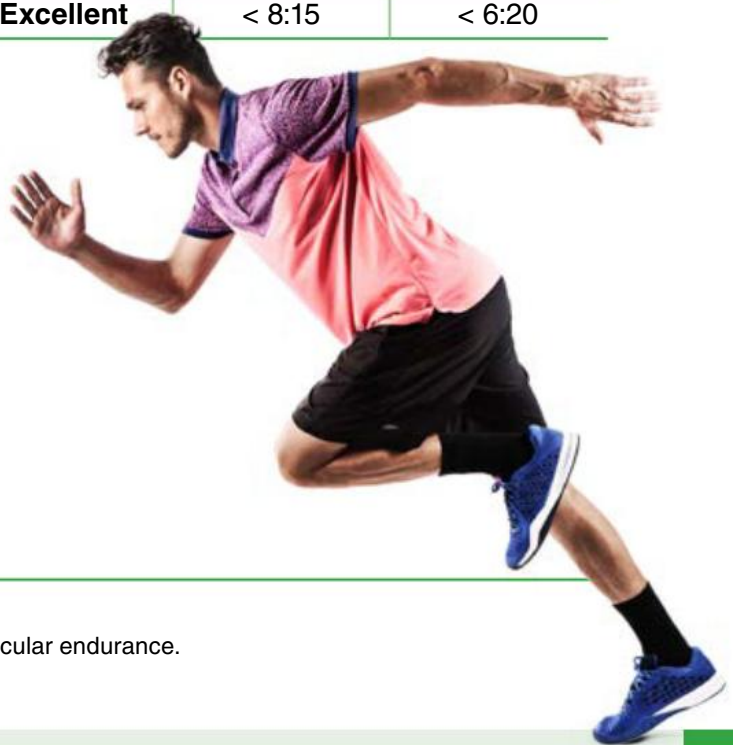


Figure 3.22:
Running is an aerobic exercise that helps to increase cardiovascular endurance.

Flexibility

Sit and reach test

- The student sits bare-footed on the floor with both legs straight out in front of them positioned against the sit and reach box.
- The fingers of the student are straight and palms facing down.
- They then flex forward at the hip and place the fingers along the ruler which is positioned onto top of the box.
- They push out along the ruler and hold for three seconds. If students cannot reach past their toes, a negative reading is recorded in centimetres.
- The measure is read from the nearest centimetre.
- Results beyond the toes are positive and those that do not reach beyond the toes are negative.
- Two warm–up attempts are allowed, followed by two measuring trials.
- Ensure students perform a warm-up prior to testing.

Table 3.7: Sit and reach test ratings.

Rating	Female	Male
Poor	< -1 cm	< -2 cm
Average	-1–5 cm	-2–2 cm
Good	6–9 cm	3–7 cm
Excellent	> 9 cm	> 7 cm

Groin flexibility test

- Sit on the floor with both legs on the floor, legs together. The soles of the feet should be together and facing each other. This should form the shape of a diamond.
- Grab hold of the ankles with both hands, and pull them as close to the body as possible. Measure the distance from your heels to your groin.

Table 3.8: Groin flexibility test ratings.

Rating	Measurement
Poor	> 20 cm
Fair	15–20 cm
Average	10–15 cm
Good	5–10 cm
Excellent	< 5 cm



Figure 3.23: Flexibility is required in the majority of yoga poses.



Figure 3.24:
Leg presses are a great way to both measure and develop muscular strength.

Muscular strength

1RM leg press

- The student should perform an adequate warm-up. An example would be to warm up with 5–10 reps of a light-to-moderate weight, then after a minute rest perform two heavier warm-up sets of 2–5 reps, with a two-minute rest between sets.
- The student should then rest two to four minutes, then perform the one-rep-max leg press attempt with proper technique. If the lift is successful, rest for another two to four minutes and increase the load 5–10 per cent, and attempt another lift. If the subject fails to perform the lift with correct technique, rest two to four minutes and attempt a weight 2.5–5 per cent lower. Keep increasing and decreasing the weight until a maximum left is performed. Selection of the starting weight is crucial so that the maximum lift is completed within approximately five attempts after the warm-up sets.

Table 3.9: 1RM leg press ratings.

Rating	Percentage of body weight
Poor	< 65 %
Average	65–110 %
Excellent	> 110 %

Hand-grip test

- Ensure that the needle of the dynamometer is set to zero.
- Hold the dynamometer in the dominant hand, vertically above your shoulder.
- The student then squeezes the dynamometer while slowly lowering the arm in front of their body to finish at the side of their leg.
- Record the value in (kilograms) as displayed on the dial. A second effort or final squeeze is not permitted after arm has been lowered.
- Repeat and record the maximum value.

Table 3.10: Hand-grip test ratings.

Rating	Female	Male
Poor	< 16 kg	< 26 kg
Average	16–27 kg	26–40 kg
Good	29–34 kg	41–49 kg
Excellent	> 34 kg	> 49 kg

Muscular endurance

Maximum push-up

- Lie on gym mat, hands shoulder width apart, bent knee position (for modified push-ups) or completely flat on the gym mat (full push-ups) and fully extend the arms.
- Lower the upper body until the elbows reach 90°.
- Return to the starting position with the arms fully extended.
- The push-up action is to be continuous with no rest.
- Complete as many modified or full push-ups as possible.

Table 3.11: Maximum push-up test ratings.

Rating	Count
Poor	0–5
Fair	6–16
Average	17–33
Good	34–40
Excellent	41 +

Plank hold

- Hold the body in an elevated position for as long as possible.
- The upper body should be held off the ground through support by the elbows and forearms.
- The rest of the body should be in the push-up position.
- Hold this position for as long as possible. The test is over when the back is no longer straight or the hips touch the ground.

Table 3.12: Plank hold ratings.

Rating	Time
Poor	< 0.5 min
Fair	0.5–1.5 min
Average	1.5–2 min
Good	2–3 min
Excellent	> 3 min



Figure 3.25:
Correct push-up technique is essential for test results to be valid.

Body composition

Body mass index

- Body mass index (BMI) is one way of calculating whether a person is underweight, overweight or falls into a healthy weight range.
- BMI = weight (kg) ÷ height^2 (m^2).
- Calculate your BMI and identify the weight range using Table 3.13.

Table 3.13: Body mass index ratings.

Rating	Calculation
Underweight	< 18.5
Lean	18.5–22
Healthy	20–24.9
Overweight	25–29.9
Obese	> 30



Figure 3.26:
The body of a weight lifter has a different composition to the body of a marathon runner.

Coordination

Alternate hand wall toss

- This is used to measure hand–eye coordination by throwing a tennis ball underarm into a target, then catching with the opposite hand.
- Place a target (30 cm in diameter) on a wall and mark a line 2.5 m away. Stand behind the line facing the wall.
- Throw the ball underarm with the preferred hand and attempt to catch the ball on the full with the opposite hand, without crossing the line. Throw the ball back against the wall again and catch with the initial hand.
- Continue for 30 seconds.

Table 3.14: Alternate hand wall toss ratings.

Rating	Count
Poor	< 15
Fair	15–29
Average	20–29
Good	30–35
Excellent	> 35



Figure 3.27:
Hand–eye coordination is essential to play tennis.



Figure 3.28:
Running speed, particularly over short distances, is an important indicator of success in many sports.

Speed

10-metre sprint and 40-metre sprint

- For the 10-metre sprint, mark a 10-metre running track or oval with witches hats or makers. Alternatively, for the 40-metre sprint, mark a 40-metre running track or oval with witches hats or makers placed at 10 m intervals.
- The student starts in a standing position with their front foot exactly on the line.
- The timer should stand at the finish line, call ready and pull down their arm from a raised position to signal the start of the sprint. The stop watch should then simultaneously be started.
- Stop the stopwatch when the student's chest crosses the line.
- Emphasise that the student runs as fast as possible.
- Allow two trials with the best result taken as the final result.
- Record the time taken to the nearest 0.1 of a second.

Table 3.15: 10-metre sprint ratings.

Rating	Time
Poor	> 2.2 sec
Fair	2.2–2.2 sec
Average	2.0–2.1 sec
Good	1.9–2.0 sec
Excellent	< 1.9 sec

Table 3.16: 40-metre sprint ratings.

Rating	Female	Male
Poor	> 7.25 sec	> 6.9 sec
Average	6.50–7.24 sec	6.15–6.89 sec
Excellent	< 6.50 sec	< 6.15 sec

Agility

T-test

- Set out four cones as to form a 'T' above (three horizontal cones should be 4.57 m apart, with the final cone 9.14 m away from the middle cone).
- The horizontal cones from the left are C, B and D. Cone A is opposite cone B, 9.14 m away.
- The student starts at cone A. They sprint to cone B and touch the base of the cone with their right hand. They then turn left and shuffle sideways to cone C, and also touch its base, this time with their left hand. Then shuffling sideways to the right to cone D and touch the base with their right hand. They then shuffle back to cone B touch with their left hand, and run backwards to cone A.
- Students have two attempts and record their best time.

Table 3.17: T-test ratings.

Rating	Female	Male
Poor	> 13 sec	> 12 sec
Fair	12–13 sec	11–12 sec
Average	11–12 sec	10–11 sec
Good	10.5–11 sec	9.5–10 sec
Excellent	< 10.5 sec	< 9.5 sec

Illinois Agility Test

- The agility run is designed to test your ability to move quickly while changing direction.
- Start lying on your front with your head to the start line and hands by your shoulders.
- On go, get up as quickly as possible and negotiate the cones in the direction indicated.
- Swap start and finish positions so that you test your agility on both sides.

Table 3.18: Illinois Agility Test ratings.

Rating	Time	Points
Poor	> 23.4 sec	15
Fair	22.4–23.4 sec	13
Average	18.7–22.3 sec	11
Good	17.5–18.6 sec	9
Excellent	< 17.5 sec	5



Figure 3.29:
Agility is an important skill in martial arts, which requires quick movements and changes in direction.

Muscular power

Standing broad jump

- The student stands with both feet parallel to each other and toes behind the starting line.
- When ready, the subject swings the arms backwards crouches, then swings the arms forward to propel and jump forward as far as possible.
- The tester then watches the subjects landing point and marks the landing point of that of the back of foot closest to the starting line.
- Measurement is recorded in centimetres.
- Three attempts per student.

Table 3.19: Standing broad jump ratings.

Rating	Female	Male
Poor	< 1.1 m	< 1.25 m
Fair	1.1–1.3 m	1.25–1.5 m
Average	1.3–1.5 m	1.5–1.7 m
Good	1.5–1.7 m	1.7–1.9 m
Excellent	> 1.7 m	> 1.9 m

Basketball throw

- The student sits with their buttocks, back and head resting against a wall. Their legs rest on the floor horizontally in front of the body.
- The student uses a two handed chest pass to push and propel the ball in a horizontal direction as far as possible. A one arm or over shoulder pass is not allowed.
- Ensure that the student keeps the head, shoulders and buttocks in contact with the wall and that ball is thrown using arms only.
- Allow two trials for each student.

Table 3.20: Basketball throw ratings.

Rating	Female	Male
Poor	< 5.72 m	< 7.90 m
Average	5.72–6.65 m	7.91–9.35 m
Excellent	> 6.65 m	> 9.35 m



Figure 3.30:
Basketball players require muscular power for both offensive and defensive purposes.

Balance

Stork stand

- The student balances on one leg.
- They may use their hands to balance but must not be leaning or holding onto any balance assisting item.
- The leg which is not in contact with the ground must be at right angle so it is bent at the knee and far from ground.
- Hold this position for as long as possible.

Table 3.21: Stork stand ratings.

Rating	Time
Poor	< 12 sec
Average	12–45 sec
Excellent	> 45 sec



Figure 3.31:
Ballet dancers have excellent balance.

Reaction time

Ruler drop

- Sit with forearms flat on a desk and thumb and forefingers apart to allow a ruler to go through.
- Your partner holds the ruler's end at thumb height.
- Partner says ready, but drops the ruler separately, any time between one and ten seconds later. Grab the ruler as quickly as possible.
- Record the measurement on the rules in centimetres. Allow two attempts.

Table 3.22: Ruler drop ratings.

Rating	Measurement
Poor	> 17 cm
Average	6–17 cm
Excellent	< 6 cm



Figure 3.32:
A fast reaction time is needed when batting in softball.

Revision questions

1. Define the health-related components of fitness and how they can be improved.
2. Define the skill-related components of fitness and how they can be improved.
3. For a sport of your choice, outline the fitness components that are necessary for an athlete to be successful.
4. Discuss the relationship between age and fitness level.
5. Distinguish between physical activity and physical fitness.
6. Identify barriers to regular participation in physical activity. Propose a possible solution to each problem.
7. Explain how the FITT principle can be used to overload the body during training. Give a specific example to support your answer.
8. Explain why injuries often occur when athletes are fatigued.
9. Critically analyse strategies that are marketed as rapid and effective in developing physical fitness.
10. Identify three reasons for undergoing fitness testing.
11. Identify three positive implications and three negative implications of fitness testing.
12. Identify and describe one fitness-testing procedure for each of the following components of fitness:
    a. Flexibility.
    b. Cardiovascular endurance.
    c. Agility.
13. Which of the following would be the most effective resistance training activity for a marathon runner?
    a. Leg extension – low weights – 20 repetitions – 3 sets – short recovery in between.
    b. Leg extension – low weights – 10 repetitions – 2 sets – long recovery in between.
    c. Leg extension – medium weights – 10 repetitions – 4 sets – medium recovery in between.
    d. Leg extension – heavy weights – 8 repetitions – 4 sets – long recovery in between.
14. Choose one of the following factors and explain how it may affect the type of training you would include in a fitness program:
    a. Gender.
    b. Age.
    c. Previous training history.

CHAPTER 4

Fundamentals of movement skill development

Fundamental movement skills are the movement patterns that involve various body parts. They are the foundation movements for the more specialised, complex skills used in play, games, sports, dance, gymnastics, outdoor education and physical activity.

Specialised movement skills are skills used in more-organised games, activities and sports. They develop after fundamental movement skills have been mastered. We mostly learn these sport-specific skills when we have the opportunity to practise them and receive feedback about them. By paying attention to the feedback and practising the skills as often as possible, we create the best environment for learning physical skills.

A range of benefits are associated with mastery of fundamental movement skills by way of participation in sport and physical activity. The benefits include better general health; improved fitness; greater coordination and physical competence; improved social skills, including teamwork, leadership and cooperation; and increased likelihood of participation in physical activity for life. In turn, these benefits lead to positive outcomes for our quality of life.



Figure 4.1: Dance uses many of our fundamental movement skills.

Outcomes

A student:

- discusses factors that limit and enhance the capacity to move and perform (PASS5-1)
- demonstrates actions and strategies that contribute active participation and skilful performance (PASS5-5)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- The nature and transfer of movement skills
- The role of practice in developing movement skills
- The value of mastering fundamental movement skills

The nature and transfer of movement skills

A skill is a learnt ability to practise and perform movements with confidence and success. Skills within physical activity and sport contexts – including sport-specific actions and movements like catching, dodging and jumping – are the foundation of quality movement performances.

Movement skills are practised in a range of physical activity and minor games contexts. Learning a new skill or improving a previously learnt skill promotes safe participation and expands opportunities to participate in new sports. It allows participants to engage with new social groups and develop self-worth and confidence.

Movement skills are often not limited to specific sports, and can be applied to, and developed in, a range of movement contexts. Often, movement skills start at a basic level, and as individuals become more experienced, these skills are used to learn more specialised skills in more-complex movement contexts. Ultimately, fundamental movement skills are the foundation for more specialised movement skills and sport-specific performances.

Importantly, some sport-specific movement skills cannot be transferred across all sports; for example, the fundamental movement skill of sprint running is not transferable to a sport such as lawn bowls. However, within specific sports, these skills can be refined and developed to practise more specialised versions of the movement skill, to therefore enhance the quality of the performance. For example, progressing in movement skill development can be demonstrated in touch football, where the ability to pass the ball takes time to practise and master. As skill development improves, the quality of the passing improves; for example, passing to the right, passing to the left, being able to run and pass, throwing a greater distance, and adding a spiral to a pass.

Fundamental movement skills

Fundamental movement skills (FMSs) are the essential movement skills that individuals perform in physical activity and sporting contexts. These movement skills can be demonstrated in everyday practices like walking around the house or bending over to pick something off the floor. More specifically, within physical activity contexts, FMSs are the foundation of the rules, strategy and movements needed to be successful in games and sports. FMSs are the building blocks for success in the specialised movement skills that are needed in most games and sports. The 12 fundamental movement skills are discussed in the following paragraphs.



Figure 4.2:
Several fundamental movement skills are required to play softball.

Static balance

Balance is a vital skill in nearly all sports. A static balance is defined as a person's ability to remain balanced while in a stationary position. Examples of sports in which static balance is very important include dance and gymnastics.

The skill components for an efficient one-leg static balance are:

- Support leg remains still.
- Torso is stable, core muscles are engaged.
- Grounded foot does not change position.
- Head is stable, eyes focused on a particular spot.
- Non-support leg is slightly flexed and not moving.
- Arms outstretched to the sides, no flailing.



Figure 4.3:
Balance is very important in gymnastics.

Did you know?

The Guinness World Record for balancing on one foot is 76 hours, 40 minutes.

Sprint run

Sprinting is a locomotor movement that involves lifting both feet from the ground for a short period of time. Running and sprinting are present in most games and sports. Without the ability to sprint, an individual would not be able to participate successfully in games such as soccer, Australian football, rugby league, netball and basketball. A good running technique can increase how fast a person can sprint.

The skill components for the sprint run are:

- The sprinter should land on the ball of the foot.
- The leg not in contact with the ground should be bent at about 90 degrees.
- The knee lift should be relatively high.
- Eyes should be focused straight ahead, not at the ground, and the torso should be stable and upright.
- Elbows should be bent at 90 degrees.
- Arm drive increases speed. Arms should move forward and back in opposition to the legs.



Figure 4.4:
Running and sprinting are present in most sports.

Vertical jump

Jumping involves using leg power to lift and propel the body off the ground. The vertical jump can be performed with a run-up, which will generate momentum, or from a still position, which means the height of the jump is due to the power generated by the individual. Examples of sports that involve jumping are gymnastics, basketball, volleyball and Australian football.

The skill components of the vertical jump are:

- Eyes should be focused upwards during the upward phase of the jump.
- Knees and arms should be bent, with arms behind the body.
- Powerful movement of the arms and legs will drive the body upwards.
- Arms and legs straighten in the air.
- Land on the balls of the feet, with knees bent to absorb force when landing.



Figure 4.5:
Jumping is used both offensively and defensively when playing basketball.

Catch

Catching involves receiving an object, absorbing its force and maintaining control of it. Objects are most commonly caught in two hands. Catching is commonly used in games such as cricket, netball, basketball and rugby codes.

The skill components for catching are:

- Eyes should track the object in flight and remain focused on the object throughout the catch.
- Feet move to place the body in position to take the catch. Feet should be stationary when making the catch.
- Hands move to make the catch.
- Fingers should be bent and cupped, to absorb the force of impact.
- Fingers close around the object immediately the catch is made.
- Elbows should be bent, to absorb the force of impact.

Internet activity

Log on to TitanOnline and complete Activity 4.1, watching the video on fundamental movement skills and completing the practical activity.

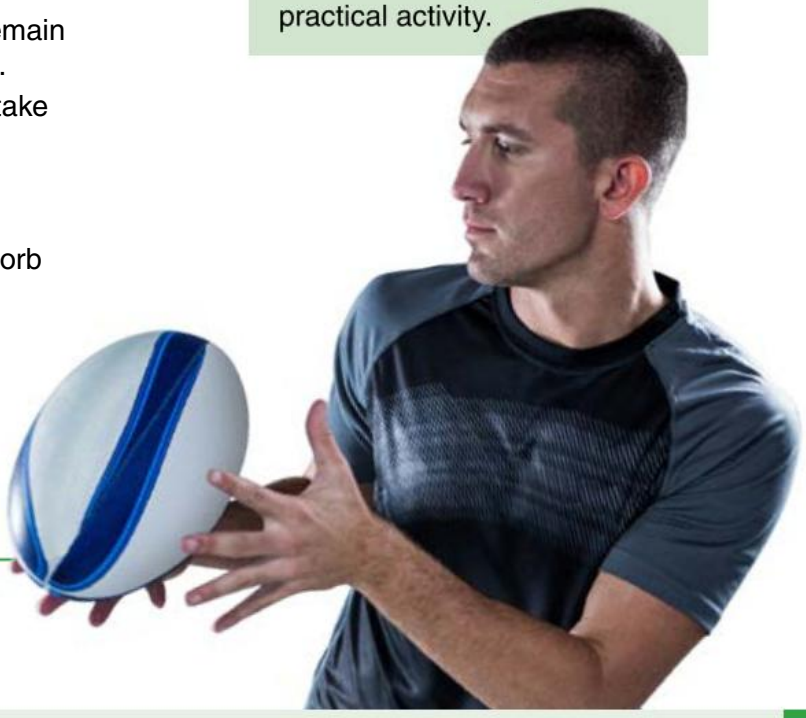


Figure 4.6:
Catching is commonly used in rugby codes.

Hopping

Hopping is a similar concept to jumping. However, the skill requires one foot to be left in the air with an individual taking off and landing on the same foot. Good balance is essential to be successful at hopping. Hopping is necessary in sports such as athletics and dance.

The skill components for hopping are:

- The leg in contact with the ground bends during landing to absorb force and straightens for the push-off component.
- Eyes should be focused straight ahead, not at the ground, and the torso should be stable and upright.
- Land and push off using the ball of the foot.
- Non-support leg helps to maintain balance during the movement.
- During the push-off component, the arms should bend and swing forwards.



Figure 4.7:
Hopping is a component of the triple jump.

Side gallop

The slide gallop involves moving the body sideways while the body and head are facing forwards. Rather than alternating the leading foot, it remains the same. The side gallop is essential in dancing, basketball, softball and racquet sports.

The skill components for the side gallop are:

- One foot leads sideways and the trail leg follows.
- Both feet are together on the ground and apart in the air.
- Head and torso usually face forwards.
- The head should be stable, with the eyes focused forwards.
- Land and push off on the balls of the feet.



Figure 4.8:
Tennis players use the side gallop when returning a serve.

Skip

Skipping is a rhythmical locomotor movement. The sequence is step-hop, step-hop, step-hop, which involves alternating feet with each step. Skipping is evident in many sports, including skipping games, dancing and rugby league.

The skill components for skipping are:

- Starts with a step-hop.
- Knee in contact with the ground should bend for the take-off component.
- The head and torso should be stable, with the eyes focused forwards.
- Land and take off on ball of the foot.
- During the push-off component the arms should be relaxed and swing in opposition to the legs.

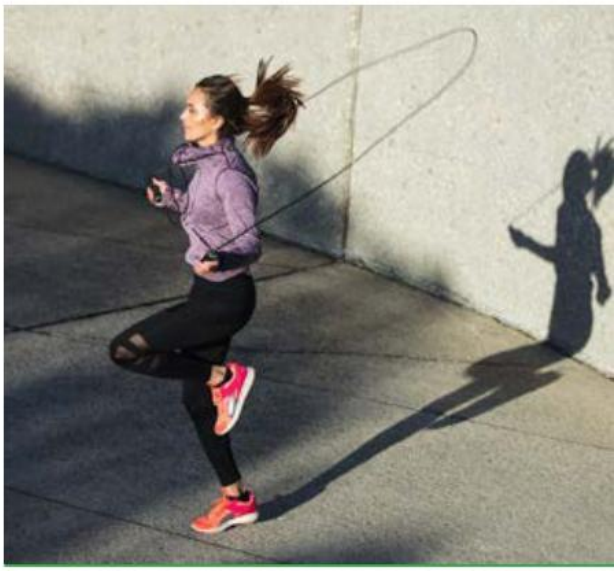


Figure 4.9:
Skipping requires coordination, timing, aerobic fitness and endurance.

Overarm throw

The overarm throw involves someone throwing or projecting an object from their body to another space. The overarm throw is used in sports such as cricket, softball, baseball and athletics.

The skill components for the overarm throw are:

- Eyes forward, focusing on where the object is to be thrown.
- Use a step, hop, step movement with the feet in preparation for the throw (the opposite foot should be forward upon release).
- The body should be side-on.
- The throwing arm moves downwards, backwards and then upwards.
- Hips, then shoulders, rotate forward.
- Upon release of the object, the throwing arm follows through, down and across the body.

Did you know?

The world record for most skips over a rope in 24 hours is 168,394, set by Sella Rosa Rega in 2019.



Figure 4.10:
The overarm throw is used in cricket for bowling and fielding.

Leap

Leaping involves taking a step and, when the back leg comes forward, stretching it out and lifting oneself off the ground to travel forward as far as possible. Leaps are often better performed when a run-up is used, with more height and distance gained. A leap is the sort of movement a person might use to jump over an object. Leaping is present in dance, gymnastics and many athletic events.

The skill components for leaping are:

- Eyes should focus forward, with the head stable, throughout the leap.
- The opposite arm is extended to the lead leg.
- The torso remains upright with a slight lean forwards.
- The take-off leg bends to start the movement. During the flight phase, the legs straighten.
- The knee should be bent and the landing done on the ball of the foot to absorb the force of impact.



Figure 4.11:
Leaps are often better performed when a run-up is used.

Kick

Kicking involves striking an object with one's foot to propel it in a certain direction. The stationary place kick is learnt first and once this has been mastered, progression can occur to kicking while moving. Good foot–eye coordination is essential. Sports that involve kicking include Australian football and soccer. Being able to kick with both feet is important.

The skill components for kicking are:

- Eyes remain focused on the object throughout the whole skill.
- Non-kicking foot placed next to the object being kicked.
- The knee of the kicking leg should be bent during the back-swing phase.
- The opposite arm to the kicking leg should be extended.
- Contact should be made with the top or instep of the foot, not the toe.
- Follow-through should occur high towards where the object is being kicked.



Figure 4.12:
Being able to kick with both feet is an important skill.

Two-hand strike

The two-handed strike involves hitting an object with either a bat or racquet. It is a manipulative skill and forms the basis for the sport-specific skills involved in striking games such as golf, baseball, tennis and hockey. Learning this skill can be difficult and is best mastered using a stationary object, such as the two-handed strike in T-ball.

The skill components for the two-hand strike in T-ball are:

- Stand side-on to the object when making contact.
- Eyes focused on the object throughout the strike.
- For right handers: left foot forward with left hand closest to the end of the bat. For left handers: right foot forward with right hand closest to the end of the bat.
- If stationary, maintain balance. If moving, step towards target area with front foot.
- Hips, then shoulders, rotate forward.
- Contact should be made with straight arms.
- Follow through should occur, so the bat is above shoulder height.



Figure 4.13:
Two-handed strikes are used when playing hockey.

Dodge

Dodging involves running in one direction and quickly shifting weight to change direction. It requires an individual to run to a certain point before pushing off their outside foot to propel them in another direction. Dodging is present in sports such as touch football, netball, volleyball and basketball.

The skill components for dodging are:

- A change of direction occurs by bending the knee and pushing off the outside foot.
- Change of direction is a fluid movement and should occur in one step.
- The body should be lowered slightly as the change of direction occurs.
- Head remains relatively stable, with eyes focused forward.
- Practise dodging off each foot.



Figure 4.14:
Volleyball players dodge to change direction quickly.

Practical activity

Participate in a range of individual and group physical activities to practise and enhance fundamental movement skills, including activities from Aboriginal and/or Torres Strait Islander cultures.

Internet activity

Log on to TitanOnline and complete Activity 4.2 by researching the teaching tips for the two fundamental movement skills listed.



Figure 4.15:
Techniques from the overarm throw are used for many specific sporting skills; for example, javelin throw, overhead lob in rugby, tennis serve, basketball dunk, volleyball smash, outfield throw in baseball, netball pass and badminton clear.

Specialised movement skills

Specialised movement skills, or sport-specific skills, are the skills that athletes need in more-organised games, activities and sports. Athletes develop them after mastering the FMSs. Two examples of these movement skills are fielding a groundball in baseball and dribbling past an opponent in soccer. The learning of specialised movement skills mostly depends on having the opportunity to practise the skills and receive feedback about them.

By mastering FMSs, participants are more likely to experience enjoyment and success in a wider range of activities. It's important that children are taught the FMSs early in life, thereby providing a foundation to build more sport-specific skills as they mature.

Many sports that involve throwing, such as cricket, netball, basketball, rugby, baseball and javelin, include throwing techniques that are specific to that sport. However, when athletes are learning these specific techniques, they do not have to start from scratch, because mastery of the FMS of the overarm throw is the basis, or platform, from which they develop many other skills.

Learning activity

1. Identify the 12 fundamental movement skills.
2. For each of the following sports or events, identify the fundamental movement skills that are needed. For example, triple jump needs the following skills: sprint run, hop, skip, leap and vertical jump.
   a. High jump.
   b. Soccer.
   c. Gymnastics (floor).
   d. Basketball.
3. Distinguish between fundamental movement skills and specialised movement skills.
4. Participate in a range of games or sports, and record the fundamental movement skills and specialised movement skills involved in each.

Other categories of movement skills

In addition to categorising skills as fundamental or specialised, there are other ways to consider movement skills. Skills may be categorised as gross or fine motor, locomotor or non-locomotor, or manipulative.

Gross and fine motor skills

Skills that we use the body's major muscle groups for are known as motor skills. There are two categories of motor skills:

- **Gross motor skills** are the skills for which we use our large-muscle groups when participating in most sporting events; for example, running and swimming. Development of the gross motor skills is the foundation for development of the fine motor skills.
- **Fine motor skills** are the skills for which we use our small-muscle groups, and include ability to manipulate small objects and to complete tasks that involve various hand–eye coordination. Fine motor skills can involve use of very precise motor movement to achieve an especially delicate task, such as such as mastering control of a small ball in the hand.



Figure 4.16:
Swimming can be categorised as a gross motor skill and a locomotor skill.

Locomotor and non-locomotor movement skills

Locomotor skills involve moving the body from one place to another. Examples are running, walking, skipping, dodging, hopping, leaping and jumping. We do not always have to be on our feet to use locomotor skills, because sliding, rolling and crawling are also this type of skill.

We use non-locomotor skills when we move our limbs but keep our body in the same place or location. Non-locomotor skills involve little or no movement of the base of support, which is usually the feet but can be another part of the body. They are sometimes described as being stability skills. Examples of non-locomotor movement skills are balancing, turning, twisting and swaying.

Manipulative skills

Manipulative skills involve use of an object we manipulate by performing an action such as holding, controlling, hitting or throwing, and we generally need to have good hand–eye coordination to use them. Manipulative movement skills are based on controlling an object, usually by using the hands or feet but also using other parts of the body. They are sometimes referred to as propulsive skills, such as striking, throwing and kicking, and receptive skills, such as catching and trapping. Hockey is one sport in which players use manipulative skills. They must hold the stick and use the correct side of it to contact the ball, and they must use it to receive, control, move and pass the ball.

In sport, locomotor, non-locomotor and manipulative skills do not exist in isolation from each other. In any game, the participants use a combination of skills to fully engage in the activity. In soccer, for example, the players can run when they sprint for the ball, walk when they recover while the ball is out of play, jump to head the ball, and throw the ball in from the sideline. The goalkeeper can catch the ball, throw the ball to start the attack, and use their feet to strike the ball.

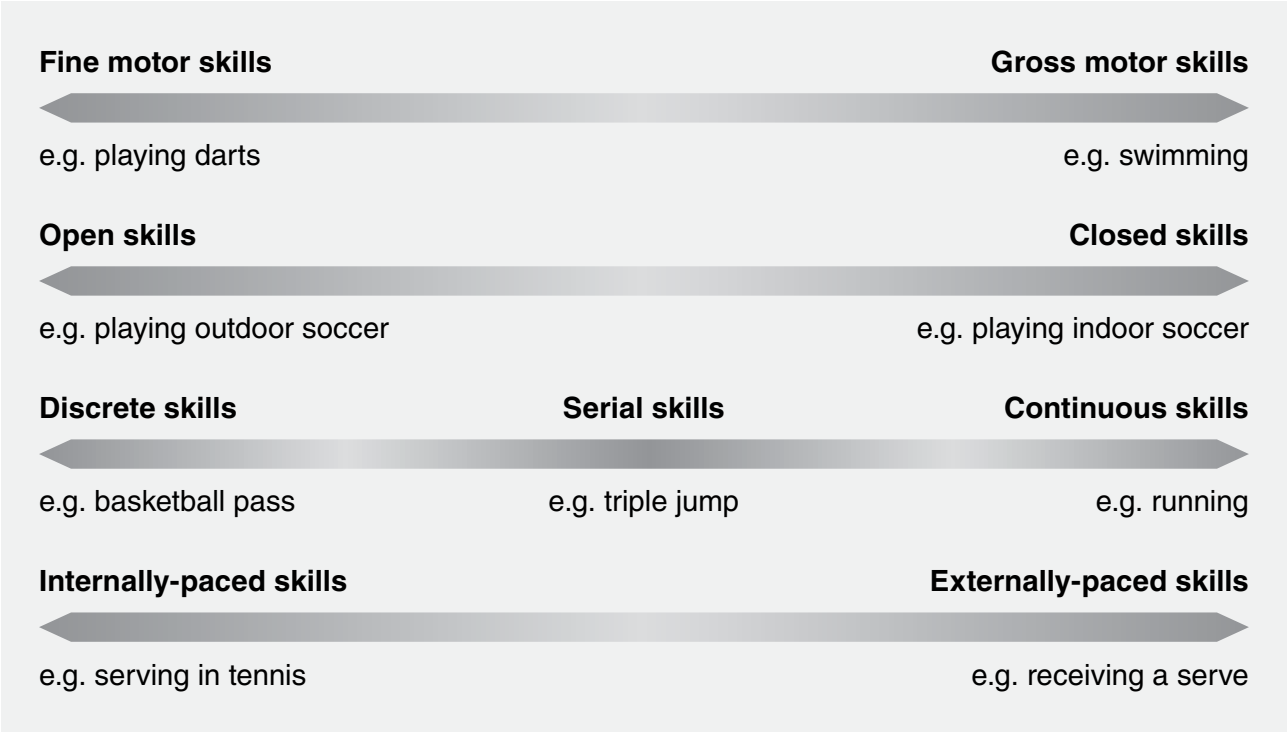


Figure 4.17:
Examples of the skills used in the skill continuums.

Skill continuums

The skills that are needed for sports vary from sport to sport and from situation to situation; for example, a drive shot in golf is different from a drive shot in cricket; and in golf, a drive shot in which the player has a sloping stance can be different from one in which the player has an even stance. Because of these variations, it is very difficult to classify the skills precisely, so we place them on continuums, which are outlined as follows.

- **Gross and fine motor skills continuum:** When we are applying gross motor skills, we are using our large-muscle groups, and the movements are not very precise; two examples are jumping and walking. When we are applying fine motor skills, we are using our small-muscle groups, moving precisely and using a higher level of hand–eye coordination; an example is playing darts.
- **Open and closed skills continuum:** This continuum is related to the effect of the environment on the skill. We apply open skills in a changing environment, such as when we are playing soccer, whereas we apply closed skills in a stable, predictable environment, such as when we are serving in tennis.
- **Discrete, serial and continuous continuum:** This continuum is related to whether the skill has a distinct beginning and end. Discrete skills have a definite start and finish; for example, a soccer throw-in. Serial skills are more complex and involve combining several discrete skills; for example, the triple jump. Continuous skills do not necessarily have a set beginning or end; for example, running.
- **Externally- and internally-paced continuum:** This continuum is all about the timing of the skill. Internally-paced skills are controlled by the athlete whereas externally-paced skills are reliant on an element of the environment, such as opponents or the referee.

Transfer of movement skills

People's ability to experience, learn and refine their motor skills greatly affects their ability to perform any physical activity. Learning or regularly performing a skill can either positively or negatively affect the learning of a second skill. This aspect is referred to as skill transfer. Transfer of the movement skills can be positive or negative.

Positive transfer of movement skills

For transfer of learning to occur, participants need to apply knowledge, skills and behaviours from a previously learnt skill to the new skill. This application is most effective when similar skills are being practised, and learning environments are similar.

When similar skills are being practised and learnt, it allows the development of a learnt skill, rather than learning a completely new skill from scratch, hence increasing the speed of transfer. This demonstrates positive transfer of movement skill, where learning new skills is less demanding. Individuals can build on prior skill proficiencies and adapt their knowledge into the learning of a new skill. For example, people who are proficient at serving in tennis and wish to learn the volleyball serve can draw on their previous experiences to help learn the desired skill. In this case, the movement patterns and skills in the two sports are similar; for example, the throw of the ball, the action of the arm on the serve, and the two-footed jump to the serving line. Therefore, there is a transfer of knowledge about serving from one context to the next, highlighting positive transfer.

Similarly, if people have previous experience in a sport such as hockey, which has movement skills such as hand–eye coordination, this can assist in learning skills in other sports, such as cricket or golf. The development of these skills can effectively assist the learning of sport-specific movement skills associated with cricket or golf.

Negative transfer of movement skills

When people's transfer of skills is negative, the skills they have previously learnt have a detrimental effect on their learning of new skills. Transfer of skills is most likely to be negative when the two learning situations are very similar but the required responses are different; for example, when you are playing the squash and tennis forehand – even though the strokes involve similar tracking and timing, the biomechanics are completely different.

Table 4.1 contains examples of movement activities and the possible positive and negative transfer of skills that may occur.

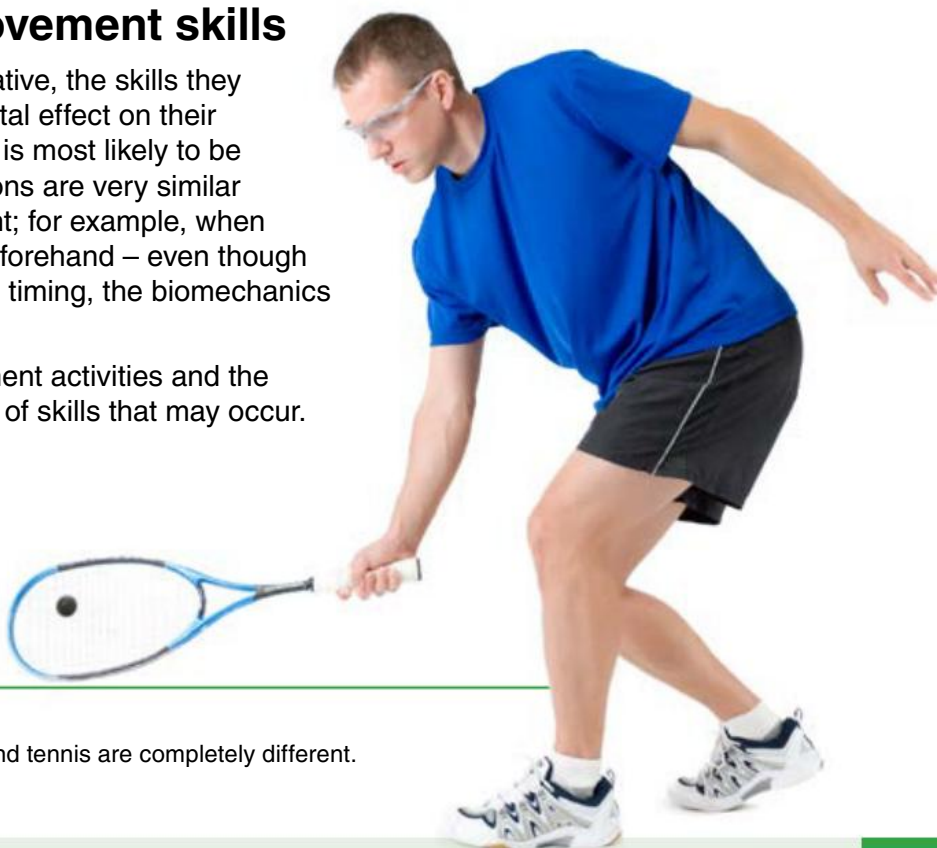


Figure 4.18:
The biometrics involved with playing squash and tennis are completely different.

Table 4.1: Positive and negative transfer of skills.

Movement activities	Positive transfer of skill	Negative transfer of skill
Kicking a ball in soccer and Australian football	Possible foot–eye coordination when making contact with the ball.	The kicking style of each activity is very different. The soccer ball is generally kicked from the ground, while the Australian football is usually kicked using a drop-punt.
Forehand shot in tennis and badminton	Possible hand–eye coordination with racquet and ball/shuttle.	The badminton player is taught to flick their wrist when playing the shot. The tennis forehand is hit with a firm, straight wrist.
Baseball and softball pitch	Can combine the movement sequences together to construct a pitch.	Softball is an underarm pitch, baseball is an overarm pitch.
Catching a baseball and a cricket ball above the head	Both catches require fingers pointing up, eyes on the ball, closing hands on impact.	The use of the baseball glove reduces the need for soft hands giving way on impact. The ball is caught in the glove webbing between thumb and index finger, as opposed to the centre of the hands in cricket.
Defending in basketball and netball	Both sports require the defensive player to shadow their opponent.	Defensively, basketball players are allowed to knock the ball out of the opponent's hand. Netball players are not allowed to make contact with the ball once a defender has possession and must remain one metre away.
Outfield throwing in cricket and throwing a javelin	Body side-on and cross over technique with the feet is similar for both upon release.	The throwing actions are different. Javelin throw is done with a straight arm. The cricket throw arm is bent before straightening upon release.

Learning activity

1. Outline your understanding of specialised movement skills.
2. Distinguish between locomotor movement skills and non-locomotor movement skills.
3. Give examples of:
   a. locomotor movement skills
   b. non-locomotor movement skills
   c. specialised movement skills.
4. In small groups, select a specialised movement skill to teach the class. Write a lesson plan in which you include:
   a. coaching points
   b. equipment needed.
5. In your own words, explain:
   a. positive skill transfer
   b. negative skill transfer.
6. Create a table in which you compare the sports listed as follows. Include the similarities that exist between the paired sports, positive transfer of skill and negative transfer of skill.
   a. Netball and basketball.
   b. Cricket and baseball.
   c. Volleyball and basketball.
   d. Badminton and tennis.
   e. European handball and basketball.
7. There have been many examples of professional players moving between rugby league and rugby union codes. Outline the transferable skills in theses sports that make this transition possible.
8. Outline the strategies a coach could use to promote skill transfer in a game.
9. Sports are sometimes played indoors and outdoors and are sometimes played on different surfaces. What type of transfer do the two situations involve? Provide three specific examples.

Practical activity

Participate in the following pairs of activities, and identify the type of transfer that occurs in each.

- Newcomb ball and volleyball.
- A softball pitch and a baseball pitch.
- A hit in hockey and an off-drive in cricket.
- Tennis and volleyball serve.
- Squash and tennis forehand.



Figure 4.19:
Some volleyball skills are transferable to other sports.

The role of practice in developing movement skills

Practice is the most important ingredient of learning skills and of refining and mastering them. When you practise a sport or an activity regularly, you speed up your learning, aid your long-term retention, and facilitate recall. Movement skills can be practised in a variety of ways, including physical practice and mental rehearsal. Importantly, however, learning of movement skills is less effective when there is no opportunity to perform the task or when practice is delayed. Therefore, the more immediate the opportunity for practice and feedback, the more likely that learning will occur.

Qualities of effective practice

Practice is essential for learning, maintaining and improving skills. When practising a skill properly and repetitively, improvement in muscle memory occurs and, in turn, makes execution of the skill automatic. The type of practice done can affect the speed, extent and amount of learning acquired. Some instructions to follow to make practice effective are listed as follows:

- Ensure mastery of basic skills before moving onto more advanced skills.
- As skill mastery occurs, introduce more-complex skills and/or scenarios.
- Avoid practising by applying poor technique; focus more on quality than on quantity.
- Time the practice session so interest and motivation levels are maintained.
- If necessary, break the skills down into parts, or components, but ensure that skill practice eventually reflects real-game situations.
- Regularly obtain meaningful feedback.



Figure 4.20:
When practising a skill properly and repetitively, improvement in muscle memory occurs.

Learning activity

1. Identify the factors that can affect the quality of the practice.
2. Identify and describe how a good coach promotes effective practice during training sessions.
3. Select two skills from a sport of your choice. Suggest how the skills could be best practised.
4. Explain how the environment influences the effectiveness of a practice situation.

Practice methods

The quality and quantity of the practice have an important role in skill learning. A good coach will organise training sessions, including drills that are appropriate to the task and the athlete, and will ensure that the training sessions remain interesting and challenging. The main types of practice that will affect skill learning are outlined as follows.

Massed practice

Massed practice is a continuous type of skill practice in which the rest periods are shorter than the practice periods. It does not include breaks, rests or alternative activities. This type of practice is often used for continuous skills that are mainly fitness based. Long-distance runners, swimmers and cyclists would benefit from massed practice, because during the event, the body increases its efficiency in response to the demands placed on it during the training. Massed practice is also appropriate in situations in which the learners are skilled and motivated. For example, the members of a hockey team might spend a whole session practising and rehearsing penalty-corner drills, whereby the attacking players are playing against the defenders. Another example is when a rugby union goal kicker practises their kicks at goal for 20 minutes with no break. Massed practice is best for highly skilled or motivated athletes.

Distributed practice

Distributed practice is characterised by periods of rest or the practice of other skills. This type of practice is best for beginners who have low motivation or who find the skill difficult or boring. Also, variety is added to the practice and between each practice session the learner is able to recover mentally and physically.

An example of distributed practice occurs in hockey. Team members spend 15 minutes working on penalty-corner drills before participating in a 20-minute session of honing their fitness and dribbling skills. They have a short rest, and then return to working on the penalty-corner drills. Another example is that of a rugby union goal kicker who practises kicks at goal for 10 minutes, either has a rest or practises another skill of the game for 10 minutes, and returns to goal kicking for another 10 minutes.

For most activities, distributed practice is generally more advantageous than massed practice. The body is allowed to recover between breaks so the player is less fatigued and keeps their mind active and alert by the change of activities. The breaks can also be used for mental rehearsal, which can result in improved performance.



Figure 4.21:
Rugby union players may use distributed practice.

Whole practice

Whole practice involves practising the skill as a whole. The coach might choose to teach a skill as a whole rather than break it down into its parts or components. This type of practice is especially relevant for simple, discrete skills and for skills that cannot be meaningfully broken down; for example, a golf swing, a swimming dive, a set shot, a vertical jump and a bench press would all be taught as whole skills. When whole practice is being used to teach a golf swing, the skill would be demonstrated and then practised in its entirety.

The main advantage of the whole-practice method of skill teaching is that the learner has the opportunity to experience the feeling of the whole movement, similarly to when they are in a game environment. It is also a time-effective method because the skill does not have to be broken down and pieced back together.

One of the method's disadvantages is that learners can lose motivation if they cannot achieve success, or they might be afraid to attempt the skill if they perceive it as dangerous. They might also find it difficult to comprehend and coordinate the various component parts of a complex skill.



Figure 4.22:
Whole practice can be used to teach a golf swing.

Part practice

Part practice is best used when a skill is complex or an element of danger is considered to exist for the player, in which case it is more appropriate to break down the complex movement into its component parts. The parts can be taught separately and then linked together so the player can develop the final skill. When part practice is used, it is important that the whole skill is demonstrated to the learner so they can appreciate the end product and understand how each part is used so they can develop the skill.

The triple jump is a good example of part-practice teaching. First, the take-off and hop are taught and practised, and next, the step is introduced and the learner works on that skill. Finally, the jump and landing are taught and the three elements are joined together.

One of the advantages of part practice is that the learner can achieve success at each level of learning. The learner is thereby encouraged and has their confidence built. However, if the learner finds it hard to put the parts of the skill together, or to appreciate the timing of the parts, their motivation can be affected.



Figure 4.23:
Elements of the triple jump may be learned and practised separately.

Internet activity

Log on to TitanOnline and complete Activity 4.3 by watching the video and completing the basketball practical activity.

Learning activity

1. Explain the following types of practice and give examples of each:
   a. Whole practice.
   b. Part practice.
   c. Massed practice.
   d. Distributed practice.
2. Identify the type of practice that is most appropriate for the following individuals and justify your responses.
   a. A beginner.
   b. A child.
   c. An elite athlete.
3. For a skill of your choice, outline how each of the following types of practice would be used in the teaching:
   a. Whole practice.
   b. Part practice.
   c. Massed practice.
   d. Distributed practice.
4. For a sport of your choice, design a 60- to 90-minute training program in which you incorporate each type of practice.

Practical activity

Select an activity from the following list:

- Basketball free throw.
- Netball shooting.
- Three-ball juggling.
- Darts.

Test: Decide how you are going to evaluate the activity you have selected. You might, for example, decide how many baskets were scored out of 30 attempts.
Each student is to perform the selected skill and record the results.

The class is to be divided into two even groups:

- Group 1 is to practise the chosen skill for 10 minutes each day for five days.
- Group 2 is to practise the chosen skill for 50 minutes continuously on one day.

Re-test: Both groups are to perform the selected skill again and to record and compare their results.

Following the practical activity, summarise your findings:

- Explain the possible reasons for your results.
- Present your results in the form of a graph or table.



Figure 4.24:
Juggling is a skill requiring hand–eye coordination and accurate throwing and catching skills.



Figure 4.25:
Mental rehearsal can help athletes learn to focus, ignore distractions and calm their nerves.

Psychological strategies

Within games and sports, psychological strategies can be used to significantly enhance performance. Psychological strategies are an integral part of movement skill practice. They emphasise the process rather than the outcome, to give athletes opportunity to understand the 'why' of movement. Through this, performance is broken down and simplified to reduce performance anxiety and build confidence in ability. Therefore, the role of such strategies in sport is to help an athlete concentrate on process, refocus on relevant cues, calm the body and mind, and positively envisage sporting success. These outcomes can be demonstrated through mental practice and visualisation.

Mental practice is the process of going over the skill or performance and breaking down the steps of a future performance. This describes a step-by-step guide to movement skill that athletes can practise and rehearse before performance to positively reassure them that they are capable of success. For example, a rugby league player preparing to kick for goal can go through the specific steps needed, like walking towards the tee, leg swing and keeping their head down to follow through.

Mental practice is linked to visualisation, where the athlete pictures the performance and imagines the future performance in a physical sense. Repetitive, realistic and successful pictures of performance prepare the athlete for the whole experience, including the sounds, colours, movements and crowd to be expected. The imagery techniques used in mental visualisation allow the athlete to create a positive representation of the future performance. For example, a soccer player in a penalty shoot-out needs to visualise successfully scoring the penalty kick. To visualise failure is to experience failure.

Mental practice and visualisation have a significant contribution in enhancing performance. These benefits are explained below.

- In building an image of the skill in their mind, beginners save time and energy during their physical practice.
- The increased confidence that athletes have after periods of mental rehearsal is an aid to their performance. Even in challenging situations, mental practice leads to improved self-confidence and reduced stress by way of visualisation of success.
- When athletes are visualising the skill, their brain and nervous system are practising sending impulses to their muscles, so they perform the skill better.
- Athletes are better able to control their excitement and nerves if they experience the outcomes by mentally rehearsing them. Mental rehearsal is very effective for promoting relaxation and aiding reduction of stress.

Mental rehearsal is an effective way to support skill development and, according to research, athletes who prepare by using a combination of 'imagined practice' and actual practice often achieve a better performance compared with athletes who prepare by solely relying on actual practice. Therefore, using mental practice and visualisation techniques plays a significant role in enhancing overall performance.



Figure 4.26:
A soccer player in a penalty shoot-out needs to visualise successfully scoring the penalty goal.



Figure 4.27:
Athletes who prepare by using a combination of 'imagined practice' and actual practice often achieve a better performance.

Learning activity

1. Define mental rehearsal.
2. Outline the benefits and limitations of mental rehearsal.
3. Identify when an athlete would use mental rehearsal.
4. Explain how mental rehearsal could be used to reduce anxiety before an important game or competition.
5. For a sport or event of your choice, write a mental-rehearsal script that players could use before they participate in a major game or competition.
6. Critically evaluate the following statement: Mental practice is as important as physical practice.

The value of mastering fundamental movement skills

The impact of fundamental skill levels

A clear relationship exists between mastery of fundamental movement skills and participation in physical activity. A person's level of participation mainly depends on whether they enjoy the activity in question, and for most people, the enjoyment comes when they have achieved basic mastery of the skills. However, the frustration and embarrassment of failing to perform a skill that others have mastered can discourage participation. This ultimately reflects on individual's attitudes to participation. Positive or negative experiences in physical activity can determine the likelihood of continued participation. Consider the following scenarios.



Figure 4.28:
Activities such as skateboarding require fundamental movement skills.

Scenario 1

Charbel is eight years old and has minimal experience playing games and sports. As a result, his manipulative movement skills, specifically catching and throwing, are limited. Because of an embarrassing past experience, where during flag football he dropped the ball in the end zone in the final minutes of the game, he feels uncomfortable during PDHPE lessons and avoids going near the ball in team games. On top of this, Charbel feels his lack of experience and less developed FMSs are barriers to him joining in ball games at lunchtime, limiting his social interactions.



Figure 4.29: Less developed skills can limit social interactions.

Charbel's situation demonstrates poorly developed FMSs, especially throwing and catching. Because of his ability and his social context, Charbel has adopted a negative mindset that he is not good at sport. Overall, he has had a negative experience in physical activity. This therefore limits his participation options; for example, playing sport and physical activity outside of school, which may further discourage continued participation.

Because of Charbel's past experience, his participation is determined by his success in a range of physical activities. Charbel deems his flag football performance unsuccessful, and therefore avoids this failure by not actively participating in future PDHPE lessons. Also, because of his poorly developed catching and throwing skills, he is unlikely to want to go on to learn sport-specific skills because he does not have the platform to build upon.

Scenario 2

Contrastingly, Mia, who is also eight years old, loves sport and PDHPE lessons. She spends her free time playing ball sports in her backyard with her brother and sister. She has highly developed manipulative skills, including throwing, catching and striking. Mia is often asked to join teams in PDHPE as her skills are an asset to the team and advantageous for potential success.



Figure 4.30: Strong skills create success and high self-esteem levels.

Clearly, Mia has a positive attitude to physical activity, and finds enjoyment in playing all games and sports. This positive attitude encourages increased participation, and establishes a long-lasting value for, and involvement in, physical activity.

Supporting this, Mia is successful in games and sports as she has strong FMSs that support her in movement contexts. This success and achievement develops high self-esteem and motivation to continue participating in physical activity.

As a result, Mia is likely to continue participating in physical activity through a variety of games and sports. She is likely to prioritise practice time for FMSs, and continue to strive in acquiring new and building on previously learnt FMSs.

As described in the scenarios, attitudes towards participation, being positive or negative, and success in movement contexts have a significant impact on participation.

Increased participation in sport and physical activity ultimately leads to healthier people, who will realise the benefits of their participation by way of having increased health, increased self-esteem and improved lifestyle choices. According to research, students who participate in physical activity daily exhibit an improvement in their memory, concentration, communication skills, problem-solving ability and leadership capabilities.

Sport not only has health benefits; it has a role in social and personal development. It is an aid to the development of social, personal and life skills as well as development of people's self-confidence and sense of self-worth. People who participate in sporting and recreation activities learn meaningful life and interpersonal skills such as leadership, teamwork, discipline, hard work, fair play and respect for other people.

Learning activity

1. Compare and contrast the two students' attitudes to participation.
2. Discuss the relationship between skill level, participation and attitude.
3. Suggest some other fundamental skills that Charbel might be better at and suggest activities that are based on those skills.
4. Describe the importance of fundamental skill mastery in sporting performance.
5. In pairs, propose strategies for implementation in your community in relation to increasing people's participation in sport and physical activity.

Practical activity

Select a specialised movement skill and work in small groups to design a practice session for teaching the skill. Try to include variety as well as activities the participants will enjoy.

In your plan, include:

- the necessary facilities and equipment
- a warm-up
- a stretching regimen
- two or three drills for practising the skill
- coaching points
- a cool-down.

Your practice session is to be implemented for groups of six. If necessary, two groups can take turns to deliver the planned session and be the participants.

At the end, discuss the strengths and weaknesses that characterised each of the sessions. Record and report back on any relevant observations about development of specialised movement skills.

Current research to improve fundamental movement skills

Current research on the improvement of FMSs among school-aged children outlines how movement skills over time either improve or decline in development. The NSW Schools Physical Activity and Nutrition Surveys are a series of school-based surveys of New South Wales school students, first conducted in 1985.

According to data collected in 2015, 67 per cent of boys and 30 per cent of girls demonstrated advanced skills in the overarm throw, suggesting boys were significantly more competent in this movement skill. In contrast, 34 per cent of boys and 54 per cent of girls demonstrated advanced skills in the leap, implying that girls are more developed in this movement skill. Overall, boys and girls were equally proficient in the side gallop and shared similar capabilities in the vertical jump.

This evidence highlights the range of movement skill mastery. As the research suggests, locomotor or object control skills are the foundation to games and sports but, overall, FMS competency is low. This therefore limits opportunities to practise FMSs in a games and sports context.

Source: NSW Health



Figure 4.31:
For people with disability, using adaptive equipment is essential in supporting effective skill development.

Promoting regular physical activity and a lifelong healthy lifestyle is dependent on the effective development of FMSs at school age. The 'Get Skilled: Get Active' teaching resource has helped teachers in facilitating this essential FMS learning and development of more advanced skills.

Another government initiative that aimed to address research indicating a trend of declining FMS competency of school-aged children was the Active After-school Communities program which was introduced to address the lack of engagement in physical activity. According to research, less than 20 per cent of primary-school students participated in the program, and of the ones who did participate, boys constituted a significantly higher proportion.

Source: www.healthykids.nsw.gov.au

As stated, it is important for all students to progress in their achievement of FMSs. For people with disability, especially students, implementing and using adaptive equipment is essential in supporting effective FMS development and improvement. Strategies need to be implemented to be inclusive and maintain a socially and ethically equitable class environment. Examples of adjustments are using a synthetic surface for a student in a wheelchair, breaking down a skill into smaller and more achievable steps for a student with Asperger's syndrome, and using a modified tennis racquet for a student with an arm or hand injury.



Figure 4.32:
It is important for coaches to watch for signals that indicate something is wrong.

Feedback

Feedback is an integral component of learning. Providing constructive feedback is an essential skill for any coach. Player feedback is useful for coaches as it helps in the analysis process. Good coaches understand that part of being a good communicator is being open to negative feedback and criticism. Within this feedback are the seeds to becoming a better, more successful coach.

Research suggests that 70 per cent of communication is non-verbal. That's why it is important for coaches to watch for signals that indicate something is wrong. Coaches skilled in reading their athletes and who encourage them to speak up can successfully prevent the effects of dehydration or injury, assist in skill development, and bolster athletes' confidence.

Source: Sport Australia

Practical activity

In small groups, participate in a range of activities that require fundamental movement skills. Support other students in the group by providing constructive feedback in relation to their movement skill, for example:

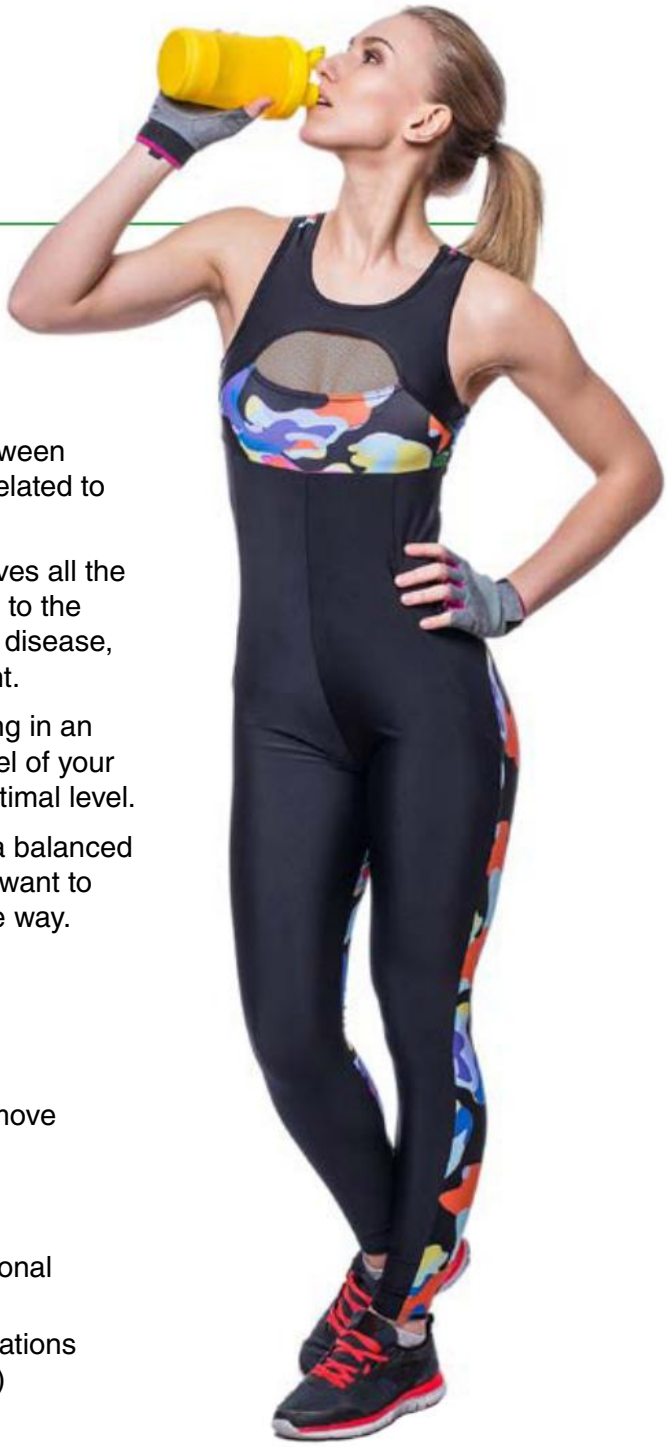
- Verbal and non-verbal feedback.
- Use technology as a tool, such as slow-motion video breakdown, to provide feedback to another student.

Revision questions

1. Distinguish between fundamental movement skills and specialised movement skills.
2. Distinguish between locomotor movement skills and non-locomotor movement skills.
3. Give examples of the following types of movement skills:
   a. Locomotor.
   b. Non-locomotor.
   c. Specialised.
4. In your own words, explain:
   a. positive skill transfer
   b. negative skill transfer.
5. Identify and describe how a good coach promotes effective practice during training sessions.
6. Outline the advantages and disadvantages of:
   a. whole practice
   b. part practice.
7. Outline the benefits and limitations of mental rehearsal.
8. Explain how mental rehearsal could be used to reduce players' anxiety before an important game or competition.
9. Outline the three stages of skill acquisition.
10. Discuss the degree to which a coach should insist on the development of conventional technique; for example, addressing an unusual but effective technique.
11. Which of the following statements is true of adolescents who have not mastered fundamental movement skills?
    a. They would probably be motivated to improve their performance so they are not embarrassed in front of their peers.
    b. They are more likely to participate less in physical activity.
    c. They don't care about sport and physical activity.
    d. They probably lack the ability to get better even if they tried.
12. An experienced squash player takes up the game of tennis and finds that he is using the squash forehand drive technique when he plays the tennis forehand shot. This can be described as:
    a. sport specific movement skill
    b. transfer of movement skill
    c. negative transfer of movement skill
    d. positive transfer of movement skill.

CHAPTER 5

Nutrition and physical activity



Food is necessary for the body to function, and good nutrition involves choosing the right foods and quantities to satisfy your individual needs. The type and amount you eat influences how efficiently and effectively your body functions. A strong link exists between dietary intake and health, and many diseases are directly related to diet and lifestyle.

We should all eat a wide variety of foods so our body receives all the nutrients it needs. Nutrients are essential for energy supply to the body, cell building and repair, development of resistance to disease, the body's normal functioning, and growth and development.

Whether you are exercising to keep fit, regularly participating in an organised sporting activity or training to reach the peak level of your sport, you need good nutrition so you can perform at an optimal level.

For weight management to be effective, you need to have a balanced diet and regularly engage in physical activity. Whether you want to lose or gain weight, you must to do so in a healthy and safe way.

Outcomes

A student:

- discusses factors that limit and enhance the capacity to move and perform (PASS5-1)
- analyses the benefits of participation and performance in physical activity and sport (PASS5-2)
- displays management and planning skills to achieve personal and group goals (PASS5-8)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Nutrition for health and physical activity
- Marketing of nutritional products
- Nutritional planning
- Nutrition, physical activity and weight management

Figure 5.1:
Nutrients are essential for energy supply to the body.

Nutrition for health and physical activity

A healthy eating pattern is fundamental to maintenance of good health and wellbeing. Healthy eating is of benefit to almost every aspect of our health, throughout our lifetime. Although many Australians enjoy a varied and healthy diet, there is considerable room for improvement. Health problems that are linked to poor eating patterns – for example heart disease, type 2 diabetes and some cancers – are an enormous burden on individuals, families and society as a whole.

Nutritional needs of specific groups

There are several specific groups within society that have differing nutritional needs for healthy living and physical activity. These groups include people with disability, children and the elderly. Within each group, there are several universal characteristics and requirements that allow for general nutritional needs to be identified. Having a healthy and balanced diet is important for everyone. Diet-related chronic disease is a major cause of death and disability among Australians.

People with disability

As each person is unique, it is important to note that the disability will be specific to the individual. Disability may be intellectual, physical, sensory or psychiatric, or a combination of these types. This means that different disabilities will have particular nutrition needs for the individual to be the healthiest version of themselves, and support their physical health. To achieve this, those with disability should be encouraged to seek advice from a healthcare professional such as a dietitian. These practitioners are trained to give individualised nutritional information that can meet the specific nutritional requirements or eating habits of the individual, and help combat secondary conditions such as fatigue, weight problems, constipation or diarrhoea. Including an adequate amount and variety of fresh fruits, vegetables and wholegrains, as well as including healthy, balanced meals and snacks can significantly reduce such health-related issues. Other dietary factors that can promote healthy living and help physical activity are limiting the amounts of saturated fats, simple sugars, salt and alcohol in the diet. It is also important to recognise individual food preferences, including textures and sensations of foods, specific to those with disability.



Figure 5.2:
Some people with disability may have difficulty with shopping, food preparation and cooking.

Children

Childhood is an important developmental period of life, with eating patterns and behaviours learnt during this time commonly carrying into adulthood. Because of this, children should be introduced to healthy eating habits based on the Australian Guide to Healthy Eating. To support health and physical activity, children should eat a sufficient amount of nutritious foods and drinks to meet their energy needs. These should involve a wide variety of foods and drinks from the five food groups. Within these groups are vegetables; wholegrains; fruit; proteins such as lean meats, poultry, fish, eggs, tofu, nuts, seeds, beans and legumes; and dairy products such as milk, cheese, yoghurt and/or their alternatives. Children's diets should also limit the intake of foods and drinks high in saturated fats, added salt and sugars. Such foods may include many processed foods, such as sweets and desserts, confectionery, burgers, hot chips, crisps and fatty and/or salty snacks. The intake of drinks such as sugar-sweetened cordial, soft drinks and sports drinks should be minimised. These foods are known as discretionary foods that should only be consumed occasionally and in small amounts.

The daily intake and serving size of food and drink from the five food groups is dependent on the child's age, weight, gender and physical activity level. Generally, those who are taller, older or are more physically active will need higher daily intakes and serving sizes than those who are younger, of a smaller stature and less physically active. Also, children who prefer to eat larger serving sizes may eat less often than those who prefer small servings more often.



Figure 5.3:
Eating patterns and behaviours are learnt during childhood.

Elderly people

The term 'elderly people' is commonly used to describe people over 65 years. To continue promotion of healthy living and physical activity into old age, it is crucial to maintain a healthy and balanced diet based on the Australian Guide to Healthy Eating. This can become more difficult with ageing, as a reduced appetite and ability to buy and prepare healthy meals can result in a lack of essential vitamins, minerals and fibre. A decrease in these nutrients can further contribute to sickness, chronic illness and overall healthy functioning of the elderly. There are several other common issues that arise within the elderly population including problems with bone health, arthritis and constipation. Such problems can possibly be reduced by dietary means such as including a variety of foods that contain enough calcium and vitamin D, and high-fibre sources of foods and fish oils. It is also important that elderly people limit the use and intake of added salt, saturated fats and alcohol, while drinking adequate amounts of water. These general nutritional guidelines can help in ensuring an adequate amount of energy, allowing involvement in physical activity. Such physical activity can strengthen bones, maintain a healthy weight and reduce pain and inflammation of the body.



Figure 5.4:
A decrease in nutrients can contribute to sickness in the elderly.



Figure 5.5:
People who exercise strenuously might need to increase the amount of energy they get from carbohydrates.

Nutritional requirements for physical activity

An athlete's diet should be similar to the diet recommended for the general public, whereby energy intake is divided to be:

- more than 55 per cent from carbohydrates
- 12 to 15 per cent from protein
- less than 30 per cent from fat.

Athletes who exercise strenuously for more than 60 to 90 minutes a day might need to increase the amount of energy they get from carbohydrates to between 65 per cent and 70 per cent.

According to more recent advice, the guidelines for carbohydrates and protein are based on grams per kilogram (g/kg) of body weight. The current recommendations for fat intake are for most athletes to follow recommendations that are similar to the ones provided for the general community, and the preference is for fats to come from olive oils, avocado, nuts and seeds. Athletes should also aim to minimise their intake of high-fat foods such as biscuits, cakes, pastries, chips and fried foods.

During digestion, all carbohydrates are broken down into sugar (glucose), which is the body's main energy source. Glucose can be converted to glycogen and can be stored in the liver and muscle tissue. It can then be used as a key energy source during exercise to fuel exercising muscle tissue and other body systems. Athletes can increase their stores of glycogen by regularly eating high-carbohydrate foods.

If the amount of carbohydrate in the diet is restricted, our ability to exercise is compromised because we do not have enough glycogen in storage to fuel our body. The result can be loss of protein (muscle) tissue, because the body will start to break down muscle tissue to meet its energy needs, and the risk of infections and illness might consequently be increased.

The current recommendations for carbohydrate requirements vary, depending on the duration, frequency and intensity of the exercise undertaken. Foods that are rich in unrefined carbohydrates, such as wholegrain breads and cereals, should be the basis of the athlete's diet. More-refined carbohydrate foods, such as white bread, jams and lollies, should be avoided or minimised.

Athletes are advised to adjust the amount of carbohydrate they consume for their fuelling and recovery to suit their exercise level, as indicated in the following four examples:

1. **Light-intensity exercise (30 minutes a day):** between three and five grams per kilogram of body weight a day.
2. **Moderate-intensity exercise (60 minutes a day):** between five and seven grams per kilogram of body weight a day.
3. **Endurance exercise (between one and three hours a day):** between six and 10 grams per kilogram of body weight a day.
4. **Extreme-endurance exercise (more than four hours a day):** between eight and 12 grams per kilogram of body weight a day.

Source: Sport Australia

Marketing of nutritional products

The marketplace has a range of nutritional products which advertisers claim will give athletes a range of advantages. These advantages include:

- a winning edge because recovery is quicker
- improved endurance
- increased strength
- reduced body fat
- enhanced immune system.

The products commonly come in the form of a liquid meal, nutritional bars or a supplement. They are often expensive and cleverly marketed but are of questionable benefit.

Advertising techniques used to promote nutritional products

The purpose of techniques used by advertisers is to increase awareness about a product, create a good reputation, improve customers' perceptions of the business and/or industry, promote a sale, gather contact details for a mailing list, and increase sales of the product. Companies promote their nutritional products via:

- direct mail
- trade exhibitions
- internet/social media
- flyers
- direct sales
- personal selling
- infomercials
- email
- print media
- television.



Figure 5.6:
Advertisers may use a social media influencer to endorse their product.

Techniques advertising companies use to promote nutritional products include:

- broadcasting repetitive, catchy jingles in advertisements aimed at children
- internet 'viral marketing' methods to directly encourage children to participate in food-product promotion
- emphasis on the convenient packaging of school lunches as being fun, trendy and easy to use
- instigation of school loyalty programs to encourage parents to purchase a specific food so they can get tokens for school equipment
- a celebrity or social media influencer to endorse the product
- point-of-sale advertising by setting up displays of child-targeted high-fat or high-sugar products at supermarket check-outs to encourage children to pester their parents
- potentially misleading product descriptions such as 'juice drink' for a product that has a very low fruit content
- magical promises that consumers will be able to use the product to lose weight, build their muscles or improve their athletic performance
- giving the impression that everyone is using the product and thereby implying that an individual will be missing out if not using it.

The market is filled with contradictory information about the health or performance benefits of many nutritional supplements. This makes it difficult for consumers to make an informed decision about what if anything actually 'works'. Reconsideration should be given to any product which makes a health claim that falls into one or more of the following categories:

- A quick fix is promised.
- Sounds too good to be true.
- Simple conclusions are drawn from a complex study.
- Recommendations are based on the results of a single study.
- A dramatic statement that is refuted by a reputable scientific organisation.
- A recommendation based on studies that have not been subjected to peer review.
- A recommendation based on studies during which differences among individuals or groups were ignored.
- Dire warnings about the danger of consuming a single product.
- A list of 'good' and 'bad' foods.
- A recommendation that is either made to help sell a product or made by the manufacturer itself.

As a consumer, it is imperative to determine the qualifications and background of any person who is recommending a nutritional product. A reputable person will have a background with or will be affiliated with an accredited university or medical facility that offers programs in the fields of nutrition or medicine. A title such as 'nutritionist' should be critically considered, as this can be used by anyone, regardless of their training, and they may not be regulated. Claims about academic qualifications can be falsified or purchased from an unaccredited institution. Evidence should exist in support of the claims being made, and the information should be factual and specific rather than vague and highly emotive. Assess whether recommendations are based on published scientific evidence or personal testimonials. Question who developed the information and whom it was created for.

Liquid meals, energy bars and supplements are examples of products that are promoted extensively to people who are physically active.



Figure 5.7:
Product descriptions may be misleading.

Liquid meals

Liquid-meal supplements are usually made of carbohydrate- or protein-rich, low-fat powder (or liquid). They are usually mixed with water or milk to be a source of energy and a nutrient-rich dietary supplement. They can be useful for athletes who are:

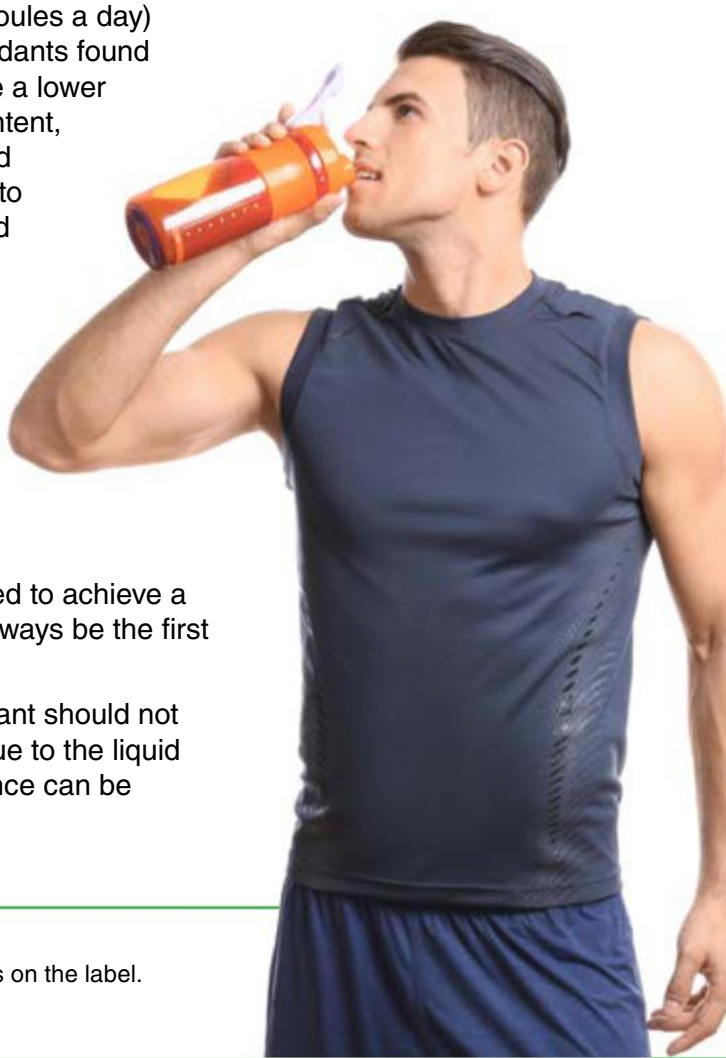
- aiming to increase their lean body mass
- coping with a heavy training load
- undergoing a growth spurt.

Liquid meals can be advantageous in that they are a compact and easily prepared meal replacement and are a substantial source of many vitamins, minerals and essential amino acids.

They can be especially useful as a post-exercise recovery snack because they are portable, non-perishable and easily prepared, so travelling athletes who have minimal facilities for preparing and storing food find them useful.

When selecting a liquid meal, it is important to read the ingredients on the label to ensure the product has adequate fibre and protein. In commercial products, fibre content varies widely, ranging from one gram to five grams, and protein content ranges from four to 15 grams. An important point to remember is that solid foods still need to be eaten every day. To consume adequate fibre, eat fruits and vegetables every day.

Low-kilojoule liquid diets (between 2100 and 3400 kilojoules a day) usually contain too little fibre and lack important antioxidants found in fruits, vegetables and wholegrains. The result can be a lower resistance to disease. Also, due to the low-kilojoule content, such liquid diets are unsafe unless medically prescribed and supervised. Where they are prescribed, they have to be used according to directions so that their energy and nutrient composition is adequate for achieving specific nutritional goals.



Individuals often overuse liquid-meal supplements and can become overly reliant on them as expensive alternatives to the whole foods they should be consuming. Because of the supplements' compact form it is too easy to take in too many kilojoules and gain unwanted weight. Failing to follow the instructions for preparing the drink may mean not enough energy and nutrients are supplied to achieve a specific dietary goal. Traditional food sources should always be the first option for meals and snacks.

People with diabetes and those who are lactose intolerant should not consume liquid meals. Diabetes can be exacerbated due to the liquid meals' high carbohydrate content, and lactose intolerance can be aggravated due to their dairy-milk content.

Figure 5.8:
When selecting a liquid meal, it is important to read the ingredients on the label.

Energy bars

Energy bars are a convenient and compact source of energy, supplying carbohydrate and protein in a solid form. Athletes can use them as an energy, carbohydrate or protein supplement. Compared with sports drinks, nutritional bars are more concentrated and are a substantial fuel boost when consumed during or after exercise. They are usually low in fat and fibre and are often fortified with a variety of vitamins and minerals. Travelling or busy athletes who have minimal facilities for preparing and storing food find them useful as they are portable, non-perishable and an easily prepared meal or snack.

Energy bars are especially beneficial for athletes who need a high level of energy and are also useful during post-exercise recovery. However, athletes often over-use them and thereby inappropriately replace whole foods with them. Compared with whole foods, they are more expensive and athletes should always consider whole-food sources to be their first option for meals and snacks. Athletes also need to consider their needs for fluid during and after exercise.

Following is a description of some of the nutritional bars that are commonly available:

- **Meal-replacement bars:** According to government regulations, these bars must meet specific criteria for their protein, carbohydrate, fat, salt and kilojoule content. The products usually include meal-replacement instructions whereby you eat one bar for breakfast and another one for lunch and then eat a proper evening meal.
- **Snack bars:** As long as their ingredients are generally considered to be safe, these bars can consist of any food item and contain a wide range of kilojoules, protein, carbohydrate and fat. They include all the 'chocolate bars' and many so-called sports bars that can be taken in between meals or pre- or post-training. There are a variety of snack bars on the market ranging from high carbohydrate or high protein to low carbohydrate. Again, their use will depend on the needs of the athlete.
- **Fruit bars:** These bars consist of dried fruit and binding agents. Their nutritional content varies according to the amount of processing the fruit was exposed to during manufacture. These forms of bars are becoming increasingly popular, with many 'health bars' including dried fruit such as dates, and nuts and protein to create healthier and substantial snack bars.



Figure 5.9:
Meal-replacement bars must meet specific criteria for their protein, carbohydrate, fat, salt and kilojoule content.

Supplements

Dietary supplements including vitamins, minerals, herbs and amino acids are intended to complement a diet that is not meeting all a person's nutritional needs. People commonly take supplements by mouth (orally) as a pill, capsule, tablet or liquid.

Athletes who have busy schedules or intense training sessions often find these products are valuable in helping achieve their nutritional goals, as well as helping sleep, gut health, muscle recovery and hormonal balance. By managing these factors, athletes and their support staff wish to support overall health and wellbeing and marginal gains in athlete performance. Supplements can be especially useful for athletes who are travelling to a country that has an inadequate or otherwise limited food supply, athletes who are undertaking a prolonged period of energy restriction, athletes who have a heavy competition schedule involving disruption to normal eating patterns, or for athletes who are experiencing abnormal amounts of stress or gut disruptions.

However, there is little evidence that supplementation with vitamins and minerals will enhance these factors and performance, except in cases where a pre-existing deficiency exists. Because of this, supplements should be viewed as the 'icing on the cake' and should only be used as an add-on or the final layer once all other factors are managed.



Figure 5.10:
There is little evidence that supplementation with vitamins and minerals enhances performance.

Often these supplements may act as a placebo, and athletes who are otherwise eating and managing themselves poorly might thereby gain a false sense of security from them. It is important to realise that the only time supplements are necessary is when an athlete's diet is deficient or use is recommended by a sports dietitian. These trained professionals can assess an athlete's nutritional needs and lifestyle factors to identify if supplementation will be beneficial. It is important that the athlete works with the dietitian to select quality products and develop a protocol specific and effective for them.

There are several risks and negatives associated with supplements that athletes need to be aware of, such as manufacturing and quality control of the products, doping and cost. Despite a legal requirement that product labelling be truthful and accurate, consumers can find it difficult to determine the quality of a dietary supplement by reading its label. The extent of quality control (specific amounts of ingredients in each batch) depends on the manufacturer, the supplier and other parties involved in the production process. Labelling inaccuracies can become particularly risky for high-level athletes who must comply with anti-doping laws. For this reason, it is recommended that Australian athletes select high-quality and accredited brands for their supplement products. Ideally, these products should be Australian made as Australia has tight manufacturing and labelling regulations. These products are also generally expensive, and can be an extra unnecessary financial burden if not needed, so a 'food first' solution should always be considered.

Following are some types of claims that are commonly included on the labels of dietary supplements or food products:

- **Health claim:** a claim that a relationship exists between the food, a food component or a dietary-supplement ingredient and reduction in the risk of developing a disease or a health-related condition.
- **Nutrient-content claim**: a claim about the relative amount of a nutrient or dietary substance in the product.
- **Functional claim:** a claim about how the product might affect the body's organs or systems.



Figure 5.11:
It is imperative to determine the qualifications and background of any person who is recommending a nutritional product.

Learning activity

1. Examine some advertisements that are being used to promote nutritional products. Look at various media, such as television and print media. Identify some of the claims being made and the techniques being used to sell the products.
2. In small groups, design a new nutritional product. In your outline, include:
   a. the product name
   b. product description
   c. target audience
   d. package design
   e. price and venue for the product launch.
3. Develop a marketing plan for your new nutritional product and include in it:
   a. the advertising medium
   b. the identity of a spokesperson
   c. details for an event launch
   d. the identities of sporting-body partnerships to boost the product's credibility
   e. use of promotional material.
4. Investigate and describe the general nutritional needs of a specific group; for example, women or the elderly.
5. Investigate two liquid meals. Compare their nutritional content and their advantages and disadvantages.
6. Investigate two nutritional bars such as 'power bars' or 'energy bars'. Record the nutritional information on the packages and determine each bar's usefulness.
7. Critically evaluate the following statement: For athletic performance, nutritional supplements are more advantageous than a balanced diet.

Common myths and misconceptions

When it comes to nutrition and physical activity, many people will hand out tips and tricks they have heard or read about. However, these are often inaccurate, leading to the health and fitness industry being full of many myths and misconceptions. These are commonly related to certain nutritional or physical activity fads, promising to give fast results.

Current myths and misconceptions about nutrition include:

- **Cutting out foods groups:** there are lots of opinions suggesting to cut out whole food groups such as carbohydrates (carbs) and/or gluten, meat or dairy. However, unless an individual has an allergy, intolerance, is an athlete on a specific food regime, or a person who has other medical issues, they should include a wide range of healthy foods outlined in the Australian Guide to Healthy Eating. This will ensure their body is getting a wide range of healthy food sources, vitamins, minerals and micronutrients. Cutting out whole food groups from the diet will reduce this and can lead to hunger, fatigue and other health issues.
- **Fat-burning foods:** when wanting to lose fat, there is a common misconception that eating certain foods or taking fat-burning supplements will make this happen. However, taking such supplements and particular foods without addressing any other lifestyle changes may be ineffective, expensive and/or unsafe. There are several natural foods such as fatty fish, coffee, green tea, apple cider vinegar and chillies that may increase metabolic rate and therefore promote fat loss. However, such research is limited, and simply adding these foods will not give immediate results. Eating a well-balanced diet and exercising regularly is the most effective and safe way to improve overall health.
- **I can out-train a bad diet:** there is a misconception that people can eat whatever they want as long as they train or are very physically active and feel as though they look healthy. However, the definition of what healthy looks like is very individualised and often inaccurate. Eating a diet full of refined sugars, salt and saturated fatty foods is not ideal, regardless of a person's physical activity levels. The body needs to be supplied with healthy and nutritious food to function properly and thrive, so that is can grow and perform daily activities. This misconception may set up unhealthy eating behaviours, and instead, healthy eating habits should be promoted from a young age. This includes encouragement to follow the Australian Guide to Healthy Eating to ensure a balanced and nutritious diet.
- **Fresh is best:** although it is good to eat fresh foods, particularly those in season, frozen produce can be just as nutritious or more nutritious than fresh food. Produce available in supermarkets may spend a considerable amount of time in transit from the farm to the store shelves, and along the way nutrient levels can decrease. Fresh fruit and vegetables picked directly from home or farms close by will have the highest nutrient density but for many this is not an option. Frozen fruits and vegetables are snap-frozen shortly after they are harvested, locking in nutrients. This allows for nutrient-dense foods to be more available, at a cheaper price than most fresh produce, allows people to eat foods that are not in season and helps Australians to eat the recommended number of serves of fruits and vegetables per day.



Figure 5.12:
Freezing fruits and vegetables allows these nutrient-dense foods to be more available out of season.

Learning activity

1. Explain why people may choose to adopt a fad diet in preference to mainstream nutritional guidelines.
2. Outline the effect that celebrities who go on a fad diet have on the general population.
3. Design a promotional flyer to warn of the potential dangers of going on high-activity, 'rapid weight loss' programs.
4. For a teen magazine, write an article about the impact that fad diets have on health and metabolism. Use facts and statistics to substantiate your claims. Include recommendations for healthy eating, the benefits of good nutrition and strategies for increasing metabolism.
5. Critically appraise current nutritional fads such as the Ketogenic diet, Dukan diet, Cabbage Soup and/or the Lemon Detox diet. For each one:
   a. describe the diet
   b. outline how its manufacturer or advertising company claims it entails promotion of weight loss
   c. critically analyse the potential benefits and/or harms.

Nutritional planning

Athletes who adequately plan their nutrition can enhance their sporting performance. A well-planned, nutritious diet should meet most of their vitamin and mineral needs and be the source of enough protein for promoting muscle growth and repair.

Foods that are rich in unrefined carbohydrates, such as wholegrain breads and cereals, should be the basis of the diet. Water is a great choice of fluid for athletes so they can aid their performance and prevent themselves becoming dehydrated.

Nutritional intake before, during and after physical activity

A diet that meets all the nutritional requirements is essential for peak physical performance. Athletes' performance needs will vary, depending on the sport or event they are pursuing. In endurance events that last an hour or longer, special consideration has to be given to food intake – in the form of carbohydrates – before, during and after competition. Hydration is also important for preventing dehydration, which can lead to reduced performance.

Good nutrition plays a key role in enhancing sporting performance. On a day-to-day basis, athletes must provide their body with essential nutrients for good health and must have enough energy to meet the demands of physical activity, including during post-exercise recovery. They must elevate their energy level before, during and after the activity.

The major fuel source for physical activity is carbohydrate. When exercising, the body needs a continual supply of energy during competition and training so an individual can continue to perform at an optimal level and delay the onset of fatigue.

Before physical activity

Some of the nutritional aspects to consider before engaging in physical activity are maintenance of adequate hydration and a high glycogen level in the muscles, and the need to plan meals and snacks to avoid having a full stomach during the activity. What an athlete consumes before, during and after exercise is important to their comfort and performance during exercise. Food that remains in the stomach during an event can cause stomach upset, nausea and/or cramping. Whether and what to eat before exercise are things that only the athlete can determine, based on their experience. Some general guidelines include the need to minimise the intake of meat and have a well-balanced meal three to four hours before the activity, followed by an easily digestible light meal – such as a banana, cereal or a smoothie – about two hours before the activity.

Athletes should avoid high-fat foods before exercising. These types of foods can be very difficult and slow to digest, and they remain in the stomach for a long time. They also pull blood into the stomach to aid digestion, whereby cramping and discomfort can result. For a pre-exercise meal, athletes should avoid meats, doughnuts, fries, potato chips and dairy products.

In remaining hydrated before the event, the athlete is able regulate their temperature efficiently, perform effectively, and minimise the need to drink excessively during the event. The guidelines for adequate hydration include drinking small amounts often rather than drinking large amounts less often. Clear urine is a good indication that the athlete's hydration level is adequate.

Because glucose is the preferred energy source for most exercise, a pre-exercise meal should include foods that are high in carbohydrates and easy to digest. Examples of those types of food are pasta, fruits, breads, energy bars and energy drinks. The muscles' glycogen stores are fuelled by adequate carbohydrate intake in the days leading up to the physical activity. For most activities, a well-balanced diet that is high in a variety of complex carbohydrates is adequate. For an endurance event that will last longer than 90 minutes, the athlete may benefit from undertaking 'carbohydrate loading'.

Carbohydrate loading is a strategy that involves making changes to training and nutrition so an athlete can maximise their stores of muscle glycogen (carbohydrate) before the endurance competition. The technique was originally developed during the late 1960s and typically involved a 'depletion phase' during which the athlete adhered to a low-carbohydrate diet for three to four days before competition. Immediately after that phase, the athlete engaged in a three- to four-day 'loading phase' during which they combined rest with a high-carbohydrate diet. Combining the two phases was shown to result in a boost to the muscles' carbohydrate stores beyond their usual resting level.

Due to ongoing research, the method has been refined so that modern-day carbohydrate loading is now more manageable for athletes. Today, undertaking one to four days of exercise 'taper' while following a high-carbohydrate diet – between seven and 12 grams per kilogram of body weight – is known to be sufficient for elevating the muscle-glycogen level.



Figure 5.13:
What an athlete consumes before, during and after exercise is important to their comfort during exercise.

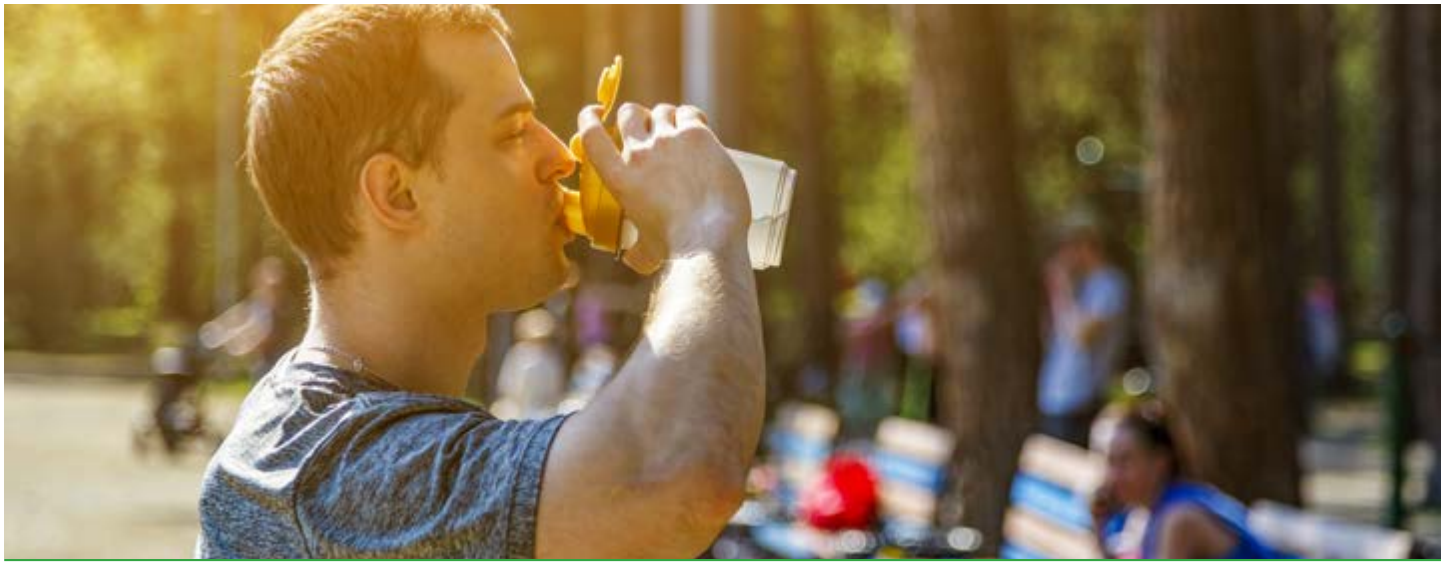


Figure 5.14:
Isotonic drinks can be beneficial for athletes who are exercising at a high intensity for 60 minutes or longer.

During physical activity

Dehydration can cause a rapid increase in the heart rate and body temperature, whereby exercise is more difficult to undertake. For each one per cent of body weight lost due to dehydration, performance is decreased by about two per cent.

To sustain rapid movement of fluid into the small intestine during strenuous activity, it is ideal to take three to four sips of water every 10 minutes, if possible, or five to six sips every 15 minutes.

For people who are exercising for fewer than 60 minutes, water is sufficient, and they do not need to consume carbohydrate-augmented fluids such as sports drinks.

Did you know?

The human body can go for more than three weeks without food, but one week is the maximum without water.

Three main types of sports drink are available, and each has its own a specific purpose:

- **Isotonic drinks** are the most common type of sports drink. They can be beneficial for athletes who are exercising at a high intensity for 60 minutes or longer. It is not necessary to replace the loss of sodium, potassium and other electrolytes when exercising, because they are unlikely to deplete their body's stores of those minerals during normal training. If, however, exercising in extreme conditions for three to five hours – in a marathon, an Ironman or an ultra-marathon event – the athlete may choose to add a sports drink that contains electrolytes.
- **Hypertonic drinks** generally contain a quantity of carbohydrates. They are mainly intended to be an energy source; their thirst-quenching effect is secondary. Compared with water, hypertonic drinks are taken up by the body slowly. They are suitable for endurance athletes.
- **Hypotonic drinks** generally contain fewer than four grams of sugar (carbohydrates) per 100 millilitres. They are intended be a thirst quencher. The athlete gets little energy from them. Compared with water, hypotonic sports drinks are taken up by the body quickly. They are suitable for people who engage in recreational sports or activities or in sports that are shorter or demand less-strenuous exertion.

Practical activity

All students are to record their weight before the exercise session. The class is to engage in vigorous physical activity for 50 minutes. Half the class is to rehydrate twice during the session and the other half is not to drink at all. All students are to record their weight again after the activity.

1. Graph the information as a percentage, and discuss your results with a partner.
2. With other students, discuss how you felt when you did or did not replace your fluids.
3. Discuss whether the strategy led the students' performance to be enhanced or detracted from towards the end of the activity.
4. Describe the implications that fluid replacement has for a sport you participate in.

After physical activity

As discussed earlier, the major source of fuel for active muscles is carbohydrate, which is stored in the muscles as glycogen in the days before the exercise. During the recovery phase, it is important to replace fluids and replenish depleted glycogen stores. The time needed for complete restoration can be one or two days. This is one reason that the post-exercise meal is critical for recovery and readiness for the next exercise session. After exercise, the first nutritional priority is to replace any fluid lost during exercise. An individual should take liquids, in small but adequate amounts, immediately after any physical activity.

It is also important to consume carbohydrate – such as fruit or juice – within 15 minutes of completing the exercise to help restore glycogen level. Eating between 100 and 200 grams of carbohydrate within two hours of endurance exercise is essential for building adequate glycogen stores, to allow training to continue. By waiting longer than two hours to eat, the muscles will have 50 per cent less glycogen stored in them. The reason is that carbohydrate consumption leads to stimulation of insulin production, and insulin aids production of muscle glycogen.

The results of combining protein and carbohydrate during the two hours after exercise are a greater quantity of stored glycogen and a faster recovery time. It is also important to consume an adequate supply of minerals and vitamins within the first 24 hours of completing any strenuous physical activity. If the diet is balanced, dietary supplements are not needed.



Figure 5.15:
Drinking juice within 15 minutes of completing exercise helps restore glycogen levels.

Energy requirements during physical activity

Energy requirements can vary significantly, depending on the type, duration and intensity of the physical activity as well as fitness level of the individual. During exercise, the body mainly sources the energy it needs from the breaking down of carbohydrate and fats whereby ATP is formed. In general, the more intense the activity, the greater proportion of carbohydrate needed.

In extreme-endurance events such as the Tour de France, the cyclists' daily energy expenditure can be more than 10 times the normal sportsperson's. Many elite-endurance athletes find it quite difficult to consume that much energy-dense food, and must do significant planning and have sound nutritional knowledge.

Factors to consider when planning a healthy nutritional intake for physical activity

When planning a healthy nutritional intake to accompany physical activity, the decision-making process can include a range of contributing factors, some of which are as follows:

- **Behavioural factors:** time available, convenience, personal values and personal lifestyle
- **Social factors:** cultural background, religious beliefs, peer pressure and the need to 'fit in'
- **Economic factors:** cost of food, personal financial position, employment position and the size of the family
- **Environmental factors:** availability of food, the family, advertising and access to information.

Education plays an important role in selection of appropriate nutritional foods. For example, people planning to participate in a half-marathon would need to research a range of factors that could impact the run. These may include ensuring sufficient carbohydrate consumption and adequate hydration on the days leading up to the run and being aware of drink station locations along the route. They might also plan to carry some glucose gel packs to supplement their glycogen stores throughout the run.

Similarly, when people are planning to go on an overnight sporting trip, they might combine some of these factors, such as 'availability of food' and 'cost of food'. The type of activity also has an important role when planning. For example, people intending to hike through bush will not want to carry too much weight, so lightweight equipment and food would be important factors for them to consider.

Athletes might design a nutritional plan according to their type of activity, its frequency, duration and intensity level. For example, the nutritional plan devised by a marathon runner would certainly be different from that devised by a shot putter.



Figure 5.16:
Hikers need to consider the weight of food and equipment they will have to carry.

Practical activity

Participate in various physical activities that require varying energy requirements. Assess your personal performance and describe which activities you were most suited to.

Nutritional planning for an outdoor expedition

When planning an outdoor expedition, there are a range of factors that need consideration, including food and nutrition. Food should be as follows:

- **High energy:** During an expedition, the average energy requirement will increase by 50 per cent and therefore more food needs to be carried. If weight and/or bulk is a problem, energy-dense foods should be taken. These include foods such as chocolate, cheese, dried fruit, nuts, biscuits, and tinned meat or fish.
- **Lightweight:** When carrying foods throughout the expedition, it is very important that they be lightweight. Whenever possible, choose dry foods.
- **Easily prepared:** When there is limited time to cook and/or limited fuel, cooking facilities, cooking skills or cooking space, it is best to select food that can be cooked in fewer than 15 minutes.
- **Tasty, appealing and varied:** When using similar ingredients day after day, meals can become monotonous. It is therefore essential to include foods that have a range of flavours. If the food is boring, appetite may reduce. When energy requirements are high and appetite is increased, it is important that the food is enticing to consume.
- **Inexpensive:** Foods such as rice, pasta and beans are generally cheap, and contain high levels of carbohydrate. This is an important factor in maintaining performance.
- **Easily stored and/or a long shelf life:** Whenever possible, buy dry goods. It will be useful to store food in tins, plastic bags and/or plastic containers that have a lid.
- **Nutritionally balanced:** Having a nutritionally balanced diet becomes increasingly important during longer trips and/or physical-difficulty sessions. For a long trip – of more than six days – consider taking a multivitamin and mineral supplement. If the activity is to be especially strenuous or long, a considerable amount of energy, carbohydrate and fluid is essential to perform at an optimal level.

Learning activity

1. Describe factors to consider when planning healthy nutritional intake for physical activity.
2. Discuss the advantages and disadvantages of carbohydrate loading. Explain how effective the method would be for a person who enjoys jogging once a week.
3. Design a basic nutrition and hydration plan, including pre-event, during the event and post-event, for:
   a. an athlete participating in a team sport such as soccer, hockey or netball
   b. an endurance athlete participating in a cycling road race, a marathon or a triathlon.
4. Identify the barriers to good nutrition that athletes face.
5. Explain the impact of poor nutrition and hydration on athletic performance.
6. Explain how nutrition and hydration during competition would differ from regular nutrition and hydration for an athlete.
7. Outline the recommendations for an athlete who complains that they feel sick when eating before an event.
8. Identify the nutritional requirements for overnight campers who will have no permanent cooking facilities on site.

Nutrition, physical activity and weight management

Maintaining an optimal weight range is achieved by regular participation in physical activity and a nutritious balanced diet. Regular participation in physical activity requires prioritisation of a healthy, flexible and balanced diet. It is essential the diet can be easily manipulated in response to special situations, such as changes to training load or special training requirements for competition. Maintaining a balanced diet will ensure adequate nutrient and energy consumption for enhancing adaptations to training and supporting optimal recovery. When engaging in heavy training, nutrient requirements increase, particularly carbohydrate, protein and micronutrients (vitamins and minerals). An athlete can usually meet these increased nutritional needs by having a diet that:

- is a source of adequate total energy (kilojoules)
- has carbohydrate intake balanced against the daily exercise load
- includes of a wide variety of nutrient-rich foods, including protein-containing foods.

Australian dietary guidelines

Adults

- Eat according to your energy needs, and be physically active to avoid gaining weight.
- Prepare and store food safely.
- In light of the importance of early nutrition, new mothers should be encouraged and supported to breastfeed.
- Enjoy a wide variety of nutritious foods.
  - Eat plenty of vegetables, legumes and fruits.
  - Eat plenty of cereals (including breads, rice, pasta and noodles), preferably wholegrain varieties.
  - Include lean meat, fish, poultry and/or vegetarian/vegan alternatives.
  - Include dairy milks, yoghurts, cheeses and/or vegetarian/vegan alternatives. Whenever possible, choose reduced-fat varieties.
  - Drink plenty of water.
- Limit your intake of saturated fat and moderate your intake of total fat.
- Reduce salt intake by choosing low-salt options and not adding salt during cooking or at the table.
- If you choose to drink, limit your intake of alcohol.
- Consume only moderate amounts of sugars, avoiding drinks and foods that contain added sugars.

Source: Adapted from the National Health and Medical Research Council



Figure 5.17:
Adults should limit their intake of alcohol.

Internet activity
Log on to TitanOnline and complete Activity 5.1 by watching the video and creating a recipe that reflects the Dietary Guidelines for children.



Figure 5.18:
Children and adolescents should enjoy a wide variety of nutritious foods for optimal growth and development.

Children and adolescents

- New mothers should be encouraged and supported to breastfeed.
- Consume sufficient nutritious foods for optimal growth and development.
  - Young children should have their growth checked regularly.
  - Physical activity is important for all children and adolescents.
- Enjoy a wide variety of nutritious foods.
  - Eat plenty of vegetables, legumes and fruits.
  - Eat plenty of cereals (including breads, rice, pasta and noodles), preferably wholegrain varieties.
  - Include lean meat, fish, poultry and/or vegetarian/vegan alternatives.
  - Include dairy milks, yoghurts, cheeses and/or vegetarian/vegan alternatives. Reduced-fat milks are not suitable for infants younger than two, because of infants' high energy needs, but older children and adolescents should be encouraged to have reduced-fat varieties.
  - Choose water as a drink. Alcohol is of course not recommended for children.
- Limit your intake of saturated fat and moderate your intake of total fat. Low-fat diets are not suitable for infants.
- Choose foods that are low in salt.
- Consume only moderate amounts of sugars and foods that contain added sugars.
- Care for your child's food; prepare and store it safely.

Source: Adapted from the National Health and Medical Research Council

The guideline points are not in any order of importance, and each one is associated with an issue that is related to promotion of optimal health.

A wide variety of foods should be eaten to ensure that the body receives all the essential nutrients it needs: carbohydrates, dietary fibre, fat, protein, vitamins, minerals and water. The nutrients are essential for the body's energy supply, cell building and repair, development of resistance to disease, facilitation of the body's normal functioning, and facilitation of growth and development.

Table 5.1 contains a description of the nutrients the body uses and an outline of the function and recommended intake for each.



Figure 5.19:
Protein builds body tissue.

Table 5.1: The function and recommended intake of nutrients.

Nutrient's description	Function	Recommended intake
Carbohydrate Carbohydrates are the body's most important energy source, and include starch, dietary fibre and sugar. Carbohydrates are also a source of other nutrients such as fibre and vitamins. Simple carbohydrates are refined sugars. Complex carbohydrates include higher levels of starch and fibre, which are digested more slowly and provide energy for longer.	They are the body's main fuel, whereby the food is broken down into glucose molecules during digestion.	Between 50 per cent and 55 per cent of total energy intake.
Protein Protein builds, maintains and replaces tissues in the body. Sources include meat, fish, chicken, cheese, eggs, tofu, nuts and beans.	Protein is necessary for growth, healing, and fighting disease and infection. It is an aid to development of antibodies and provision of energy.	Between 15 per cent and 20 per cent of total energy intake.
Fat Only small amounts of fat are needed in the diet. Fats and oils belong to the chemical family known as lipids. Saturated fats are found in animal products such as cheese and are linked to an increase in cholesterol and a higher risk of heart disease. The two 'better' types of fat are monounsaturated fats, such as the fat in avocado, nuts, olives, oil and chicken, and polyunsaturated fats, such as the fat in fish, nuts, soy beans and polyunsaturated margarine.	Fats are an important energy source, are the source of essential fatty acids, and act to protect the vital organs and insulate the body against temperature extremes.	Between 25 per cent and 30 per cent of total energy intake.

Table 5.1: The function and recommended intake of nutrients. *(continued)*

Nutrient's description	Function	Recommended intake
Vitamins Vitamins are organic compounds that the body needs small amounts of. The fat-soluble vitamins are vitamins A, D, E and K and the water-soluble vitamins are vitamins B and C.	Vitamins are necessary for growth of body tissue, are an aid in nerve and muscle functioning and in release of energy.	The recommended intake varies for each vitamin.
Minerals Minerals are inorganic substances that the body needs small amounts of. They constitute about four per cent of body weight, and the most important one is calcium.	Minerals are essential for building of skeletal and soft tissues, regulation of the heartbeat, blood clotting, nerve response, and oxygen transport.	The recommended intake varies for each mineral.
Water The body consists of between 50 per cent and 70 per cent water, depending on age and body composition. Almost half the water is located in the joints, and the rest is located around the joints and in the blood. The body loses water in the form of sweat, urine and faeces.	Water carries the nutrients to the cells and the waste products from the cells, acts as a lubricant around the joints, cushions against shock, and regulates body temperature.	Between one and two litres a day depending on activity levels, age and body size.

Learning activity

1. Explain the function of:
   - **a.** protein
   - **b.** fat
   - **c.** carbohydrate.
2. Explain the functions of the various vitamins in the diet.
3. Name some sources of the following minerals:
   - **a.** Calcium.
   - **b.** Phosphorous.
   - **c.** Iron.
   - **d.** Sodium chloride.
   - **e.** Potassium.
   - **f.** Iodine.
4. Explain the functions of minerals in the diet.
5. Explain the importance of water for the body.
6. Explain the importance of adequate intake of fibre in the diet.
7. Create a health-promotion pamphlet to target the dietary guidelines for children and adolescents.
8. Analyse your dietary intake for the past week. Present your data as a graph under the headings of the five food groups.
9. Compare and contrast your dietary intake with the dietary guidelines for children and adolescents.

Healthy weight loss and weight gain

The general aim of weight loss is to decrease total energy intake while maintaining an adequate intake of protein, carbohydrate and other nutrients. Loss of body fat should be a long-term goal. For overweight people, consistent weight loss of approximately one kilogram a week is a suitable goal, and can be achieved by reducing daily energy intake and increasing moderate-intensity physical activity.

When attempting to lose weight healthily, the focus should be on losing fat rather than losing lean muscle mass. Setting sensible goals, having realistic expectations and making lifestyle changes will help.

An individual's weight and body composition is a product of many factors. These include the quality and quantity of foods consumed, physical activity levels and types of training, physiological and genetic make-up, age, gender and health status. When setting weight-loss goals, consideration should be given to all of these factors. It is important to avoid products and programs that promise quick, easy and/or permanent results without permanent changes in lifestyle. Other weight-loss methods such as liposuction, lap-band surgery, appetite suppressants and herbal remedies are promoted as easy fixes but they are often associated with several negative physical and mental health implications.

When aiming to gain weight, it is important to understand the difference between fat gain and muscle gain. Fat gain is often easier to achieve compared with muscle gain, although in most situations it is not desirable. The body does need a certain percentage of fat for protection and cushioning of the vital organs, maintenance of healthy hair and skin, insulation against cold and heat, and energy supply to the muscles. However, having too much fat in and on the body can be unhealthy. Similarly, being underweight is not desirable, because it can lead to more-serious issues such as immune-system weakening; energy reduction; negative effects on the heart and blood pressure; and problems to do with bone health.

An individual's build mostly depends on genetic factors. There are ways to put on weight, but the gaining of lean body weight – muscle instead of fat – is a slow process that can take months or years of hard work. Like weight loss, weight gain should be gradual. It is important to be patient and to consult with a medical professional to ensure that any weight-gaining tactics are healthy and appropriate. By engaging in moderate-intensity exercise, appetite is stimulated. Eating nutritious foods aids healthy weight gain. Lean muscle mass is increased by regular participation in resistance training.



Figure 5.20:
Being underweight can weaken the body's immune system.

Internet activity

Log on to TitanOnline and complete Activity 5.2. Investigate and explain the changes to the Healthy Eating Pyramid over the years.

To manage weight effectively, a combination of a balanced diet with regular physical activity is recommended. This approach includes a diet based on a wide variety of nutritious foods combined with at least 30 minutes of moderate-intensity physical activity on most days of the week. This includes a mix of cardio-based and resistance training. Regularly participating in moderate-intensity physical activity burns kilojoules and also increases basal metabolic rate (BMR).

Although representatives of the media and the weight-loss industry tend to focus on dieting, it is only one aspect of weight management; just as important, and some people would argue more important, is the role of physical activity in weight management. People who focus on dieting rather than on physical activity to lose weight reduce their opportunities for losing weight faster and developing lifelong habits for maintaining a balanced weight-management approach. When exercising, an individual is able to burn kilojoules and increase lean muscle and BMR, causing the body to increase energy expenditure when at rest.

Generally speaking, males need a larger energy input than females. This is due to several physical and metabolic variances, such as differences in muscle mass, body size and energy expenditure. Because of this, there are often stereotypes of 'masculine' and 'feminine' foods, commonly supported by food marketing. For example, high-protein and high-carb foods such as meats, pizza and burgers are often viewed as masculine while salads, juices, fruit and muesli are often viewed as feminine. The result of such stereotypes can significantly influence nutritional decisions, and further lead to females eating smaller quantities of already low-kilojoule foods and potentially under-eating. Similarly, males may lack an abundance of quality fruits, vegetables and essential micronutrients. However, some females are quite muscular, active and/or tall and need larger energy input than the average male. These stereotypes may influence nutritional decisions and can lead to difficulties for males and females attempting to lose or gain weight in a healthy manner.

It is up to the individual to determine what works best for their body, based on the Australian Guide to Healthy Eating. All individuals should take into account their body size, daily energy expenditure, appetite, food preferences and possible body composition goals, as this should dictate how much and what foods they should consume. It is important to remember that everyone should strive to eat a healthy and balanced diet consistently, as well as incorporate physical activity to maintain a healthy weight.

Weight management is a complex process. Promises of quick and effortless weight loss most often lead to failure and disappointment. To manage weight healthily, it is important to understand the following.

- Having a sedentary lifestyle is a significant barrier to successful weight loss or maintenance.
- To lose weight, an individual needs to burn more kilojoules than they take in.
- Building muscle assists in weight management as a higher muscle mass causes the body to use more energy, even at rest.
- Effective weight management involves behaviour modification, which is a lifelong commitment.

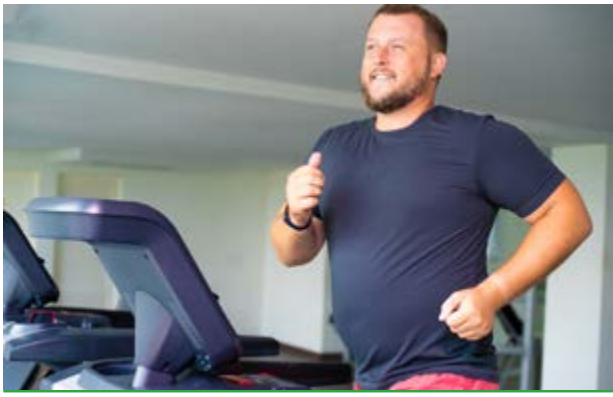


Figure 5.21:
To lose weight, an individual needs to burn more kilojoules than they take in.

Did you know?

Fad diets promote all types of crazy ideas – the baby food diet is a fad that encourages adults to replace all regular meals with baby food!

The dangers of high activity and rapid weight loss programs

There is an abundance of weight loss programs that promise rapid results. Although such programs seem inspiring, they are often dangerous and can leave many long-lasting negative repercussions for participants. To achieve rapid results, trainers will often put their clients through high-volume or high-intensity activity and limit their food. This combination can be exceptionally dangerous for a number of reasons.

When the body is under intense stress, due to high volume or intensity of training, it needs sufficient energy from food to perform and recover. However, weight-loss programs often promote a restrictive diet to achieve an energy deficit and weight loss. If the body is deprived by such a high deficit for extensive periods of time, it will recognise this and attempt to hold onto as much fat as it can to survive. This results in a slowed metabolism and is not ideal when the goal of the program is to lose weight.

A restricted diet may also lead to an inadequate consumption of essential vitamins and minerals for body functioning, causing weakness and fatigue. High-volume or intense training under fatigue is dangerous and may cause a lowered blood pressure and faint feelings during activity. It may also result in injury, due to lack of concentration on correct form, technique, recovery and intensity on joints, muscles and ligaments.

Depending on the type of activity undertaken for the program, a decrease in muscle mass and bone density may occur as the body cannot repair and build muscle tissue if it does not have the energy supply available. It is also important to recognise that weight loss, using the methods above, is often a result of reducing water retention and lean muscle, not fat. Because of this, even if there was fat loss, there is a strong probability that weight gain will occur in the future.

As these high activity and rapid weight loss programs can achieve desirable results quickly, this lifestyle can become addictive, disordered and unhealthy. It is crucial for those who wish to achieve weight loss to take a critical view of the program and question the core values and beliefs of those providing it. Individuals should be aware that the healthiest way they can lose weight is to make small lifestyle changes over a period of time, so that it becomes maintainable and a lifestyle choice.

Learning activity

1. Design two nutritional programs: one for a person who wants to lose weight and the other for a person who wants to gain weight.
2. Assess the effectiveness of weight-loss programs that are being promoted on television and/or on the internet.
3. Explain how gender stereotypes influence nutritional decisions and the implications of this on healthy weight loss.

The energy-balance model

Energy balance involves the relationship transfer between 'energy in' and 'energy out'. Maintenance of energy balance is a key goal when regularly participating in physical activity. Energy balance is achieved when the total energy intake from food is matched against energy expenditure from daily activity. The term 'energy intake' refers the carbohydrate, protein and fat in the food and drink consumed, and is measured in kilojoules. 'Energy expenditure' refers to what is burnt by the body. This includes engagement in physical activity and daily movements, as well as the body's natural processes such as breathing and functioning. Individual energy requirements are influenced by factors such as body size, body composition, age and gender. A large person burns more kilojoules every day than a small person does, and people who have an active lifestyle burn more kilojoules than people who have a less active lifestyle do.

A day's energy intake from food is generally in the range of between 8000 and 14,000 kilojoules for males and between 6000 and 10,000 kilojoules for females. Energy intake and energy expenditure do not have to be met exactly every day; it is the balancing over time that is the determining factor in maintaining a healthy weight range.

If a person's average energy intake equals their average energy expenditure, their weight will remain as it is. Greater intake than expenditure is known as a 'positive energy balance' and over time will result in weight gain. When this is excessive, it may lead to several health complications. Expenditure greater than intake is known as 'negative energy balance'. Over time this may result in weight loss. However, if maintained over extended periods of time, a severe negative energy balance can lead to a decline of bodily functions such as a decrease in metabolism, bone mass, thyroid function, hormone levels, ability to concentrate and physical performance.

Because children need energy to grow properly, their energy is in balance when their energy intake and energy expenditure are supportive of natural growth without promotion of excess weight gain.

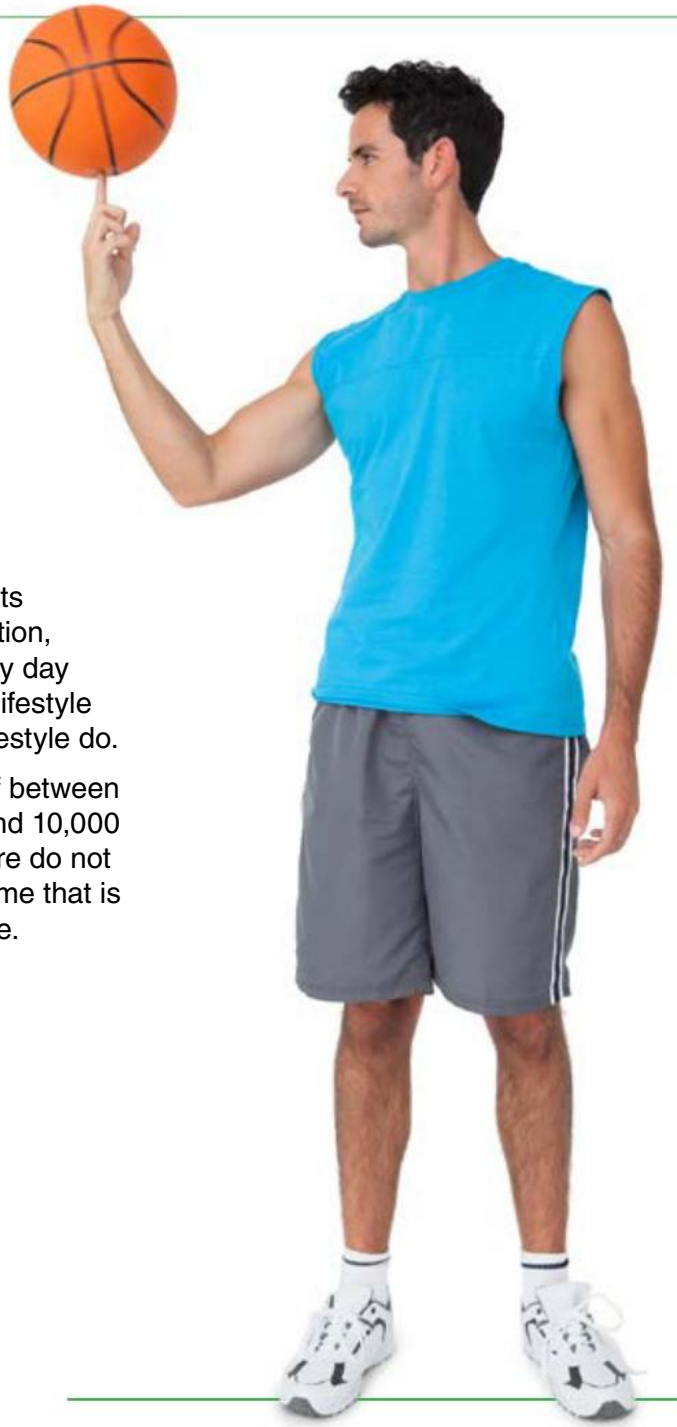


Figure 5.22:
Balancing energy intake and energy expenditure over time helps people to maintain a healthy weight.

Internet activity

Log on to TitanOnline and complete Activity 5.3. Keep a food diary for typical day. Use the software to calculate your total daily kilojoule intake and the amount of exercise you would need to do to balance your energy intake.

Revision questions

1. List the common health problems that are associated with a poor diet.
2. Examine the potential dangers of high activity and rapid weight loss programs.
3. Describe how the energy-balance model can be used as a tool for healthy weight management.
4. Explain how inadequate or excessive nutrient intake is linked with health problems.
5. Explain the function of minerals in the diet.
6. Explain the importance of water in the body.
7. Explain the function of:
   a. protein
   b. fat
   c. carbohydrate.
8. Compare the dietary guidelines for adolescents and children with the guidelines for adults.
9. Explain how poor nutritional intake has an impact on athletic performance.
10. Explain how inadequate hydration has an impact on athletic performance.
11. Outline the factors that affect a person's intake of fluid and food:
    a. pre-event
    b. during the event
    c. post-event.
12. Critically evaluate the following statement: Compared with a balanced diet, nutritional supplements are more advantageous for athletic performance.
13. Identify some of the claims made about nutritional products and the techniques that are used to sell them.
14. Outline ways for identifying 'fad' diets.
15. Outline the recommendations for an overweight person to lose weight.
16. Which of the following statements regarding the nutritional requirements of specific groups is true?
    a. Adolescents should have no chocolate in their diet to avoid skin blemishes.
    b. The diet of overweight adults should not include fats to reduce weight.
    c. The diet of women should include a regular source of iron.
    d. Men should take multivitamins to complement their diet.
17. Which of the following dietary characteristics is a nutritional requirement for healthy living?
    a. Has at least 35 grams of fibre a day.
    b. Consists predominantly of protein.
    c. Contains no fat or processed sugar.
    d. Limits carbohydrate intake.

CHAPTER 6

Participating with safety

Risk is a part of everyday life but misfortune and injury occur only rarely. Like most things, participation in sport and physical activity has an element of risk, especially risk of injury. Sporting clubs and associations are increasingly becoming responsible for risk management.

Potential risks are specific to the type of sport or activity, and clubs and associations conduct risk assessment so they can provide a safe and enjoyable environment for players, spectators, coaches and other officials. Risk management involves consideration of players' skill level, personality, self-control and maturity, fitness level and previous experience, as well as environmental factors including the grounds, facilities and prevailing weather conditions. Other considerations include modification of rules, use of protective equipment and use of technology.

Injury assessment and management are integral parts of sport and physical activity. Ideally, injury-management processes should include provision of first-aid training and first-aid equipment as well as use of trained first-aid officers.



Figure 6.1: Potential risks are specific to the type of sport or activity.

Outcomes

A student:

- discusses factors that limit and enhance the capacity to move and perform (PASS5-1)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- displays management and planning skills to achieve personal and group goals (PASS5-8)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Risk environments and behaviours
- Assessing risk
- Managing risk
- Injury management

Risk environments and behaviours

The environment in which the risk may occur is the first focus when identifying and evaluating different environments and behaviours. Common activities that individuals may experience risk in while participating include water-based activities, outdoor recreational activities and team sports. The degree of risk involved depends on the particular activity; however, the following procedure can be used to identify and evaluate the potential risks across all sport and physical activities.

1. Identify the risk environments.
2. Identify the risk behaviour.
3. Assess the risk.
4. Manage the risk.

Not all risk results in negative outcomes; however, when individuals willingly choose to participate in a dangerous sport or activity, they are taking a risk. Many contextual factors influence the reasons individuals participate in behaviours that may cause harm, such as peer pressure or trying to explore new boundaries. Due to influencing factors, young people often engage in risky behaviours, despite knowing the potential negative outcomes. Depending on the sport or physical activity, different short-term and long-term consequences may result from participation.

When risky behaviours are paired together – for example, mountain climbing and consuming alcohol and/or drugs – there is a significant increase in the chance of injury occurring. Young individuals are 10 times more likely to experience a critical injury when two or more risk-taking behaviours occur simultaneously.

Identifying risk environments

Sport and physical activity will always entail unpredictability in that situations are never completely foreseeable nor risks avoidable. The optimum risk-identification processes that are followed cannot lead to complete elimination of risks; they can be used to simply reduce them. It is important for sporting associations to establish plans and processes to not only identify risk environments but manage risks in case unpredictable circumstances arise.



Figure 6.2:
Whitewater rafting involves a moderate to high degree of risk.

Did you know?

Having a risk of 'one in a million' is the same as the risk entailed in flipping a coin and getting 20 heads in a row!

Internet activity

Log on to TitanOnline and complete Activity 6.1 by investigating the information and assessing the risks associated with whitewater rafting. List the potential injuries and outline the risk-management measures that should be taken.

Learning activity

1. Describe how to identify risk in sporting and physical-activity environments.
2. Identify the physical activities and sports that the students at your school engage in.
   a. List the potential environmental risks that are evident.
   b. Suggest a way to either reduce or remove each risk you have identified.
3. Identify the potential environmental risks entailed in outdoor recreational activities.
4. Design an action plan to enable a sporting association to cope with the occurrence of an unpredictable event in its sport.
5. In small groups, select a local sporting team that a group member belongs to.
   a. Outline the sport's risk environments.
   b. Explain how the risk environments are managed.

Identifying risk behaviours

Risk behaviours vary in degree of intensity. Everyday behaviours such as walking up a flight of stairs and driving a car involve a certain degree of risk. Bungee jumping, sky diving, skiing and snowboarding are common sports and physical activities that have a much higher degree of risk. It is difficult to completely eliminate risk from an individual's life, which is why it is important to be able to understand and identify risky behaviours and their potential outcomes.

The degree of risk for a specific sport or physical activity will be different depending on an individual's perception of risk and their own personal capabilities. An individual may evaluate the positive consequences of participating in sky diving to far outweigh the potential negative consequences. Deciding to engage in the sport or physical activity is called the 'fight' response. Other individuals will avoid participating in such activities because they perceive the level of risk to be beyond the potential benefits or their personal capabilities. This is known as the 'flight' response.

Individuals are constantly exposed to risk but the final decision to participate in a particular sport or physical activity depends on the individual's evaluation. There are three common risk-taking categories. There are individuals who:

- avoid risk by not participating in a sport or activity due to the significant level of risk recognised by the individual
- take risks by participating in sports and physical activities regardless of the perceived risks
- reduce the level of risk by participating in sport and physical activities while reducing the perceived level of risk involved.



Figure 6.3:
A snowboarder can reduce their risk of injury by wearing a helmet.

Did you know?

The oldest woman to parachute out of a plane completed a tandem jump when she was 102 and she was an Australian!

Case study

You glance at your friends and wonder how on earth they talked you into this. Even though you have all your protective equipment on, your palms are sweaty and your heart is racing. You reach around for the reassuring touch of the parachute on your back. You risk looking down, and can just make out the trees below.

Out jumps one of your friends. You watch him fall until he too is as small as the trees thousands of metres below.

You realise there is no backing out now.

Your brain realises what you are about to do and a range of functions begin to affect your body. Your blood pressure increases and your heart starts to beat so quickly and so hard that you can feel it hitting your chest. Your mouth is very dry and you have a strong urge to go to the toilet. Your breathing rate increases to the point at which you feel you are sprinting in the 100-metre final at the school's athletics carnival. The butterflies in your stomach are not just hovering; they are doing a full gymnastics routine. You reassure yourself: I can do this!

Twenty seconds until the jump: the adrenaline has well and truly kicked in.

Ten seconds on the clock: welcome to the world of risk.

One second on the clock: welcome to the world of fear.

Your body has responded to the perception of risk. This is known as the 'fight or flight' response.

You jump.



Figure 6.4:
Sky diving is a high-risk sport.

Learning activity

1. Identify why people choose to participate in adventure activities.
2. Survey the class to determine who would participate in the following adventure activities:
   - **a.** Sky diving.
   - **b.** Canyoning.
   - **c.** Whitewater rafting.
   - **d.** Bungee jumping.
   - **e.** Hang gliding.
   - **f.** Scuba diving.
   - **g.** Abseiling.
   - **h.** Heli-skiing.
   - **i.** Caving.
3. Use the internet to complete a profile of an extreme sport.
4. For one extreme sport, outline the potential risks involved and the measures that are taken to reduce them.
5. Design a poster to promote an adventure activity.



Figure 6.5:
Swimming at any beach not patrolled by lifeguards increases the risk of injury.

Factors increasing risk

The level of risk for a particular sport or physical activity is dependent on a variety of internal and external factors. Injury occurs in some physical activities and sports more often due to the following factors.

Water-based activities have a significant increased level of risk involved. Aquatic environments ranging from beaches to inland lakes can have deceptively fast-changing underwater currents that are invisible to individuals standing on shore. Swimming at any beach not patrolled by lifeguards increases the risk of injury.

Participating in individual sports and physical activities without an accompanying person increases the chance of harm should first aid or medical assistance be required. Whenever you are participating solo, you should notify someone of your intentions. For example, when bushwalking alone, individuals should write in intention books located at the beginning of trails or notify a friend of their walk plan and expected time of return so that, if an injury was to occur, someone would know where the individual is potentially located.

Playing surface types and the age of the ground can also increase the chance of individuals injuring themselves. For example, when playing contact sports, the ground should be soft so when individuals come into contact with it, they do not receive abrasions. Synthetic surfaces are commonly used for soccer, tennis and hockey to increase safety by ensuring surfaces are level and void of any holes.

Due to the unpredictable nature of many sports and physical activities, individuals should always warm-up prior to participating to reduce the risk of injury. The warm-up should begin slowly and prepare the individual for the specific sport or physical activity that will follow. Correct and well-maintained safety equipment should always be used to prevent injury; for example, wearing shin pads when playing hockey or softball.

An individual's ability must be taken into consideration when doing any physical activity or sport. Completing training with qualified instructors will help development of correct technique and knowledge to minimise the risk of an injury occurring.

Factors influencing risk behaviours

Risk taking is a common behaviour for young individuals in particular. As part of their development from childhood to adulthood, adolescents experiment with different sports and physical activities. As individuals mature, the level of risk they continue to participate in generally declines but certain individuals continue to be involved in risk behaviours.

Factors that influence participation and involvement in certain risk behaviours include:

- The inclination to seek sensation and developmental prosperity towards risk taking: such desire may influence individuals to participate in high-risk sports or physical activities such as sky diving.
- Spontaneity or impulsiveness combined with lack of knowledge of the consequences entailed can lead to individuals participating in activities such as mountain climbing or abseiling without significant prior knowledge, which is a requirement for safe participation.
- Biological factors such as gender, age and maturation are extra risk factors. Males are more likely to engage in risky behaviour. As age increases, so does the risk of sustaining an injury in physical activities and sport. Older individuals are more likely to lose balance and fall during physical activities as well as break bones when significant impact occurs.
- The desire to conform to social norms and peer pressure can also lead individuals to participate in risky behaviours. For example, if an individual's friends are not wearing protective gear such as a helmet when skateboarding, they are unlikely to value its significant importance and won't wear the equipment either.

A typical profile of a risk taker is shown in Figure 6.7.



Figure 6.6:
Abseiling without significant prior knowledge is unsafe.



Figure 6.7:
Typical characteristics of a risk taker.

Assessing risk

Assessing risk promotes positive health and wellbeing. Individuals gain increased knowledge of physical activities and sporting environments when they evaluate the positive and negative risks that may be experienced when participating. The occurrence of dangerous situations and injuries is reduced when thorough investigation tasks place prior to individuals becoming involved in physical activities or sports. Assessing the potential risks can be extremely beneficial for a coach who is about to start a new sporting program. Before beginning the program, any modifiable risks such as an uneven ground surface, can be improved so that safe participation may occur. Also, necessary preventative measures can be implemented, such as always carrying first-aid equipment.

Risk assessment

Risk assessment is the course of action that is taken to reduce the likelihood of legal liability. The aim is to address potential problems before they arise.

Risk assessment should be proactive to the issue of safety and to create a safer environment that meets the legal obligations of a duty of care. A fundamental error is to isolate risk management as a one-off procedure, whereas should be an ongoing process that all sporting organisations should follow and evaluate as part of their core activities.

The potential benefits from having effective risk-management procedures and taking up opportunities for implementing them are:

- improved outcomes and enjoyment for all participants
- improved financial management and financial risk control
- enhanced image and reputation
- improved safety for the participants
- more effective management
- effective compliance with legislation and sporting governance.

Common risks that face sporting organisations include:

- not having the appropriate legal structure that provides protection from personal litigation against members
- inadequate maintenance of equipment and facilities
- lack of suitable insurance
- poor planning in regards to medical emergencies and training of appropriate personnel.



Figure 6.8:
Without effective risk-managment procedures, sports such as motor racing would struggle to secure suitable insurance.

Features of a risk assessment

A risk assessment involves a number of steps that are aimed at reducing the potential risks. The club assesses the factors that potentially have an impact on safety in the hope of reducing or eliminating them. The five common features of risk assessments are as follows:

1. **Identification:** identification of the potential risks.
2. **Severity:** determination of the severity of the risk.
3. **Likelihood:** determination of the likelihood that the risk will occur.
4. **Plan:** establishment of a risk-management plan.
5. **Evaluation:** regular evaluation of the process.

The potential risks are dependent on the sport or physical activity that is being done. Step 1 in the risk-assessment process is to identify the potential risks by making a list of the:

- activities involved, such as swimming in the surf; belaying during abseiling; and running, tackling and kicking in football
- environmental risks entailed at the venue, such as the prevailing weather and the playing surface
- personal risks, such as skill level, fitness level and medical conditions
- equipment used, such as padding on football posts.

Once a list of the potential risks has been identified, Step 2 is to determine the severity of the risk. The seriousness or severity of the injury can be classified as follows:

- **Very high:** The injury could include death, disability and/or substantial financial implications.
- **High:** The injury could be long term and serious and could have financial implications.
- **Medium:** The injury could include need for medical treatment and have some financial implications.
- **Low:** The injury could include need for first aid and possibly have minor financial implications.
- **Very low:** The injury is unlikely to occur.

Step 3 in risk assessment is to determine the likelihood that the identified risks will occur. As for Step 2, a level approach is taken, and is based on the following classifications:

- **Very likely:** The identified risk is very likely to occur at some stage.
- **Likely:** The identified risk is likely to occur at some stage.
- **Medium:** The identified risk might occur at some stage.
- **Unlikely:** The identified risk is unlikely to occur.
- **Very unlikely:** The identified risk is very unlikely to occur.

Step 4 involves making a plan that will address the perceived risks.

Step 5 of risk management is to evaluate the plan following the activity to establish any areas that could have been improved and make recommendations for future activities.



Figure 6.9:
Golf is a low-risk sport.

Case study

The case study outlined in Table 6.1 is a sample of a risk assessment for an abseiling company and a football/soccer company.

Table 6.1: An example of a risk assessment.

	Abseiling company	Football/soccer company
1. **Identification:** Identify the potential risks.	The potential risks: ▪ include death ▪ include disability ▪ have substantial financial implications.	The potential risks include the fact that: ▪ the injury requires medical treatment.
2. **Severity:** Determine the severity of the risk.	The severity of the potential risks is very high.	The severity of the potential risks is medium.
3. **Likelihood:** Determine the likelihood that the risk will occur.	The likelihood that the identified risks will occur is as follows: ▪ Death: unlikely. ▪ Disability: medium. ▪ Financial implications: unlikely.	The likelihood that the identified risks will occur is as follows: ▪ That the injury will need medical treatment: likely.
4. **Planning:** Establish a risk-management plan.	The risk-management plan might include: ▪ ensuring up-to-date training for the personnel ▪ closely supervising the participants at all times ▪ regularly checking the equipment ▪ postponing the activity in adverse weather conditions.	The risk-management plan might include: ▪ regularly checking the playing surfaces and equipment ▪ knowing about medical conditions and undergoing training in relation to them ▪ instigating appropriate training and playing procedures.
5. **Evaluation:** Regularly evaluate the process.	▪ Evaluate and monitor the potential risks. ▪ Evaluate the effectiveness of the existing practices. ▪ Implement changes if needed.	

Assessing risk factors

Assessment and management of risk are complicated issues. Sporting associations and clubs have to assess and manage risk to determine various factors, such as insurance needs and legal requirements. Effective risk managers will assess and manage safety, cost and participation levels.

The potential risks are specific to the type of sport or activity, and assessment and management of the risks vary, depending on the context; for example, the potential risks are very different for sports such as abseiling, swimming and the various team sports. Because the potential risks vary to a great extent, the skills needed for undertaking a risk assessment are extremely specific, and are listed as follows:

- **Knowledge of the sport:** a sound and thorough knowledge of the sport is essential if all the potential risks are to be identified.
- **Experience:** experience in the sport and in risk assessment is essential.
- **Ability to work in a team:** identification, analysis and evaluation of risk are best done in a team situation and include methods such as brainstorming so that ideas can be discussed.
- **Training skills:** ongoing training within the sporting club or association is needed.

Risk assessment is conducted to provide a safe and enjoyable environment for the players, the spectators, and the coaches and other officials.

When you use a risk-priority matrix, you are able to determine the level of risk that is potentially entailed in each incident you have identified, for your organisation, if the incident occurs. This is achieved by giving each identified risk a priority rating, from extreme to minor, by way of combining the likelihood that the incident will occur and the consequences entailed if the risk does arise.

To use the risk-priority matrix, refer to Table 6.2 to rate the likelihood that each identified risk will occur and refer to Table 6.3 to rate the consequences if the risk does occur. Risks will vary between organisations, so it is essential to determine ratings for each risk in the particular context.

Table 6.2: The likelihood that the identified risk will occur.

Rating	Likelihood that the risk will occur in the course of a year
A	**Almost certain:** The risk will probably occur, and could occur several times during the year.
B	**Likely:** There is a high probability that the risk will occur, and it is likely to occur once during the year.
C	**Possible:** There is a reasonable likelihood that the risk will occur over a five-year period.
D	**Unlikely:** The risk could plausibly occur over a five- to 10-year period.
E	**Rare:** It is very unlikely but not impossible that the risk will occur, and it is unlikely to occur over a 10-year period.

Table 6.3: The consequences from occurrence of the identified risk.

Rating	The potential impact, in relation to the organisation's objectives
A	Extreme risks are likely to occur and to have potentially serious consequences.
B	Major risks are likely to occur and to have potentially serious consequences.
C	Medium risks are likely to occur and to have serious consequences.
D	Minor risks are likely to occur and to have low consequences.
E	Negligible risks are likely to occur and to have either few consequences or no consequences.

After ranking A, B, C, D or E for likelihood and consequences, you have a greater idea of what potential risks are faced and the likelihood that they might occur.

Learning activity

Playing soccer at a local park can be a cost-effective and fun way for young people to participate in sport and physical activity. However, as for all sports and physical activities, there is a degree of risk involved. Some of the risks that individuals could be exposed to at local parks are:

- rubbish and dangerous objects lying around
- polluted air from smoke or exhaust fumes
- uneven ground surface with potholes and long grass
- limited medical equipment and potentially no nearby medical facilities
- limited or broken protective equipment, such as padding around goal posts that has not been properly maintained.
- road safety issues when arriving and leaving the venue and while retrieving balls which may be kicked onto nearby roads.

Rank each of the risks (A, B, C, D or E) that a recreational soccer player could face. Rank the likelihood of each risk occurring and rank the potential impact.



Figure 6.10:
As for all sports and physical activities, there is a degree of risk involved in playing soccer.

Sources of advice and support

Seemingly countless legal/liability issues are associated with risk assessment, and it is important that sporting clubs and associations access advice and support. Various organisations are available to help in planning for safe participation, including the following:

- **Sport Australia:** www.sportaus.gov.au
- **NSW Department of Sport and Recreation:** https://sport.nsw.gov.au
- **NSW State Emergency Service:** www.ses.nsw.gov.au
- **NSW Police:** www.police.nsw.gov.au
- **St John Ambulance:** www.stjohnnsw.com.au
- **Royal Life Saving Society Australia:** www.royallifesaving.com.au



Figure 6.11:
It is essential to have up-to-date weather information before climbing activities.

These organisations provide information about implementation of policies in areas such as infectious diseases, drugs, spinal injuries and serious injuries.

On a smaller scale, the members of individual sporting associations can access simple information such as weather forecasts, which they can easily pass on to other members. For weather-reliant sports, it is essential to have up-to-date knowledge of the local weather conditions. The Bureau of Meteorology, at www.bom.gov.au, is the best source for up-to-date weather information.

Learning activity

1. Describe the factors that increase the risk in a physical activity or sporting environment of your choice.
2. Assess the risk factors for:
   a. Sunday-morning Nippers activities conducted by the local surf club
   b. abseiling in the Blue Mountains.
3. Compare the risk factors that are associated with a range of sports or physical activities you participate in.
4. Explain how a risk-management plan for a professional sporting club would differ from that for an amateur sporting club.
5. Describe the skills needed for completion of a risk assessment.
6. Explain why each skill is important when a risk assessment is being completed.
7. Identify the people who can help plan for safe participation in sport and physical activity.
8. You are on a committee for an outdoor-recreation club.
   a. Brainstorm a list of the risks that the activity possibly entails.
   b. Suggest ways to minimise each risk you have identified.
9. Identify a range of your local area's organisations that can aid planning for safe participation in an outdoor recreational activity.

Modifications needed in physical activity

Physical disability

Physical disabilities that may need physical activities to be modified for the safe participation of individuals include cerebral palsy, epilepsy, multiple sclerosis and muscular dystrophy. Instead of excluding individuals with these conditions from safely participating in a range of physical activities, modifications to instructions, rules, equipment and environments can be made.

Altering the length of involvement in the physical activity could assist in safe participation for people with varying physical disabilities. Reducing the time or increasing the number of breaks individuals receive when playing team sports such as netball will ensure participants can rehydrate and rest so that they can safely participate for longer. Adjusting the time of day that activities are run will ensure that individuals are at their optimal level of performance. Rather than participating in physical-activity programs in the middle of the day in the direct heat of the sun or at the end of the day when individuals may be experiencing fatigue, activities may be done early in the day.

Modifying the rules – for example, reducing the number of players on a court or field at a specific time – is likely to reduce the level of contact experienced by individuals, which positively promotes safe participation for people with disability. Equipment modifications may also be necessary; for example, using lighter or larger equipment. A small beach ball can be substituted for a regular netball as it is not only lighter but travels more slowly, allowing students with physical disability greater reaction time to receive or catch the ball. Balance beams may be lowered to ensure that if the individual was to fall off, there would be limited distance between the person and the ground. Substantial modifications may be necessary to safely promote the involvement of individuals in wheelchairs. The location of a particular physical activity may need to be changed so that the playing surface is hard, level and easy for either the individual or their carer to manipulate a wheelchair on.

Children

Many sporting organisations recognise that the needs, abilities and skill levels of children are vastly different from those of adults. As a result, they offer modified sports. Common modifications are listed as follows:

- change the size of the equipment
- reduce the size of the playing field
- reduce the size or height of the goal area
- reduce the game's duration
- reduce the number of players on the field or court
- allow unlimited interchange
- not have a competition winner.

Organisations modify children's sports to:

- promote participation
- make them safer
- make them fun and enjoyable
- promote social interaction
- promote the benefits of engaging in physical activity and sport.



Figure 6.12:
Tee-ball is a modified substitute for softball and/or baseball.

Auskick, an initiative of the Australian Football League (AFL), is an example of a sport that has been modified for children. The aims of the AFL's Auskick policy, which has been designed by Australian football experts, are to:

- ensure a fun and safe environment
- maximise participation, skill learning and development
- offer rules and procedures that are appropriate to the children who play the game
- involve appropriately accredited coaches
- provide a logical, sequential transition from introductory-level games to competitions played in at clubs and/or schools
- have the community manage the sport.

To take the emphasis away from endurance and to facilitate greater skill development among the Auskick players, the AFL has a policy of reducing the playing area and the playing time and suitably modifying the equipment. By playing on smaller grounds, the players are encouraged to concentrate on the game, because the ball is never far away.

Managing risk

The issue of managing risk should be of primary importance to all the stakeholders in a sporting club. All participants, including players, coaches, administrators, volunteers and spectators should have a voice when planning around the factors that influence safe participation. These factors are described in more detail below. They can include individual factors such as skill level, environmental factors such as weather, and organisational factors such as appropriate modified rules.

Factors that influence safe participation

There are a range of factors that influence safe participation in physical activity and sport. These include:

- individual factors
- environmental factors
- organisational factors.

Individual factors

Individual factors are linked to how the participants conduct themselves in their sport or physical activity. Managing risk is a complex issue, and the following factors have to be considered before participating in physical activity and sporting activities.



Figure 6.13:
Body contact sports such as judo have greater risk of injury.

Skill level

Club officials are responsible for ensuring that participants engage in activities or competitions that match their skill level. For example, team sports are often 'graded' (according to factors such as age, gender, size and experience) to ensure that the players do not participate beyond their skill level, because if they do, the chance that an injury will occur is significantly greater.

The importance of skill-level acknowledgement in risk management is highlighted in the fact that participation in adventure sports has become widespread. Organisations must undergo a comprehensive accreditation process, during which the main focus is on safety and training. Part of the process is to ensure that new participants are taught the basic skills before they attempt the activity. For example, an abseiling company might use indoor rock climbing to teach the needed skills before allowing the participants to engage in the activity in the potentially riskier outdoor environment.

Movement action

Correct movement patterns and techniques are essential for facilitating safe participation in sport and physical activity. Coordinated movements result in enhanced reaction times and also improved athleticism and agility. People who are in a risky situation thereby benefit by being able to handle their environment better. For example, if you are just about to be hit in a tackle, you can use the correct movement action to either help decrease the impact or avoid the collision.

Fitness level

Fitness level is an influencing factor in relation to safe participation in sport and physical activity. Fitness requirements vary, depending on the type of sport or physical activity. For example, players engaging in a sport such as hockey or netball need a reasonable level of cardiovascular fitness whereas players engaging in a sport such as rowing or triathlon need a high level of cardiovascular fitness.

Responsibility for fitness development varies. For example, in a team sport, the onus is on the coach to develop appropriate fitness components whereas people who are taking up a new activity have to take on the responsibility themselves.

Previous experience

Safe participation can be heavily influenced by the participant's previous experience. In most cases, previous experience will result in enhancement of safety. For example, in a team sport, an experienced player is more likely to have knowledge of the needed skills and is more likely to be able to identify the potential risks. Similarly, athletes who have had experience in surf or snow sports are more likely to take precautions because they understand the unpredictability of surf or snow conditions. They might decide not to go swimming after they have identified a rip at the beach or they might decide to avoid steeper skiing slopes when visibility is poor.

Learning activity

1. Explain how the following factors affect an athlete's risk of injury in a sport of your choice:
   - **a.** Skill level.
   - **b.** Movement action.
   - **c.** Fitness level.
   - **d.** Previous experience.
2. Investigate modifications that may be needed to increase safe participation in a sport of your choice for children.

Environmental factors

Environmental factors are in relation to the surroundings in which the sport or physical activity takes place. It is important that measures be put in place for promoting safe participation in all sport and physical activity. The types of measures that are put in place will vary between activities but the process of ensuring a safe environment is the same. Two common environmental factors to consider are:

1. The grounds and facilities, such as a purpose-built playing surface.
2. The prevailing weather conditions, which can have an impact on areas such as the beach, at which currents and wave size can influence safe participation.

An appropriate surface is needed for most sports and physical activities. Special surfaces are installed in purpose-built environments such as parks and ovals, skateboarding parks, indoor stadiums and aquatic centres.

Safety is relatively simple to monitor in purpose-built environments, because inspections of sections such as the playing areas, warm-up areas, change rooms and first-aid rooms can be done regularly. The equipment needed for the particular activity can also be inspected and modified so that safe participation is ensured; for example, padding can be installed on the goal posts.

Existence of hazards is somewhat inevitable throughout grounds and facilities. One example of a hazard is placement of equipment too close to the playing area, and another is existence of slippery surfaces in water-based activities. Identified hazards have to be removed, and risks have to be minimised, to create a playing environment that is as safe as possible.

Weather

Activities that are done in a natural environment such as a beach, river, lake or snowfield are heavily influenced by the prevailing weather conditions. It is difficult to eliminate or minimise risk in an unpredictable natural environment but the risk can be managed. At the beach, for example, the currents and wave size are related to the prevailing weather. Although natural phenomena cannot be altered, Australia's local councils provide lifeguards who patrol the beaches to manage the risk. Flags are set up in swimming areas to ensure that the swimmers avoid any dangerous currents and surf. Unfortunately, due to a number of factors, not all beaches are patrolled, and even at the ones that are, some swimmers choose to swim outside the flagged area.



Figure 6.14:
Snowfields are groomed to make them safer for skiers.

Other water environments entail a number of potential risks; for example, a river can contain a dangerous current, and a lake can contain submerged objects.

Snowfields are natural environments in which surfaces can be made safer. By way of inspection and maintenance, the slopes are 'groomed' and safety boundaries are set for the skiers. Outside of snow season, 'slope maintenance' is completed to make the conditions even safer. Although the environments can be inspected and maintained, the prevailing weather – in the form of a high wind, a blizzard or a 'white-out' – is beyond the authorities' control and is the cause of risks that cannot be minimised.

Water currents

A common form of physical activity for many Australians involves participating in aquatic environments. Such environments can be extremely dangerous for individuals who have limited knowledge or prior experience. Drowning is the most serious risk that can occur in aquatic environments. Unfortunately, one person drowns in Australia on average every week. Other risks that individuals may experience when swimming in the surf include:

- getting caught in a rip and taken further out to sea away from the beach
- hitting a sand bar when surfing or diving
- being stung or bitten by a marine animal; for example, a bluebottle
- suffering an injury when colliding with another individual or object, such as a surfboard or wave ski.



Figure 6.15:
Swimming in the surf carries a risk of being stung by bluebottles.

Individuals can prevent the above situations occurring by always swimming at environments patrolled by lifeguards and abiding by their instructions. Reading the signs at different locations will also alert individuals of the potential hazards or environmental conditions that may be present. Swimming with another person is another preventative measure that can reduce the risk of injury. Last, understanding individual capabilities will help to reduce the chance of injury or risk while swimming in water environments. People with limited swimming ability should participate in swimming lessons to enhance their skills before entering more challenging environments.

The average person does not have the necessary skills or knowledge to be able to recognise many of the potential risks in various environments. Trained volunteers and members of sporting organisations are relied on to provide as safe an environment as possible for the sports and physical activities they run. Those people are responsible for minimising risk, whether by way of modifying the activity or cancelling or postponing it.

Learning activity

1. Complete this activity in groups of three or four.
   a. Brainstorm a list of adventure activities.
   b. Select three activities from the list, and identify the geographical considerations and weather conditions that can have an impact on safe participation in the activity.
   c. Suggest how each of the potential risks could be reduced.
2. Describe how the following factors influence safe participation in a sport of your choice. Use examples to illustrate your answer:
   a. Environmental factors.
   b. Grounds and facilities.
   c. Weather conditions.
3. Explain how a professional extreme-sport athlete might be less at risk of suffering an injury compared with a person who participates only occasionally.

Organisational factors

The organisational factors to reduce risk include matching opponents to size; modified rules; and equipment, clothing and body protection. These factors are an important aspect of ensuring safe participation in sport and physical activity.

Matching opponents to size

Depending on the specific sport or physical activity, opponents can be graded according to their age, gender, skill level and physical size. For some team sports where contact between the opposing team occurs often and with significant force, such as rugby league, it is important that players are of similar size to reduce the risk of injury.

Categorising opponents by size is not as common as categorising players by skill level and age; however, it does occur in rugby league, basketball and boxing. In these sports, the weight and physical stature of the individual significantly impacts their placement and opposition. When athletes play contact sports where the risk of sustaining an injury is already moderately high, a strategy to decrease this risk involves playing opponents of similar weight and size. Safe participation in sport and physical activity is not promoted when a 50-kilogram teenager is matched to a 100-kilogram teenager. However, when young individuals are matched against other players of similar size, greater team work, collaboration and confidence is fostered due to the reduced fear of being injured.

Modified rules

Most sports now have a set of modified rules for junior competitions, and the rules are in place for various reasons, including:

- promotion of a healthy, safe and fun environment
- provision of help during the transition to adult participation
- minimisation of injury by promoting fair and equal participation
- provision of an environment for skill development.

The aim of having modified rules is to make participation in sport and physical activity safer. Equal participation is promoted regardless of factors such as ability and gender. For example, soccer is modified for juniors, in the form of Miniroo football. The modifications include having:

- a smaller playing field
- fewer players
- no goalkeepers
- no set positions
- unlimited interchange
- no corners.



Figure 6.16:
Weight divisions in boxing helps to improve the sport's safety.



Figure 6.17:
Sports may be modified to minimise physical contact between players.

Internet activity

Log on to TitanOnline and complete Activity 6.2 by reading the information about blood policies in the listed sport. Explain the policy's purpose and how it could be adapted to your school's sports program.

Equipment, clothing and body protection

In making participation safer, designers of protective equipment consider individuals and environmental factors. Examples of protective equipment range from helmets to heat-appropriate apparel such as hats and light, loose clothing. Protective equipment is used in most sports and most sporting associations have strict rules for its use. In cricket, for example, the following equipment and clothing is used to protect the body and minimise risk:

- lightweight and well-ventilated helmet that has a face grille and an adjustable chin strap
- batting gloves
- thigh pad
- protector
- pair of leg pads
- wicket-keeping gloves
- hat
- sunglasses.



Figure 6.18:
Equipment such as gloves and pads are used to protect the body and minimise risk.

Learning activity

1. Name the modified versions of the following sports:
   - a. Australian football
   - b. Baseball.
   - c. Cricket.
   - d. Football (soccer).
   - e. Golf.
   - f. Gymnastics.
   - g. Hockey.
   - h. Lacrosse.
   - i. Netball.
   - j. Rugby league.
   - k. Rugby union.
   - l. Softball.
   - m. Volleyball.
2. Select one sport from the list and investigate the modified rules for it.
3. Teach your class the rules of the modified sport. Play a game using the rules.
4. Explain how modified rules are used to promote participation in sport.
5. Identify the protective equipment used in the following sports and physical activities:
   - a. Australian football.
   - b. Baseball.
   - c. Cycling.
   - d. Equestrian sports.
   - e. Football (soccer).
   - f. Ice hockey.
   - g. Netball.
   - h. Rugby league.
   - i. Rugby union.
   - j. Water polo.
6. For a sport of your choice, explain how technological and equipment developments have led to better safety and increased participation.
7. For a team sport of your choice, identify the rules that have been designed to protect participants' safety.

Injury management

Although sporting clubs and organisations do widespread risk assessments, sporting injuries will continue to occur. Sports injuries are commonly caused by overuse, direct impact or application of force that is greater than the body part can structurally withstand. Two types of sports injury are acute and chronic injury.

- **Acute injuries** occur suddenly, and an example is spraining your ankle when you land on it awkwardly.
- **Chronic injuries** are caused when you repeatedly overuse specific muscle groups or joints. Poor technique and structural abnormalities can also be contributory factors in development of chronic injuries.

Medical investigation of any sports injury is important, because you might be hurt more severely than you realise. For example, what seems like an ankle sprain might actually be a bone fracture.



Figure 6.19:
A sprained ankle is an acute injury.

Injury assessment

Injury assessment is an integral part of sport and physical activity. People will always participate in some sort of activity, so it is inevitable that injuries will occur. All sporting associations should ensure they have an injury-management process as part of their overall risk-management program. Ideally, the injury-management process will include provision of first-aid training and first-aid equipment as well as use of trained first-aid officers. An effective management plan will include identification of the potential risk, analysis of the likelihood that the risk will occur, and efficient preparation for the risk's occurrence. For example, a lawn-bowls club in which the participants are elderly might prepare for the possibility of injury by having a defibrillator on site but would not consider having spine-based equipment on site, because of the small chance that a spinal injury will occur.

First-aid training is a vital risk-management component for all sporting associations. The training can range from basic emergency care to senior first-aid and specialist courses about sports-injury management. Personnel such as St John Ambulance officers can be used but, at some stage, trained ambulance personnel might have to be called. Officials and participants should be aware of the first aid that is available and should be informed of the processes and contacts they will need when seeking help.



Figure 6.20:
Elderly participants would benefit from first-aid staff trained in using a defibrillator.

Did you know?

Cardiopulmonary resuscitation (CPR) has been used since the 1700s but it looked a lot different to the DRSABCD protocol we use today.

Two common classifications of sports injury are soft-tissue injury and hard-tissue injury. Common soft-tissue injuries are sprains, strains, bruises, abrasions, lacerations, blisters and cramps; and common hard-tissue injuries are bone fractures, tooth breakages and joint dislocations.

In some circumstances, injury management can involve preparation for life-threatening injuries such as spinal, head and abdominal injuries. The important thing is to ensure that a trained person is always available when a sport or physical activity is taking place.

First aid in a sporting environment is the same as first aid in other environments such as the home, school or workplace. When an injury occurs, the first thing to do is take the same steps you would take if you were handling an emergency, by remembering the 'DRSABCD' acronym as shown in Table 6.4. People who use this acronym have a guide to follow whenever an injury occurs. The procedure can be conducted quickly if the injury is not severe.

Table 6.4: An explanation of the DRSABCD acronym.

D	**Danger**	To yourself, other people and the casualty
R	**Response**	Check to see if the casualty is conscious.
S	**Send**	Send for help.
A	**Airway**	Check the airway, and clear and open it.
B	**Breathing**	Check for breathing.
C	**CPR**	Apply 30 compressions per two rescue breaths, and if there no signs of life, apply 100 compressions per minute.
D	**Defibrillation**	If a defibrillator is available, use it as soon as possible.



Figure 6.21: First-aid training is a vital risk-management component for all sporting associations.

In most injury assessments, the only steps used will be the first two. After checking for danger, if none has been found, a response is checked for. If a response is received, the casualty is conscious and the person doing the check can move onto the next stage of the injury assessment. Exceptions to this 'checking order' are spinal, head and neck injuries, for which extra care has to be taken and the casualty has to be continually monitored.

The type of injury will be the determining factor in the extent of the injury assessment. In sporting-injury assessment, a procedure that is commonly followed is known as TOTAPS – another acronym that is easy to remember. The 'TOTAPS' acronym is explained in Table 6.5.



Figure 6.22:
If a casualty is unconscious, a first-aider should call for help.

Table 6.5: TOTAPS is used to assess sporting injuries.

T	**Talk**	Ask the athlete questions such as 'What happened?' and 'Where does it hurt?'
O	**Observe**	Look at the affected area for signs, and compare it with the uninjured side.
T	**Touch**	Carefully touch above and below the injury site to locate the pain.
A	**Active movement**	Ask the athlete, 'Can you move the injured area yourself?'
P	**Passive movement**	If the athlete can move the injured area, very carefully move the injured area yourself.
S	**Skills test**	If the athlete has no pain from the previous two steps, see whether they can complete some game-related skills.

TOTAPS can be stopped at any step. The determining factor will be the step at which a serious injury is identified and it is decided that the athlete should not continue to participate in the activity. If a hard-tissue injury or a life-threatening injury is suspected, TOTAPS should be able to be used to identify it within the first two steps. For example, it is preferable not to touch a hard-tissue injury or move the casualty. Similarly, a life-threatening injury such as suspected spinal damage is very serious, and the athlete should be immobilised and medical assistance sought immediately.

Internet activity

Log on to TitanOnline and complete Activity 6.3 by accessing the injury fact sheets and researching an injury you have had or is of interest to you.

Learning activity

1. Identify a range of organisations that provide first-aid training.
2. Compare the management procedures for soft-tissue injuries and hard-tissue injuries.
3. Select a sport.
   a. Brainstorm a list of injuries that can potentially occur in it.
   b. Select two injuries and describe how you would manage them using TOTAPS.
4. Complete this activity in groups of two or three.
   a. Create a scenario in a sport in which at least three players suffer an injury.
   b. Swap your scenario with another group's.
   c. Explain how you would manage the other group's scenario using TOTAPS.
5. Practise DRSABCD with a partner.

Immediate management techniques

Immediate treatment is dependent on the type of injury involved. A common way to manage soft-tissue injuries such as bruises, strains and sprains is use of the 'RICER' procedure – yet another easy-to-remember acronym. The RICER procedure, explained in Table 6.6, can be used to manage an injury via promotion of faster recovery and an earlier return to play.

Table 6.6: The RICER procedure is used to manage sports injuries.

R	**Rest**	'Rest' means stopping participation in the activity and not moving the injured area. The aim of the resting is to reduce blood flow and prevent movement from causing more damage.
I	**Ice**	Ice cubes, commercial ice packs or similar products should be wrapped in a wet cloth and applied directly over the injured area for between 10 and 20 minutes. This application should be repeated every one to two hours, and the aim of it is to reduce the pain and swelling.
C	**Compression**	A compression bandage should be applied directly over, above and below the injured area. If an ice pack is being used, the bandage has to go over it. The aim of the compression is to aid reduction of the swelling and any more bleeding into the injured site.
E	**Elevation**	When possible, the injured area should be raised above the level of the heart. The aim of the elevation is to aid reduction of the swelling and bleeding.
R	**Referral**	If appropriate, a healthcare professional such as a doctor or physiotherapist should be consulted so they can give a diagnosis and complete an injury-management plan.



Figure 6.23:
Hard-tissue injuries should be immobilised.

The 'RICER' procedure is sometimes known as RICED, in which case all the steps are exactly the same and the final 'D' simply stands for 'diagnosis' or 'doctor'. RICER should be continued for between 48 and 72 hours – that is, for between two and three days – following the injury.

Another useful acronym for management of soft-tissue injuries is 'HARM'. It can be used alongside RICER, and is explained in Table 6.7.

Table 6.7: HARM is used to manage soft-tissue injuries.

H	**Heat**	No form of heat, such as the jets of hot water in a spa bath, a hot-water bottle or a liniment cream, should be applied to the injury, otherwise the swelling and bleeding will increase.
A	**Alcohol**	The casualty should not consume alcohol because it would cause the swelling to increase.
R	**Running**	The casualty should not run or engage in any other type of physical activity, otherwise the injury could deteriorate.
M	**Massage**	The casualty should not be given a massage or have a heat rub applied, because it would cause the swelling and bleeding to increase.

Hard-tissue injuries such as fractures and dislocations can be serious injuries that require effective first aid. The key procedures are DRSABCD, immobilisation and professional medical treatment. Once DRSABCD has been completed, the injury should be immobilised which might be as simple as the introduction of a sling for the arm. Effective ways to manage hard-tissue injuries include either making the casualty comfortable or not moving them at all while waiting for medical help to arrive. Professional medical treatment should be sought for all suspected hard-tissue injuries.

Another common type of hard-tissue injury is tooth breakage or dislodgement. When possible, a dislodged tooth should be carefully rinsed and put back in place. Broken teeth or teeth that cannot be replaced should be carefully rinsed and kept moist, in a saline solution, milk or the injured person's mouth. Professional medical advice in the form of a dentist should be sought immediately.

Some soft- and hard-tissue injuries need different management techniques. For example, soft-tissue injuries such as cuts, blisters, cramps and stitches are common sporting injuries that will not benefit from use of the RICER procedure. By contrast, a nose breakage is a hard-tissue injury that can benefit from the procedure.

Life-threatening injuries such as spinal, head and abdominal injuries are also managed by use of DRSABCD, immobilisation and seeking of medical help. The way to seek medical help is to call for an ambulance immediately. In the case of a suspected spinal injury, the casualty should not be moved and should stop activity immediately.



Figure 6.24:
Cramps do not benefit from the use of the RICER procedure.

Learning activity

1. Explain the purpose of the RICER procedure.
2. Describe the HARM procedure.
3. Explain how you would manage a:
   - **a.** sprained ankle
   - **b.** broken leg
   - **c.** sprained thumb
   - **d.** bruised thigh
   - **e.** spinal injury
   - **f.** broken arm
   - **g.** dislodged tooth
   - **h.** swollen knee.
4. Design an injury-management flow diagram for teachers to use during your school's sports carnival.
5. Investigate the management techniques that are applied to treat a:
   - **a.** cut
   - **b.** blister
   - **c.** cramp
   - **d.** stitch
   - **e.** broken nose.
6. Practise applying a sling to immobilise a broken clavicle.
7. Predict the short- and long-term effects of returning from an injury too soon.
8. Investigate the treatment that is necessary for life-threatening injuries.



Figure 6.25:
Taping can help athletes to return to their sport or activity more quickly.

Injury rehabilitation

Injury rehabilitation is the final step of the injury-management process. Procedures such as TOTAPS and RICER are the initial part of injury rehabilitation. For example, if the RICER procedure is applied to a minor soft-tissue injury during the first 48 to 72 hours, the injury-rehabilitation process has begun and the athlete will soon be able to decide when they will restart the activity.

Internet activity
Log on to TitanOnline and complete Activity 6.4 by researching the types of exercises that would be appropriate for rehabilitation of a sprained ankle.

Injuries range from minor soft-tissue injuries, such as bruises or sprains, to major injuries, such as an arm fracture for which setting is needed or knee-ligament damage for which surgery may be needed. Athletes who are suffering a more severe injury will have to undergo rehabilitation to get the injured area back to its pre-injury condition. Like all areas of injury management, injury rehabilitation entails a set of procedures that have to be followed, and if they are followed correctly, the injured athlete is more likely to fully recover earlier. The methods that can be used to help athletes return to their sport or activity include mobilisation; fitness; training; and use of heat, massage, taping and stretching. Many sporting clubs provide the services of a qualified sports physician or physiotherapist but most people access that type of professional at a clinic.

The injury-rehabilitation procedures are explained in Table 6.8.

Table 6.8: The injury-rehabilitation procedures.

Mobilisation	Mobilisation is especially important in the case of injuries that occur in or around joints. The associated swelling and bleeding lead to stiffness in the joint, and the athlete is unable to move the injured area through its full range of movement. Mobilisation is best undertaken under the supervision of a physiotherapist, who will 'progressively' mobilise the injured joint or move it through an increasingly greater range of movement.
Fitness and training	It is important that athletes try to maintain fitness while undergoing rehabilitation. When possible, they should try to do some type of training to maintain the relevant fitness components such as strength, flexibility and cardiovascular endurance. One popular method is to do cross-training, whereby the athlete swims, cycles on a stationary bike or uses a treadmill to maintain cardiovascular endurance.
Heat	After the first 72 hours, heat can be applied to the injured area. The heat can be applied in a range of ways, from a simple hot-water bottle to use of ultrasound by a physiotherapist. Heat is used to aid the healing process by way of pain relief, muscle relaxation, blood-flow increase and enablement of the injured area to be more easily stretched.
Taping	Taping of an injured area, especially a joint, can be used to provide support and stability for the injury during the rehabilitation process. Taping is also commonly used to help the athlete participate while recovering from the injury.
Stretching	Stretching of the injured area after the first 72 hours is an important process that is used to aid prevention of muscle-tissue scarring. Static stretching, whereby muscles or muscle groups are elongated and put under tension, should be done lightly and gently. Proprioceptive neuromuscular facilitation or PNF stretching is good for injury rehabilitation because the focus of it is on flexibility and muscle strength. It is best completed with a partner or under the supervision of a physiotherapist.

Learning activity

1. Explain the importance of the following injury-rehabilitation procedures:
   a. Heat.
   b. Mobilisation.
2. Explain how the following procedures could be used as an injury-rehabilitation method and an injury-prevention method:
   a. Taping.
   b. Stretching.
3. Identify ways in which the following injured athletes could maintain fitness during a two-month recovery period:
   a. A cricket player who has a broken wrist.
   b. A swimmer who has a recurring shoulder injury.
   c. A tennis player who has knee-ligament damage.
   d. A hockey player who has a lower-back strain.
   e. A rugby league player who has a strained hamstring muscle.
   f. A netball player who has ankle-ligament damage.

Revision questions

1. Define the terms ‘risk’ and ‘risk management’.
2. Identify the characteristics that are contributory factors in risk in the following environments/circumstances:
   a. Water.
   b. Isolation.
   c. The playing surface.
3. Describe the techniques that can be used to identify risk in sporting and physical-activity environments.
4. Explain the purpose of a risk assessment.
5. Apply the common features of a risk assessment in assessing a sport of your choice.
6. Explain how the following factors affect the athlete’s risk of suffering an injury in a specific sport:
   a. Fitness level.
   b. Skill level.
   c. Previous experience.
7. Describe how the following factors influence safe participation in a sport of your choice. Use examples to illustrate your answer:
   a. Environmental factors.
   b. Grounds and facilities.
   c. Prevailing weather conditions.
8. For a sport of your choice, explain how developments in technology and equipment have led to an increase in safety and participation.
9. For a team sport of your choice, identify the rules that have been designed to protect participants’ safety.
10. Summarise the following acronyms: DRSABCD, TOTAPS and RICER.
11. TOTAPS is a process of injury diagnosis. Choose the best option below that describes what the ‘A’ stands for and what it means.
    a. Active movement – player attempts to move the injured site themselves.
    b. Attempt to stand – player tries to stand and assesses if they can play on.
    c. Assess the injury – look for any deformity at the injured site.
    d. Arrange for medical help – call an ambulance or transport to medical support.



AREA OF STUDY 2

Physical activity and sport in society

- Australia's sporting identity
- Lifestyle, leisure and recreation
- Physical activity and sport for specific groups
- Opportunities and pathways in physical activity and sport
- Issues in physical activity and sport

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CHAPTER 7

Australia's sporting identity

Countries strive to gain a sense of national identity so they can determine their place in the world. In Australia, which is a relatively young nation, sport is used as a major determining factor in relation to national identity. From colonial sporting days to our ongoing success in the international sporting arena, sport has been a cornerstone of our national identity.

In the early days of Australian society, sport was mostly the domain of men. Physically and socially, the common sports were formed to be participated in by men only. As Australia developed as a nation and sport became embedded in our national identity, sport was widened to encompass groups that had been excluded. Women, people with disability, Aboriginal and Torres Strait Islander peoples as well as various other minority groups emerged as competitive sporting groups.

Although passion and support for sport continues, the level of participation in sport is declining in all age groups except among young people. This declining participation rate is likely to result in continuing changes in relation to what constitutes sport in Australia.

Outcomes

A student:

- discusses the nature and impact of historical and contemporary issues in physical activity and sport (PASS5-3)
- analyses physical activity and sport from personal, social and cultural perspectives (PASS5-4)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- The role of sport in shaping Australia's identity
- Factors influencing Australia's sporting identity
- Current and future perspectives on sport in Australia



Figure 7.1:
Australia is recognised as a sport-loving nation.

The role of sport in shaping Australia's identity

Sport has always been a prominent part of Australia's uniqueness, and continues to play a significant role in defining Australia's social and cultural identity. Australia's overall love of watching and/or playing sport, from backyard cricket to Olympic and Paralympic glory, defines the nation.

As a young country, having success on the sporting field, especially on international platforms like the Olympics and world championships, puts Australia on the map. By Australian athletes thriving on the world sporting stage, Australia is recognised and commended on its sporting ability and attitude. With other countries recognising Australia for its sporting ability, the nation is proudly unified to celebrate this international identity.

Sport has led to development of a form of nationalism whereby Australia has been united on many levels. For example, the gender inequality gap has been bridged by inclusion of Women's Big Bash League (WBBL) and Women's Australian Football League (AFLW) competition being broadcast on primetime television. While there is still a long way to go, sport can be a medium to shape a unified Australian identity.

History of sport in Australia

Unsurprisingly, the sport that emerged in colonial times mostly reflected the culture of the British migrants. The most popular activities were horse racing, boxing and the cruel practice of 'cock fighting' (forcing two roosters to fight to the death). Gambling was part of the events and people were able to bet on the outcome of the competitions.

Although a handful of sports existed, society's main focus was on survival, and sport as we know it today remained very much in its infancy. As society developed and grew, so did the opportunity for leisure and sport activities. During the early years of the 19th century, the basis of any contest was British virtues, specifically 'manliness' and adherence to Christianity. Sport was perceived as being a means of testing a man's physical abilities and his adherence to Christianity while he was competing. The origin of rivalry in sport was the contention that existed between newly landed migrants and Australian-born white people, and the rivalry continues in the form of the strong competition that exists between Australia and England.

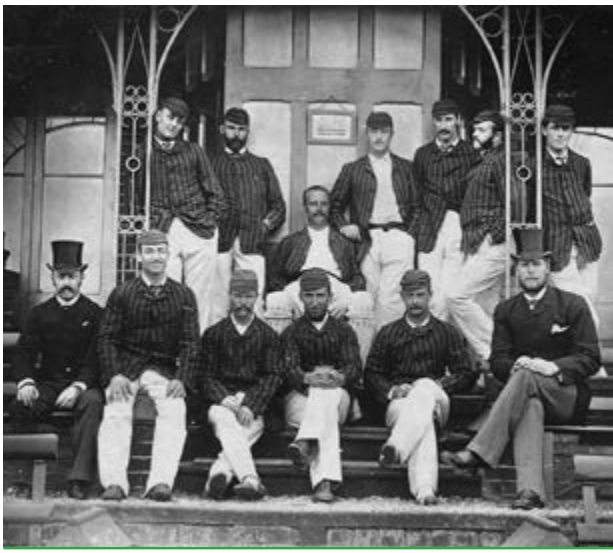


Figure 7.2:
The long-running Ashes rivalry was established in 1882 when the Australian cricket team defeated England in a test match for the first time on English soil.

By the mid-1850s, team sports had become prevalent. Cricket and football had been brought over by British migrants, and the first recorded cricket match was played in 1832, in Sydney. Cricket matches were being played as 'friendlies' in England whereas competitive matches were being played in Australia in the form of games between various Sydney suburbs. The importance that was placed on competition could be seen even during the beginnings of Australian sport.

A significant milestone in Australian sport was the emergence of Australian football, a uniquely Australian game. Developed in 1859, it constituted a branching away from British influences. There was a clear break from the traditional sports that had been brought out by the British migrants.

Australia's sporting identity expanded when the first 'Melbourne Cup' was run, in 1861. Seventeen horses competed in the first Cup, racing for a prize of £170 (pounds were Australia's currency at the time) and a gold watch for the jockey.

Although our sporting identity was becoming uniquely Australian, immigration was the dominant factor in the development of sport. Migrants came from widespread parts of Europe and brought their nationally popular sports, including athletics, tennis and cycling, and those sports soon became part of the Australian lifestyle.

International sporting competitions were introduced in Australia during the second half of the 19th century. An Aboriginal cricket team toured England in 1867 and 1868, and the first cricket match between Australia and England was held in Australia in 1877, in Melbourne.

The modern Olympic Games emerged towards the end of the 19th century, in 1896. The first Games were held in Athens, and Australia's two medals were won by Edwin 'Teddy' Flack; both were gold, for the 800-metre and 1500-metre athletics events. Australia has competed in every summer Olympic Games since, and has been one of only three countries to have done so.

Australia's sporting identify continued to develop throughout the first half of the 20th century. Australia continued to participate in international sporting competitions, mainly against England and English colonies, in sports such as cricket and rugby. The country continued to improve its national standing at the Olympic Games by steadily increasing the number of medals and overall ranking.



Figure 7.3:
Champion racehorse Phar Lap won the Melbourne Cup in 1930.

Did you know?

The Ashes test cricket series got its name from a mock obituary published after England's loss in 1882, which said the 'body' of English cricket would be "cremated and the ashes taken to Australia".

Internet activity

Log on to TitanOnline and complete Activity 7.1 by researching the AIS's contribution to Australian sport.

The second half of the 20th century, and specifically the period 1949–66, was a 'golden era' for Australian sport. During that time, Australia had considerable success in a number of sports, and the journey to where the nation's sporting identity is today was finalised.

In 1980, because of sport's importance for Australia's identity, the Australian Government built the Australian Institute of Sport (AIS) in Canberra. The sports that the AIS originally targeted were athletics, basketball, football, gymnastics, netball, swimming, tennis and weightlifting. Since the AIS's inception, Australia has enjoyed considerable success in a range of sports. The nation reached a fourth-place ranking at the 2000 and 2004 summer Olympics, winning 58 and 49 medals, respectively. At the Rio 2016 Olympics, Australia slipped to an overall ranking of 10th.

Reasons for change in Australian sport

Sport choices, interests and prevalence has changed within Australia over the years. This can be due to new sports becoming popular, population changes so more cultural games are being introduced, advertising online and television rights. These factors play a significant role in shaping the evolving Australian sporting identity.

There have been significant changes in Australian sport, including spectator interest and elite athlete success, yet most importantly, changes have been made by governments and authorities to make Australian sport more inclusive. Reform at a community and elite level in sport comes in the form of new competitions, funding opportunities, school programs and clearer pathways to pursue careers in sport. Creating a sporting culture that suits the social context and individual interests of the community invites people to be involved in the sporting experience, including playing, being an official and spectating. This forms a part of the Australian sporting identity.



Figure 7.4:
A wider audience can enjoy watching AFL matches with free-to-air television broadcasts.

For example, with Channel 7 television rights broadcasting Australian Football League (AFL) games on free-to-air television, a wider audience can now enjoy watching the AFL, rather than traditional Victorian Football League (VFL) Melbourne supporters. This has a flow-on effect into local community clubs and teams, with more people showing interest in this sport.

Inclusivity for minority groups, including people with disability, women, and those of different cultures, for example, celebrates the diversity of Australia, which defines Australia's identity.

Traditionally, women in sport at elite level participated in competitions with limited prize money and television coverage. The creation of competitions such as AFLW, WBBL and W-League allows women to compete on a professional level with media coverage. This develops a respect and admiration for the athleticism, competitiveness and elitism of women in sport.

People with disability have also gained a significant platform in Australia's sporting identity. Athlete success and broadcasting of the games lifts the status of people with disability in sport. The Paralympics allows Australian athletes to achieve international success, and through free-to-air television, Australians are able to watch and equally support their success. Increased popularity and respect for non-traditional sports is shown at elite level, such as the final of wheelchair tennis at the Australian Open now being played at Rod Laver Arena. Through this added emphasis on inclusion in Australian sport, the Australian sporting identity evolves with change to continue supporting the success of all athletes in sport.

Learning activity

1. Construct a timeline of the major events in Australia's sporting history.
2. Explain the reasons that sport was not participated in extensively during early colonial times.
3. Identify the major sports that are played in the following countries: the United States, Malaysia, Canada, Brazil, New Zealand, Norway, Jamaica, Kenya, Japan and Ireland.
4. Explain the reasons for and benefits of creation of the Australian Institute of Sport.
5. Construct a table that includes the city, country and year of each modern Olympic Games and how many gold, silver and bronze medals Australia won at each Games.
6. Suggest reasons for Australia's increasing international sporting success.
7. For a sport of your choice, write a report about its history and development in Australia, and present the report to the class.

Contribution of sport to local and national identity

Sport plays a significant role in the development of local and national identity in Australia. From club teams that have local competitors to international teams that compete on the world stage, sport has been a determining factor in the shaping of Australia's identity.

Local identity

Local identity is often achieved when successful sporting competitors are associated with the town they originated from, and one example is Donald (Don) Bradman, who was known as 'the boy from Bowral'. Many communities bond by way of participation in community and state competitions. Regardless of the size of the competition, the spectators strongly associate themselves with their chosen team and enjoy a sense of pride when their team is successful.

The concept of local identity is perhaps best illustrated in the National Rugby League (NRL) State of Origin matches, which are between New South Wales and Queensland. 'Origin' players represent either the state they were born in or the state they played their first game in. The first game took place in 1980 and was the start of the formation of intense state rivalry, which comes to a head in an annual series of three games.

Because competitions in sports such as rugby league and Australian football have expanded, cities and regional areas have had the opportunity to support teams that are unique to their area. Central Coast Mariners FC is a soccer team that plays in the A-League. Central Coast residents have embraced the Mariners, and the team's support has quickly grown so that the area now has a strong sense of local identity. Residents from various suburbs come together to cheer for their local team, creating an identity that is specific to the New South Wales Central Coast region.

Did you know?

Don Bradman's cricket records were set over 80 years ago and many still remain to this day. While his test batting average was a staggering 99.94, he only hit six sixes in his test career.

National identity

Countries strive to gain a sense of national identity and sport has been an ongoing influence on how Australia is viewed in the world. From colonisation to ongoing success in the international sporting arena, sport has been the cornerstone of our national identity.

Sporting success has developed to a significant influence on how Australia is recognised on the international stage. With success in many sports, particularly in swimming, rugby and cricket, for example, other countries identify Australia as a sporting nation. Successive governments have recognised this fact and have directed significant time, money and expertise towards achievement of success at an international level. Initiatives and programs include funding for local clubs and schools, pathways to learn and train at the AIS, and representative opportunities throughout school and junior sporting teams.



Figure 7.5:
Australia's international swimming success has inspired governments to fund sporting initiatives.

Internet activity

Log on to TitanOnline and complete Activity 7.2, researching the development of women's cricket in Australia.

Australia has become a dominant nation in international competitions such as the Olympics, Commonwealth Games and world championships. It has also enjoyed success in traditional sports such as cricket, tennis, field hockey and both rugby codes. Notably, however, measuring sporting success on an international level is difficult in these sports with a narrow playing audience. To measure more accurately, the 'global' game of football (soccer) can indicate Australia's sporting ability. The Socceroos' qualification for the 2018 FIFA World Cup and the Matildas' progress to the quarterfinals in 2019 illustrates Australians' passion for winning, drive to achieve and ambition to provide all Australians a sense of national pride.

Learning activity

1. Using the NRL State of Origin as an example, examine the contribution of sport to the development of local identity.
2. Research a local sporting identity. Outline their sporting background and success.
3. Research three sports that were played in colonial Australia. For each sport, identify:
   a. the rules
   b. who played the sport
   c. how the sport differs from the sport that is played today.
4. Identify sports and events in which Australia has had little success in international competition, and analyse the reasons for the lack of success.
5. Identify and describe the determining factors for a sport's popularity and success in a specific community (for example, rugby league in Newcastle or Australian football in Melbourne).
6. Design a poster to promote participation in a sport that is not popular in a specific community at present.



Figure 7.6:
The Women's Liberation movement had opened up more sporting opportunities for women.

Emergence of specific groups as sporting identities

Sport in colonial Australia was participated in by men only. As Australia developed as a nation and sport became embedded in our national identity, sport was widened to encompass groups that had originally been excluded. Women, people with disability, Aboriginal and Torres Strait Islander peoples, and various other minority groups emerged as competitive sporting groups.

Women

Sport in colonial Australia was male dominated; women's subordination was reflective of the strong patriarchal social order of the times. Women were deterred from participating in physical activity and were relegated to spectating. They were perceived to be 'the fair sex' – the prevailing belief was that sport was physically detrimental to women. As time passed, ways of thinking were slowly expanded so that women were included in the sporting arena. During the 1960s, Women's Liberation activists stipulated equality for women, including equality in relation to women's involvement in sport.

Ever since the Women's Liberation movement, female athletes have been gaining considerable success in sport. In spite of their continuing success, however, women continue to either take, or be given, less notable roles in various areas of the sporting industry. Coverage of sports is an example whereby media representatives favour male-dominated sports, especially in relation to event coverage for the Olympic Games and the Commonwealth Games. At a national level, men's games still get priority broadcasting at primetime, play at larger stadiums and have more sponsorship opportunities. Coverage of women's games is heightened when a female athlete or team excels, but it quickly reverts to minimal coverage once the spectators have taken in the achievement. It is important to understand that attitudes and behaviours cannot change overnight; however, active steps need to be taken to heighten the respect and appreciation of women in sport.

Case study

Ellyse Perry, born in 1990, was raised in the suburbs of Sydney. At school, Ellyse's participation in sports was ever-present; she played in a range of sports including tennis, athletics, touch football and golf.

Cricket and soccer were her focus, and at just the age of 16, Ellyse made her debut for both the Australian cricket team and the Australian women's national soccer team. All before finishing Year 12 in 2008, Ellyse became the youngest person to represent Australia in cricket, in the second one day international of the Rose Bowl series against New Zealand in July 2007. As her incredible sporting career began to thrive, she became the first Australian to have appeared in cricket and soccer World Cups.

Despite a promising soccer career, Ellyse's future in cricket had been secured when she was in the group of the first women cricketers to be handed contracts by Cricket Australia in 2008. In a juggle to maintain cricket and soccer, in 2010, Ellyse was finally faced with the decision of whether to play for Australia at overlapping events: the ICC World Twenty20 (T20) or the 2010 AFC Women's Asian Cup. She chose cricket.

Ellyse is regarded as one of the biggest superstars the women's game of cricket has produced. Her success as an all-rounder includes T20 performances at domestic and international level, and Test cricket performances for Australia. Ellyse was Australia's leading wicket taker at the Women's World T20 in the Caribbean 2010, with a three-wicket haul earning her player of the match in the final. In August 2015, her stellar batting (264 runs) and bowling (16 wickets) performances helped Australia in regaining the Ashes, which once again earned her the player of the series award. From 2015 to mid-2017, Ellyse smashed 16 half centuries in 26 innings. This included her double century at the Women's Ashes Test in 2017, which was the highest women's Test score in Australia, and the third highest of all time. In December 2017, she won the inaugural ICC Women's Cricketer of the Year award.

Ellyse became the first cricketer for Australia, male or female, to play in 100 T20 international matches in 2018 during the 2018 ICC Women's World Twenty20 Tournament. In the final of the same tournament, she became the first cricketer for Australia, male or female, to take 100 wickets in T20 international matches.

People with disability

Sports for people with disability have existed for more than 100 years. Sports in which participants without disability were favoured were modified to meet the needs of participants who had a physical or intellectual disability.

Sports for people who had a physical disability were developed by way of rehabilitation programs that were widely used after World War II. Servicemen who had a debilitating injury were encouraged to participate in the 'adapted' sports that were a part of the servicemen's rehabilitation process.

What started as a means of injury treatment soon became competitive. Sir Ludwig Guttman wholeheartedly believed that sport is a means of physical and mental therapy for people with physical disability. He founded the Stoke Mandeville Games, which were to be organised for patients who had a disability and were attending the Stoke Mandeville Hospital, in England. The event later evolved into the Paralympic Games.

Case study

Dylan Alcott, born in 1990 in Melbourne, was born with a tumour wrapped around his spinal cord. After being operated on in the first weeks of life, he was left a paraplegic, requiring him to use a wheelchair. Growing up, Dylan had the support of his family and they treated him like anyone else. Playing sport was a big part of his childhood, during which wheelchair tennis was his sport of choice.

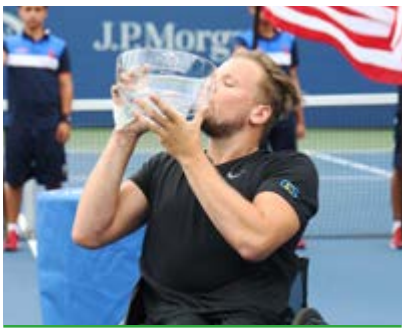


Figure 7.7:
Dylan Alcott after winning the US Open in 2015.

Dylan first made the sporting headlines playing wheelchair basketball, after winning a gold medal at the 2008 Beijing Paralympics at the age of 17. From this, Dylan was honoured to receive a Medal of the Order of Australia (OAM) in 2009.

Following the gold-medal glory, Dylan received a scholarship at the University of Illinois and played and studied overseas for one year. In 2010, he was a part of the Rollers first ever World Championship win in 2010. Dylan was named in the World All-Star Five for the tournament. At the 2012 Paralympics in London, he was part of the Australian men's wheelchair team that won silver.

Dylan's sporting career took a change in direction with a return to wheelchair tennis in 2014. In 2015, Dylan won the quad wheelchair Australian Open title, his maiden grand slam title. By the end of the year, he was ranked number one in the world after eight title wins, including two grand slam singles titles. In 2018, Dylan won his first Wheelchair Tennis Masters title in the Quads singles event. His successes continued in 2019, with wins in the singles and doubles at both the French Open and Wimbledon.

Alongside this impeccable sporting record, Dylan has contributed positively to the community by advocating for people with disability. He has a passion in continually trying to change the way people with disability are perceived in the wider community. This is demonstrated by Dylan setting up a foundation, the 'Dylan Alcott Foundation', being an ambassador for Variety, the Children's Charity and Starlight Children's Foundation, co-founding disability and accessibility training start-up Get Skilled Access, and creating the 'Ability Fest' inclusive music festival. Stretching his achievements even further, in 2019 Dylan won a Logie for most popular new talent as co-host of the ABC's live music show, 'The Set'. As Dylan says: "For every one thing you can't do, there are 10,000 others you can."

Aboriginal and Torres Strait Islander peoples

Indigenous Australians have long been associated with sport, especially rugby league and Australian football. Aboriginal and Torres Strait Islander athletes have played a major role in Australia's sporting identity.

In most competitive Australian sports, Indigenous sporting heroes have made their mark, including:

- Cathy Freeman in athletics
- Jason Gillespie in cricket
- Adam Goodes in Australian football
- Evonne Goolagong-Cawley in tennis
- Anthony Mundine in boxing.

Although Aboriginal and Torres Strait Islander people have enjoyed immense success in various sporting fields, many have also been exposed to harm or disadvantage through racism, socioeconomic factors such as lack of education and resources, and geographical factors such as distance and location. Indigenous athletes have faced these elements and risen above them to create a sense of pride for their communities.

Internet activity

Log on to TitanOnline and complete Activity 7.3 based on traditional Indigenous games.

Case study

Ashleigh (Ash) Barty is an Indigenous Australian who grew up in Ipswich, Queensland and showed great sporting talent from an early age. As a junior tennis player, she experienced success in both singles and doubles and was ranked number two in the world.

Her professional career began in 2010 at the age of 14 and Ash soon established herself as an elite doubles player. Her 'break out' year came in 2013, competing in three Grand Slam finals and winning one WTA title with doubles partner Casey Dellacqua.

In 2014, Ash announced that she was taking a break from tennis because she had spent so much time travelling the world pursuing her tennis dream from a young age. During her tennis break, she pursued a career in cricket and was selected to play with the Brisbane Heat in the inaugural Women's Big Bash League.

In 2016, Ash returned to professional tennis. By 2019, her successes included six singles titles and ten doubles titles on the WTA Tour. Ash also became number one in world rankings after a singles win in the 2019 French Open.

Ash has represented Australia in the Federation Cup since the age of 16 and helped her team make the final in 2019 by remaining undefeated in all of her matches. In addition to her success on the court, Ash also serves as a National Indigenous Tennis Ambassador for Tennis Australia, using her high profile to promote tennis to Indigenous Australians.



Figure 7.8: Ashleigh Barty playing in the Federation Cup in 2017.

Learning activity

1. Discuss how discrimination in sport affects women, people with disability and Indigenous Australians.
2. Explore the emergence of a specific group as a sporting identity in Australia, and brainstorm a list of popular sports played by specific groups such as:
   a. women
   b. people with disability
   c. Indigenous Australians.
3. Go to the website of the Australian Paralympic Committee. Research the sport profiles and provide a report about a sport of your choice.
4. Create a poster about a Paralympic athlete (other than Dylan Alcott) and include a profile of the athlete and their achievements.
5. Suggest reasons for the male dominance that exists in media coverage of sports.
6. Watch a television news program and analyse the proportion of coverage for women's sport compared with the proportion of coverage for men's sports. Chart your results on a pie graph.
7. Research one of the following Indigenous athletes and prepare a speech about their achievements:
   a. Lionel Rose: boxing.
   b. Evonne Goolagong-Cawley: tennis.
   c. Nova Peris: hockey and athletics.
   d. Johnathon Thurston: rugby league.
   e. Lance (Buddy) Franklin: Australian football.
   f. Patrick (Patty) Mills: basketball.
   g. Kyah Simon: football (soccer).

Local, state, national and international associations and events

For Australia's sporting success to continue, sport has to grow at local, state, national and international levels.

Sporting organisations provide opportunities for athletes to participate and represent various areas at a range of levels. For example, local organisations can encourage athletes to participate in community events, and state or territory organisations can encourage them to participate so they go on to represent their state or territory.

Australian governments understand the importance of sporting success, and have introduced initiatives to ensure that sport in Australia continues to be dynamic and innovative and to expand community involvement at grassroots level.



Figure 7.9:
Sporting associations provide representative opportunities for elite athletes.

In introducing a major new participation program, the Australian Government wants to see greater numbers of Australians, especially young people, participate in sport at grassroots level. The government hopes to achieve grassroots participation in rural and regional communities as well as in cities throughout the nation.

It is essential that grassroots sports, which are heavily reliant on the efforts of many thousands of volunteers, continue to be supported and promoted and that they grow and remain the source of even more opportunities for individuals, families and communities.

An example of the sequence of sporting associations for hockey is:

- **Local:** Fairy Meadow Hockey Club.
- **State:** Hockey NSW.
- **National:** Hockey Australia.
- **International:** International Hockey Federation.

Did you know?

A great example of a national association growing grassroots participation is the AFL Women's, which since introducing its first professional team in 2017 and has seen amateur participation more than double.

Table 7.1 shows the top 20 sports and physical activities in Australia.

Table 7.1: Top 20 sports and physical activities by number of participants in 2018.

Rank	Sport/activity	Participants	Rank	Sport/activity	Participants
1.	Walking (recreational)	8,783,064	**11.**	Yoga	984,362
2.	Fitness/gym	6,874,541	**12.**	Australian football	913,668
3.	Swimming	4,505,531	**13.**	Netball	901,903
4.	Running/athletics	3,334,693	**14.**	Cricket	798,618
5.	Cycling	2,359,660	**15.**	Dancing (recreational)	688,293
6.	Football	1,767,288	**16.**	Pilates	585,706
7.	Tennis	1,202,011	**17.**	Surfing	508,015
8.	Bushwalking	1,189,493	**18.**	Gymnastics	489,058
9.	Basketball	1,017,968	**19.**	Touch football	464,721
10.	Golf	1,015,150	**20.**	Martial arts	316,826

Source: Sport Australia

Learning activity

1. Identify and describe the ways in which the local, state/territory and federal governments support participants at all levels of sport.
2. Suggest ways in which elite athletes can support 'grassroots' participation in sport.
3. For a sport of your choice, design a pamphlet to increase the rate of participation in the sport.

Impact of major events and competitions

Hosting a major sporting event can result in many economic, social and cultural benefits, and raising a city's profile can lead to lasting economic benefits. This raised profile can be important in bringing economic benefits, such as increased tourism and business investment.

A significant benefit is the long-term investment that results from preparation for a major event, in that the host city or country will have a legacy of improved sporting venues. Also, the city will usually have to invest in infrastructure and transport to cater for the resultant influx of people.

Major sporting events such as the Olympics entail a surge in visitors, athletes and media representatives, who are the source of an injection of money into the local economy.



Figure 7.10:
Infrastructure such as Sydney Olympic Park was built in the lead up to the 2000 Summer Olympics.

Learning activity

1. Identify the world champions Australia has produced over the past five years in:
   a. team sports
   b. individual sports.
2. Complete a PNI (positives, negatives and interesting points) in relation to the economic and social benefits of:
   a. increasing the funding for support of Olympic athletes as they participate in overseas events
   b. the Gold Coast hosting the 2018 Commonwealth Games.
3. Complete this activity in pairs. You are to be on a committee that is applying to FIFA to stage the 2026 Football World Cup in Australia. Using your knowledge of the potential economic and social benefits, write a letter to the government in which you outline your reasons for wanting to stage the event.
4. Explain the influence that the Olympic Games and Commonwealth Games have on sporting-participation trends.
5. Explain the relationship that exists between sporting success and funding opportunities, which include government grants and sponsorship. Consider how sporting success affects funding, and conversely how funding affects sporting success.

Factors influencing Australia's sporting identity

Australia's sporting identity is influenced by factors such as the media, politics, players, spectators, officials, sponsorship and the various cultures that are united in Australia. These factors play an important role in the shaping of behaviours in sport and attitudes to sport and are defining factors in relation to our national identity.

Diverse range of sporting cultures in Australia

Australia is a diverse nation that has a population of more than 25 million. Throughout our history, cultural influences have been part of the shaping of our national sporting identity. Cultural influences on Australian sport can be split into three major areas: settlement, immigration, and Aboriginals and Torres Strait Islanders.

British settlers introduced a range of sports in Australia that remain prominent today. Sports such as cricket, the rugby codes, football, hockey and netball were introduced in Australia and continue to be played today in both domestic competitions and international competitions.

Extensive immigration, especially after the Second World War, was the source of introduction of a rich array of cultures and new sports in Australia. Existing sports were also affected by the immigration, because renewed emphasis was placed on them; two examples are the popular Eastern European sports of weightlifting and gymnastics. Sports that are popular in Asia now have a higher profile in Australia; four examples are judo, taekwondo, table tennis and badminton.

Australia's Indigenous population makes a large contribution to Australia's sporting identity. Aboriginal and Torres Strait Islander people have had great success in a variety of sports, and their high-profile athletes become role models who promote their sports among their populations.

Sport Australia (SPORTAUS), the Australian Government's statutory agency providing leadership and funding in sport in Australia, has recognised the importance and value of sport in the lives of Indigenous Australians. SPORTAUS has targeted 16 sports and has developed programs for improving Indigenous people's access to sport, creating cultural awareness by highlighting traditional pastimes, and forming sporting pathways for talented Indigenous athletes.

Improved sporting participation rates among all Australians, including Indigenous Australians, is viewed as being an important factor in both improvement of the nation's health and facilitation of social cohesion.



Figure 7.11:
Immigration introduced a wide range of cultures and new sports to Australia.



Figure 7.12:
Nations around the world are eager to host major sporting events such as the Olympics and FIFA World Cup.

Politics in sport

Sport is a major part of Australia's national identity, as it is for many countries, so it is inevitably somewhat political, as noted in relation to the Olympic Games hosting process. Nations throughout the world are eager to host major events such as the Olympics because they realise that the large-scale events are a unique opportunity to showcase their country to the rest of the world.

In the case of the Olympic Games, the selection process is an intriguing political course of action that involves the following three steps:

1. Lodgement of a formal proposal to the International Olympic Committee (IOC).
2. Evaluation of the plans and of subjects such as media operations and marketing, and visits to the potential host cities to evaluate their proposals.
3. After receipt of the recommendations from the evaluation commission, voting by the IOC members by way of a series of elimination rounds until a winner is announced.

The Olympic Games have inherent political elements, and various historical movements have been publicised in the form of an Olympic boycott. Such boycotts was mounted for three consecutive Games in the 1970s and 1980s.

- For the **Montreal 1976 Olympics**, 28 countries initiated a boycott because banned South African rugby players had been participating in rugby games with New Zealand players.
- For **Moscow 1980**, 62 countries boycotted because the United States was leading a protest against the Soviet Union's 1979 invasion of Afghanistan.
- For **Los Angeles 1984**, 14 countries boycotted because the United States had led the boycott of the 1980 Games.

Sport also entails political elements at national level, where politicians have recognised the benefits of associating with high-profile athletes and the sports they participate in. Politicians can often be seen at international sporting events and the grand finals of the major football codes. The politicians understand that a significant number of Australians love sport, so they use the 'love' to associate politics with the 'winning' nature of sport. They benefit by presenting themselves as 'typical Australians' whom members of the public can relate to via the interest the two parties have in common.

Case study

Qatar's successful bid to hold the 2022 FIFA World Cup sparked global controversy regarding the transparency and honesty of the bidding process.

Qatar was awarded the hosting rights in 2010, but soon after, allegations of bribes and kickbacks between Qatar and the executive committee emerged. Accusations were aired in May 2011 that Qatar's lobbying officials used money to bribe votes.

Allegations of bribery on the part of two members of the FIFA Executive Committee were tabled. In addition to this, it was suggested that committee members demanded $4 million and knighthoods, in exchange for their votes. Furthermore, representatives of the Ivory Coast and Cameroon were supposedly each paid $1.5 million to support Qatar's bid for the tournament. Finally, a Qatari state-run television channel is said to have offered $400 million to FIFA, for broadcasting rights, just 21 days before FIFA announced that Qatar will hold the 2022 World Cup. These bribery and kickbacks allegations have been denied by Qatar.

FIFA's secretary general said Qatar "used its financial muscle to lobby for support". But the competition for the successful bid is skewed when monetary means are used. Without confirmed accusations as the investigation continues, it is hard to know if the FIFA 2022 World Cup successful bid for Qatar was fairly awarded after all.



Figure 7.13:
The FIFA World Cup.

The media

Sport is a major part of Australia's identity, and sporting information is communicated to the Australian public by various media. In the early stages of sport in Australia, technology for communicating sport-related information was limited. For example, in 1876, the news of Edward Trickett's sculling championship took three weeks to reach Sydney by mail steamer and telegraph.

As technology developed, media coverage as a new means of communication became more efficient. Four thousand people viewed the 1861 Melbourne Cup but as a result of various technologies the race is now accessed by a global audience of 900 million people. Media that are commonly used today include social, print, television and radio, and web-related avenues are constantly evolving.



Figure 7.14:
Australian journalists commonly label sportspeople as 'heroes' or 'villains'.

Social media has a significant influence on a number of organisations, communities and individuals in society. Sport, too, is impacted by its powerful influence. It is becoming the norm for local clubs, sporting organisations and professional athletes to have a public social media profile through which they promote their sport, share key messages and sporting success to the community/followers. This is advantageous to remain relevant in the community, recruit new players into local teams and clubs, or form a fan base to support a high-profile team; for example, an NRL team.

The public platform of the internet and social media also presents opportunities for sport to informally reach out to the community, and publicise through an everyday media initiative. This includes advertising, for example, for national teams, merchandise/apparel, live games and individual player achievements.

Social media is heavily scrutinised by the public. With users having easy, 24-hour access to social media platforms, it is important to ensure the content posted is appropriate. Individually, players as professional representatives of their clubs have to carefully ensure their public profiles are positive and appropriate to their status as influential role models for the community, especially for young people. At professional level, for example, clubs and organisations use social media to announce player injuries, team compositions and ladder updates. Importantly, such announcements need to be credible, accurate and trustworthy.

Media representatives have an important role in the shaping of behaviours and attitudes in relation to sport in Australia. They have a huge effect on the Australian public by way of providing comment and influencing participation by females. Essentially, media representatives 'comment' on various happenings in the world of sport. Many people have condemned media commentators and their practice of sensationalising sport by using only provocative images and headlines. The commentators commonly play on Australian sportspeople's images as 'heroes'. In most daily newspapers, there will be numerous headlines in which the journalist has used words and phrases to put the sportsperson on a pedestal.

Media representatives also strongly influence female participation. Historically, sport has been a male-dominated activity, and sport featuring men continues to dominate most types of spectator sport. For example, the top five sports that Australian spectators attend are Australian football, horse racing, motor sports, rugby league and cricket, all of which have significantly large participation and following by men. As a result, the media coverage of the sports tends to be male oriented, which can reinforce the perception that these sports are 'unfeminine'. Sports such as netball, hockey, gymnastics and swimming are portrayed as being acceptable for women whereas coverage of women's rugby union and cricket, although increasing, remains well below their male counterparts.

On a business level, media organisations have recognised the value of sport and how sport attracts a large audience, or readership, in relation to all types of media. They attract advertising and sponsorship revenue to make profits for their owners and their shareholders.

Learning activity

1. Explain how the diverse range of sporting cultures in Australia contribute to Australia's sporting identity.
2. Suggest ways that female sportspeople and spectators could change the bias that exists towards coverage of male-dominated sports.
3. Research the impact that apartheid had on sport during the period between 1948 and 1990.
4. Read the sports section of a daily newspaper, and list the sensational or provocative headlines. Explain why the strategy of sensationalism is used in the print media. Replace each headline with a headline that is more accurate and based on honesty.
5. Prepare a report about the incident that occurred during the Munich 1972 Olympics, when Israeli athletes were killed.
6. Identify how sport can be used to unite populations and divide them.

Impact of high profile athletes

Whether high profile athletes like it or not, they are viewed by many in the community as role models both on and off the field. This attracts praise and admiration when behaviours and performances are at their best, and often criticism and public humiliation when they behave poorly. Professional athletes can have a significant impact, particularly with children who might be influenced to engage in sport or emulate behaviour or unique techniques. In the wider community, they may use their influence to advocate for causes, act as ambassadors for charities or secure sponsorship.



Figure 7.15:
High profile athletes may use their influence to act as ambassadors.

Case study

Adam Goodes is a former professional AFL player who played for the Sydney Swans. He emerged after his 1997 draft pick to be a dual Brownlow Medal winner, dual premiership player, four-time All Australian, member of the Indigenous Team of the Century and representative of Australia in the International Rules Series. Post retirement in 2015, Adam remains a high-profile figure in the community.

By Adam having tremendous sporting success, and becoming a high-profile athlete because of it, he had the opportunity to make a difference in the community by influencing opinions, actions and attitudes.

In 2014, Adam co-founded the GO Foundation, which promotes empowerment of young people through education. The foundation aims to give Indigenous young people opportunities to learn, receive guidance and mentoring, develop leadership skills and be employment ready. Effectively, Adam advocates for equity in education, no matter ethnicity, geographic location or cultural background – things Adam actively promoted throughout his sporting career; for example, by promoting the Sir Doug Nicholls Round in the AFL.

Adam's significant sporting achievements have been equally matched by his commitment to community work. His involvement in advocating for Aboriginal and Torres Strait Islander peoples and lobbying against racism earnt him the accolade of Australian of the Year in 2014.

Learning activity

1. What are the ways high profile athletes such as Adam Goodes can have a positive effect on the community?
2. Research another high profile athlete and report on they have contributed to community or youth projects.

Spectators and sport

Spectators are the supporters and fans of the players, team and sporting code who promote the game and find enjoyment in watching the sport. Professional and high-level sport at national and international level is supported and funded through spectator involvement.

At a national level, for example within the A-League, people can associate with a local club and find a sense of community within sport. Having a community with shared interests and passions can encourage people to be more involved in sport; for example, improved participation rates, people going to live games, and the purchase of merchandise. Ultimately, the role spectators have in the A-League is to encourage the team from the sidelines, show interest and follow their results, and promote the game in the community. In turn, the team or sport becomes known in the community, and hopefully the fan base will grow.

International sport calls on a more broad sense of community. The people of Australia are the spectators of the sports that represent the country; for example, the Australian men's national cricket team or the Australian Swim Team. Some Australians follow national teams by travelling to international events; others may watch the sport on television or through online streaming services, or keep updated on the score through the internet via live commentary sites or social media posts.

Not everyone can be an elite athlete but everyone can be a spectator of a sport. Therefore, Australia's sporting identity is built on the spectators and their support for sport.

Learning activity

1. Many people have labelled Nick Kyrgios one of the most naturally gifted tennis players of his era, but his attitude and effort undermines his performance. In your opinion as a spectator, does his on-court behaviour affect your opinion of him? Would you consider him to be a good or poor role model? Does his behaviour represent what is traditionally expected by Australian spectators? Justify your response.
2. Suggest reasons that the off-field behaviour of high-profile athletes is so widely reported. What influence does this type of behaviour have on Australia's sporting identity?
3. Compose a letter to one of the high-profile athletes whose off-field actions have been inappropriate. In the letter, explain your belief that their actions have had a negative impact on the community.

Social implications

Australia's success at international sporting events has significant social implications that affect many individuals and communities. Effects include reformed community attitudes, greater support and participation for a particular sport, athletes becoming role models for young people, and adopting resilience and persistence in the face of adversity.

When an Australian sporting individual or team has success at international level, there is increased media attention on the athlete/s and the result. In this technological world, results are streamed or posted instantly on social media and news platforms. Publication brings a greater awareness of the sport, and the community can appreciate and support the success of the performance. As a result, people take an interest in the sport, which can flow onto increased participation at a local level. Also, with the increased social presence that international sporting success brings, athletes become role models to young people in the community, who admire them for their sporting ability, ambition and achievements. Athletes demonstrate to young people how success comes from hard work, and that achieving your goals is possible.



Figure 7.16:
International sport calls on a broad sense of community.

Economic implications

Australia's performance in international sporting events can have significant economic implications; for example, sponsorship and funding opportunities.

Sponsorship is reliant on the profile of the sporting performance. From sponsoring on the uniform of athletes to television advertising in the breaks of games, businesses and large corporations can set up or maintain a high degree of brand awareness. Their financial contributions for such coverage can help individual athletes and teams to buy uniforms, pay for equipment and resources, and contribute to travel costs.

If athletes are not performing on the international stage, people in the community lose interest or start watching other sports. In turn, sponsors and advertisers take interest in more popular sports with a larger audience. For example, during the television ad breaks of the Commonwealth Games netball, businesses will prioritise advertising when Australia is playing, or during the final series, to maximise audience reach.



Figure 7.17:
The Local Sporting Champions grant provides financial assistance for competitors aged 12–18 to attend championship events.

The Australian Government also plays a significant role in contributing economically to sport via funds contributed by taxpayers. From grassroots to elite athletes, funding and grants enable sporting opportunities in multiple sports. For example, the Local Sporting Champions grant from Sport Australia provides financial assistance for coaches, officials and competitors aged 12–18 participating in competitions and championships with significant travel requirements. Awardees receive $500–$750 to help with the cost of attending their championships. This in turn encourages participation by limiting the financial barriers.

Learning activity

1. Research the history of tobacco advertising in sport, and create a timeline to document the legislative changes (changes to the law). Explain the reasons underpinning the changes in attitude towards tobacco sponsorship.
2. Evaluate the advantages and disadvantages of alcohol sponsorship in sport.
3. Investigate the major sponsors of a sport or sporting team of your choice. Do any of the sponsors have a positive influence on the supporters' and players' sporting identity?

Current and future perspectives on sport in Australia

Individualised sport and fitness activities are on the rise. People are fitting sport into their increasingly busy and time-fragmented lifestyles to help achieve their personal health objectives.

Over the past decade, participation rates in aerobics, running and walking, as well as gym memberships, have all risen sharply, whereas participation rates for many organised sports have either held constant or declined. Rather than commit to a regular organised sporting event, people are increasingly opting to go for a run wearing headphones and carrying their phone when the opportunity arises.

There will continue to be a rise in lifestyle, adventure and alternative sports that are especially popular among younger people. These sports typically involve complex, advanced skills and have some element of inherent danger and/or thrill seeking. They are also characterised by a strong lifestyle element, and the participants often gain cultural self-identity and self-expression by participating in them.

In the case of children and adults, sport is effective in helping to reduce the rising rates of obesity and chronic illness. If managed appropriately, sport can be an effective mechanism for helping achieve social inclusion for members of marginalised groups and for reducing the crime rate. It can also be used to build bridges to other countries and to achieve overseas aid, peace, development and foreign-policy objectives.

Australia and the other countries that are members of the Organisation for Economic Co-operation and Development (OECD) are facing having an ageing population. The result will be changes in the types of sport we play and how we play the sports. Indications are that Australians are embracing sport into their old age. If strong participation rates are to be retained, senior citizens and Australia's multicultural make-up will both have to be catered for in the sports of the future. Sporting organisations will be challenged to capture the sporting preferences, interests and involvement of the people in these diverse cultures.

Source: Sport Australia

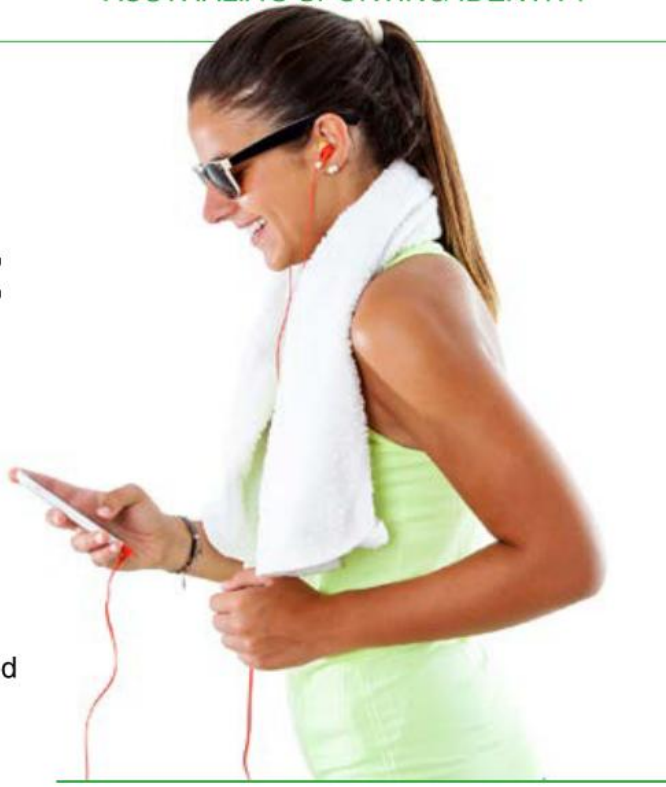


Figure 7.18:
Technology enables people to be entertained while they exercise.



Figure 7.19:
Sporting opportunities for older Australians are important as the population ages.

Emergence of new sports

Adventure sports are now a common sporting pursuit among Australia's growing population. People are looking for experiences that are substantially different from the experiences they have during their everyday life, and are finding excitement in risk activities.

Outdoor recreation has significantly grown in recent years, due to improvements in safety and reduction of participation costs, and willing participants are better able to access adventure sports.

Following is a list of popular adventure sports that are available to the general public:

- abseiling
- ballooning
- bike riding
- bushwalking
- canyoning
- caving
- hang gliding
- horse riding
- kayaking
- paintball
- parasailing
- sailing
- scuba diving
- sky diving
- snowboarding
- snow skiing
- surfing
- water skiing
- wakeboarding
- whitewater sports.



Figure 7.20: International associations have recognised interest in adventure sports.

Most of these adventure sports have been commercialised; that is, companies have been set up to run adventure sports as a business, intending to make a profit. Also, adventure sports have become more professional. Due to improvements in technology and increased knowledge about adventure sports, the sports can be conducted relatively safely. Many adventure sports have also become more accessible. Adventure sports such as whitewater rafting, water skiing and go-karting are now available in 'theme parks' located in major urban centres. The purpose of this initiative is to facilitate mass participation in sports in which the only people who had participated were people who had the interest, time, money and equipment necessary for engaging in the activities.

Australia's sporting identity is taking a new direction after the rise of adventure, lifestyle, extreme and alternative sports. These types of sports often have an element of danger or thrill, and complex and advanced skills are needed to successfully perform them. Notably, participants often obtain cultural self-identity and self-expression through their involvement, which is particularly positive for young people. International associations, like the bodies that run the Olympic and Paralympic Games, have recognised the interest people have in these adventure sports, and – after considering the logistics such as venues/environments needed, competitor demand and spectator interest – have made inclusions for them.

The number and type of events in the Olympics changes from games to games. The IOC recognises the emergence of new sports for inclusion in the Olympic games. For a sport to be included in the Olympics, the IOC must determine it to be widely practised around the world, enabling participation by a majority of countries.

For Australians, participation in these adventure, extreme and lifestyle sports is enabled through local, state and national associations and events. Like any sport, development to elite athleticism begins at a local level; for example, joining a local karate centre. As skill develops, competitors can progress to state competitions through the NSW Karate Federation. Eventually, competitors can represent the state at national competitions.

Learning activity

1. Identify new directions in Australian sporting pursuits.
2. Explain the term 'globalisation' and its potential impact on sport in Australia.
3. Discuss the impact of adventure sports on participation levels in traditional sports.
4. Discuss the safety implications for a variety of adventure sports.
5. Create a profile of an adventure sport.
6. Identify an adventure sport for the class to experience during an excursion. Investigate issues such as popularity, access, cost and safety.

Opportunities for increased participation

Opportunities for increased participation in a variety of sports can occur at a local, state and national level. These include setting up and running local competitions, funding school programs and initiatives, and being able to watch and be involved with representative sports. Each sport offers an array of participation options and uses many methods to increase involvement within the sport. For example, funding school programs for external clubs and organisations, like the AFL through its Auskick program, exposes young people to new sports. This encourages students to participate in weekend sport teams and competitions. Also, organised annual competitions can be created to provide the opportunity for individuals and groups to participate as a community in various teams. An example of this is the Koori Netball Tournament.

The Koori Netball Tournament is an annual competition that involves local netball teams and Aboriginal community members. The two-day tournament has been running since 2000 and is aimed at increasing participation of Aboriginal women in sport and recreation in a fun, competitive environment. To encourage as many people as possible to participate, options include under 12s, open women's and mixed competitions. Effectively, this tournament encourages the Aboriginal community to use sport as a medium to gather, celebrate their culture and share in their similar interests.

Ultimately, creating opportunities for increased participation in various sports can be achieved through local club involvement and creation of state competitions to encourage exposure to new sports.

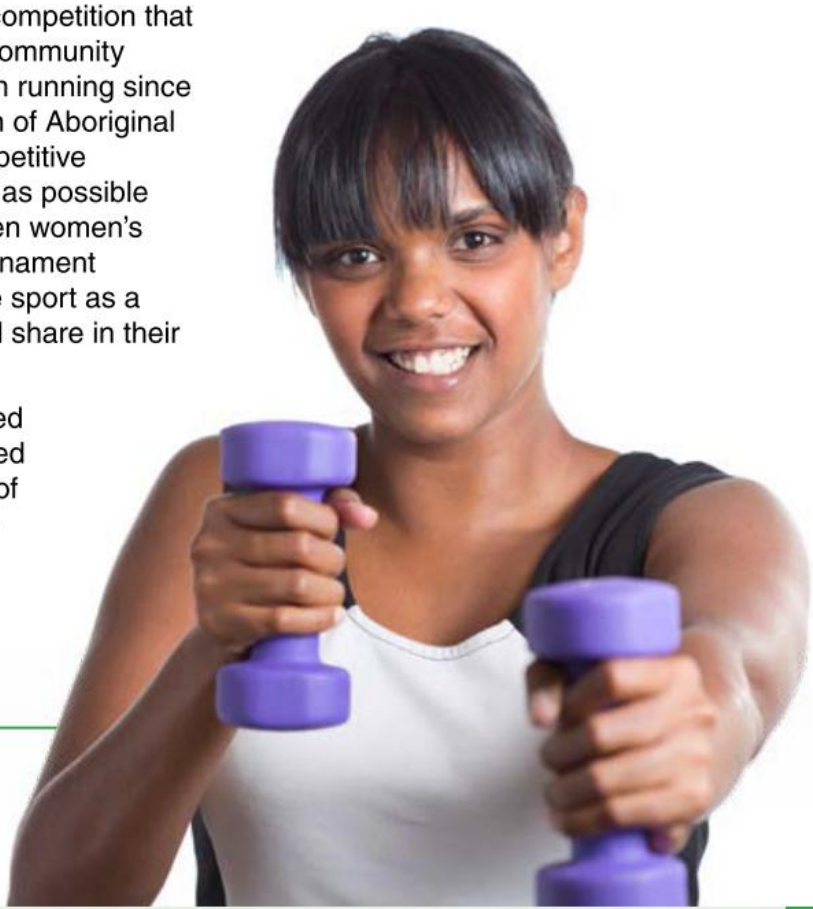


Figure 7.21:
The Koori Netball Tournament is aimed at increasing participation of Aboriginal women in sport.

Learning activity

1. Discuss the degree to which new directions in sport offer opportunities for increased participation.
2. Explain why the male–female gap in participation in sport and physical activities is closing.
3. Suggest ways that governments, schools, parents and sporting organisations could improve participation rates for:
   a. males
   b. females
   c. older males and females
   d. children.
4. Discuss the potential impact on society of reduced participation in sport and physical activity.
5. Design a survey to determine sport and physical-activity patterns among the following groups before comparing your findings.
   a. Students in your year at school.
   b. Adults when they were at an age similar to yours.

Future developments of sport in Australia

There are a range of factors that will impact on sport in Australia in coming years. These factors are detailed in the following text.

Participation rates and representation at various levels

Participation rates in sports within local communities dictate the representative opportunities available to players. Without participation at a grassroots level, representative opportunities would not be fulfilled and therefore not offered. There needs to be a level of interest and, ultimately, skill, to allow representative competitions to occur. The quality and prevalence of representative opportunities at local, state and national levels feeds from participation rates. For example, if more people play Oztag rather than volleyball, there will be more representative pathways to cater for the interest of players. Also, the quality of the teams increases as the player pool to choose from is greater. Therefore, the more participation, the higher likelihood of talent and skills to be developed, and the more likely representative teams are filled for competition to occur, hence dictating future sporting practices for Australia.

Performance

The performance of athletes and high-profile sporting teams can determine the sporting scape of future Australia. The success of sport at a national and international level can generate interest from spectators, sponsors and supporters, who are significantly influential in generating support socially and financially. Spectators enjoy and find interest in watching teams win their games and events. Spectators also include participants at a local level. If sporting teams are not having success at an international level, for example, the Australian rugby union team, spectators may find greater interest in watching an Australian team that are the best team in the world at present, win and have success on the court in another code or sport. Ultimately, if a team is not performing, spectators and young participants lose interest, and therefore the sport is less prominent in the sporting community.

Professionalism

Athletes are high-profile community members, and therefore have a significant influence on the attitudes of individuals and groups within the community. As a result, remaining a professional in their context on and off the field can find these athletes as role models for young people in the community. For example, watching an NRL player start a fight against the other team demonstrates to people in the community that it is acceptable to be physically violent when you are upset, which is not the case. Contrastingly, watching opposition players shake hands at the completion of the match demonstrates a mutual respect for each other and their team's ability, no matter the result of the game. Effectively, the role-model opportunities for athletes to demonstrate socially and ethically appropriate behaviours and attitudes can be achieved through professional practice. Importantly, however, if these role models do not demonstrate values and attitudes that align with their spectators, they may choose to support another sport.

Spectator enjoyment

Watching, playing and supporting sport in Australia is based on spectator enjoyment. This being the active involvement and engagement of the fan base in the community with the sport. The more exciting and interesting the sport is, the more likely it will be popular and enjoyable to watch as a spectator. If spectators do not find enjoyment when watching sports, they will either not watch sport, or divert their support to another code. Therefore, promoting competitions that are exciting to watch and are inclusive to all interests and backgrounds is important. For example, the inclusion of new sports at the summer Olympic Games in Tokyo 2020, including skateboarding and surfing, develops and engages a broader spectator community and creates opportunities to be interested in a new field of competition. Also, acknowledgement and inclusion of multicultural games and sports allows spectators to enjoy aspects of the game that resonates with their own community and culture. For example, discussion about the traditional Aboriginal and Torres Strait Islander version of AFL during the Sir Doug Nicholls Round engages awareness for spectators in a new aspect of the game.

Spectator and player behaviour

The behaviour of spectators and players on and off the field can be significantly influential to the prevalence and endurance of sports in the Australian sporting scape. First, players in high-profile sports and elite competitions are role models for the community. Their social and ethical behaviour is observed and scrutinised by fans at the games and on various media platforms; for example, television broadcast and social media. Therefore, if players demonstrate behaviours or attitudes that do not align with their morals and values, they may choose to participate in, or support, another sport. Also, the sporting community developed through team fan bases can foster a sense of belonging for people; however, it can also reveal destructive qualities of people in the community. For example, abuse of the referees and violence against other spectators. As a result, people may look to other sports with more controlled and respectable behaviour, to then influence the social reputation and popularity of the sport in the Australian community.



Figure 7.22:
Spectator behaviour can affect a sport's reputation.

Safety

If players and spectators deem sports unsafe or too risky, they may be hesitant to participate or support the game, and therefore may choose to follow or play other sports. Injuries are significant risks in many competitive sports, and can deter people from participating. For example, concussions, broken bones, and bruises and contusions can be consequences of playing sports.

If measures are taken to support people to safely participate, for example enforce mandatory wearing of headgear in rugby, or wearing lifejackets when surfing, people can feel more supported in their participation. As a spectator, watching high-contact sports, for example MMA fighting, can be quite graphic and confronting. As a result, spectators may choose to support a sport that isn't high impact. Therefore, safety is a significant consideration when supporting or participating in sports, and the prevalence of sports in the community can be influenced by perceptions of safety.



Figure 7.23:
Wearing protective headgear is becoming more common since increased awareness of potential brain injury in contact sports.

Legal liabilities

Legal liabilities are an important factor to consider for those involved in the delivery of sport and physical activity. To be involved in any organisation or sporting group, or even part of supervising physical activity, a person should have appropriate skills and preferably undergone some formal training. Depending on the level of coaching, training may be completed within the club structure or be completed with an outside agency. It also ensures that the person running the session has adequate knowledge and experience. Officials involved in physical activity and fitness, particularly if they are responsible for the safety of others, should have a current Senior First Aid and CPR Certificate. Many sporting organisation make this compulsory.

If coaching or training a child, the person must complete a 'working with children' check, which involves a criminal history check. The check also involves reviewing any previous workplace incidents or misconduct.

At all times individuals involved in the delivery of sport and physical activity should be aware of their 'duty of care'. Duty of care is a legal responsibility to act in a manner that will not result in harm to others. Duty of care applies to coaches and others who are in a position where they influence the delivery of sport and physical activity, especially in the case of children.

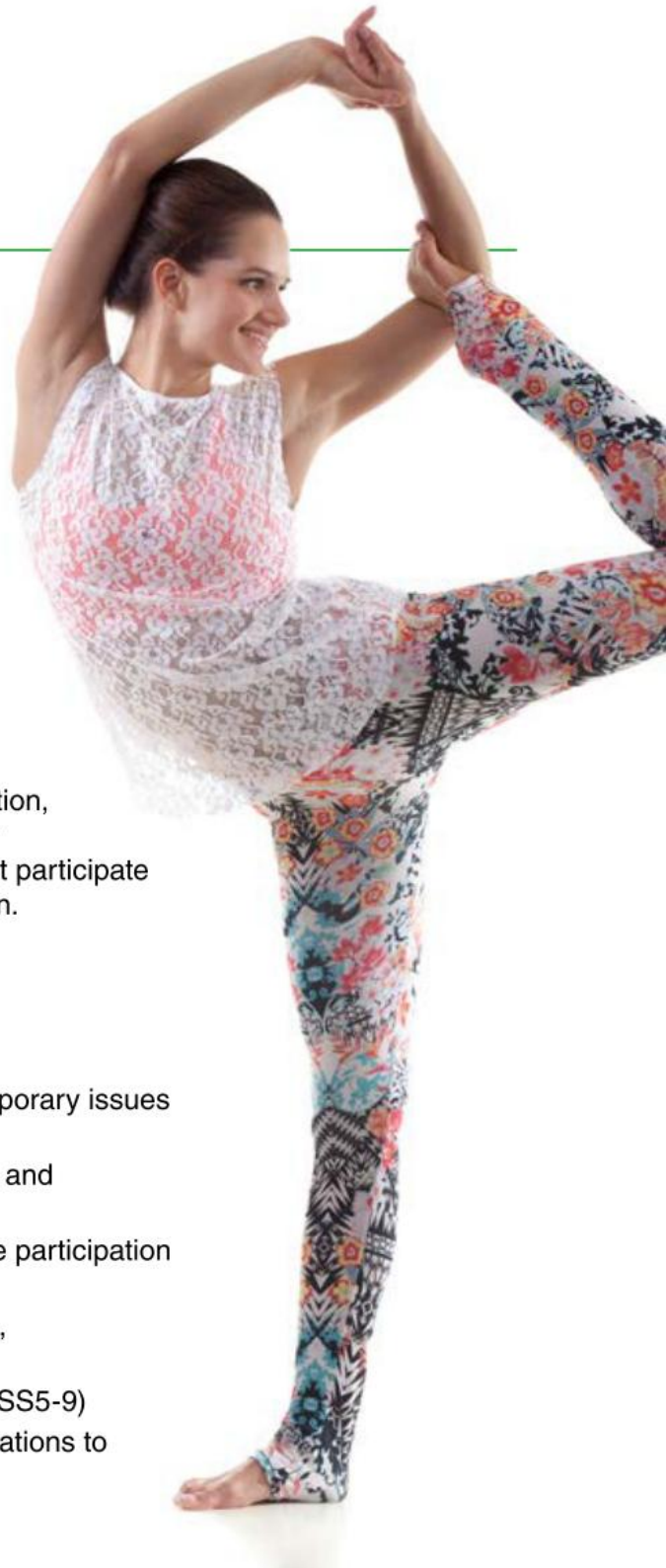
Those involved must ensure that they plan activities with consideration for possible risks and address ways of minimising those risks. The concept relies on proactive behaviours as well as reactive behaviours that can keep individuals out of harm's way. Duty of care might address issues such as safe playing surfaces, safe transportation, appropriate conditioning, maintenance of equipment and monitoring behaviour of athletes.

Revision questions

1. Explain the reasons for creation of the Australian Institute of Sport.
2. Outline how sport can be a contributory factor in local identity.
3. Outline how sport can be a contributory factor in national identity.
4. Describe the role of sport in the shaping of Australia's identity.
5. Examine the changes in the sporting identity of the following groups:
   a. Women.
   b. People with disability.
   c. Aboriginal and Torres Strait Islander peoples.
6. Discuss the impact of international competitions on local sporting identity. Give specific examples.
7. Describe the impact of the following two factors on sport in Australia. Use specific examples to justify your response:
   a. The media.
   b. Politics.
8. Explain the purpose of having a 'code of behaviour'.
9. Identify the trends in relation to participation in sport and physical activity in Australia. Account for the trends.
10. Predict trends in relation to participation in sport and physical activity in Australia. Justify your response.
11. Which industry has been banned from sponsoring sport in Australia?
    a. Alcohol.
    b. Pharmaceutical.
    c. Tobacco.
    d. Small business.
12. What is meant by the statement: 'Legal liability may be a barrier to sport in Australia in the future'?
    a. Governments may make it illegal to play sport because of the cost of injury.
    b. The cost of insurances and payouts may make some sports too costly in the future.
    c. Employers may take legal action if one of their workers is injured at sport.
    d. Sporting bodies may have legal powers to discipline players in the future.

CHAPTER 8

Lifestyle, leisure and recreation



Leisure and recreation activities are the activities that people enjoy doing in their spare time. Leisure and recreation are subjective, which means that one person might enjoy participating in bushwalking, for example, whereas another might not share the person's appreciation for that activity. Some popular leisure pursuits are watching television, playing computer games, participating in a favourite sport, reading, watching movies and playing music.

Many recreation and leisure services often fail to effectively meet the leisure and recreational interests of groups such as people with disability, women, elderly people and people of low socioeconomic status. Similarly, barriers such as high fees, limited hours of operation, inflexible membership programs, time, and work and family commitments are contributory factors for why people do not participate in the leisure and recreational pursuits they are interested in.

Outcomes

A student:

- discusses the nature and impact of historical and contemporary issues in physical activity and sport (PASS5-3)
- analyses physical activity and sport from personal, social and cultural perspectives (PASS5-4)
- demonstrates actions and strategies that contribute active participation and skilful performance (PASS5-5)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Perceptions of lifestyle, leisure and recreation
- Impact of participation in leisure and recreation
- Promoting lifelong leisure and recreation now and in the future

Figure 8.1: Yoga is a popular recreational activity.

Perceptions of lifestyle, leisure and recreation

The meanings of lifestyle, leisure and recreation

The term 'lifestyle' refers to how a person spends their time, the way that they behave, their work and play habits, their interactions with others and their interests. Leisure is defined as the time during which an individual is free from the demands of work or school and can participate in the hobbies or sports they enjoy. It is inherently subjective, which means that ideas about what constitutes leisure differ. One person might enjoy bushwalking whereas another might not share the person's appreciation for that activity.

Leisure can also be viewed as being a specific action or activity. Some popular contemporary leisure pursuits are social networking, watching television, playing computer games, participating in a favourite sport, reading, watching movies and playing music.

Recreation is defined as being a source of refreshment. It includes activities during which mental and physical health is renewed. Recreational activities are done for enjoyment or pleasure when not working.

Range of leisure and recreational pursuits

There is a significant variety of leisure and recreational activities available for Australians of all ages to participate in. For some activities, such as riding a bike, individuals can join organised community groups that participate in the activity regularly. The individual's perceptions of leisure and recreation as well as their age will determine the activities they participate in.

Different population groups have common leisure and recreational activities that they participate in, though they are not limited to participating in other activities.
Typical profiles are as follows:

- **Children and adolescents:** playing sport, going to the movies, listening to music, playing electronic or computer games, skateboarding, surfing, streaming videos.
- **Adults:** walking, bike riding, dining out, exercising at a fitness centre, shopping, swimming, camping, picnics, home decorating, fishing.
- **Older adults:** art and craft activities, cooking, reading, watching television, completing puzzles (crosswords), gardening, volunteering.

Did you know?

Video games were first released in the early 1970s and had very basic graphics – Atari's 'Pong' used a simple dot moving on a blank screen to represent a tennis ball.

Internet activity

Log on to TitanOnline and complete Activity 8.1, researching the most popular recreational and leisure activities in Australia

Learning activity

1. Explain the difference between leisure and recreation.
2. Investigate how much your family members watch television. Compare and contrast your results with other class members.
3. Conduct a school survey about the range of leisure and recreational pursuits that students engage in. Identify where and when they participate and the amount of time they spend on each activity.
4. Suggest reasons for the decline in daily time that people spend engaging in sport and outdoor activity.
5. Outline the health implications of the decline for individuals and communities.

Perceptions of leisure and recreation activities

Individuals have different perceptions of the quality and effect of various leisure and recreational activities. Depending on many factors, individuals may only feel satisfied when participating in specific activities they perceive to be valuable to their health and wellbeing. An individual's physical, emotional, mental, spiritual and social dimensions of health will impact their classification of viable and worthwhile leisure and recreational activities. For example, an elderly person with multiple health conditions is likely to perceive regular yoga participation as a positive leisure activity to improve their health issues. In comparison, young adolescent males are likely to perceive yoga as a less viable recreational activity to participate in to enhance their health and wellbeing, instead choosing to participate in CrossFit.

Many individuals who lack extensive free time to spend participating in leisure and recreational activities may choose to participate in high-intensity activities that quickly achieve their purpose or function; for example, running or completing a short personal training session.

The value that individuals place on various activities and their perceptions of them will also depend on facilities they can access. If schools and communities have a number of multipurpose facilities that can be used for a range of leisure and recreation activities, then individuals are encouraged to place significant importance on including participation in these activities in their daily life. In contrast, individuals who live in remote communities may only be able to access one shared community hall.



Figure 8.2:
A person with multiple health conditions is likely to perceive regular yoga participation as a positive leisure activity to improve their health issues.

Considering leisure is often classified as the time individuals are unrestricted by commitments, activity regulations and the level of freedom individuals feel they receive will impact their perception on the potential benefits of different activities. Individuals who have allocated a significant amount of time throughout their day or week to leisure and recreational activities are still likely to participate in organised activities such as playing golf at a club or participating in a group fitness class, whereas individuals who are already heavily involved in organised sporting teams are more likely to spend their leisure time in less formal activities, such as walking or swimming at the beach.

Practical activity

1. Participate in a yoga or Pilates session, and play a game of tennis or golf. Identify the similarities and differences between the activities, and analyse which activities were more demanding in terms of your skills.
2. Referring to your community, identify a range of activities that exist that people might perceive as being less physically demanding and/or less rewarding. Analyse and challenge the perception.

Impact of participation in leisure and recreation

Participation impacts for specific groups

Needs and patterns of participation

Various groups of people will have diverse needs for leisure and recreation. Not surprisingly, involvement in recreational and leisure activities does not happen by accident. Individuals, families and groups choose to plan – even if haphazardly – what they are going to do in their leisure time. Councils and governments carefully assess what types of leisure and recreation opportunity they can provide in the best interests of the various groups in the community. Commercial providers calculate how they can create viable, attractive businesses and a multitude of other attractions that people will enjoy during their leisure time. Increasingly, governments, town planners and transport providers are focusing on how they can provide attractive, accessible residential estates and community-activity hubs where they offer a mix of educational, retail, social, recreational and cultural activities.



Figure 8.3:
A significant proportion of the younger Australian population engages in tennis.

Aboriginal and Torres Strait Islander peoples

Indigenous participation rates in leisure and recreational activities are generally lower than those for other Australians; however, rates peak for school-age children and decline as age of the individual increases. Common leisure and recreational activities that adolescent Aboriginal and Torres Strait Islander peoples participate in include boxing and gym or fitness activities. For older adults, more passive activities such as walking become popular. Males participate in longer sessions as younger individuals; however, as age increases, females participate in more leisure and recreational activities. Aboriginal and Torres Strait Islander peoples in the Northern Territory have the lowest engagement rates compared with all other Australian states/territories.

Participation rates for Aboriginal and Torres Strait Islander peoples are significantly influenced by immediate family members and close relatives. Also, the cost of activities often substantially influences participation rates. As a population group, Aboriginal and Torres Strait Islander peoples have relatively lower incomes and higher numbers of split families compared with other Australians.

To help individuals participate in leisure and recreational activities, subsidised transportation, uniforms and registration costs are needed. Further strategies to ensure that Aboriginal and Torres Strait Islander peoples continue to participate include:

- ensuring that activities are culturally sensitive and accepting of traditional customs and beliefs
- using mentors to encourage prolonged participation for school students
- informing participants about ways to enhance their lifestyle including their health and wellbeing, not only how to participate in the activity
- increasing access in remote areas by providing organised activities or venues
- facilitating flexible enrolment or participation commitment.



Figure 8.4:
Participation rates for Aboriginal and Torres Strait Islander peoples are influenced by family members.



Figure 8.5:
Aboriginal and Torres Strait Islander peoples have a strong history of success in a variety of football codes.

For an adult in a non-remote area, being sufficiently active for health is defined as having 150 minutes of physical activity over five or more sessions per week. The most recent age-standardised data on physical activity levels among Indigenous adults show that about two in three (64 per cent) Indigenous adults aged 18 and over in non-remote areas were not sufficiently active for health; this figure is higher than the comparable proportion for other Australians (56 per cent). Around three-quarters (76 per cent) of Indigenous children aged 4–14 were physically active for at least 60 minutes every day during the previous week.

Source: Australian Institute of Health and Welfare



Figure 8.6:
Painting is a recreational activity that provides mental health benefits for elderly people.

Elderly people

Elderly people need to stay physically and mentally active long after they have finished working and raised a family. Many community facilities have a place for elderly people to be able to follow their creative interests such as arts and crafts, engage in a physical activity such as an exercise class, and interact with other people during social functions or planned group outings. It is important for elderly people to have opportunities to engage mentally and physically on a regular basis.

As people age, physical activity is often one of the first things they may find difficult. Participating in low-impact exercise classes can be a great way for elderly people to stay physically fit and empower themselves to stay physically independent for as long as possible. If an elderly person has strong muscles and bones, they have a greater chance of living independently and keeping up their daily routine for longer. Exercises can include options that range from walking around the local park or neighbourhood to doing water aerobics or yoga.

Of those aged 75 years or older, 78 per cent of females and 80 per cent of males continue to be active in some way, with more than half the Australian population over 55 years of age being physical active at least five times a week. Participation in physical activity commonly decreases for males and females between 40 and 54 years of age. However, it then increases until individuals reach 75, where it then typically reduces as age increases. Significant factors influencing activity participation rates for elderly people include disability and geographical location. Although many elderly individuals are active throughout their life, more than 50 per cent are not sufficiently active in line with the physical activity guidelines. The National Physical Activity Plan Survey conducted by the Heart Foundation indicated walking as the most popular form of physical activity, with 11 per cent of elderly people walking every day. Walking was also the activity that 65 per cent of the elderly population surveyed indicated they were most interested in. Following walking, 38 per cent of respondents indicated interest in swimming on a regular basis.

Source: Australian Bureau of Statistics

People with disability

For people with disability, leisure and recreation activities are an essential aspect of 'quality of life'. Participation in leisure and recreation activities is likely to result in enhancement of interpersonal relations – with peers, family members and community members – and promotion of a sense of belonging in community. Also, involvement in leisure activities leads to an increase in social competence, communication skills and decision-making skills as well as to enhancement of learning experiences.

Each leisure or recreational activity needs to be assessed in relation to its safety for individuals with disability. Some alterations or adjustments for difference may be needed before any particular person with disability can participate. Facilities must accommodate individuals with varying disabilities; and they need to provide full access; for example, wheelchair-friendly buildings, parks and toilet facilities. Including individuals with disability in the planning and facilitation of activities will ensure inclusive environments are created and maintained, and that ignorance does not become a discriminatory factor. Similarly, developing guidelines for teachers or leaders will ensure that individuals with extra or different needs are cared for and supported equally across a variety of activities.

The General Social Survey conducted by the ABS estimates that people with disability are 15 per cent less likely to participate in sport and active recreation than the general population. It is reasonable to assume that this under-representation in sport participation among persons with disability is due to disadvantages or barriers encountered.

The AusPlay Survey (AusPlay) also provides information relating to participation in sport and physical activity by people with disability or physical condition that restricts their life in some way. AusPlay data indicate that 77.8 per cent (78.6 per cent male; 77.0 per cent female) of people surveyed with disability or physical condition that restricts their life in some way participated in sport or physical activity at least once in the previous 12 months, 68.9 per cent (68.5 per cent male; 69.3 per cent female) participated at least once per week, and 51.9 per cent (52.8 per cent male; 51.1 per cent female) participated at least three times per week. These figures were significantly lower than for those people surveyed who did not have a disability or physical condition that restricts their life in some way: at least once per year (total: 90.7 per cent; male: 90.6 per cent; female: 90.7 per cent); at least once per week (total: 83.3 per cent; male: 81.8 per cent; female: 84.8 per cent); at least three times per week (total: 63.7 per cent; male: 61.6 per cent; female: 66.1 per cent). The top five activities were walking, followed by swimming, gymnasium workouts, cycling and aerobics exercises. The variables 'restriction' and 'work hours' had a negative impact on frequency of participation, while education had a positive impact. Once people made the decision to participate in physical activity, they participated quite often.

Source: www.clearinghouseforsport.gov.au



Figure 8.7:
Some alterations or adjustments for difference may be needed before any particular person with disability can participate.

Young people

Young people participate in a number of physical activities, with social team sports being the most popular among school-age students and adolescents. Netball is a common sport participated in by mostly young females. The varying adaptations of rugby league and cricket have increased the participation levels of young people within the sports. Increased flexibility in involvement, for example, beach cricket for those wanting less commitment to an official sports team, has increased cricket's popularity among the younger Australian population. Tennis, Australian football and basketball are also sports that a significant proportion of the younger Australian population engages in. According to survey data, the most popular activities that young people participate in are dancing, soccer and swimming (lessons and or recreation). Just under half of all young people participate in soccer. Of all people who participate in dancing, more than half are young people aged 6–13.



Figure 8.8:
Just under half of all young people participate in soccer.



Figure 8.9:
One of the most popular activities that young people participate in is swimming.

At the time of the survey, around nine in 10 (88.9 per cent) young persons aged 15–17 had engaged in some form of exercise in the last week. However, only about one in 50 (1.9 per cent) 15–17 year olds met both the physical activity and muscle strengthening aspects of the guidelines. Around one in 10 (10.3 per cent) 15–17 year olds participated in 60 minutes of exercise every day and around one in six (15.8 per cent) did strength or toning activities on three or more days in the last week; meeting the individual recommendations within the guidelines.

The proportion of 15–17 year olds engaging in 60 minutes of exercise every day has almost doubled since 2014–15 (5.5 per cent), whereas strength or toning on three or more days in the last week has not increased significantly (13.1 per cent in 2014–15).

Young males (15–17 year olds) were almost three times more likely than females (14.1 per cent compared with 4.9 per cent respectively) to have engaged in 60 minutes of exercise every day. Young males were also almost two and half times more likely than females to have participated in three or more days of strength or toning activities (22.4 per cent compared with 8.4 per cent).

Source: Australian Bureau of Statistics

Learning activity

1. Explain why sport and physical activity participation rates are consistently high for young people.
2. Identify the measures your school takes that are contributory factors in the high participation rate.
3. Compare Australia's most popular sports for boys and girls. Account for the differences.
4. Outline a range of activities that could be suitable for an elderly person.
5. Identify and describe the positive and negative influences on young people's participation in sport and physical activity.
6. Identify the leisure and recreational needs of groups such as young children, adults, elderly people and people with disability.
7. Identify your local area's leisure and recreational services for children, elderly people and people with disability.
8. Create a database of your local facilities and their contact details.

Influences on participation

A range of factors can influence participation in leisure and recreational activities for Australians. These factors may impact different groups within the population in different ways. The following information provides examples of factors that influence groups such as Aboriginal and Torres Strait Islander peoples, elderly people, people with disability, young people and people seeking a challenge.

The media

The media, whether it is the internet, print or broadcast media, is a significant influencer on our perceptions and attitudes towards participation in leisure and recreation. For Aboriginal and Torres Strait Islander peoples, the media may promote participation in activities, highlight previous achievements by Indigenous Australians and educate about the health benefits associated by participation. For the elderly, media coverage can increase awareness of new activities or organisations suitable for senior participation in recreation. For people with disability, the media may enhance promotion of mentors with disability and promote inclusive practices. For young people, the media may educate about the variety of activity options available to them and how to access services.



Figure 8.10:
The media may educate young people about the variety of activity options available.



Figure 8.11:
Geographical location can affect the type of recreational activities available.

Governments

Local, state and federal governments use policy, legislation and funding to influence participation. For Aboriginal and Torres Strait Islander peoples, governments provide health promotion and support to communities. For elderly people, government departments enforce policies that ensure leisure and recreational providers are accessible with appropriate ramps and wide pathways. Governments also provide funding for care that enables participation for people with disability. For young people, government legislation is created to ensure that physical activities and supervision are safe.

Geographical location

The Australian continent is vast and offers a wide variety of leisure and recreational opportunities. The population is largely concentrated in large towns and cities. Aboriginal and Torres Strait Islander peoples are more likely to live in rural and remote areas of the country, which may limit opportunities for participation. For elderly people with limited mobility and people with disability, travelling distance to recreational activities may impact access. Young people are often reliant on others for transport, so may be limited to local recreational opportunities or those close to public transport.

Age

Australia has an ageing population and age influences the leisure and recreational choices people make. Participation in active recreation is greater for younger Aboriginal and Torres Strait Islander peoples, particularly among individuals in formal education settings. Health conditions commonly associated with age, such as osteoporosis, impacts the participation levels of elderly people. Older Australians should continue to participate in low impact activities such as swimming and walking. As people with disability age, they may suffer greater limitation as their disability impacts their health status. For young people, their youth enables them to engage in more vigorous activities in preference to sedentary leisure and recreation activities. Adolescents may perceive themselves as 'invincible' and choose to participate in risky activities.

Culture

Aboriginal and Torres Strait Islander peoples have a strong culture that promotes traditional Indigenous games or practices. Elderly people may choose to participate in activities that reflect their heritage or cultural identity. People with disability benefit when communities have a culture of inclusivity. Popular culture may influence young people to engage in certain recreational behaviours targeted specifically at their age group.

Gender

There is a strong link with gender and participation in leisure and recreation, with most groups within the Australian population reporting greater participation by males. Young people are the exception, where males and females are more equal in the participation rates. Certain cultural groups within Australia have beliefs that may limit participation in certain activities, such as certain religions and attitudes towards female participation. Young males are significantly more likely to participate in risky, thrill-seeking activities such as motocross.



Figure 8.12:
Australians should continue to participate in low impact activities, such as swimming or snorkelling, as they age.



Figure 8.13:
Young people are more likely to engage in vigorous physical activity in their leisure time.

Disability

The type and degree of disability influences participation. Aboriginal and Torres Strait Islander peoples, the elderly and young people who have disability generally have less involvement than their peers without disability. Fear of injury, negative attitudes to disability, inadequate facilities, lack of transport and cost are all aspects which influence participation for people with disability. There has been some recognition of the need to provide greater access for people with disability which has seen improvements in opportunities, especially for young people and those engaging in modified activities.

Family

The value that families place on recreation, leisure and healthy lifestyles has a strong influence on individuals. Aboriginal and Torres Strait Islander peoples have strong family connections, with a culture of respect for elders, and as such are strongly influenced by their upbringing. The elderly are not only influenced by their upbringing, but also influence their own family by acting as role models. People with disability are influenced by the level of support and encouragement they receive from their family. Young people are influenced by the participation of older siblings, parents and extended family members. They rely on financial support, emotional support and transportation provided by the family to engage in leisure and recreation.

Social support

Social support is an individual's perception that they are cared for, helped, encouraged and supported by the other people that make up their social network. This support can come from family, peers, close friends and colleagues. Aboriginal and Torres Strait Islander peoples rely on social support to overcome the disadvantage they experience in terms of health and socioeconomic status. The elderly may experience greater need for social support from their family as peer groups diminish and the ability to engage in active recreation independently is lessened. The level of social interaction and employment status of people with disability may impact their social support network and influence their recreational and leisure opportunities. Young people are strongly influenced by their peers and families, and enjoy sharing leisure and recreational experiences.



Figure 8.14: Recreational choices of young people are influenced by the participation of older siblings.

Barriers to participation

Passive leisure activities such as watching television, reading or listening to music can provide relaxation and aid mental health, but active leisure and recreation activities have greater health benefits. Many people fail to adequately participate in active leisure and recreational activities. The most common barriers are:

- advanced age
- ongoing injury or illness
- undefined injury or illness
- insufficient time due to work or study commitments
- accessibility
- lack of interest
- cost
- availability of facilities and services
- access to adaptive equipment.

Examples of ways to overcome barriers that keep Australians from participating in active leisure and recreational activities are shown in Table 8.1.



Figure 8.15: Active leisure and recreation activities have great health benefits.

Table 8.1: Common barriers to leisure and recreation.

Barrier	Tips to overcome the barrier
"I don't have enough time."	This is a common excuse. To overcome this barrier, individuals could try the following: ▪ Keep a diary of daily activity for a week and use it to assess how much spare time is actually available for active leisure and recreation. If the activities are physically demanding, consider breaking the time periods up into smaller, more manageable blocks. ▪ Involve the family. For example, instead of gaming or watching television together, get outside. Play backyard cricket, go to the local swimming pool or take the dog for a walk through the park. ▪ Take a brisk 15-minute walk at lunchtime. ▪ Try to incorporate active leisure such as walking for enjoyment into daily life. For example, get off the bus or train one stop earlier and walk the rest of the way.
"Active leisure and recreation is boring."	Sometimes lack of interest is the problem rather than lack of time. If someone finds active leisure and recreation boring, they could try the following: ▪ Enlist the help of a friend, join a local walking group or try a recreational activity that both of you can do. ▪ Think back to the activities that were enjoyable as a child. Revisit these activities; they still may be enjoyable. ▪ Mix it up. Plan to participate in a range of activities.

Table 8.1: Common barriers to leisure and recreation. *(continued)*

Barrier	Tips to overcome the barrier
"I'm too tired."	Life can be exhausting but, amazingly, the more active a person becomes, the more energy they will have for everything else in their life. If a person lacks energy, they might try the following: ▪ Try to be active on most days of the week. ▪ Take time to enjoy nature. ▪ Try something new to mentally stimulate as well as physically stimulate yourself. ▪ Try to get more sleep.
"It's too hot." / "It's too cold." / "It's raining."	There's always something that can be done, regardless of the weather. To overcome climatic barriers, a person might try the following: ▪ Have a variety of indoor and outdoor activities to choose from so that weather can't interfere with planned activities. ▪ Swim at a heated pool. ▪ Take a brisk walk through an air-conditioned shopping centre. ▪ Choose weather-specific activities such as skiing or snow-play in winter or swimming in summer.

Unfortunately, there are still many barriers restricting individuals to participate in regular recreational activities. Depending on the population group, some factors are more predominant than others; for example, time restraints are a common barrier for adults. In comparison, primary reasons that younger people don't participate in leisure and recreational activities are their reduced perception of the level of fun they will have, being afraid to fail, perceived level of competence and the number of friends participating.

Internet activity

Log on to TitanOnline and complete Activity 8.2, by preparing a report about the barriers to participation in active recreation faced by people with disability.

Learning activity

1. Identify barriers that prevent you from participating in leisure activities.
2. Explain how you can overcome the barriers.
3. Survey your class members about why they are prevented from participating in sport and physical recreation.
4. Identify ways in which recreational facilities and services could be used to promote and enhance participation by all groups.
5. Design a health-promotion campaign for your community to encourage all groups to participate in recreational activities.
6. Assess your school grounds for areas that have access for people who have a physical disability. Analyse a sport session, and identify ways in which the activity could be modified so that a person with physical disability could participate.



Figure 8.16:
It is common for recreational activities to be done in environments that promote relaxation; for example, a nature park.

Short- and long-term benefits of participation

It is important for individuals to include time in leisure and recreational activities throughout their life as part of a healthy and balanced lifestyle. When individuals spend time in leisure activities, doing tasks and activities that they enjoy, they gain a greater sense of purpose, identity and satisfaction. Some leisure and recreational activities encourage individuals to engage with others, such as family, friends and community groups, which promotes a greater quality of life due to being surrounded by people with similar interests and concerns. Individuals sharing positive life experiences with others can assist personal growth and development of skills which are not often fostered during non-leisure time, such as the workplace. Development of social skills positively affects the individual as well as the communities surrounding them.

Physical activity is commonly done during an individual's allocation of leisure and recreation time. Therefore, leisure and recreational activities are often closely linked to significant improvements occurring in an individual's mental and physical health. Some benefits are increased productivity levels in activities other than leisure and recreation and greater physical health. Like all aspects of an individual's health, leisure and recreational activities should be integrated alongside other positive health behaviours such as eating a varied diet to promote a balanced lifestyle. Levels of stress, depression and anxiety have also reduced among studied individuals who took time out of their regular routines to participate in leisure and recreational activities. Practices such as yoga can be viewed as not only requiring the body to physically move but also the mind to relax. It is also common for leisure and recreational activities to be done in environments that promote relaxation; for example, a nature park.

Short- and long-term health benefits, including social, mental, physical and spiritual benefits are shown in Table 8.2.

Table 8.2: Short- and long-term benefits of participation.

Social benefits	▪ Promotion of family and peer interaction. ▪ Creation of opportunities for social networking. ▪ Promotion of social cohesion by way of having people work together. ▪ Enhancement of self-esteem and confidence.
Mental and emotional benefits	▪ Reduction of depression, stress and anxiety. ▪ Improvement of concentration, decision-making and strategic thinking; for example, playing cards or board games. ▪ Enhancement of memory and learning. ▪ Releasing of tension. ▪ Provision of an escape from the daily routine. ▪ Aiding of a sense of identity. ▪ Development of creativity and expression; for example, drawing and painting.
Physical benefits	▪ Prevention of diseases such as coronary heart disease, hypertension (high blood pressure), colon cancer and type 2 diabetes. ▪ Improvement of overall physical health. ▪ Aiding of weight control. ▪ Building and maintenance of healthy bones, muscles and joints.
Spiritual benefits	Spiritual activities such as church functions, yoga, meditation and some martial arts can lead to benefits for people who are looking to challenge, develop or maintain their values, morals and beliefs in today's society.

Learning activity

1. Reflecting on the leisure or recreational activities in which you regularly participate, analyse the list of benefits outlined in Table 8.2 and nominate which are short-term and which are long-term benefits.
2. Consider the following scenario: Mark is 17 and about to begin his final year of schooling. He is a hardworking student who is very keen to attend university the following year. Mark is ambitious in terms of his goals, and consistently plans his study timetable for the week ahead. He also works at a café on weekends.
   a. Identify the school and work issues that Mark might need to address this year to achieve a balanced lifestyle.
   b. Considering the benefits, outline how Mark can create opportunities for participating in leisure and recreation activities.
   c. In regards to Mark's primary aim of maximising his school performance, what are the potential benefits of making time for leisure and recreation?
   d. What are the potential dangers if Mark dedicates all his time exclusively to study and work?

Reasons for changes in participation levels

There are multiple reasons underpinning a change in the participation levels in leisure and recreation in Australia. A primary reason is technology, which is constantly changing the way people work, rest and play. Greater access to technology has changed the way we communicate, read, watch television, play games, organise holidays and take photographs just to mention a few.

Social change has seen a decline in participation in traditional, competitive sports, with people increasingly attracted to leisure and recreational pursuits. These less structured activities require less long-term commitment and are attractive to people who perceive themselves as time-poor. Changes in employment and work patterns such as extended trading hours have also changed the way Australians choose to use their leisure time. Australians' annual expenditure on leisure and entertainment has seen an increase in the past decade, while money spent on commodities has decreased. This trend of buying 'experiences' rather than 'things' underpins greater involvement in recreation. This reason, together with a greater interest in sustainability and environmental issues, has seen an increase in eco-tourism, outdoor activities and camping.

Leisure activities that are popular with older Australians are seeing greater participation due to the ageing demographics of the Australian population. For example, the activity of walking remains the leading recreational activity in Australia.

Participation in thrill-seeking recreational activities is increasing. Recently, involvement in surfing skateboarding, parkour and extreme sports has increased considerably when compared with more traditional sports and physical activities. Teenagers and young adults are the primary population groups looking for activities that are physically and mentally challenging. Also, sponsorship opportunities and the inclusion of extreme sports in the Olympic Games has further encouraged individuals to become involved in these sports.



Figure 8.17:
Walking is the leading recreational activity in Australia.

Internet activity

Log on to TitanOnline and complete Activity 8.3. Prepare a presentation around the health issues associated with the uptake of technologies and passive leisure activities.

Learning activity

1. Investigate the range of technology-based leisure and recreational activities that Australians have available to them.
2. Explain the health benefits that people with disability might gain if they have access to technology.
3. Analyse the impact that increased use of technology has on participation rates in sport, recreation and physical activity.

Promoting lifelong leisure and recreation now and in the future

Strategies to increase participation

Community or school gala days provide opportunities for individuals who may not be able to regularly participate in leisure and recreational activities outside of their education due to factors such as geographical location or socioeconomic status. During these days, people also get to trial and experience activities before fully committing themselves to participate regularly. Furthermore, days when large numbers of individuals come together to participate increase a sense of community spirit and encourage continued participation.

Constructing facilities that allow for leisure and recreational activities to occur at any time of the year will reduce external influences such as the weather impeding the participation levels of individuals. However, if it is not possible to construct new buildings or covered areas, hiring existing facilities such as community halls for a small fee means that people can participate in activities regardless of outdoor conditions.

Internet activity

Log on to TitanOnline and complete Activity 8.4, outlining the safety considerations involved in planning a school canyoning excursion.

Did you know?

Satellite phones transmit signals via a satellite and can be rented for as little as $8 per day – a great option for safe recreation in remote areas.

Encouraging activity organisers to consider training volunteers to help with facilitation is another positive way that activities can continue to be run for a reduced expense to the participating individual. For example, Parkrun is a global community activity. It involves communities organising a five-kilometre run through the local area once a week. Individuals are encouraged to volunteer for positions such as marshaller and timekeeper to accrue points on their online profile. Rosters help to formalise the organisation of volunteers and can assist with informing other participants when an activity may be occurring.

An alternative way schools can implement leisure and recreational activities is by creating lunchtime groups; for example, providing yoga sessions in the school auditorium. This gives students opportunities to experience short sessions of activities on a regular basis. Also, the activities can be student or teacher led, ensuring that there is no cost for the activity and students are welcome to join as they please.

Learning activity

1. Create a database of local facilities and contacts for leisure and recreation.
2. Propose strategies to increase leisure and recreation activities in your school or local community.

Future directions in leisure and recreational pursuits

Changes occurring in relation to demographics, globalisation, transport, infrastructure and technology have a profound effect on the leisure and recreational activities individuals are able to participate in. Australia's future with an ageing population, increased population and greater urbanisation will provide unique challenges to recreational resources. To continue the positive growth of available leisure and recreational activities within all geographical areas, communities must actively respond to the needs of each area. As Australia's diversity continues to increase, it is imperative that activities continue to be more culturally and socially inclusive. For example, restaurants, theatres, music outlets, hotels and shopping centres are a few environments where more culturally dynamic leisure and recreational activities are occurring. Continuing to accept new and different cultural traditions from around the world will ensure new activities are explored in Australia. Changing attitudes towards sustainability and the natural environment have brought a shift in the major influencing factors that individuals validate their participation choices by. For example, people may choose kayaking over motorised boating due to kayaking's lower environmental impact.

The trend for new and more advanced technologies will obviously continue and accelerate. People will be spending more leisure time using devices for socialising, communicating, gaming and relaxing. The availability of technology has increased activities individuals are able to do, such as stream online music; however, it has also meant that many people are choosing to reduce the amount of active leisure and recreational activities they engage in.

Changes in the workforce will potentially see more available time for leisure and recreation. In response to the predicted changes, commercial leisure and entertainment industries are undergoing a technological transformation that will be just as profound as the future of work. The way we work and play in the future could well be unrecognisable from what we do currently. It will certainly be an interesting future, considering we are already seeing a walk in the park being replaced by a virtual reality walk on a treadmill and skydiving being conducted in indoor facilities.



Figure 8.18:
Kayaking has a lower environmental impact than motorised boating.



Figure 8.19:
People are spending more leisure time using devices for relaxing and socialising.

Revision questions

1. Predict future trends in leisure and recreation that you believe you will witness in the coming decade.
2. Distinguish between leisure activities and recreation activities.
3. Describe the trend in Australia of spending time engaging in sport and outdoor activity on a daily basis. Account for the trend.
4. Outline the trend's health implications for individuals and communities.
5. Identify the barriers to participation faced by:
   a. people from various cultural backgrounds
   b. people with disability
   c. girls and women
   d. elderly people.
6. Explain the difference between active leisure time and passive leisure time. Give examples.
7. Identify and describe the physical, mental and spiritual benefits of engaging in sport and physical activity.
8. Explain how participation in leisure and recreation activities can lead to improvements in the quality of life of people with disability.
9. In relation to the health of individuals and communities, outline the benefits and the limitations of technologies.
10. Analyse the impact that young people's use of technology has on participation rates in sport, recreation and physical activity.
11. Outline strategies that could lead to greater participation in leisure and recreation in your local area.
12. Which statement best defines environmental sustainability?
    a. Maintaining the qualities that are valued in the physical environment.
    b. Keeping waterways free of debris and pollutants.
    c. Reducing litter and waste in our society.
    d. Taking pictures and leaving only footprints.
13. Which type of benefit matches a person developing a love and appreciation of nature through their involvement in outdoor recreation?
    a. Physical benefit.
    b. Spiritual benefit.
    c. Social benefit.
    d. Mental and emotional benefit.

CHAPTER 9

Physical activity and sport for specific groups

The group covered in this chapter is people with disability. The groups Aboriginal and Torres Strait Islander peoples and young people are covered in the eBook version of this text.

Physical activity and sport play a vital role in the wellbeing of all Australians, including people with disability. This group faces unique challenges to enhance their physical activity and sport participation. Participation is integral to improving their quality of life and to enhancing their physical, emotional and social health and wellbeing.

Engagement in physical activity has immense potential physical benefits for the members of this group: increased flexibility and strength; improved sleep patterns; improved muscular and cardiovascular endurance; and reduced stress, cholesterol and blood pressure.

Outcomes

A student:

- discusses the nature and impact of historical and contemporary issues in physical activity and sport (PASS5-3)
- analyses physical activity and sport from personal, social and cultural perspectives (PASS5-4)
- demonstrates actions and strategies that contribute active participation and skilful performance (PASS5-5)
- evaluates the characteristics of participation and quality performance in physical activity and sport (PASS5-6)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)

Key knowledge

- Historical perspectives
- Factors influencing physical activity and sport choices
- Enhancing future participation and enjoyment in physical activity and sport



Figure 9.1:
Sport can be modified to cater for people with a disability.

Historical perspectives

Throughout history, people with disabilities have been treated differently from those who conform to or fit societal norms. In the past, people with disability were often institutionalised, were rarely integrated into mainstream schools and suffered disadvantage and a lack of acceptance in the community. There was little or no accommodation to enable people with disability to access many of the physical activities and sports that most Australians take for granted.

Since the late 1960's there has thankfully been a favourable, albeit gradual change in the way communities view people with disabilities. Some of the actions which contributed to this change include a range of legislation and policies that promoted the rights of people with disability and saw increased integration into the community. Inclusion in the school system increased awareness and acceptance. The increased educational and vocational opportunities have enabled people with different to reach their potential and lead fulfilling lives.

Part of this change included greater access to sports and physical activities which were initially valued for rehabilitation. Over time, games were modified to promote greater participation and enjoyment. Movements such as the Paralympics, Special Olympics and Invictus Games have elevated public awareness and recognition of talents and strengths of people with disability.

Table 9.1 contains examples of the types of sport and physical activity that people with disability participate in at elite-competition level.



Figure 9.2: Movements such as the Invictus Games have elevated public awareness and recognition of talents and strengths of people with disability.

Internet activity

Log on to TitanOnline and complete Activity 9.1 by researching the listed questions relating to a popular sport for people with disability.

Table 9.1: Examples of elite sports and physical activities that people with disability participate in.

Paralympics	Special Olympics	Other sports
▪ Alpine skiing ▪ Archery ▪ Cycling ▪ Ice-sledge hockey ▪ Ice-sledge racing ▪ Wheelchair rugby ▪ Wheelchair tennis	▪ Aquatics ▪ Athletics ▪ Bocce ▪ Bowling ▪ Equestrian ▪ Gymnastics ▪ Table tennis	▪ 'Blind' cricket ▪ Goalball ▪ Para-powerlifting ▪ Wheelchair: – baseball – football – hockey

Evolution of physical activity and sport for this group

The physical activities that all sectors of the Australian community enjoy have changed over time, for several reasons. Due to the increasing popularity of the fitness industry over the past few decades, many people have started to attend a gym regularly. Group-exercise classes such as yoga, Pilates, spin, pump, boxercise and boot camps are now commonplace. Representatives of the personal-training industry have brought a wider range of activities and a greater knowledge to the public. Proliferation of media coverage and specialised venues has led to greater participation in extreme sports. People who want to participate in adventure sports such as whitewater kayaking and rock climbing can now practise in human-made facilities as well as in a natural environment.



Figure 9.3:
Physical activities that people with disability engage in are often modified versions of traditional activities.

Sports and physical activities that people with disability engage in are often modified versions of traditional activities. Also, numerous activities have been developed to cater for specific groups of people with disability.

Organised sports for people with disability are usually split into the following three 'wide' disability groups:

- people who are deaf
- people with a physical disability
- people with an intellectual disability.

Internet activity

Log on to TitanOnline and complete Activity 9.2, by researching and preparing an athlete profile on two Australians who have excelled at the Paralympics.

These three groups are catered for in the following three separate Olympic Games:

- **The Deaflympics, for people who are deaf:** First held in Paris in 1924, they were the first international sporting event for athletes with disability. The Winter Deaflympics were added in 1949. The biggest difference between the Deaflympics and the Olympics and Paralympics is that sounds cannot guide the Deaflympians. Starter's guns, commands or referee whistles are modified. Qualifying athletes must have a hearing loss of at least 55 decibels in their better ear. To ensure an equitable playing field, hearing aids, external cochlear implants and similar are not allowed to be used in this competition.
- **The Paralympics, for people with physical, mental and sensorial disabilities.** The range of physical disabilities includes limb deficiency (for example, amputation), impaired muscle power (for example, paraplegia and spina bifida) and vision impairment. The first Summer Paralympic Games were held in Rome in 1960. Governed by the International Paralympic Committee, the Games are usually held three weeks after the closing of the Olympic Games, in the same host city. The Paralympics began by combining a sports competition developed for World War II veterans that had spinal injuries and a Canadian event organised for disability groups.
- **The Special Olympics World Games, for athletes with intellectual disabilities:** The first International Special Olympics Summer Games were held in the United States in 1968, and the first Winter Games were held in the United States in 1977.

Learning activity

1. Research and discuss the evolution of physical activity and sport for people with disability, including significant events and actions that brought about the changes.
2. Prepare a report on Australia's involvement in Special Olympics and Paralympic Games.

Past challenges faced by this group

Throughout history, people with disability have been subjected to a number of injustices and have faced many challenges and difficulties. Within the physical activity and sporting context, those with disability have often struggled to be accepted and included in mainstream activities.

Often, the disability itself – such as vision, hearing, physical or intellectual impairment – was viewed as an insurmountable barrier to participation in sport and physical activity. Because of this lack of understanding, there was no education and training about how to include people with disability. This led to discrimination against people with disability; it was 'too difficult' to find solutions to promote inclusion and provide access in the domain of sport and physical activity. There was also a common belief and misunderstanding that people with disability were very limited in what they could do. People with disability have often been underestimated, with unique knowledge, strengths and abilities going unacknowledged.

Another difficulty faced by this group has been a lack of access to coaches and available resources for them to participate in physical activity and sport. This is not limited to a lack of funding, equipment and spaces for these people to safely and comfortably engage in activity. There has also been a stigma associated with disability, which meant that people with disability were not viewed as real competitors, their sports were not seen as real sports, and their events were not seen as real competitions.

Did you know?

The relationship between Eunice Kennedy Shriver and her sister Rosemary, who had an intellectual disability, was the inspiration for the Special Olympics.

Physical activities and sports associated with this group

Changes over time

Over time, many changes have been made to physical activity and sport to enhance participation of people with disability. There has been a significant shift of perspective in relation to involving those with disability, with an emphasis on inclusivity and access. This has involved providing equitable inclusion and opportunities, accessibility and participation of those with disability in a range of activities. Such inclusion and participation is a result of educating those responsible for providing sporting opportunities – organised sporting groups, coaches, trainers and teachers – about modified sports that cater specifically to people with disability and how to involve people with disability within sports, games and activities. Adjustments often include rule and equipment modifications to meet the needs of those with disability, such as wheelchair basketball.

Other sports such as swimming have categories for those with disability to compete in. In multiclass swimming events, individuals with disability compete and their times are scaled against the world record for the specific event and class. This makes competing in this sport equal for all those with disability, regardless of their class level. By modifying rules of common games and aspects such as field size, ball possession, goal size/height and game length, people with disability will be much more likely to participate in physical activity and sports, as they feel supported, included and confident. And in recent times, there has been an increase in participation rates of people with disability.

Reasons for modifications

All Australians should achieve at least 30 minutes of moderate to vigorous physical activity every day to achieve health benefits. For people without disability this is often an easily achievable goal. However, for those with disability, it can become difficult to achieve this goal due to discrimination, lack of confidence and lack of or limited access to facilities, programs and resources. For this reason, many modifications have been made to physical activity and sport, to ensure an inclusive environment, where those with disabilities can fully participate without fear and judgement.

Modifications have also been made to rules of regular and modified games and activities to allow those with disabilities to perform to their ability. Equipment can also be modified to accommodate the specific needs and physical limitations of those involved. Modifications are crucial for not only the safety of those with disability, but their enjoyment in physical activity and sport. If they are able to enjoy sporting activities, they are more likely to be involved in regular physical activity, socialise with others and try new things. These are all vital for a positive self-esteem and overall health.

Many modified sports promote participation for people with disability, as their disabilities are no longer seen as a limitation, and instead form part of a level playing field, where those with similar and/or different disabilities can compete or play against each other in a safe, supportive environment. These modifications allow people with disability to be included in physical activity, explore movement concepts and develop crucial life lessons through sport, similar to their peers without disability.



Figure 9.4:
Modified sports promote participation for people with disability as their disabilities are no longer seen as a limitation.

Strategies to enhance participation, enjoyment and performance

It is essential that participation of people with disability is promoted so that participation rates can be increased and everyone can reap the benefits of becoming physically active. The support can be provided in a number of ways, listed as follows:

- Aim to make the activities challenging, physically and intellectually.
- Create a broader range of divisions for different levels of abilities, based on people's individual disabilities, so that competition becomes more equitable.
- Aim to teach new skills and enhance existing ones based on strengths.
- Aim to keep the activities as cost effective as possible.
- Offer a wider range of competitive opportunities, from grassroots level up, to create structured pathways.
- Offer diversity in the activities (for example, type, rules, modifications and equipment used) to ensure inclusion.
- Make sure that instructors are qualified, when they are required.
- Promote and advertise the activities.
- Use the community's recreational facilities, to promote a sense of belonging and acceptance of disability within the community.
- Make enjoyment the aim of all activities, because if a person is not having fun, they will not continue participating.
- Make activities as accessible as possible, and reduce physical barriers.



Figure 9.5:
A broad range of divisions for different levels of abilities should be created so that competition becomes more equitable.

Did you know?

Sporting wheelchairs range in cost from a few thousand to over fifteen thousand dollars.

Learning activity

Write a letter to your local council to request funding for implementation of strategies for increasing the amount of physical activity for people with disability. In the letter, include:

- what you hope to achieve
- how you will achieve your goals
- the outcomes if the strategies are successfully implemented
- ways in which the council can support your strategies
- how you will evaluate the implementation of your strategies.



Figure 9.6:
Family support has a large role in facilitating opportunities for people to be physically active.

Factors influencing physical activity and sport choices

A range of factors influence people's participation in sport and physical activity, from the influence of culture to the physical environment and the available facilities. Participation is promoted when people are given opportunities to engage in many types of sport and physical activity. Enjoyment and support provided by family members is also crucial. Family support has a large role in facilitating opportunities for people to be physically active.

Barriers to participation in physical activity include the high costs, poor access to facilities and unsafe environments. Other, more complex issues that are related to identity and the shifting of social networks are also very influential.

Factors that influence physical activity choices of this group

There are a range of factors that influence the physical activity choices of people with disability. These include:

- **Lack of suitable facilities:** examples include places providing quiet time for people with autism who may experience sensory overload, resources for people with physical disabilities and existence of culturally inappropriate facilities.
- **Access to facilities:** difficulty in accessing facilities, such as a lack of ramps and lifts.
- **Education:** well-educated people are more likely to regularly participate in sport and/or physical activity. When people with disability are educated about the activities and programs available they will be more inclined to be involved.

- **Cost:** especially when special facilities and support are required, such as specialised trainers, equipment and programs.
- **Self-esteem:** people of all gender identities who regularly participate in sport and physical activity can develop new skills, as well as experience increased self-esteem, improved fitness and development of new social networks. These are motivating factors when making physical-activity choices. It is important that people with disability are supported, included and accepted, to feel comfortable when participating and to make new friends.
- **Culture:** people who were born in Australia are more likely to participate in physical activity than people who were born in a country in which English is not their native language. People with disability as well as a different cultural background may find it even more difficult to access a supportive environment that accommodates their disability and developing English language skill.
- **Geographical location:** the rate of participation in physical activity is higher among people who live in a capital city than it is for people who live in rural and remote areas. People with disability are more likely to have access to programs tailored to their needs in cities than in rural/remote areas.
- **Body shape:** in Australian Bureau of Statistics surveys, young girls cite their concerns about body shape and weight management as being the main reasons for their participation in sport or physical activity. Pressure to conform to the popular ideal of beauty is an major influence on teenage girls when they are choosing how to be physically active. However, this is not limited to girls, and influences all gender identities. People with disability may find it difficult to be compared with people without disability, and must be encouraged and supported to participate in physical activity and sport.
- **Skill level:** this can be an influence especially when people do not have the necessary physical ability or they are not confident enough in their skills to be able to participate. Skill level can often be a deterrent for those with disability, which is why modified and inclusive sports and physical activity are encouraged.
- **Accommodation of disability:** many people are prevented from being physically active due to lack of understanding, resources and coaching for those with disability. The type of disability can influence the amount and type of physical activity a person can participate in.



Figure 9.7:
Visual impairment can influence the amount and type of physical activity a person can participate in.



Figure 9.8:
Activities that involve animals can be beneficial for people with autism.

The role of culture in physical activity and sport choices

Australia is a culturally diverse society. Out of our about 25 million people, one in four was born overseas, and 44 per cent either were born overseas or have one parent who was born overseas. Most Australians can trace their ancestry to other countries, and many practise the customs and traditions of their country of origin. If people have a wide variety of social networks, they have more of an opportunity to try a range of sport activities, make new friends, and be more aware and appreciative of all cultures. People with disabilities who identify with cultures from overseas may choose to participate in sport and physical activities from those countries.

Cultural identity and playing sport are both important in Australian society. Community participation in sport and recreational activities is consistently recognised as being an important feature of the Australian way of life. People with disability may be influenced to engage in sports and physical activities as part of identifying as Australian and to promote inclusion.

Internet activity

Log on to TitanOnline and complete Activity 9.3, by researching a sport with a particular cultural background that has been modified to be inclusive of people with disability.

Outcomes and opportunities provided by physical activity and sport for this group

People with disability generally have fewer opportunities to participate in physical activity and sport compared with people without disability, due to a number of social and physical barriers. However, inclusion of people with disability is increasingly becoming encouraged, due to the identifiable health benefits and development of education. When those with disability are involved in physical activity and sport, there are many outcomes and opportunities that can be provided, such as building a sense of community, connectedness, inclusion and diversity. These outcomes result from shared experiences, challenges and struggles, where people can come together in a safe space to support each other. This focus on inclusion allows people with disability to be accepted, with different categories for competition allowing individuals with disability equal opportunities to compete against people of the same level, and have equal opportunities in representation and participation in physical activity and sport. This gives people with disability the opportunity to demonstrate their strengths while challenging assumptions about what they are capable of achieving. Physical activity and sport also allows significant opportunities for social, emotional, mental and physical health and wellbeing benefits. When diversity is encouraged, it allows each individual to demonstrate their different strengths and skill sets.



Figure 9.9:
Participating in sport and physical activity encourages those with disability to meet new people and try new things.

Benefits of participation for this group

There are many positive outcomes of participation in sport and physical activity for people with disability. These include:

- **Improved functioning and quality of life:** exercise improves overall health and wellbeing, allowing those with disability to develop fitness and strength. This encourages independence and a sense of freedom.
- **Enhanced motivation:** with an increased quality of life, those with disability are more likely to continue being active. This is because they become motivated to achieve goals and not let disability define or limit them.
- **Increased self-esteem:** participating in sport, physical activity or exercise encourages those with disability to meet new people and try new things in a safe and supportive environment. This can result in a sense of pride and accomplishment.
- **Increased social interaction:** active environments encourage communication and socialisation. For people with disability, a supportive sense of community is important to reduce feelings of isolation and loneliness.
- **Improved coordination:** sport and physical activity encourage development of movement and thinking skills. Under the guidance of a trained professional, activity can be tailored for people with disability to improve coordination and help with every day and specialised movement tasks.
- **Improved emotional wellbeing:** exercising causes the brain to release endorphins, which are the 'feel good' hormones of the body. Endorphins help manage symptoms of anxiety and depression and have the ability to lift mood. For people with disability, this can improve their emotional wellbeing and general happiness.

- **Improved fitness:** participation in sport, physical activity and exercise can improve cardiovascular fitness and muscular strength. This can assist some forms of disability, allowing greater movement and independence, as well as many other general health benefits.
- **Easier weight management:** people with disability are encouraged to achieve 30 minutes of moderate to vigorous activity per day. Moving the body in a safe way to achieve this will help in maintaining a healthy weight and enable a healthier mind and body.
- **Improved body image:** being active not only causes individuals to look fitter but to also feel fitter. When people with disability feel better about themselves, their body and their achievements, they will feel more accomplished and successful.
- **An improved immune system:** exercise increases the number of disease-fighting blood cells in the body, reducing the likelihood of becoming sick. This can increase overall health.
- **Reduced likelihood of lifestyle diseases, including heart disease, diabetes and some cancers:** with a healthy, balanced diet, being active ensures the body organs are functioning correctly. It also reduces build-up of fatty plaque in arteries, strengthens the heart and lungs, reduces stress, lowers blood pressure and improves blood circulation.
- **Reduced chance of developing osteoporosis:** exercise, particularly weight-bearing exercise, causes new bone tissue to form, making the bones stronger. People with disability sometimes need take medication to manage their bone-density levels, as low bone density can lead to weak bones being susceptible to breaks. However, involvement in weight bearing may reduce the need for medication.
- **Reduced chronic pain:** gentle exercise and activity can reduce swelling and inflammation in the joints of people with disability. This can help manage and alleviate chronic pain and increase happiness and quality of life.
- **Increased likelihood of academic success:** physical activity and exercise boosts blood flow and oxygen supply to the brain and the body. This can improve concentration levels of people with disability, giving them the opportunity to focus on education and improve academic success.
- **Economic benefits such as health savings:** the health benefits that result from being more active can cause the disability to become less debilitating for the individual. This increases their overall health and reduces the costs of treatment and/or management of the disability.

Learning activity

1. Explain why weight management may be more difficult for people with disability and how regular physical activity can be beneficial.
2. Provide examples of how engaging in physical activity can improve the body image of a person with disability.
3. Working in pairs, design a health-promotion campaign aimed at encouraging people with disability to regularly participate in sport and physical activity.
4. Suggest how participation rates in sport and physical activity differ for people who were born with disability compared with people who acquired disability when either younger or an adult. Justify your response.

Enhancing future participation and enjoyment in physical activity and sport

As the physical, social and emotional benefits of physical activity for people with disability are significant, future participation in physical activity and sport should be encouraged. Continual involvement and encouragement of people with disability in physical activity and sport will encourage future generations to be regularly active. Today's generation of participants can be seen as role models, who represent similar struggles, achievements and experiences to the next generation. The inspiration that can be taken from such role models can significantly impact the lives of future generations and encourage an inclusive and active sporting society. By identifying that everyone is different, presenting individual strengths and weaknesses, normalisation of disability can occur. This can teach acceptance of others and ensure a higher self-esteem for people with disability. Such acceptance can provide encouragement for continual involvement in physical activity and sport, and reduce negative impacts of disease and disability for the individual and society.



Figure 9.10:
Swimming is a sport that can cater for a wide variety of disabilities.

Current challenges faced by this group

Although as a society we have been making strides in inclusivity in physical activity and sport, there are still several challenges faced by people with disability. At a grassroots level, people with disability are still less likely to engage in physical activity and sport compared with people without disability. They are not always provided with equal opportunities and pathways to professional sport. This can make it difficult, as there is no set route or recommended pathway for development. People with disability are not always accepted into mainstream sports and activities and there are not enough specialised mainstream programs for people with disability.

For inclusivity to improve, there needs to be a continual increase in community education about physical activity for people with disability. It is often expensive to run, engage in and purchase specialised equipment for physical activity and sport for people with disability and a lack of funding is another challenge faced. Sports for people with disability are also often under-represented in the media. Compared with sports featuring athletes without disability, sports featuring people with disability are not often shown on primetime television, or shown at all. This implies that elite success for people with disability is not possible.

Learning activity

1. Brainstorm and list the barriers that people with disability face in relation to regular participation in sport or physical activity.
2. Suggest solutions for overcoming the barriers.
3. Suggest reasons that people with disability choose not to participate in sport or physical activity.
4. Investigate a support network for people with disability and describe the type of support provided.
5. Provide examples of athletes who have overcome adversity and/or succeeded 'against the odds'.

Physical activities and sports available for this group

There is an increasing number of physical activities and sports available for people with disability within the local and wider community. For people using a wheelchair, there are many local clubs and sports that provide opportunities. Examples of wheelchair sports available include wheelchair basketball, wheelchair Australian football, wheelchair tennis and hand cycling. These sports have modified rules, restrictions and equipment such as shorter playing times, field sizes and ball travel. These modifications allow people using wheelchairs to engage in the activity to their ability, based on the mainstream game. For people who are blind, there are a number of sports with special programs available including rowing, swimming, netball, cycling, blind cricket, tennis, surfing and goalball. Goalball is particularly popular in New South Wales and is played at the Paralympics. Swimming is another sport that can cater for a wide variety of disabilities. Swimming teachers and coaches can do training that focuses specifically on people with disability. Competitive swimming also uses a classification system for all multiclass swimmers for physical, visual and intellectual disabilities, meaning swimmers' times are related to their level of disability. A sporting organisation offering a program for people with an intellectual disability is the Australian Football League (AFL). The AFL runs the National Inclusion Carnival, a week-long tournament for males with intellectual disabilities.

In addition to sports for people with disability, there are also many physical activities available. There are health and fitness centres and programs that focus on providing opportunities and training for people with disability, under the guidance of qualified personal trainers and specialised exercise physiologists and dietitians.



Figure 9.11:
All Australians should achieve at least 30 minutes of moderate to vigorous physical activity every day.

Learning activity

1. Choose five sports that are played by people with disability. Research how each one is played, and report back to the class.
2. Participate in three of the sports you chose for Question 1. After you have participated in them, write a one-page report in which you describe the game's enjoyable aspects and the components you found most difficult.
3. In small groups, either invent a game for people with disability and participate in it or modify and participate in an existing sport that has been specifically designed for people with disability. In a written explanation, include:
   a. a name for the game or sport, if you have invented the activity
   b. a brief description of the game or sport and its main aim; for example, 'to score more goals than the other team scores'
   c. the rules of the game or sport.

Current services and support groups

Many support networks exist for promoting and supporting people's participation in physical activity. These include community groups; private businesses; YMCAs; and government enterprises such as local councils, departments with responsibility for sport and recreation (in each state and territory) and Sport Australia. Many health-promotion initiatives and websites, which are mainly government-sponsored, have been developed for all groups to promote physical activity, including:

- www.health.nsw.gov.au
- www.beactive.com.au
- www.sportaus.gov.au

Some examples of other websites and programs that are aimed at promoting physical activity and sport for people with disability are described in Table 9.2.

Table 9.2: Services and support groups promoting physical activity and sport.

Programs	▪ **Adaptive Surfers of Australia:** assists people with disability to participate in surfboard riding through creative techniques and equipment modifications. ▪ **Access for All Abilities Program:** a government program supporting inclusive sport and recreation opportunities for people with disabilities. ▪ **Australia's Higher Education Disability Support Program:** provides funding to eligible higher education providers to undertake activities that assist in removing barriers to access for students with disability. ▪ **AFL National Inclusion Carnival:** an annual week-long representative carnival for males with an intellectual disability.
Websites	▪ **www.sportingwheelies.org.au:** a not-for-profit organisation that focuses on providing access to physical activity for people with disability. This ranges from a junior development program to supporting ex-service personnel. ▪ **www.disabilitytrust.org.au:** access to a specialised gym, with qualified personal trainers, physiologists and dietitians to cater for disabilities. Provides opportunities for fun and creative physical activities for all age groups and various disabilities.

Strategies to promote participation

Australia's states and territories are implementing health initiatives and strategies that are aimed at increasing people's participation in physical activity. Politicians wish to increase the amount of physical activity engaged in by people with disability. All the strategies that are now in place have a similar framework for achieving the governments' goals, and their focus is on the areas outlined as follows:

- **Schools and communities:** Physical-activity patterns are generally established when an individual is very young, and parents and carers are very much role models at this stage. Schools, parents and carers must have a significant role in providing support for physical-activity opportunities. Students and children with disability should be included in all schooling activities, particularly physical education where possible, from a young age. This will encourage their peers to be accepting of people with disability, and encourage individuals to feel a sense of belonging.
- **Workplace and transport:** The workplace has considerable potential for integrating physical activity in the working day. Governments need to promote alternative modes of transport for commuters to use when travelling to and from work. Initiatives such as Walk to Work Day are developed to promote active transport. Governments and other stakeholders also need to address access to workplace areas, and include physical additions such as ramps to ensure everyone can access their workplace and public transport.
- **Community groups and clubs:** An integrated approach to physical-activity participation has to be promoted among all the relevant stakeholders to maximise participation. Offering programs for people with disability and including people with disability in community and club sporting groups should be encouraged.
- **Families:** Family members have to work together and encourage each other to participate. More than half of all physical activity occurs in and around the home, despite existence of distractions such as television, computer games and labour-saving devices. Taking time to get outside and participate in physical activity needs to be encouraged by the family.

The best way to achieve the aim of increasing Australians' participation in physical activity is for our local, state/territory and federal governments to:

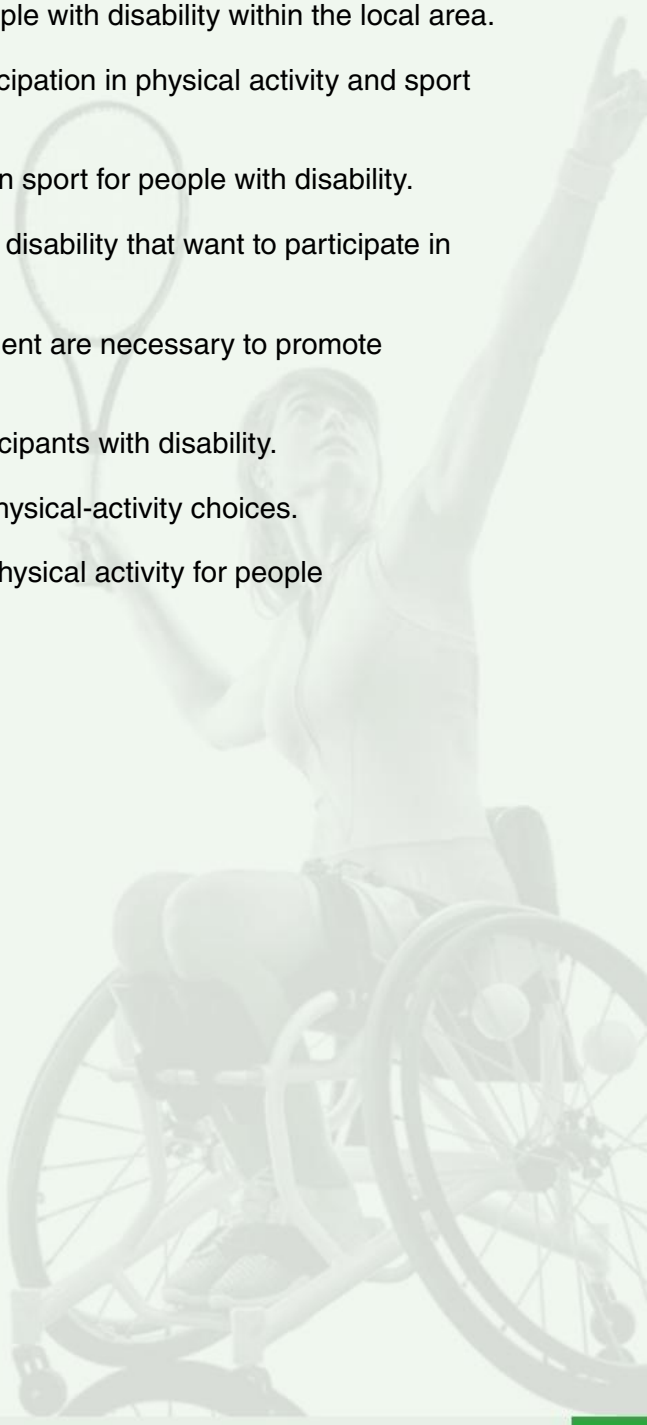
- provide funding and leadership
- coordinate most of the strategies they develop
- monitor and evaluate the individual strategies
- offer education and training programs
- create awareness by way of advertising and promotion
- build community relationships
- involve health professionals.



Figure 9.12:
Offering programs for people with disability and including people with disability in community and club sporting groups should be encouraged.

Revision questions

1. Discuss how a sedentary lifestyle impacts quality of life.
2. Describe the barriers that people with disability face in relation to regular participation in sport and physical activity.
3. Suggest a range of original strategies that would be effective in increasing participation in sport and physical activity for people with disability.
4. Outline a range of support networks that are available to people with disability and the type of support that is provided by them.
5. Identify the physical activities and sports available for people with disability within the local area.
6. Describe the impact that geographic location has on participation in physical activity and sport for people with disability.
7. List the social health benefits resulting from participation in sport for people with disability.
8. Explain the need for resilience skills for those people with disability that want to participate in sport and physical activity.
9. Explain the reason why modifications in rules and equipment are necessary to promote participation and inclusion.
10. Name five modified sports that are very popular with participants with disability.
11. Identify and describe the factors that influence people's physical-activity choices.
12. Analyse the role culture plays in the choice of sport and physical activity for people with disability.



CHAPTER 10

Opportunities and pathways in physical activity and sport



A wide range of voluntary and paid opportunities exist in physical activity and sport, including coaching, managing, refereeing, marshalling, officiating, supervising, fundraising and administrating.

People volunteer for a variety of reasons; for example, because they wish to help other people and community members, be involved with their family members, follow their religious beliefs, make friends and/or gain a feeling of belonging. People also volunteer to foster their personal growth, gain a sense of achievement, do something that is intrinsically satisfying, gain recognition, acquire or develop skills and experience and/or give something back to the sport they love.

Opportunities and career pathways in physical activity, sport and the recreation industry are constantly evolving. Gaining training qualifications through recognised providers enable people to develop the skills required for a career in the physical activity, sport and recreation industry.

Outcomes

A student:

- analyses physical activity and sport from personal, social and cultural perspectives (PASS5-4)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- displays management and planning skills to achieve personal and group goals (PASS5-8)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Opportunities in the physical-activity, sport and recreation industries
- Skills and leadership in physical activity, sport and recreation
- Career pathways in physical activity, sport and recreation

Figure 10.1:
A wide range of employment opportunities exist in sport.

Opportunities in the physical activity, sport and recreation industries

Opportunities for volunteer work and a career in the physical activity, sport and recreation industries can be fun, challenging and rewarding. The wide range of volunteer and employment prospects includes community-based recreation centres, fitness clubs, adventure tourism and management of camps.

Employees generally need to have a specific qualification from a recognised institution and a background in and enjoyment of physical activity, sport and recreation. Most positions are casual, which means an individual is covered for workers' compensation but not paid during holidays or when they are sick. Many positions in the physical activity, sport and recreation industries are seasonal; for example, a ski instructor could only work in the winter months in Australia.

Volunteering in physical activity, sport and recreation

A volunteer is a person who contributes their time, skills and experience for no financial gain. In Australia, about 6.1 million people participate in voluntary and community activities each year and contribute more than 713 million hours of their time. The most common types of organisation that people volunteer for are organisations associated with:

- sport and physical recreation
- education and training
- community/welfare
- religion.

The most common volunteering activities are fundraising, preparing and serving food, teaching or providing information, and fulfilling administrative duties.

The range of voluntary and community opportunities that are available in physical activity, sport and recreation industries include:

- coaching
- managing
- refereeing
- officiating
- driving buses
- serving as president
- serving as vice-president
- serving as secretary
- serving as treasurer
- serving on a committee
- supervising the canteen
- convening fundraising
- managing equipment
- providing services for spectators
- serving as a marshal
- serving as the pre-event coordinator
- undertaking logistics
- serving as registrar.



Figure 10.2:
Many people volunteer in sport and recreation organisations.

Benefits of volunteer work

Volunteers come from diverse backgrounds and have varying needs and expectations. As a result, their level of motivation and commitment, time allocation and involvement will vary greatly. Volunteers give their time, skills and experience because they wish to:

- help other people
- help their community
- be involved personally or with their family members
- be intrinsically satisfied
- be extrinsically satisfied
- improve their level of social contact
- develop their skills
- follow their religious beliefs
- gain new skills and experience
- use their skills or experience
- gain recognition
- foster their personal growth
- improve their self-image
- enhance their self-esteem
- gain a sense of achievement
- fulfil a sense of obligation
- give something back
- bring about social change
- gain skills, knowledge and experience to develop their career
- forge a pathway to enhance their work experience
- form friendships and bonds and acquire support and a feeling of belonging.

Although voluntary and community involvement has many benefits, many people either never participate in voluntary work or decide to stop volunteering altogether. The main reasons for not choosing to volunteer are personal ones, including having too many other commitments, not having enough time, and having to meet work and family responsibilities.

A goal of any club or community organisation is to recruit and retain volunteers. Although volunteer turnover is to be expected, high turnover rates are a hindrance in relation to a club's or organisation's capacity to deliver quality services. To reduce volunteer turnover, clubs and organisations need effective management and organisational skills so that the volunteers feel valued, enjoy themselves and are rewarded for their time and commitment.

Internet activity

Log on to TitanOnline and complete Activity 10.1, investigating various volunteering opportunities and roles.



Figure 10.3:
Lifeguards volunteer their time to help their community.

Outcomes of volunteer involvement

In addition to the plethora of benefits that individuals gain from volunteering in sport and physical activity, the wider community also receives positive outcomes. As individuals are consistently interacting with others who have similar interests, an increase in personal health and happiness can result. Regular volunteering often results in individuals developing new or larger friendship groups, which strengthens the community bonds between varying groups of people.

It is not only the individuals participating in the activities organised by the volunteers who benefit, the volunteers further develop many skills including problem-solving and task management. Increasing the skill set of communities helps to advance the quality of workers through productive practical learning activities.

Volunteer opportunities commonly involve regular interaction between multiple community groups, therefore decreasing the level of isolation and loneliness experienced by people who do not regularly interact with others. Through volunteering, individuals establish partnerships that can effectively collaborate to achieve common future goals.

People often volunteer for sporting activities they are specifically interested in, therefore devoting specific unique skills they are highly passionate about and transferring them to others with less knowledge. More diverse sport and physical activities can also be provided to communities when individuals volunteer. Also, as volunteers are not paid for their work, activities can be provided at a reduced cost to those participating, improving the health and wellbeing of communities by allowing equitable access to activities.

Did you know?

Approximately 1.8 million Australians donate their time and energy to community sport and recreation clubs.

Learning activity

1. What opportunities for volunteer work exist within your:
   a. school?
   b. local community?
   c. local sporting club?
2. Investigate and explain the personal and community benefits of voluntary work that you have witnessed or experienced in your local community.
3. List the characteristics that a good volunteer should have.
4. Design and conduct an interview with five volunteers to determine their reasons for being involved on a voluntary basis.
5. You have been put in charge of organising volunteers for the next Commonwealth Games.
   a. Create an application form for potential volunteers.
   b. Describe the skills you are looking for.
   c. Write a description of the types of responsibility the volunteers will have to meet.
   d. Explain how you will recruit the volunteers.
   e. Describe how you will evaluate the volunteers' satisfaction when the Commonwealth Games have concluded.



Figure 10.4:
Physiotherapy is an important role in the sports industry.

Employment opportunities in physical activity, sport and recreation

People have become more aware of the benefits of maintaining a healthy lifestyle and regularly participating in physical activity. The subsequent demand for physical activity, sport and recreation services has resulted in diverse employment opportunities on a casual, part-time or full-time basis. The industry is extremely competitive, so it is advantageous to have the appropriate qualifications and experience.

Examples of employment opportunities in sport, physical activity and recreation include:

- professional athlete
- coach
- umpire, referee or official
- physiotherapist
- fitness instructor
- fitness trainer
- fitness centre manager
- outdoor education instructor
- physical education teacher
- university lecturer
- swimming instructor
- swimming pool lifeguard
- beach lifeguard
- park ranger
- environmental scientist
- sports science
- statistics
- journalism
- sports photography
- event management
- recreation marketing officer
- recreation manager
- project officer or coordinator
- tour operator
- specialist guide
- sales and marketing
- accounting and finance
- operations and logistics
- customer service
- information technology
- player management
- retail management
- venue management
- greenkeeper
- senior management
- administration.

Table 10.1 contains a description of the role or function and work description in relation to various vocations in the sport industry.

Table 10.1: Various vocations in the sport industry: roles and work descriptions.

Role or function	Work description
Professional athlete	A person who has sport-specific ability and is able to compete at a professional level. They can work either independently or under supervision, and are able to establish a career and earn an income through contracts, prize money, grants and endorsements.
Coach	A person who has coaching and sport-specific ability and is charged with developing individual and team performance. They are an effective coach who can demonstrate a range of characteristics, including knowledge, communication skills, interpersonal skills, organisational skills, enthusiasm and dedication. The coach is required to: ▪ evaluate and analyse the players' and/or the team's performance ▪ plan, conduct and evaluate the training sessions ▪ design and implement individualised training sessions ▪ fulfil a variety of roles including motivator, instructor, mentor and facilitator ▪ oversee a team of assistants including a trainer, an assistant coach, a skills coach and a physiotherapist ▪ plan and implement the game strategy ▪ recruit the players.
Official	A person who has a range of administrative skills and is required to: ▪ implement and interpret the rules and regulations ▪ supervise the sporting teams and events ▪ administer the competitions ▪ allocate the equipment ▪ register the players for competitions and events.
Manager	A person who has a range of administrative and/or managerial skills and is required to: ▪ organise and manage the equipment ▪ liaise with the head coach ▪ coordinate the necessary flights and/or accommodation ▪ supervise the athletes ▪ organise entry into the competitions ▪ book the venues ▪ organise the fulfilment of promotional and media duties.
Junior development officer	An individual who has the coaching, officiating and administrative skills that are necessary for supervising and developing talented junior athletes. They are responsible for liaising with the junior athletes and their families as well as with the officials, especially the coach and manager. They are also responsible for promoting the sport.

Table 10.1: Various vocations in the sport industry: roles and work descriptions. *(continued)*

Role or function	Work description
Athlete-support person	A person who has the necessary skills and expertise for supporting athletes, managing, assessing and treating injuries, and improving the athletes' performance. Common types of athlete-support person are a sports trainer, a massage therapist and a strength and conditioning coach. A sports trainer is required to: ▪ tape and bandage injuries ▪ provide treatment and rehabilitate injured athletes ▪ liaise with the coaching staff ▪ develop and implement the training programs. A massage therapist is required to: ▪ massage soft-tissue injuries to parts of the body such as muscles, ligaments and tendons ▪ liaise with the members of the coaching staff ▪ use massage techniques to promote relaxation. A strength and conditioning coach is required to: ▪ develop and implement the strength and conditioning programs ▪ design the individualised programs ▪ evaluate and modify the training programs ▪ liaise with the members of the coaching staff ▪ design the rehabilitation programs.

Learning activity

1. Identify the skills, experience and qualifications that are required to gain employment in a sector of the sport, physical activity or recreation industry that interests you.
2. Explain how the sport industry has developed over the past 25 years.
3. Predict how the sport industry will grow over the next 20 years.
4. Interview the coach and manager of a sporting team you are involved with. Identify their:
   a. qualifications
   b. role for the team
   c. role in the club
   d. extra duties
   e. reason/s for fulfilling the role
   f. skills that are necessary for the role.

   Present you findings to the class.

Internet activity

Log on to TitanOnline and complete Activity 10.2 by watching the video and summarising the information about the coaching code of behaviour.



Figure 10.5:
Journalism is a popular career in the sports industry.

Post-school study and career options in physical activity, sport and recreation

After completing school, students have many options to complete further study in courses that enable them to teach sport and physical education to educate students or become qualified coaches.

Other areas that individuals can become involved in include analysing game play, such as becoming a video analyst of competitions or games who provides the coach with vital information they have observed or recorded on video.

Another related area that individuals can become involved in is becoming qualified to give nutritional advice to sports teams or devise individual nutritional guides for athletes. Some elite athletes, such as Olympians, employ people to create a specific nutritional plan that will help them prepare for major competitions. Physiotherapy, the field in which people help to prohibit and manage injuries, is another area with an increasing number of career opportunities.

Sport psychology is another developing area. People who are interested in the intrinsic motivations of people's participation in certain activities may be interested in becoming qualified to assist athletes improve the mental component of their chosen sport.

Although not being especially physically active roles, sport reporters, editors and producers of sports news are areas where people can be invested in physical activity, sport and recreation. These industries may be beneficial to individuals who have had to retire from participating in sport due to injury or were not fortunate enough to have a professional career in the sport of their choice.

Qualifications and training requirements

Qualifications for working in the physical-activity industry vary significantly and are dependent on the type of work. Individuals can attain different levels of qualifications, including certificates, diplomas and degrees, depending on their career goals, the time they plan to invest in their study and the institute or service provider they will study with.

Working in the sport and physical activity industry requires individuals to have sufficient knowledge of human anatomy, biomechanics and exercise physiology. Most working environments are outdoors, where the atmosphere is one of excitement and continual change. Individuals need to develop good communication skills and be fit, imaginative and motivated. Many jobs in the industry are either casual or part time. People with more than one qualification are more likely to remain in full-time employment.

Work in the recreation industry is varied and generally limited to people who have a background in outdoor recreation. People who are involved in the recreation industry often facilitate adventure-based activities, manage an outdoor-recreation organisation or serve as a guide. Many of the jobs are casual or part time, and several are seasonal. To be employed in the recreation industry, individuals need to show they are motivated, reasonably fit and imaginative, and must have good people and communication skills.

Because so many people in the community have strong playing backgrounds in sport, those seeking paid employment opportunities really need formal qualifications to stand out. Qualification and training requirements range from on-the-job training to gaining a nationally recognised qualification. Each qualification has a descriptor for indicating the type of training the person has completed as well as specification of the industry that the person is qualified to work in. In the sport industry, gaining a qualification is a way for career-oriented people to take up a role such as coach, manager, sport official, development officer or athlete-support person.

Nationally recognised qualifications include:

- Certificate I
- Certificate II
- Certificate III
- Certificate IV
- Diploma
- Advanced Diploma.

Table 10.2 outlines the abilities of a person who has gained a qualification at each of these levels as applicable to the sport industry.



Figure 10.6:
There are a variety of qualifications available for people who want to pursue a career in the diving industry.

Table 10.2: Abilities of a person at each level of qualification.

Qualification	Abilities
Certificate I	▪ Recollect knowledge in a limited range of areas. ▪ Display basic practical skills. ▪ Execute routine tasks under supervision. ▪ Collect and pass on information.
Certificate II	▪ Recollect knowledge in a reasonable range of areas. ▪ Take limited responsibility for work output. ▪ Solve basic problems. ▪ Collect and pass on information from varied sources. ▪ Demonstrate a range of skills.
Certificate III	▪ Demonstrate abstract knowledge. ▪ Demonstrate a range of sequenced skills. ▪ Solve a variety of problems. ▪ Take responsibility for work output. ▪ Take limited responsibility for other people's work output. ▪ Analyse and interpret information.
Certificate IV	▪ Use theoretical processes to demonstrate abstract knowledge. ▪ Solve complex and unpredictable problems. ▪ Analyse and interpret information from a variety of sources. ▪ Take responsibility for work output. ▪ Take limited responsibility for other people's work output. ▪ Recognise and apply skills and knowledge in a broad range of contexts.
Diploma	▪ Use theoretical processes in a broad area to demonstrate abstract knowledge. ▪ Interpret technical or managerial problems. ▪ Apply artistic and practical skills and knowledge in a broad range of contexts. ▪ Evaluate information and statistics. ▪ Take responsibility for their own personal work output. ▪ Take responsibility for other people's work output.
Advanced Diploma	▪ Demonstrate knowledge and understanding in specialist areas. ▪ Interpret technical or managerial problems and propose solutions. ▪ Take responsibility for group outcomes. ▪ Apply artistic, conceptual and practical skills and knowledge in a broad range of contexts. ▪ Evaluate information and statistics and execute strategies. ▪ Exhibit accountability for their own personal work output.

Learning activity

1. Write a job advertisement for one of the following positions that are in the physical activity and recreation industry:
   a. Trainer for a local Australian football team.
   b. Personal trainer.
   c. Physiotherapist for the state soccer team.
   d. Fitness instructor.
2. Research the qualifications that are required for coaching the following team levels:
   a. Junior.
   b. Junior representative.
   c. Professional.
   d. State.
   e. National.
3. Identify the skills required for working in the recreation industry.
4. Identify differences between the recreation industry and other industries.
5. Predict how the recreation industry will grow over the next 20 years.
6. In pairs, search a range of employment websites for jobs in the physical-activity and recreation industry. Present a report to the class, and in the report, describe the:
   a. number of job opportunities that are available in the industry
   b. types of job
   c. job descriptions
   d. salaries
   e. basis of employment; that is, whether the jobs are full-time, part-time or casual.

Case study

Write an application for the following example of an employment advertisement.

Fitness and Recreation Coordinator

Planet X Fitness, Australia

Do you want to make a difference to young people's lives?

A motivated person is required to develop and oversee programs in the fitness room and our indoor and outdoor recreation facilities. This is a full-time position in which you will be working closely with the manager to develop and implement the programs.

For this responsible role, you will need to be action-oriented, display strong organisational skills and thrive on delivery of results, customer satisfaction and service. You will need to work autonomously, but also be able to follow procedures and direction and work as part of our dynamic team. You will also need relevant qualifications and/or experience in the fitness or recreation industry.

If this sounds like the perfect job for you, don't wait! It's easy to apply online. You'll be guided through a simple application process and instructed to attach your résumé and a cover letter.

Skills and leadership in physical activity, sport and recreation

The term 'leadership' can be defined in a variety of ways, but in most definitions it is referred to as being a behavioural process whereby the intent is to influence individuals or groups towards achieving a set of goals. The concept of leadership is pertinent in the contexts of physical activity and sport; leadership can have a critical role in a program's success or failure. For example, the leadership behaviours of coaches and players can have a significant impact on the outcome of a player's or team's performance.

An effective leader has to have a multitude of skills, many of which are dependent on the participants' age and level of ability. Skill traits of effective leaders include the ability to:

- create options and opportunities
- solve problems
- communicate effectively
- be well organised
- provide constructive feedback
- be flexible
- share accolades and successes
- empower other people to take on a leadership role
- treat the group members as equals
- identify and structure appropriate training sessions
- learn from experience, and self-monitor the knowledge and skills they are helping develop
- be role models
- inspire other people
- listen carefully to all group members
- understand group members' physical, social, emotional and cognitive needs
- prepare both players and teams so they can their maximum potential
- provide training sessions from which the outcome is improved performance.

Personal attributes and skills

To be successful in the sport industry, you need numerous personal attributes and skills, including hard work, commitment, enthusiasm, motivation, people skills and organisational ability. People in the sport industry need to be able to work autonomously and to be part of a team in which the members are dedicated to success.

Coaches are required to be organised to effectively prepare their team to be able to competently and confidently play in competitions. They must also know how to teach their players tactical strategies and perform technical movement by using effective communication skills. They must be able to communicate in various environments, during competition games as well as at training sessions. Coaches must also be caring for their players, to ensure that safety measures are always a priority to prevent injury from occurring. Effective coaches are also very motivated to demonstrate their passion for the sport or activity and encourage the same level of heightened enthusiasm to be displayed by the players. To further motivate players, coaches should demonstrate good leadership qualities, such as setting achievable goals and being consistent throughout training programs or competition seasons.

Personal attributes and skills needed by athletes to enhance successful participation in various physical activities include self-motivation to pursue the activity and to commit to all responsibilities. An athlete who also has an intrinsic desire to succeed and continually aims to achieve their personal best is driven to achieve the success or goal being worked towards. To improve, athletes must also be prepared to take constructive criticism and work to apply it to their performance. Therefore, being able to manage stress and challenging situations is another attribute that successful athletes commonly display.

Learning activity

1. Identify the leadership skills you have.
2. Imagine you are the coach of a junior sporting team. You are about to meet and train the players for the first time.
   a. What are you going to say to them?
   b. What do you expect of them?
   c. What leadership style will you apply, and why will you apply it?
   d. What leadership skills are important for the members of this age group?
3. Identify and describe the characteristics and skills of an effective coach.
4. Observe a coach in action.
   a. What leadership style and skills do they display?
   b. Are they appropriate for the group members' age?
   c. What recommendations could you give to improve their leadership style and skills?

Transfer of skills

Being part of a sport team or participating regularly in physical activity helps in the development of many personal attributes and skills that positively affect other aspects of individuals' lives, such as their occupation or career. For example, the ability to solve complex problems in a timely manner under pressure may help individuals to make effective decisions regarding their workplace. Team sport players also develop the ability to work together as a unified group, which is another transferable skill that can be used away from the sport and physical activity environment. Being able to work with different people to achieve a common goal is useful in many workplaces where collaborative learning is encouraged and practised. Time management is another skill that can help people to productively work in other areas of life. Committing to weekly training sessions and competitions develops positive habits required to balance other commitments such as work, caring for children and being able to spend time in leisure. The ability to bounce back from adversity, classified as having resiliency, is another important skill that can be used outside of the sport, activity or recreation environment. Learning that it is not always possible to achieve success builds good character skills and helps individuals to create alternative strategies to potentially achieve the goal that was being worked towards.



Figure 10.7:
Resilience skills can be learned through team sports.

Leadership opportunities in physical activity, sport and recreation

Leadership is the ability to influence, inspire and direct other people towards achieving set goals. In physical activity and sport, leadership ability was formerly linked to either a player's athletic success or who was the most mature member of the group. More recently in professional sport, however, athletes have been given training, instruction, formal support and education in leadership.

Researchers have identified three leadership styles:

- **Autocratic leadership**, also known as authoritarian leadership, is a leadership style that is characterised by individual control over all decisions and little input from the group members. Autocratic leaders typically make choices based on their own ideas and judgements and rarely accept advice from their followers. Autocratic leadership involves absolute, authoritarian control over the group.
- **Democratic leadership,** also known as participative leadership, is a leadership style whereby the group members have a more participative role in the decision-making process. Researchers have found that this leadership style is usually one of the most effective and that it leads to higher productivity, better contributions from group members and increased group morale.
- **Laissez-faire leadership,** also known as delegative leadership, is a leadership style whereby the leader is 'hands off' and allows the group members to make the decisions. Researchers have found that this is the leadership style that generally leads to the lowest productivity among group members.



Figure 10.8: There is no 'one size fits all' style of leadership.

In relation to leadership, there is no 'one size fits all' style. Good leaders recognise the challenges and successes involved in bringing individuals together to function effectively as a team. They do not care about titles, prestige, power or what looks good on paper; they are about developing a strong relationships with the group members. Leaders also recognise that group members have different motivations for driving themselves to excel, and they seek to cultivate the motivating factors. As a visionary leader, you must be able to adapt and be flexible enough to work in situations characterised by changing goals and motivations and the need to both deal with conflict and delegate responsibilities to build successful groups.

There are many opportunities within community and professional sport and recreation activities for individuals to take on leadership roles. For example, being the team captain, or taking on the role of administration manager or coach, allows people to develop and demonstrate leadership qualities.

In local community-based physical activity programs and team sports for primary-aged students, having a democratic leadership structure is beneficial. Participants and their parents and carers are able to vote on team decisions. They are also encouraged to voice their opinion regarding activity elements, such as training time and uniform to ensure that decisions are made in the best interest of the majority of team members. In comparison, professional sport teams are more likely to be organised with an autocratic leadership. The individual making the decisions is usually an extremely skilled and knowledgeable person such as the coach. They ensure decisions are made to enhance positive outcomes and team success according to game codes and rules.

Positive characteristics of leaders

Becoming a leader can be a challenging initiative but developing some of the following skills will enhance individuals' ability to effectively lead others towards achieving a goal. Not all people are great leaders; some individuals are better at helping a leader to motivate a team of people to overcome a challenge.

Positive characteristics leaders display include:

- Able to effectively manage their own individual needs by being relatively organised.
- Think creatively about a diverse array of alternative solutions that could effectively ensure a goal or challenge is met or achieved.
- Can communicate to various audiences using different modalities; for example, leaders are comfortable communicating verbally and non-verbally to people of different age groups. Not only are leaders able to communicate but the way in which they do is concise and explicit.
- Being very responsible for their own actions and holding themselves accountable for the actions of those who are part of the team they are leading. Leaders do not blame other people for unsuccessful actions or when situations do not go directly to plan.



Figure 10.9:
Leaders are comfortable communicating to people of different age groups.

When individuals feel confident to suggest solutions to challenges or are very passionate about a particular idea or concept, they may be suited to a leadership role within that activity. When pursuing a leadership role, individuals need to realise they will be constantly learning and must be eager to gain new information and share it with other people.

Practical activity

In pairs, instruct your class members in a sport of your choice. Prepare a 15-minute coaching session using the traits of an autocratic leader and another using traits of a democratic leader. Try to incorporate the leadership skills that an each type of leader would apply. Remember to include a warm-up, a skills session and a game (if time permits).

1. Identify which leadership style was more effective.
2. Explain whether the leadership style would be effective over the course of a season.
3. Identify the leadership style that would be more effective for each of the following groups and justify your response:
   a. Children. b. Adolescents. c. Professional athletes.
4. Devise another way in which you could compare and contrast the results of the two leadership style coaching sessions.
5. Reflect on your own performance as a coach and other coaches you have had, to explain the positive characteristics of effective leaders.

Career pathways in physical activity, sport and recreation

Progressing a career in physical activity or sport can be challenging, with multiple steps required to be completed before an individual can successfully achieve the activity or personal goal. To create a successful career in a physical activity, sport or recreation, an individual first needs to be extremely passionate about the activity and have a long-term commitment to success. Individuals looking to progress their own achievement in a physical activity, sport or recreational activity may hire a coach to assist developing physical and intellectual skills. Coaches who have already gained various qualifications will have the required experience in the industry to effectively help the development of less knowledgeable or skilled people. Coaches and supervisors can also help individuals to set achievable goals by using the SMART criteria, which ensures that career development can occur because the individual is constantly identifying and achieving specific, measurable, attainable, relevant and time-bound goals.

Professional and community responsibilities

Athletes face public scrutiny for their on- and off-field performances. Whether they like it or not, athletes are viewed as being role models and/or celebrities, and even a minor indiscretion can often be 'big' news in the media. It is becoming clear that many athletes struggle to balance their expectations of their on-field performance with their prioritisation of socially acceptable behaviour off field.

Many athletes are unaware of their responsibilities in this context, and in numerous sports participation in educational programs is promoted to:

- instil individual and societal values in the athletes
- acknowledge the various pressures, anxieties and opportunities that athletes face
- encourage the athletes to take responsibility for their actions
- develop strategies for dealing with peer pressure
- examine issues that are relevant to professional athletes
- develop strategies for dealing with attention from fans and media representatives
- develop strategies for dealing with technology and social media.

Did you know?
The average length of a professional rugby league player's career is only 43 games, usually spanning three or four seasons.



Figure 10.10:
Referees police the on-field behaviour of athletes during competition.



Figure 10.11:
Most professional teams, clubs and organisations provide media training for their members.

Addressing the media

Athletes often find themselves at the centre of media attention. Although media coverage of sport in Australia is significant, it is the controversial athletes that tend to make the front page of the newspaper or are the subject of the lead story in the nightly television and radio news. Media representatives can be dominant and influential, and they often highlight negative images of athletes. Compared with other types of sporting incident, violent sporting incidents are the source of negative sporting images whereby they tend to draw more attention. Most professional teams, clubs and organisations now provide media training for their members.

The aims of the training are to:

- prepare athletes for interviews with media representatives
- educate athletes about the organisation's policies
- help athletes relax and feel comfortable when they are being interviewed
- help athletes to respond in an intelligent, educated and informed way
- prepare athletes for the responsibilities entailed in using social media.

As a consequence of the social-media explosion that has taken place over the past few years, new opportunities have been introduced along with challenges in relation to how athletes communicate with their fans. The implications, both positive and negative, are amplified when athletes engage with users of social media.

Social media platforms allow for information to be shared instantly to very large audiences. Some platforms such as Instagram allow viewers to experience being 'in the moment' with the person who shared a video or image. Elite sport players' social media use is consistently scrutinised and highlighted by the media due to athletes usually having a significant following of fans and critics.

Ryan Lochte, 12-time Olympic medallist, was banned from competitively swimming for 14 months due to uploading a picture of himself receiving an intravenous infusion (IV drip). Although the action is not illegal, Lochte breached the American anti-doping policies by posting the picture which he captioned, 'Athletic recovery with some #ivdrip', and was therefore suspended. It was reported that the company which Lochte tagged in the picture, which has since been deleted, paid Lochte a significant figure to post the photo to promote its business. Lochte expressed to the media that he admitted his actions went against the rules, despite being legal.

Bobby Madley, an English Premier League soccer referee, was sacked after posting an offensive message on Snapchat about a man with disability. Madley's action was reported by one of his followers and passed on to his boss. Since the incident, Madley has faced significant backlash for the insensitive comment, causing his marriage to break down and forcing his relocation to Norway.

On a positive note, former basketball player Baron Davis used another social media platform, LinkedIn, to connect to a plethora of businesspeople in various industries. The app allowed Davis to establish his entrepreneurial visions and create an enterprise by connecting with other like-minded individuals.

Time management and lifestyle balance

For most professional athletes, the hardest part is dealing with the increased responsibilities, pressures and workloads that accompany their career. Conversely, some athletes – professional and amateur – seem to have too much spare time, which they might use in ways that are detrimental not only to their career but also their life; for example, behaviours such as drug use or gambling. According to research (and common sense), athletes who have a balanced lifestyle and can manage their time effectively are more likely to achieve their sporting goals. Achieving optimal performance is essential for all athletes.

As an athlete, to manage your time effectively, you need to:

- never stay on the one task for too long
- regularly take a break
- talk to someone who understands and encourages you
- set realistic goals
- reward yourself when you achieve your goals
- try to make the work environment as motivational as possible
- work with a partner whenever possible
- listen to relaxing music
- keep a diary
- plan ahead
- plan to relax regularly
- become involved in community or volunteer work.

Learning activity

1. In your own words, explain the term 'time management'.
2. What does the term 'prioritising' mean?
3. Predict how your commitments will change during your Year 12 and/or university studies.
4. Predict how your commitments will change when you enter full-time work.
5. Assess the advantages and disadvantages of athletes' use of social media.

Case study

Read the following news article and prepare a media statement for the following scenarios:

- You are a player manager, and this athlete is one of your clients.
- You are the CEO of the club the athlete plays for. Prepare a statement, which you will read to all the players, in relation to the incident and the club's expectations.
- You are the player involved and have accepted responsibility for your actions. Prepare a media statement to that effect.

OPINION



Sports stars losing sparkle

Stephen Lloyd – Columnist

Drug taking, binge drinking, assaulting fans, racial vilification, match-fixing allegations; these are a few of the offensive features of sport that are reported on a regular basis.

Only last week, a 'highly respected' star athlete, on a yearly six-figure salary, made the headlines for all the wrong reasons. Allegations of binge drinking, breaking team curfew, assaulting nightclub patrons, vomiting and 'doing a runner' from a cab have been levelled at this player. And what has been the response from the player and his manager? Deny everything, blame the media, lay low and hope it blows over!

Sport was supposed to build character, values, teamwork, honesty and responsibility: all admirable qualities. Has sport lost its way in valuing morals and ethics, or does society share the blame?

In Australia, there seems to be two sets of rules: one for elite athletes and one for the average citizen. A number of recent incidents that are criminal in nature have been swept under the carpet, or the athlete involved has been let off with a fine. If this behaviour was committed by the average person on the street, they would be subject to criminal prosecution.

Athletes have a mutual obligation. In return for the inflated amounts of money and celebrity status, society expects athletes to advocate high ethical standards and be role models in the community.

Long-term employment opportunities

Professional athletes have to deal with unique issues in relation to long-term employment opportunities. On average, Australians will be in paid employment for between 35 and 45 years and will enjoy peak earnings five years before retiring. On average, professional athletes will also work for between 35 and 45 years but their professional sporting career will last for between only seven and 12 years and be over before they reach 40. They will enjoy peak earnings before they turn 35, and the earnings are likely to constitute between 75 per cent and 90 per cent of their lifetime earnings. In the case of many professional athletes, a promising career is cut short due to injury and, without alternative career options, they can experience employment difficulties.

Because of their limited playing (earning) career, professional athletes are faced with a variety of unique financial issues. Accordingly, they need to consider:

- becoming financially educated
- maximising their sponsorship opportunities
- budgeting
- taking out a life- and disability-insurance policy
- managing their investments
- taking out a bank loan or mortgage
- implementing tax-minimisation strategies (some tax rulings acknowledge the short-term earning capacity of many professional athletes).

A professional athlete has to ensure that their player manager and financial adviser are accredited and experienced, that they can provide a character reference and a professional reference, and that they are willing to commit to serving their best interests.



Figure 10.12:
Professional coaches often come from a playing background.

Internet activity

Log on to TitanOnline and complete Activity 10.3, investigating the information about gaining sporting qualifications in a sport of your choice.

The qualifications required to become a coach depend on the type and level of sport or activity that the coach will be supervising. Professional coaches often come from a playing background, although this is not essential. They require sound knowledge to pass on and effectively manage the team. In addition, to initially gain employment, coaches will often be required to have attained a bachelor degree or a high-level coaching qualification.

An individual's prior professional experience can lead to them becoming a positive investment for a club; therefore, they can attract a significant salary. Professional coaches are often challenged by intense scrutiny from fans, economic pressures and the media. This results in frequently changing clubs throughout their career. The team's success, or lack thereof, is often attributed to the coach. Therefore after string of poor results, coaches are either fired or resign to allow the club to rebuild.

Alternative career opportunities

Becoming an elite athlete can be a significant challenge and once that level is attained, career length is often relatively short. Injury, illness and physical limitations can be the cause of athletes having to retire early from their sport or activity at a professional level. It is therefore important that individuals are aware of alternative jobs or career opportunities while they are still playing or coaching professionally, and that they have plans to enable them to follow such alternative paths. This is often termed 'succession to retirement'.

Planning to continue working in the sport and recreation industry in other areas apart from playing as an athlete or coaching a team ensures smooth transitions when elite athletes and coaches discontinue their present role. Previous strict training regimes and daily routines for elite sport players are often significantly different from the requirements for working in other roles.

Studying while professionally training is another effective strategy for post-sporting career options. It allows individuals to receive a formal qualification and begin an alternative career once they finish in the sport or activity at professional level. For example, studying exercise and sport science while training will then give the individual the opportunity to become a physiotherapist (after further study), specialising in treatment for common injuries related to their specific sport or recreational activity.

Some sports players complete business management courses while engaging professionally with their chosen sport or activity, so that on retirement they can create their own business which trains other people to participate in the activity or sport.

Planning for alternative career opportunities in the same sport or recreation industry ensures that an individual can remain employed in the area they are passionate about without the physical or mental demands of playing or coaching at an elite level.

Learning activity

1. Critically evaluate the likelihood of lifelong employment or longevity of a selected career pathway in physical activity, sport or recreation.
2. Analyse the importance for professional athletes of planning for alternative career opportunities.
3. Explain the role of the player manager and the services they provide.
4. Outline how you would address the following scenarios if you were a player manager. Your player has:
   a. become world champion
   b. been involved in an off-field incident in the form of a nightclub brawl
   c. been implicated in a match-fixing scandal
   d. been put on report for executing a dangerous high tackle.
5. You are a 16-year-old amateur golf player who is ranked world number one for your age group. A global sporting company has offered you a four-year endorsement that is worth millions of dollars. If you sign the contract, you will have to leave school immediately to join the professional tour.
   a. What are the advantages and disadvantages of leaving school to join the tour?
   b. If you were managing the player, what would be your advice? Justify your response.

Revision questions

1. Define the term ‘volunteer’.
2. Provide five examples of volunteering opportunities that exist in the physical-activity and recreation industry.
3. Name four benefits of participating in volunteer work.
4. Identify four job opportunities that exist in the physical-activity and recreation industry.
5. Outline the roles of:
   a. coach
   b. manager
   c. official
   d. sports trainer
   e. player manager.
6. Explain how the sports industry differs from other industries.
7. Discuss how the sports industry has developed over the past 20 years, and predict how the industry will grow. Justify your response.
8. Compare and contrast the autocratic, democratic and laissez-faire leadership styles.
9. Demonstrate how elite athletes can manage their time to keep their life in balance.
10. Explain the advantages and disadvantages of athletes’ use of social media to interact with their fans.
11. Outline the work conditions and professional responsibilities of two sport-related careers.
12. Outline the training opportunities that would help people who would like to pursue the two sport-related careers you nominated in the last question.
13. Describe the positive characteristics of successful leadership.
14. Player managers support professional athletes in establishing their careers. Which response best represents the career opportunities for player managers?
    a. Limited opportunities but financially rewarding.
    b. Many positions available due to the increasing number of professional athletes.
    c. Easy to get a job but financial rewards are limited.
    d. Easy to get a job if you have a finance or business degree and have a genuine love of sport.

CHAPTER 11

Issues in physical activity and sport



The issue covered in this chapter is drugs in sport. The issue of gender is covered in the eBook version of this text.

Throughout history, use of drugs in sports has led to many negative impacts. Use of drugs by athletes to modify and enhance natural bodily processes has caused sports competitions to become unfair in several scenarios. Often, use of banned drugs and substances gives an athlete a competitive edge over competitors.

Drug use (doping) has long been an issue in sport, and in relation to drug cheating, more incidents and greater sophistication have accompanied advances in technology. As authorities work to develop superior drug-testing methods, drugs cheats are experimenting with new drugs in an attempt to beat the testing systems.

Sport Integrity Australia was formed in 2019 and serves as the over-riding body that protects sporting integrity in Australia. As such, it brings together the functions of several groups working in this space, including the Australian Sports Anti-Doping Authority (ASADA). ASADA's roles are to perform testing, provide education and monitor sporting bodies' anti-doping programs.

Outcomes

A student:

- discusses the nature and impact of historical and contemporary issues in physical activity and sport (PASS5-3)
- analyses physical activity and sport from personal, social and cultural perspectives (PASS5-4)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Historical issues in physical activity and sport
- Current state of play in physical activity and sport
- Future perspectives

Figure 11.1: Players from rugby codes have been caught up in drug scandals in the past.

Historical issues in physical activity and sport

The word 'doping' is derived from the Dutch word *dop*, which is the name given to an alcoholic beverage that was made of grape skins and that Zulu warriors used to enhance their prowess during battles. The term became current at the turn of the 20th century, and was originally used to refer to illegal doping of racehorses. However, the practice of performance enhancement by way of use of foreign substances or another artificial means is as old as competitive sport itself.

Ancient Greek athletes are known to have used special diets and stimulating potions to fortify themselves, and during the 19th century, cyclists and other endurance athletes used strychnine (a common rat poison), caffeine, cocaine or alcohol for the same purpose. At the 1904 Olympic Games, held in St Louis, Missouri, Thomas Hicks achieved victory in the marathon (though he was near to death at the finish line) with the help of raw egg, injections of strychnine and doses of brandy that were administered to him during the race.

By the 1920s, it had become evident that it was necessary to introduce restrictions in relation to drug use in sports.

Source: World Anti-Doping Authority (WADA).

Significant historical events that have raised the profile of this issue

While drug use has been an issue in sport since ancient times, recent technological developments have been accompanied by an increase in the incidence and sophistication of drug cheating. At the same time as authorities are working towards superior drug-testing methods, drugs cheats are experimenting with new drugs in an attempt to beat the testing systems. The drugs in question are especially dangerous because we have minimal knowledge of their short- and long-term effects.

Table 11.1 contains a summarised history of drug scandals that have occurred in sport.



Figure 11.2: Lance Armstrong admitted to doping during his career.

Table 11.1: A summarised history of drug scandals in sport.

Ancient games	▪ Extracts of mushroom and plant seeds were used to enhance performance.
1896	▪ The first drug-use death in sport was recorded. Cyclist Arthur Linton overdosed on the drug trimethyl. Doping was not illegal at the time.
1904	▪ Marathon runner Thomas Hicks collapsed after he had mixed strychnine with brandy. Strychnine was not illegal at the time.
1930s	▪ Use of synthesised drugs such as amphetamines became apparent in sport.

Table 11.1: A summarised history of drug scandals in sport. *(continued)*

1950s	▪ Athletes in the Union of Soviet Socialist Republics (USSR) started to use male hormones. Steroids were developed in the United States. Distance athletes started to experiment with blood doping.
1960	▪ At the Rome Olympics, Danish cyclist Knut Jensen collapsed, having fractured his skull after ingesting amphetamines, and later died.
1967	▪ British cyclist Tommy Simpson died during the Tour de France after taking amphetamines.
1968	▪ The International Olympic Committee (IOC) issued a list of substances that were from then on banned in sport. Drug testing began at the Mexico City Olympics.
1969	▪ The first track-and-field athlete was barred after testing positive.
1976	▪ At the Montreal Olympics, female East German swimmers won 11 out of the 13 events, and during the 1990s, it was revealed that their coaches had been systematically injecting them with steroids during the mid-1970s.
1984	▪ At the Los Angeles Olympics, an Olympic silver medallist was stripped of his medal after testing positive for steroids.
1987	▪ Erythropoietin (EPO), a synthetic drug that has an effect similar to that of blood doping and 'blood packing', was believed to be responsible for the death of several young cyclists.
1988	▪ At the Seoul Olympics, Ben Johnson won the 100-metre sprint setting a new world record. He subsequently tested positive to anabolic steroids and was stripped of his medal and his world record.
1991	▪ Twenty former East German swimming coaches admitted under oath to having systematically doped their former athletes.
1992	▪ Three German sprinters submitted identical urine samples during a drug test but due to a technicality escaped any penalty.
1994	▪ Argentinian football champion Diego Maradona was banned from competing in the World Cup after testing positive to five different drugs.
1995	▪ Sixty-five weightlifters were banned after testing positive to anabolic steroids and stimulants.
1998	▪ Four-time Olympic swimming champion Michelle Smith, of Ireland, was found guilty of having manipulated her urine samples and was banned for four years. ▪ The members of the Tour de France cycling team Festina were expelled from the race after their team doctor was caught with 400 vials of performance-enhancing drugs – mainly EPO. ▪ Former Olympic sprint gold medallist Florence Griffith Joyner died, at age 38. Drug use during her career was suspected to have been the likely cause, but the autopsy results came back negative. ▪ At the world swimming championships, in Perth, four Chinese swimmers were banned for four years after testing positive to diuretics and steroids.

Table 11.1: A summarised history of drug scandals in sport. *(continued)*

1999	▪ Many athletes, including sprinter Linford Christie, former Australian Open tennis champion Petr Korda and French footballer Christophe Dugarry, tested positive to the performance-enhancing drug nandrolone.
2003	▪ Australian cricketer Shane Warne tested positive to diuretics and was banned for one year.
2006	▪ Australian rugby union player Wendell Sailor tested positive to cocaine and was banned for two years.
2007	▪ Gold medallist sprinter Marion Jones pleaded guilty to having used steroids before competing at the 2000 Sydney Olympics. Her results from September 2000 onwards were consequently annulled. ▪ Australian football player Ben Cousins was arrested for drug possession and had his contract with Australian Football League (AFL) club West Coast Eagles terminated.
2011	▪ Seven-time Tour de France winner Lance Armstrong came under a United States federal investigation for doping. He denied all allegations, continued to compete, and retired later in the year.
2012	▪ In August, the United States Anti-Doping Agency declared it had banned Lance Armstrong for life from competing not only in cycling but in any sport, and stripped his titles from him. Armstrong maintained his innocence.
2013	▪ A common 2013 headline was 'The Darkest Day in Australian Sport'. In February, the Australian Crime Commission (ACC) released a report in which it confirmed that performance-enhancing drugs were being widely used across a number of Australian sports. After the ACC earlier received information from the Australian Sports Anti-Doping Authority (ASADA) about the increased use of performance- and image-enhancing drugs (PIEDs) among professional athletes, it instigated a project to assess the extent of the use and identify any connections between athletes and perpetrators of organised crime. ASADA especially turned its attention to two football clubs: Essendon from the AFL and the Cronulla Sharks from the National Rugby League (NRL). It interviewed players and officials from both clubs as well as players from other clubs. ▪ The AFL Commission fined the Essendon club $2 million, and the club forfeited its place in the 2013 AFL finals. It was prohibited from participating at the 2013 and 2014 National Drafts during the Round 1 and Round 2 selections. It was instead granted a selection at the end of the Round 1 drafts during the 2014 season. Essendon coach James Hird was suspended from the AFL for 12 months and was prohibited from working with any other AFL club during the period. ▪ The NRL fined the Cronulla Sharks club $1 million. Coach Shane Flanagan was suspended for 12 months for having seriously failed the players in relation to their welfare during the 2010 and 2011 seasons. The NRL cancelled former Cronulla Sharks trainer Trent Elkin's registration, suspended him indefinitely and advised him he would be unlikely to be considered worthy of employment in the game for two years.

Table 11.1: A summarised history of drug scandals in sport. *(continued)*

2013	▪ Canberra Raiders winger Sandor Earl was suspended and was issued with an infraction notice for having used and trafficked peptides, especially the peptide CJC-1295. ASADA banned him for four years. ▪ On Oprah Winfrey's television show, Lance Armstrong admitted to having undergone doping during his career. After admitting he had used performance-enhancing drugs throughout his career, when Winfrey asked him pointedly whether he thought he could have won the race seven times in a row without using them, Armstrong replied, "No."
2015	▪ Fremantle Dockers AFL player Ryan Crowley was banned for one year for the presence of banned substances in a positive test sample collected from the Round 17 match against GWS.
2016	▪ The World Anti-Doping Agency (WADA) banned a large majority of the Russian Olympic Team from competing in the 2016 Rio Olympic Games. This was due to an independent commissioned report which found evidence of a four-year, state-run 'doping programme'.
2017	▪ The National Anti-Doping Organisation (NADO) called to ban the Russian Olympic Committee from participation in the 2018 Winter Olympic Games for proven corruption of the Sochi Olympic Games and continuing to fail its obligations to clean sport.
2018	▪ Russia was banned from competing at the 2018 Winter Olympic Games in PyeongChang, South Korea, due to continued drug possession, use and corruption. Only Russian athletes who could prove they had not been cheating and were cleared by a panel and compliant with WADA were allowed to compete. They were not allowed to wear Russian uniforms, compete under the Russian flag or have the Russian national anthem play if they won a gold medal. Instead, they performed under the Olympic flag. ▪ The NRL imposed a two-year ban on players including Evrett Vaurasi and Mokena Moeke, and a one-year ban on Bacho Salam. These suspensions were a result of presence and use of prohibited substances.
2019	▪ Australian Mack Horton highlighted the issue of drug cheating when he refused to join Chinese world champion, Sun Yang on the medal podium. This followed an incident regarding Sun Yang's out-of-competition testing and his conviction for drug cheating in 2014.



Figure 11.3:
Drug doping continues despite the best detection efforts of drug testers.

Learning activity

1. Choose one of the significant events in the timeline and research the incident and report to the class. The focus of your research should be the impact the event had on the sport, the athlete and associated stakeholders.
2. One of the highest profile athletes to test positive for drugs was Lance Armstrong. Investigate how he was able to avoid detection for such an extended period of time and the impact his cheating has had on the sport of cycling.
3. How does drug doping impact the careers of clean athletes? What impact can it have on grass-roots participation?
4. Suggest reasons why drug cheating has persisted over such an extended period of time.

Impact of the issue

Throughout history, use of drugs in sports has led to many negative impacts. Use of drugs by athletes to modify and enhance natural bodily processes has caused sports competitions to become unfair in several scenarios. Often, use of banned drugs and substances gives an athlete a competitive edge over competitors. Pressure can then come from other athletes and their support teams to conform to doping, to achieve a high standard of success, sponsorship, money, recognition and team selection. As athletes are often viewed as role models for society, use of banned drugs and substances can lead to a lack of trust and respect of these sportspeople. This can tarnish the reputation of the athlete, team, club, coach and other associated members, and potentially destroy their sporting career. Of course, illicit drugs have many negative health risks and side effects for the athlete involved, including heart failure, heart palpitations, organ damage, anxiety attacks, acne, rage, tumours/cancers and infertility; and for males, breast tissue development and reduced testicle size.



Figure 11.4:
Doping methods have evolved in an attempt to beat testing systems.

Did you know?

The most commonly used performance-enhancing drug is anabolic steroids.

As a result of the negative impacts of drugs and substances in sport, the World Anti-Doping Agency (WADA) and the Australian Sports Anti-Doping Authority (ASADA) were developed. Established in 1999, WADA monitors the World Anti-Doping code, holding the world's sporting bodies accountable to a doping-free environment. WADA provides a comprehensive list of prohibited substances and doping methods. The policies, procedures and practices developed by WADA influence ASADA's approach to drugs and substances in sports. ASADA manages prohibited substances and methods, education about doping, testing and investigations within the Australian sporting landscape. Both of these organisations aim to protect the integrity of sport, promoting clean and fair competition and keeping athletes safe from effects of doping.

Positive and negative effects

Although for the vast majority of stakeholders in sport and physical activity there are no positive effects of drug use in sport, some drug-using athletes will benefit financially and might achieve a level of success that would have been unobtainable to them if they had competed 'naturally' (drug free). Similarly, the coaches who advocate or tolerate doping stand to benefit from their athletes' or players' success if the drug use remains undetected.

In sport, the negative consequences of using banned substances far outweigh any perceived positive effects, and affect all stakeholders. Cheating athletes and players mostly ignore the well-documented health issues and the realistic possibility of premature death. All athletes who test positive in relation to a banned substance are affected by the consequent embarrassment to themselves and their family as well as by way of losing their public profile. They potentially also lose income from sponsorship and a future career in the media or the corporate world. Convicted drug cheats receive a suspension from their sport, and the result is usually the end of their sporting career.



Figure 11.5:
Anabolic agents aid in the building and repairing of muscle tissue.

Following is a list of the banned substances in WADA's Prohibited List (2019):

- **Anabolic agents:** includes substances that have anabolic (tissue building) and androgenic properties. They are a steroid hormone that induce an anabolic state, which is the building and repairing of muscle tissue. Banned anabolic steroids include androstenedione, boldenone, nandrolone and testosterone.
- **Peptide hormones, growth factors, related substances, and mimetics.** Erythropoietin (EPO) accelerates production of red blood cells by the body, which can increase exercise endurance and reduce recovery time. Athletes are tested by way of a comparison between the concentrations of the substance in their body with the range of concentrations that are normally found in humans. Some substance use can be excepted if there are physiological or pathological reasons for its use.
- **Beta-2 agonists:** commonly used to treat asthma, and when they are taken into the bloodstream, they can cause anabolic effects. Athletes can receive permission to use them to prevent or treat asthma. Their use can be abused to widen the bronchi in the lungs, to increase oxygen consumption. Urine samples over the therapeutic threshold may be considered doping.
- **Hormone and metabolic modulators:** includes the human growth hormone (HGH), which stimulates cell division and cell growth and has an anabolic (muscle building) effect on the body. Banned hormone and metabolic modulators include testolactone, raloxifene, myostain inhibitors and activators of adenosine monophosphate (AMP)-activated protein kinase. These modify the effect of hormones and accelerate or decelerate specific enzyme reactions.
- **Diuretics and other masking agents:** use of diuretics can aid weight loss and cause dilution of urine so that other substances such as anabolic steroids cannot be detected.

The banned methods listed by WADA are outlined as follows:

- Manipulation of blood and blood components.
- Chemical and physical manipulation, including tampering with samples and tampering with intravenous infusions.
- Gene and cell doping, including modification of cells, genes and other genetic elements.

Other banned substances include:

- Beta blockers, which inhibit the effect of the body's stress hormones, resulting in a relaxing effect on the heart and blood circulation (to prevent anxiety and muscle trembling).
- Cannabinoids (from cannabis, or marijuana), as they have a relaxing and euphoric effect on the body and mind.
- Narcotics, which are suppressors of severe pain.
- Stimulants. These increase mental and physical activity, suppressing feelings of fatigue to increase performance. Includes cocaine and ecstasy.
- Glucocorticoids. These are produced by the body or manufactured and injected synthetically. They are steroid hormones that have pain-relieving and anti-inflammatory effects.
- Alcohol, during competition.
- Many types of supplements.



Figure 11.6:
Cannabinoids are banned in sport due to their pain-relieving effects.

Learning activity

1. Outline the positive effects, if any, and the negative effects of one issue you have studied, in relation to:
   a. spectators **b.** athletes **c.** society.
2. Create a media file in relation to television programs, magazines and/or newspapers in which you highlight the issue you have studied. Prepare a report for the class that analyses the issue's positive and/or negative outcomes.
3. Using the media file you created for Question 2, prepare a 250-word report for Sport Australia to highlight the current state of the issue in Australian sport. In the report, include:
   a. information about the affected sport/s
   b. information about the resources that are required so that the issue in sport can be combatted
   c. information about how the negative outcomes affect young athletes.



Figure 11.7:
ASADA is responsible for administering Australia's anti-doping policy.

Current state of play in physical activity and sport

Apart from using a good public-relations department, most professional sporting organisations prefer to be proactive in addressing issues that have a negative impact on their sport and on sport in general. Whether the issue is doping, violence, gender inequity, sponsorship or another issue that affects sport and physical activity, the days of ignoring or denying that an issue even exists are long gone. Today, due to the amount of media attention, technology such as smartphone photography and video, professional sportspeople's increased status and an increased number of stakeholders, the issues that affect sport and physical activity are more transparent.

In Australia, ASADA is responsible for administering the national anti-doping policy. It has an established framework for trying to eliminate doping in sport. It achieves this goal by undertaking testing and education programs, developing and monitoring anti-doping programs, testing sportspeople Australia wide, investigating doping breaches and prosecuting offenders.

Despite the fact that amoral scientists and medical personnel are continuing to develop performance-enhancing substances, organisations such as ASADA are striving to eliminate doping in sport. But for as long as sport continues to offer athletes opportunity to achieve fame and fortune, the battle to eliminate doping in sport will continue to be long and arduous.

ASADA is clearly attempting to keep doping of athletes in check, but the many users of steroids who do not compete and who use the drugs for personal gratification by way of achieving a muscular physique remain mostly unchallenged. Although off-prescription supply and possession of the drugs is illegal, law enforcement is difficult and mostly ineffective. Steroid use among gym members, especially males, is increasing.

Media representation of the issue

In today's society, access to different forms of media is more prevalent than ever before. This instant access to media coverage contributes to the portrayal of sports and doping issues. Representation of drug use and doping in sport through media has potential and power to influence thoughts, opinions and information in relation to these issues. Media representation of such issues comes with positives and negatives. On one hand, it enables the public to become informed on doping issues within sport. This makes it difficult to cover up issues and encourages an honest sporting environment. An example of this is the media representation, including the documentary *Icarus*, that provided the public with information and truths about the Russian doping scandal leading up to the 2016 Rio Olympic Games. This led to the public becoming educated and aware of this issue, fuelling anger and distrust of the country and its athletes. Further, this promotes a clean sporting field and holds athletes and support staff accountable for their actions.

Individuals may also use media representation to their advantage to tackle issues regarding doping in sport. For example, in the 2016 Rio Olympic Games, Australian swimmer Mack Horton used his influence in an interview to call out his rival competitor, Sun Yang. Horton commented on the fact Yang was a "drug cheat", and the lack of respect he had for athletes who test positive to drugs. Horton followed this stance further in 2019, when he refused to take the medal podium with Sun. This received worldwide press coverage and debate ensured about the protest. Several days later, the Australian swimming team was drawn further into the debate when one of their own, Shayna Jack, received a positive test result.



Figure 11.8:
Mack Horton refused to share the podium with Sun Yang in 2019.

Alternatively, instant media representation may provide misinformation about the issue and lead to excessive scrutiny of those involved, even when they may be innocent. The media's large degree of influence on the public may also force governments and organisations to take action against doping issues which otherwise may have flown under the radar. The Russian doping scandal is an example of this. The media focus on this issue encouraged WADA and the International Olympic Committee (IOC) to take serious action towards the punishment and handling of the case.

Ethical and legal implications

There are a range of legal issues surrounding drug doping. ASADA has legal responsibilities to treat athletes fairly and follow agreed protocols in testing practice. They have a responsibility to ensure avenues of appeal are available and sanctions are proportional to the infringement. Sponsors, athletes and clubs will often have legal agreements in contracts prohibiting drug use. Some drugs used by athletes are illegal and result in legal action in addition to sanctions by any of the relevant sporting bodies.

In an ethical sense, drugs in sports violates the spirit of the game. It highlights issues of unfair advantages gained by some athletes and puts a question mark over all elite performances. It places unfair pressure on clean athletes to dope in order to compete. It makes spectators and sponsors question the integrity of all winning athletes. In some way, society is ethically responsible, in that the immense wealth that is offered to the best athletes encourages drug cheating.

Case study – Russia and the Olympic games

In December 2014, German documentary *Icarus* was aired on television and gained significant media attention. Featuring Russian athletes, coaches and anti-doping officials, the documentary revealed the involvement of the Russian government in obtaining performance-enhancing drugs for athletes, as well as covering up positive results. Reactions to the documentary led to WADA to form an independent commission to investigate Russian doping systems. From this, WADA released two reports in November 2015 and January 2016 containing evidence of a state-sponsored drug program occurring in Russian track-and-field athletics. WADA recommended the indefinite suspension of Russia from world track-and-field events. The International Association of Athletics Federation (IAAF) acted on this advice, advising the suspension would continue until Russia could prove it had cleaned up its act.



Figure 11.9:
A Russian whistle-blower described a national program of doping in the lead up to the 2014 Sochi Winter Olympic Games.

In May 2015, the former Russian lab director Grigory Rodchenkov spoke with *The New York Times* about the many Russian athletes who competed at the 2014 Sochi Winter Olympic Games. He explained how Russia was running a state doping-program including many of their Russian athletes. These whistle-blower accusations sparked calls for a total ban of all Russian athletes, across all sports, in the 2016 Rio Olympic Games. The accusations also resulted in WADA commissioning an independent investigation. The investigation concluded with a report published in July 2016, providing corroborating evidence of a state-directed doping system, and disappearing positive testing methods, from late 2011 to late 2015, involving more than 1000 Russian athletes during this time.

Suspicions have been raised as to how Russia was able to cover up positive results of its athletes. It is believed that before the start of the Games, athletes gave clean urine samples when performance-enhancing drugs were not in their system, which were then frozen and stored by Russian authorities, and the athletes resumed doping. During the Games, the Russian athletes gave urine samples and were watched by independent doping control officers, as per protocol for all athletes. These positive samples were then smuggled out of the laboratory at night through a 'mouse hole' between rooms. They were taken away by a secret service agent, disguised as a sewer engineer. From here, tamperproof lids were removed by a method that did not break the seal. The contaminated urine was replaced with the defrosted clean athlete urine sample. The clean samples were then smuggled back in and placed in the laboratory to await testing.

Case study – Russia and the Olympic games *(continued)*

Despite recommendations by WADA that Russia should be regarded as non-compliant to the World Anti-Doping Code, and therefore enforce a blanket ban from competing at the 2016 Summer Olympics, the IOC rejected this advice. Instead, it stated that each international federation will make their own decisions on each athlete, in their respective sports, on an individual basis. Only athletics and weightlifting international committees decided on a total ban of Russian athletes. On the day before the opening ceremony, 111 athletes were removed due to doping and 278 were cleared to compete, under the Olympic flag. The decision made by the IOC was controversial and widely criticised. There was disappointment that a straightforward, strong and harmonised approach was not taken, with strong concerns of the message the decision would send to potential whistle-blowers in the future. There were further concerns about the political reasoning behind the decision against a blanket ban. The Russian Olympic Committee was also fined $15 million for the IOC doping investigation and required to contribute money to the independent testing authority to help build the capacity and integrity of the global anti-doping system.

Unlike the IOC, the International Paralympic Committee voted to ban the entire Russian team from the 2016 Summer Paralympic Games. The committee also suspended the Russian Paralympic Committee, having found evidence that doping was also present at the 2014 Winter Paralympics.

With many questioning the reasoning behind the extensive national doping programs, the move of the Russians into Olympic cheating can be traced back to 2010. Russia fell short of medal expectations, only winning 15 at the Vancouver Winter Olympics. This was disappointing in the lead-up to it hosting the 2014 Games in Sochi. Investigators say Russian officials went to elaborate means to ensure a good show in 2016. This worked, with Russian athletes more the doubling their medal count, wining 33 medals, 13 of them being gold – the most of any country. However, many athletes were stripped of their medals.

Two years later, the IOC made the decision to allow Russian athletes to compete in the 2018 Olympic Winter Games in PyeongChang, South Korea. However, these athletes had to pass scrutiny, and were not permitted to wear their nation's uniform; instead they competed under the title 'Olympic Athlete from Russia' (OAR). No officials of the Russian Ministry of Sport were accredited to attend PyeongChang 2018 and the former Russian minister of sport was barred for life from any Olympic Games. He was then appointed deputy prime minister by President Putin.

1. What legal and ethical issues are raised in the case study?
2. Evaluate the factors that would influence a government to accept the risk and become involved in systemic drug cheating.
3. Summarise and critically analyse the response of the IOC to the information it received regarding drug cheating in this instance.

Factors that influence the issue

A number of factors influence the issue of drugs in physical activity and sport, including:

- changes in society
- role of key groups
- strategies that have been designed to address the issue
- legislative and policy changes.

Changes in society

Over the years, various changes have filtered through society, and societal changes have had an impact on issues of drugs and banned substance use in physical activity and sport. The societal influences include:

- Improvement of education standards for athletes and support staff. Athletes are becoming more aware of what they are taking and educated on their right to question and say no to substances they may be instructed to take.
- Increase of values in relation to 'clean sport'. Athletes are being made to be more accountable for their actions.
- Existence of different governance systems such as ASADA, WADA and the World Anti-Doping Code, that hold athletes, supporting staff and sports accountable to anti-doping expectations.
- Globalisation.
- Improvements in technology to test athletes and samples for the presence of banned substances. Improvements can also create more ways to hide use of banned substances.
- Professionalism in sport. Athletes are made to achieve a high level of excellence while remaining clean and honest.
- An increased amount of leisure time.
- Increased disposable income.
- Viewing of athletes as role models, with their career possibly being ruined by use of prohibited substances.



Figure 11.10:
Media exposure and improvements in education mean athletes are more accountable for their actions.

- Decrease of a sense of civic responsibility and community.
- The greater influence of the media and exposure of cases to a wider audience. This can lead to fans expressing disappointment and lack of faith in these athletes and teams. Media exposure also makes doping programs and cases harder to cover up.



Figure 11.11:
National sporting organisations support ASADA in educating their athletes.

Role of key groups

Sport Integrity Australia was formed in 2019 to serve as the over-riding body that protects sporting integrity in Australia. As such, it brings together the functions of several groups working in this space, including ASADA. ASADA's roles are to perform testing, provide education and monitor sporting bodies' anti-doping programs. It pushes for an aligned international response to doping, investigates positive drug tests and prosecutes offenders.

Sport Australia is another key group. It makes specific Australian sporting bodies comply with the anti-doping requirements. The national sporting organisations support ASADA in educating their athletes and implementing the testing. They develop policies for promoting the anti-doping stance and implement policies for matters such as sanctioning offenders. The National Measurement Institute provides services such as analysis of samples and research into new detection methods.

Athletes can also be viewed as being a key group, because it is their responsibility to be aware of the drugs, including the therapeutic drugs that are on the 'banned' list, and to adhere to the rules and comply with the testing protocols. They can influence other athletes by taking a strong stance in relation to competing without using drugs and promoting their views publicly.

Internet activity

Log on to TitanOnline and complete Activity 11.1, which involves a quiz testing your knowledge of WADA rules about issues about drugs in sport and testing protocols.

Strategies to address the issue

To maintain the integrity, honesty and trust of sport, its athletes and supporters, many strategies have been introduced to address issues regarding drug use in sport. Educational programs are a good example. These can be implemented in schools and clubs and with athletes from grassroots through to professional level. Such programs address key issues regarding drug use in sport, educate consumers on prohibited substances and doping methods, and stress the importance of fair and clean sporting competition. These presentations are available face to face or online; for example, via ASADA's e-learning anti-doping tools.

Within Australia, ASADA is an example of a service providing information on drug use in sport. ASADA works closely with sports, athletes, support personnel, law enforcement agencies and governments. They work together to design and deliver educational programs and support athletes to meet their anti-doping obligations. ASADA also focuses on detecting and managing anti-doping rule violations, conducting investigation cases and monitoring and reporting compliance of sport anti-doping policies. These activities are based on a framework of an ethical code and practice of drug use and compliance in sport. ASADA does testing in-competition and out-of-competition to ensure athletes are clean year round. This testing is almost always done with no-advance notice, so that possible doping schemes are less likely to occur. Testing can involve gathering urine samples, blood samples or both, to be tested in a laboratory. The technologies available to test these samples are rapidly developing and improving; however, so are the technologies and methods used for doping. Therefore, to ensure compliance to anti-doping regulations, consequences of doping such as sanctions, fines and bans have been enforced on many athletes and support staff. This has been a strategy put in place to deter possible doping cases in the future.



Figure 11.12: Athletes can influence their peers by taking a strong stance against doping.

Learning activity

1. Analyse the effectiveness of the strategies that are currently being used to stop drug cheats.
2. Investigate how drug tests are undertaken.
3. Explain why drug cheating is continuing despite the current testing procedures.
4. Outline the reasons that athletes use performance-enhancing drugs.
5. Discuss your answers with a partner, and list your ideas for dealing with drug cheats. Join with another pair, discuss your ideas, write a statement in which you outline your strategies for dealing with drug cheats in sport, and present the statement to the class.

Legislative and policy changes

Governments play a vital role in promoting a doping-free culture within sport. They can contribute to the creation of an environment where doping is unacceptable, in any form, by adopting and enforcing legislation, regulation, policies and programs. An example of such legislation is the National Anti-Doping Framework, developed by the Australian Government Department of Health. This framework aims to align anti-doping efforts throughout Australia, by an agreed set of principles and cooperation between the Australian and state and territory governments. However, governments cannot act alone. For success in fostering an anti-doping culture, close cooperation between the governments and the sports sector is required. An example of this cooperation is the World Anti-Doping Code, which connects the aims of governments and sporting organisations around the world to promote clean sport. The code is a core document that harmonises anti-doping policies, rules and regulations within sport. It continually undergoes a review process to ensure robust protection of the rights of clean athletes worldwide. This also allows for rules, regulations and policies to evolve with the world of sport and doping issues.

Another example of legislative and policy change resulted from the 2013 'darkest day in sport' saga. An Australian Crime Commission investigation found widespread drug use in professional sport. The findings indicated that organised criminal networks were involved in distributing drugs to sports scientists, coaches, support staff, doctor, pharmacists and athletes. In some cases, there was orchestrated doping of entire sports teams, such as in the National Rugby League (NRL) and Australian Football League (AFL) competitions. The findings of the report were described as "shocking and disgusting", with use of prohibited substances including peptides, hormones and illicit drugs being widespread among professional athletes. It was also found that some coaches, sports scientists and support staff working with the elite athletes had been involved in the facilitation and use of the prohibited substances.

As a result, many changes were made to ensure this did not occur again. ASADA received a boost in its powers and it is able to suggest athletes to incur civil penalties. There were multiple investigations and inquiries conducted, such as an inquiry into gambling and sport and the potential impact it has on the integrity of sporting codes. The AFL created a whistle-blower service to assist in combating doping in its sport, ensuring individuals feel safe and supported to call out doping incidents. It also conducted deep background checks on many supporting staff members and associated individuals to ensure a systematic move forward to a clean sporting code.

Learning activity

1. Identify and describe the issues that are being faced in the sporting industry.
2. Outline the issues' potential impact on future participation in sport.
3. Describe what sporting organisations can do to combat some of the issues being faced in the sporting industry.
4. Outline what can be done at a school and community level to address the state of the issue you have studied.
5. Design a health-promotion campaign aimed at raising awareness of the issue you have studied. Include strategies for preventing the issue from arising in sport and physical activity. Use ICT (information and communication technology) to present your campaign to the class.



Figure 11.13:
There needs to be more support for doping in sport whistle-blowers.

Future perspectives

It's difficult to imagine a future where sport returns to a truly drug-free status. While there remains the lure of multi-million dollar contracts, public adulation and celebrity status, the temptation to get that competitive edge by any means possible remains an unfortunate truth. There is some evidence to suggest that the pressure to cheat will increasingly impact young athletes.

Gene doping may someday replace drug doping, with an athlete's DNA being altered to produce performance-enhancing substances. Other futuristic advances that might impact drug use such as steroids includes embedded technologies such as artificial muscles or smart clothing that may assist an athlete's muscle power.

Strategies to promote positive outcomes

WADA is entrusted with developing anti-doping policies and frameworks and providing education. Countries should be encouraged to join WADA in an attempt to eradicate the use of drugs in sport.

In Australia, ASADA has developed a range of strategies for reducing the incidence of doping in sport. Its objective is to deter use of doping in sport and promote development of programs for educating the members of the sporting community about matters related to drugs in sport. It achieves this objective by conducting research, undertaking drug testing, developing and implementing initiatives, and encouraging professional sporting organisations to develop and implement comprehensive and consistent anti-doping initiatives.

So that ASADA can achieve its objectives, it is continuing to develop testing procedures and protocols, to offer education and relevant support, and to advocate for adoption of consistent and effective anti-doping programs internationally.

Source: Australian Sports Anti-Doping Authority (ASADA)

Additional strategies to redress the issue

The use, methods and technologies of detection of drugs in sport will continue to evolve. With performance-enhancing drugs becoming harder to detect, due to their effects mimicking the body's natural responses, new strategies need to be continually implemented to address drug taking and doping methods in sport.

It is important to reflect on the reasons why athletes may become involved in doping, and why their support staff may promote and support the process. Questioning why athletes dope is an open-ended question, with every case having unique motivations. However, athletes often become caught up in their own 'athlete bubble' and lack vision of the bigger picture. Sport generates enormous amounts of money worldwide. This, along with incentives including fame and career success are driving forces for athletes to go to extreme lengths to be the best. There is also pressure from the nation to perform well, as sport contributes massively to nationalism and sporting pride. Athletes may also dope to reduce risk of injury or time spent injured. Injury is common for athletes but can be detrimental to their career and health, generating stress that their lifelong dream maybe over.

By understanding these driving factors, strategies can be developed and implemented that assist athletes and reduce pressures they may feel. It is important to promote individual athlete success outside of their sporting world. This may include encouragement to engage in vocational training and career planning, hobbies and/or jobs within or outside the particular sporting industry and provide the support to do so. If athletes have this exposure to the 'outside world' and have personal successes outside of their sporting career, they may feel less inclined to dope, as their sporting successes are not the single defining feature of who they are.



Figure 11.14:
Supplements are one of the leading causes of failed anti-doping tests, according to ASADA.



Figure 11.15:
Some medicines may contain substances that are banned in sports competitions.

Internet activity

Log on to TitanOnline and complete Activity 11.2 by watching and reporting on the video 'Doping to win'.

Education about illegal doping and doping methods and their associated health risks and career consequences also needs continual development. From a grassroots level, athletes, carers and support staff need to be aware and well educated, as the fundamental knowledge of illegal doping in sport is not always understood. If more individuals involved in sport doping are better educated and supported, they may feel more informed and empowered to decline or not consider doping as a means to improve their performance.

There also needs to be more support for doping in sport whistle-blowers. This support may come in the form of protection – legal, psychological and physical. Individuals involved may know the practice is wrong but not feel safe in making a stand against it. For example, a young athlete who has trained their whole life to make a certain team may make this team and discover there is a drug doping system taking place within the team and feel pressure from other athletes and support staff to conform. They may know this is wrong and against their moral values. However, if they speak against it, their career may be destroyed and they may feel unsafe or threatened. Alternatively, if they have legal, psychological and physical support in their favour, they will be more inclined to report the incident, knowing they can still live out their lifelong dream with another team.

Improvements in testing technologies and methods may also become a bigger deterrent to sport doping. Methods such as freezing and storing blood and urine samples from athletes are already occurring. However, the development of new technologies that are able to detect substances not previously detectable can enable re-testing of samples given previously. Improvements in procedures to make testing more affordable, quicker and simple to administer is ideal; however many substances and methods can be extremely difficult to detect. Methods such as administering saliva tests, which can detect simpler and common illegal drugs, could be implemented. Genetic testing is another potential area; tests could be done to indicate if abnormal amounts of natural body responses, such as red blood cells, are a possible natural genetic advantage or a result of illegal blood doping.

Athletes and support staff need to be held accountable for their actions and involvement in doping in sport. It is important that there is a stronger, unified stand against doping, to discourage future cases. This may include tougher punishments, such as higher fines and/or longer bans. It is also important to acknowledge that people make mistakes, and they can learn from these. However, those who are educated and supported should be able to make the right moral and ethical decisions.

Internet activity

Log on to TitanOnline and complete Activity 11.3 on gene doping.

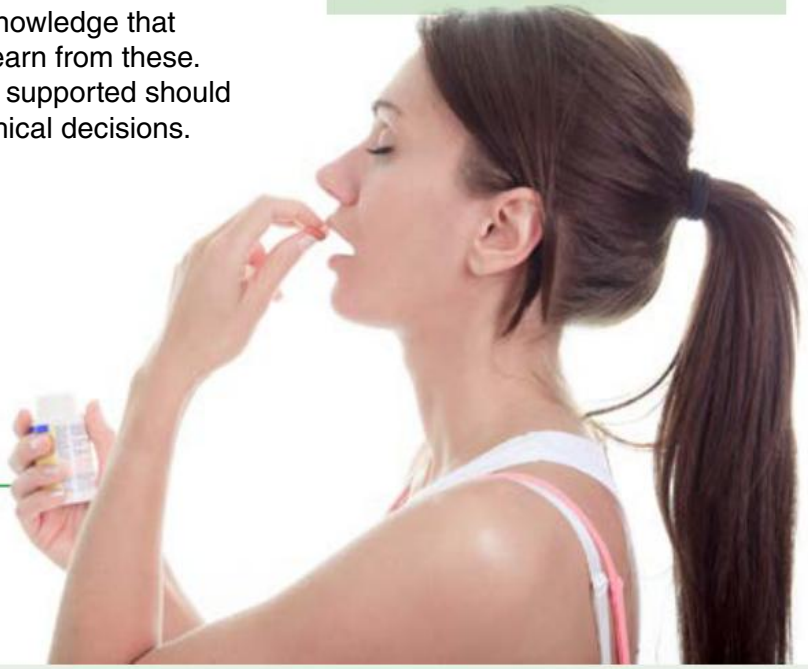
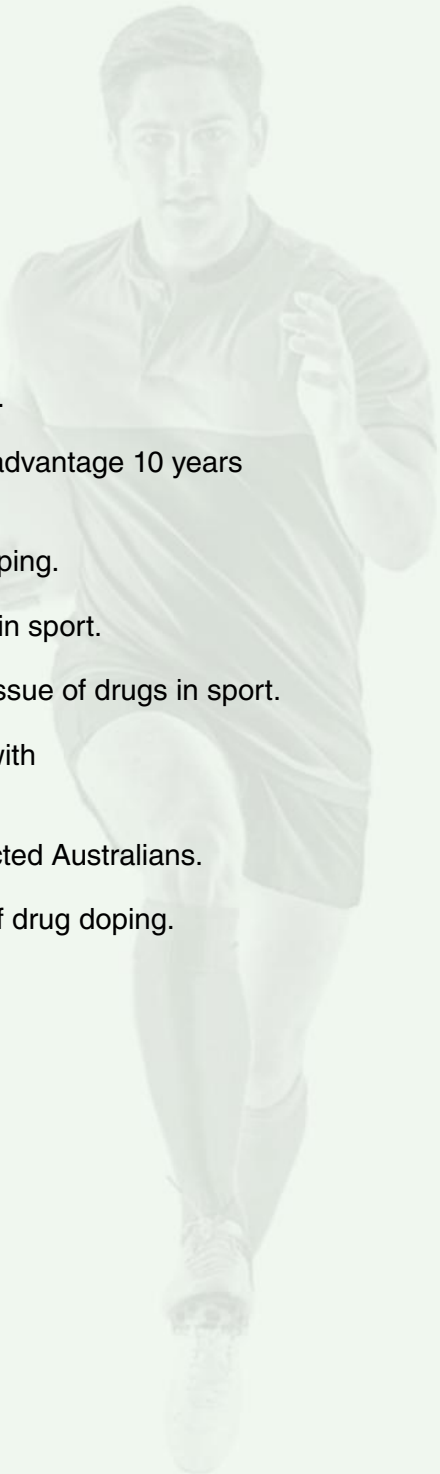


Figure 11.16:
It is an athlete's responsibility to be aware of banned drugs.

Revision questions

1. Define the term ‘doping’.
2. Describe the impact of drugs in sport on:
   a. clean athletes
   b. participation rates
   c. spectator numbers
   d. sponsorship.
3. Identify and describe two substances that are prohibited in sport.
4. Outline the moral and health implications of drugs in sport.
5. Describe one current example of drug cheating as reported in the media.
6. Research and predict how cheating athletes may try and get that unfair advantage 10 years from now.
7. Describe a range of events that have raised the profile of the issue of doping.
8. Describe the changes in society that have influenced the issue or drugs in sport.
9. Describe and evaluate the actions that have been taken to address the issue of drugs in sport.
10. Outline the legal and financial implications for athletes caught cheating with prohibited substances.
11. Describe two significant historical events involving drug doping that affected Australians.
12. Outline legislative efforts that have been introduced to tackle the issue of drug doping.





AREA OF STUDY 3

Enhancing participation and performance

- Promoting active lifestyles
- Coaching
- Enhancing performance: strategies and techniques
- Technology, participation and performance
- Event management

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CHAPTER 12

Promoting active lifestyles

Physical inactivity is a major concern in Australia due to the increasing incidence of obesity and its associated health issues. Groups that promote the benefits of an active lifestyle have been considering how to incorporate physical activity in daily life and have identified that some settings are conducive to facilitation of opportunities for physical activity. The settings include sporting clubs, schools and various organisations, through which a range of competitive and non-competitive physical-activity programs are offered.

In Australia, physical inactivity is a risk factor in relation to many of the major chronic diseases and is a contributing factor in the related conditions of obesity, high blood pressure and high blood cholesterol. In being subject to multiple risk factors, physically inactive people are also subject to increased exposure to chronic disease.

The Australian Government has designed a set of guidelines to increase the amount of incidental physical activity that people engage in. According to the guidelines, people should increase their physical activity and combine it with a healthy diet. The focus of the guidelines is on the range of benefits that people can gain from being physically active, including disease prevention and improvement of health and wellbeing.



Figure 12.1: Cycling is an excellent way to stay active.

Outcomes

A student:

- demonstrates actions and strategies that contribute to active participation and skilful performance (PASS5-5)
- evaluates the characteristics of participation and quality performance in physical activity and sport (PASS5-6)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Settings and opportunities for physical activity
- Individual and group roles and responsibilities for promoting physical activity
- Information, products and organisations

Settings and opportunities for physical activity

The home, school and workplace, and especially the community, provide numerous opportunities for physical activity. On a community level, the local government (council) provides services an individual can access, and they can choose to join any number of sporting or recreation clubs.

Also, the people we live with can have an impact on our physical-activity level and on the development of lifelong habits. If parents, carers and guardians model active behaviour for the children they are responsible for and the children have the necessary support, encouragement, transport and financial resources, the family is much more likely to be physically active. Families that have an active lifestyle are generally healthier and happier.

According to the physical-activity guidelines, children should participate in 60 minutes of moderate to vigorous activity every day. Children spend a lot of their time at school, so the school environment as well as any after-school care program is a critical setting for the promotion of an active lifestyle.



Figure 12.2:
Families that have an active lifestyle are generally healthier and happier.

Did you know?
Walking at a quick pace can use almost as many calories as jogging the same distance.

Devising methods for being physically active at the workplace is the most practical way for many adults to become more active. Most adults spend half their waking hours at work, and for many people, the work is mainly sedentary. If they choose to walk to work and take the stairs rather than the lift, they have already included two simple ways to be physically active in their daily lifestyle.

Structured settings for physical activity

Physical inactivity in Australia is a major concern due to the rising incidence of obesity and its associated health issues. Groups that are involved in promoting the benefits of an active lifestyle have been looking at how to incorporate physical activity in people's daily life and have identified the following settings as entailing opportunities for physical activity:

- sporting clubs
- school sport
- various organisations and programs, such as the Duke of Edinburgh's International Award.

In these three settings, a range of physical-activity programs are offered in competitive and non-competitive formats. Sporting clubs are a logical setting for promotion of physical activity. They are in a position whereby they can facilitate long-term participation in a wide variety of sports and physical activities in which people of differing interests and abilities are catered for.

Increasingly, sporting clubs are seeking and gaining professional support from government-based agencies such as the Australian Institute of Sport (AIS) and the various state- and territory-based sport and recreation associations. The sporting clubs are therefore better able to develop strategies for promoting sport as being an enjoyable, safe and lifelong option.

Schools are another structured setting in which physical activity is promoted by way of compulsory lessons in subjects such as sport and PDHPE. The school setting for promoting physical activity is discussed in more detail later in this chapter.

As a result of the issues that have arisen due to inadequate physical activity, various organisations and programs have emerged to target either a specific group or a specific activity. Programs such as the Duke of Edinburgh's International Award targets young Australians. The program began in Australia in 1958 and has gained popularity in recent years. Its aim is to offer young people between 14 and 24 a non-competitive form of personal challenge based on four areas: skill, voluntary service, adventurous journey and physical recreation, outlined as follows:

- **Skill:** Activities can be from a range of study areas such as art, craft, music, communication or nature. The aim is to encourage participants to pursue their personal interests and develop their practical skills.
- **Voluntary service:** All of the various services included are of benefit to the local community. The aim is for participants to learn how to provide a service to the community.
- **Adventurous journey:** Various exploration and expedition journeys are included. The aim is to promote adventure and discovery.
- **Physical recreation:** Various individual and team sports and physical-recreation activities are included. The aim is to promote participation in physical activity.

The Duke of Edinburgh's International Award has the following three levels:

- **Bronze:** This stage takes about one year to complete and the minimum age is 14.
- **Silver:** This stage takes about one and a half years and the minimum age is 15.
- **Gold:** This stage takes about two years to complete and the minimum age is 16. It entails an extra achievement: Gold Residential Project.



Figure 12.3:
Sporting clubs can facilitate long-term participation in sport and physical activity.



Figure 12.4:
The Duke of Edinburgh's International Award promotes participation in physical activity and recreation.

Physical activity in the local community

Encouraging all people in the community to be involved in physical activity requires various opportunities for participation and multiple entry levels. Local organisations could use strategies such as giving individuals and groups opportunities in social sport and competitions, and offering chances to referee or umpire games or to coach or manage a team.

Naturally, people have as many different levels of interest in sport as they have different cultural backgrounds, values and attitudes, and physical abilities. By considering this, local clubs are able to effectively and actively cater to the needs, interests and abilities of their community to encourage maximal participation. For example, a club which has Muslim members who observe Ramadan could schedule a break in competition during the fasting period, a gym in an area with lots of retirees could offer 65 years+ classes, and local facilities with accessible courts could have a wheelchair basketball competition.

Real-life examples include the Disability Trust's Sport and Recreation Services, which provide a range of sports and activities for people of all ages and disabilities to participate in physical and creative activities. Outcomes of the service are that participants have fun, gain fitness and develop friendships. Because the service provides a supportive environment, people with a disability are likely to continue to participate in the physical activities and enjoy sustained benefits.

Other groups such as NSW Health provide programs for seniors at local venues, aiming to promote active lifestyles. Examples of these types of programs include warm water exercise classes, yoga, Pilates, fall prevention, tai chi, dance, swimming and walking groups.

Recreational settings designed to increase participation in physical activity

In Australia, two popular recreational settings for physical activity are beaches and state/territory and national parks. Both settings have a wide variety of opportunities for physical activity.

Traditional activities that beachgoers can engage in are:

- beach volleyball
- kiteboarding
- windsurfing
- water skiing
- surfing
- swimming.

Modified activities such as beach cricket, beach soccer and beach tennis are also becoming increasingly popular.

Activities that visitors to state/territory and national parks can engage in are:

- camping
- canoeing/kayaking
- hiking
- mountain biking
- fishing
- swimming.

Beach and park settings are ideal for any person who wishes to reach the recommended physical-activity level by way of non-competitive activity.



Figure 12.5: Surfing is a popular recreational activity in Australia.

Activities of cultural significance designed to increase participation in physical activity

Australian society is a dynamic and diverse community. Being a multicultural society, accommodating for the diverse cultural backgrounds, including ethnicity, religion and traditions, is significantly important. As a result, creating participation options that either include or are relevant to different cultural backgrounds can encourage participation in physical activity.

For example, Aboriginal and Torres Strait Islander communities have a unique and rich culture that can be embedded within physical activity. Providing opportunities to walk Country during school lessons, and creating tournaments for Aboriginal and Torres Strait Islander communities, for example, the Koori Knockout, are examples of how culture can facilitate physical activity opportunities. Effectively, these activities, sports and competitions based on cultural significance for Aboriginal and Torres Strait Islander peoples can increase physical-activity levels. People feel more supported by their community to participate, and find comfort in sharing their experience with people of similar backgrounds and interests.

Initiatives designed to increase participation in physical activity

There are many significant local, state and national initiatives of the community and governments to increase participation in physical activity. These initiatives are formed and delivered with the aim to make participation opportunities more accessible for more people.

For example, the New South Wales Government introduced the Active Kids Program in 2018 with the aim of helping children get active. This initiative gives parents of school-enrolled children two $100 vouchers to use towards sport and active recreation costs. The NSW Government clearly recognised a need to promote more participation in physical activity and therefore prioritised it by providing financial support for children to, for example, join sporting teams, learn to swim or do after-school sport programs. Effectively, this provision is designed to increase children's participation in physical activity.



Figure 12.6:
The Active Kids Program provides financial support for children to join a team or after-school sport programs.

Physical activity in schools

Schools are a structured setting in which physical activity is promoted by way of compulsory lessons in subjects such as sport, health and physical activity.

Table 12.1 contains an outline of how participation in physical activity is promoted in schools across a range of settings.

Table 12.1: How schools promote participation in physical activity.

School setting	How schools use the setting to promote participation
Lessons in health and physical education	Schools promote participation in physical activity by regularly conducting compulsory physical-education lessons and educating students in physical-education practical lessons.
PASS elective subject	Students who are interested in sport or physical activity can elect to participate in extra physical-activity avenues by studying this elective.
School curriculum	Schools promote physical activity via their compulsory and elective subjects such as PASS, PDHPE and SLR. They can also promote it via their school-based sporting events such as athletics and swimming carnivals and via cross-curricular sporting activities.
Competitive sport	Schools give opportunities for their students to engage in physical activity through weekly sport classes as well as via regular carnivals and events and regional and state representative competitions.
Access to recreational areas	Schools promote physical activity by enabling their students to access appropriate recreational areas that students might not be able to access outside the school setting.

Learning activity

1. Outline the motivating factors for people's participation in physical activity.
2. Identify the structured settings your local community has available for physical activity.
3. Identify the recreational settings your local community has available for physical activity.
4. Examine the school setting and evaluate the degree to which it promotes participation in physical activity for all students.
5. Go online to research the Duke of Edinburgh's International Award program by investigating:
   a. what its participants do
   b. why people join it
   c. how it works
   d. its three levels
   e. how people can join it
   f. its rules and conditions.
6. In groups of three or four, investigate the recreational setting located nearest to your school. Identify the physical activities it has available.
7. Create a directory of the facilities your local area has that can be used for physical activity, sport and recreation.



Figure 12.7:
Incidental physical activity, such as walking or riding to school, is beneficial for health.

Incidental, recreational and structured physical activity

Engagement in incidental physical activity is another opportunity for people to gain health benefits. Incidental activity happens in a variety of settings and is viewed as being a positive and easy way for all people to improve their health by applying a variety of simple yet effective strategies. Incidental physical activity involves building activity into the daily routine. An individual can do the activity throughout the day over as few as 10-minute blocks. Following are some examples of how incidental activity can be done.

- At school:
  - Walk to and from school or ride a bike there and back.
  - Get off the train or bus early and walk part of the way to the destination.
  - Participate in the school's sport activities; for example, a lunchtime sporting activity.
- At home:
  - Wash the family car.
  - Mow the lawn.
  - Do some housework such as vacuuming carpets or mopping floorboards.
  - Go for a walk, jog or run before or after school.
  - Be active – for example, by walking fast on a treadmill – while watching television or listening to music.

Did you know?

That exercising not only improves your appearance, it improves brain performance and memory.

Internet activity

Log on to TitanOnline and complete Activity 12.1 on the physical, emotional and social benefits of a lifelong physical activity available at one of the listed venues.

Recreational physical activity is exercise and movement that is founded on fun. People participate in this type of physical activity for enjoyment, to be social and have a fun time. They make an active choice and priority to participate in physical activity but the approach to participation is unstructured. Examples of recreational physical activity are kicking the football with friends after school, walking the dog and playing on equipment at the park.

Structured physical activity is planned and prepared contexts and opportunities for people to participate. This includes organised competitions in various sports. Structured physical activity allows a consistent opportunity for people to regularly participate, for example, each weekend, and in turn commits people to continue participation in physical activity. This structure often includes coaches, umpires or referees, designated sporting grounds for home/away matches, representative opportunities and a competition ladder of results. Structured physical activity is demonstrated in the community through multiple examples including:

- playing in the local netball competition on Saturday mornings
- playing social indoor soccer on weeknights
- representing the local region in hockey.



Figure 12.8:
Structured physical activity, such as hockey competitions, commits people to continue participation.

Learning activity

1. Explain the term 'incidental physical activity'.
2. Give five examples of incidental physical activity.
3. Prepare a letter to the school's administration advocating a strategy to increase levels of incidental, recreational and structured physical activity in the school setting.
4. Outline the technological advances that have led to a reduction in the need for human movement in the following areas:
   a. Transport. b. Work or school. c. Leisure.
5. Choose two of the areas listed in Question 4 and identify some options for how people can be more active in them.
6. Wear a pedometer or use a fitness tracking app for a week, and keep a log of your daily activity. Alternatively, count how many steps you take while travelling, for example, between classes at school and on your way home from school. Compare your results with class members.
7. Survey 20 peers to determine contributory factors to positive personal experiences when engaging in physical activity. Record and graph your results.
8. Investigate the health benefits associated with regular physical activity.

Factors that contribute to positive physical activity experiences

There are a number of factors that contribute to participating in physical activity; however, their effect on the participation experience can be positive or negative. For a sport or physical activity experience to be perceived positively, it needs to contribute enjoyment and offer participants success and social benefits.

It is important for people to participate in physical activity; however, if they do not enjoy the activity, they aren't encouraged to continue that activity for lifelong participation. Individuals need to experience a sense of enjoyment and fun in various physical activities and sports. This can be achieved through offering multiple levels of competition in sports (ranging from social to highly competitive) and opportunities to try new sports or play with different people in different contexts. Enjoyment can create a positive physical activity experience for individuals and groups.

Enjoyment can often come from having success in sports or activities. Success can include winning games or competitions, scoring points, improving on past performance, coming first, or achieving an individual or team goal. The aim to win against the opposition in sports can encourage people to participate and achieve success. Having a goal in activity and then successfully attaining that goal can promote self-efficacy and self-belief. This instils a positive attitude towards participation. Therefore, success and achievement in competition can create a positive participation experience for individuals and teams.

Also, sporting teams are prime examples of how physical activity opportunities can provide social benefits for participants. The teamwork, camaraderie and support systems developed in sporting teams are encouragement for people to participate in physical activity. As teams encounter challenges, for example, tough oppositions or injuries, qualities like resilience and optimism allow team members to bind together and support each other to continue participating. This develops a supportive environment, which in turn promotes a positive participation experience.



Figure 12.9:
Success and achievement in competition can create a positive participation experience for individuals and teams.



Figure 12.10:
Families support individuals in developing healthy lifestyle practices from an early age.

Individual and group roles and responsibilities for promoting physical activity

The groups which have roles and responsibilities in promotion of physical activity include:

- individuals and families
- schools
- health professionals
- fitness industry and service organisations
- the media
- policymakers, legislators and urban planners.

Individuals and families

A number of individual and family factors lead to either inhibition or promotion of physical activity. On an individual level, most commonly among physically inactive Australians, constraining factors and barriers to physical activity are lack of time, injury and disability. In particular, lack of time is consistently reported – people perceive that they have less free time for exercise and sporting activities.

Other factors that have an impact on physical activity participation are lack of social support, lack of enjoyment, having children, having health problems and feeling self-conscious. Overcoming these barriers is essential for individuals to achieve an adequate level of daily physical activity.

Families ultimately support individuals in developing healthy lifestyle practices from an early age, hence significantly influence individuals and their participation in lifelong physical activity. Finding activities that children are good at or enjoy, and prompting the benefits of physical activity from an early age, are examples of how families can encourage physical-activity participation.

Helping children find activities that they like is one of the keys to helping them stay active in the future. Dancing, skipping, running, playing ball, riding a horse, flying a kite – it doesn't matter what the activity is as long as they like it. Children who are good at balancing might also like dance or gymnastics, for example, whereas others who have good hand–eye coordination might have a talent for cricket or tennis. Importantly, this interest and engagement will instil positive behaviours and attitudes towards physical activity, and develop skills for individuals to take responsibility for their participation in the future.

The best way to maintain variety in children's activities is to have a mix of sports and a mix of moderate and vigorous activities. Two examples of moderate activities are climbing and bike riding (cycling), and a few examples of vigorous activities are swimming; running; dancing; and team sports such as netball, soccer and football. By trying out various activities, children learn new skills, stay interested and challenged, and get enough exercise.

Following are some tips for parents, carers and guardians to encourage their children to be active:

- Be a positive role model by being active yourself.
- Provide positive feedback.
- Spend active time with your children: rather than watch television or focus too much on household chores that have to be done, make some time to have fun by playing frisbee, walking or cycling with your children.
- Encourage your children to play outside.
- Encourage your children to take up an organised sport or group lessons in swimming or dancing.
- 'Get the family going' by organising family activities such as camping, bushwalking and outdoor games.
- Involve your child in daily household chores such as cleaning the house, washing the family car and gardening, whereby everyone will be physically active and help the house run smoothly.
- Balls, bikes and scooters are great gifts and are fantastic for promoting physical activity and creating opportunities to play outdoors.
- Limit screen time: keep an eye on the amount of time your children spend watching television or using a computer. Aim for no more than two hours a day and preferably fewer than 30 minutes a day.



Figure 12.11:
Children should be exposed to a variety of moderate and vigorous physical activities.



Figure 12.12:
Parents and guardians can be positive role models by being active themselves.

Internet activity

Log on to TitanOnline and complete Activity 12.2. Investigate the statistics and health issues associated with being overweight or obese. Develop a health-promotion campaign aimed at reversing Australia's obesity trend.

Schools

For a variety of reasons, schools are a logical place in which to promote physical activity. A significant number of schools already have good infrastructure in place, including facilities such as sporting fields, basketball courts, sport equipment and gymnasiums. Schools also promote physical activity as part of their curriculum; for example, by way of their Personal Development, Health and Physical Education (PDHPE), PASS and sport programs.

The important issue is that schools have quality programs to arrest the alarming dropout rate in relation to physical activity, especially among adolescents. Some advocates argue that due to the increasing incidence of childhood obesity, physical activity is now as important as teaching of literacy, numeracy and technology. However, the school curriculum remains overcrowded with more traditional learning, where emphasis is placed on academic results. In an expansive curriculum, subjects are often competitive in relation to time and money.

It is difficult to find the right balance but following are a number of strategies that are already in place for promoting physical activity in schools:

- Introduction of programs for maximising participation, enjoyment and skill learning.
- Introduction of programs for maximising opportunities for lifelong engagement in physical activity.
- Introduction of programs for promoting positive physical-activity experiences.
- Whenever possible, inclusion of physical activity in subject areas other than PDHPE, PASS and sport.
- Creation of a positive physical-activity environment that includes well-maintained facilities.
- Provision of shaded and/or indoor facilities so that the physical activities can continue when weather conditions are extreme.
- Provision of secure bike-storage facilities to encourage students to cycle to and from school.
- Working with local councils to provide safe walking and cycling options for students travelling to and from school.
- Adoption of appropriate policies in relation to factors such as wearing of hats and coping with water and weather extremes, which can have an impact on physical activity.
- Linking with the local community to ensure that facilities are available for physical activity outside school hours.
- Instituting appropriate training for teachers, especially non-specialists.



Figure 12.13:
A significant number of schools already have good infrastructure in place, including facilities such as sporting fields and equipment.

Health professionals

Health professionals are a group of people who have an important role in promotion of physical activity. They include people such as doctors, specialists, nurses and physiotherapists. General practitioners (GPs) are in an especially good position for providing advice about the benefits of physical activity because they:

- see more than 80 per cent of the Australian population each year
- are perceived to be credible among members of the public
- have a high level of authority
- are in a position to understand how engagement in physical inactivity has an impact on their patients' overall health.



Figure 12.14:
Doctors are able to identify patients who would benefit from physical activity.

General practitioners are therefore in a powerful position in relation to promoting physical activity. The issues that patients present with to their doctor can often be alleviated by way of physical activity. For example, doctors often see patients who have high cholesterol or high blood pressure, patients who are overweight or smoke, and patients who have a chronic disease such as type 2 diabetes or a cardiovascular problem. GPs are therefore able to collect information and subsequently identify patients who would benefit from engaging in physical activity. They are able to advise them about a suitable course of action and monitor their progress in follow-up consultations. They can also give patients appropriate written information, refer them to programs or other health professionals, and use strategies such as the current health-promotion initiatives to encourage them to be active.

On a wider scale, health professionals are part of a powerful lobby group, the members of which can assume a leadership role in promoting physical activity. They are in a position to change the emphasis in the area of health from cure to prevention. Initiatives such as increased funding, public education, professional development and collaboration with other interested parties are ways in which health professionals can influence people's attitudes towards physical activity. These initiatives are especially important so that future directions can be established to address sedentary behaviours and obesity issues among Australian children and adolescents.

Learning activity

1. Identify your school's areas in which students can participate in physical activity.
2. Design a new school that has promotion of physical activity as its main focus.
3. Explain how health professionals are able to promote physical activity.
4. You are a general practitioner at a local surgery. A 46-year-old male patient presents with high blood pressure and high blood cholesterol, is a heavy smoker, is moderately obese and has type 2 diabetes.
   a. Design a six-month physical-activity program for the patient.
   b. Design a way to monitor patients' physical-activity levels at your surgery.
5. Explain how physical inactivity results in being a 'burden' on the community.



Figure 12.15:
Health and fitness centres provide trained professionals to lead activities and create specialised programs.

Fitness industry and service organisations

According to statistics, more than half of Australian adults are overweight and not engaging in enough physical activity, so the fitness industry has a huge role in promoting physical activity. The fitness industry is represented by the national body Fitness Australia, which provides leadership in accreditation, research and training. The fitness industry encompasses health centres, fitness centres and fitness professionals located throughout Australia. As a professional organisation, it is well placed to promote the benefits of physical activity so that the quality of life of the general population can be improved.

Despite the role that the fitness industry has in promoting physical activity, less than 10 per cent of Australians are members of a gym, and the number of people who actually use their membership regularly is even lower. One of the challenges that fitness-industry representatives face is that they have to increase membership among health and fitness centres throughout the country. Three examples of the issues that health- and fitness-centre representatives are facing and trying to address are image, cost and accountability, all of which are important, because the industry has a valuable role in promoting physical activity.

Like schools, health and fitness centres are an ideal setting for physical activity in that they are well resourced and have a wide variety of services and options. For example, of a health or fitness centre may provide resistance-training facilities, a range of aerobic-based activities in which members use equipment or attend fitness classes, specialised classes such as Pilates or yoga, and water-based activities if the centre has a swimming pool. Health and fitness centres also provide trained professionals to lead the activities and are in a position to create specialised programs for their members, based on each member's needs. Health and fitness centres are often in a central location and are well serviced by public transport, which are motivating factors for many people. Being conducted indoors, the services are not affected by the weather, and in being able to pay their membership fees on a weekly, monthly, quarterly or annual basis, people have an incentive to keep attending, having already paid for their membership.

To maintain and improve their role in promoting physical activity, fitness-industry representatives:

- work collaboratively with representatives of other organisations such as government authorities, media representatives and health professionals
- promote physical activity to the general population
- provide an accreditation scheme that includes a code of practice for health and fitness centres
- provide structured training schemes for fitness leaders and personal trainers
- work with the members of similar groups to provide research opportunities, develop innovative practices and investigate current trends.



Figure 12.16:
Service organisations such as Surf Life Saving Australia offer the opportunity to both be active and make a difference within the community.

Service organisations are in a unique position to promote physical activity and improve physical-activity levels. Although the format varies between the organisations, they usually have two similar goals: to promote social change and improve the lives of various groups.

An example of a service organisation is Surf Life Saving Australia (SLSA), the main role of which is to save lives at the beach. New South Wales has 129 surf-lifesaving clubs that have a total of more than 75,000 members. The uniquely Australian surf-lifesaving movement is inclusive whereby younger and older people are offered the opportunity to make a difference, make friends, be active and possibly save a life.

The media

The media is in an ideal position to promote physical activity because it reaches most of the Australian population. It is a form of mass communication where the aim is to present messages and information to people. It is essential that messages about physical activity reach their target audience, and although the message is essentially the same, the nature of the target audience varies, depending on factors such as age, gender and culture.

Some companies have a multi-million-dollar budget to draw on to promote their product but the same is not necessarily applicable to promoting physical activity. Responsibility for promoting physical activity in the media lies with government authorities. Unlike companies, which advertise to sell more of their product and thereby increase profits, the government does not get a direct or immediate return when investing in advertising by way of the media. Rather, it is anticipating an increase in activity levels as part of an overall strategy for improving Australians' health. The effects are therefore not often seen for many years, and are measured according to factors such as a reduced rate of chronic diseases and the associated reduction in medical treatment costs in relation to diseases such as type 2 diabetes and cardiovascular disease.



Figure 12.17:
When urban planners are designing parks and recreational facilities, they must consider the needs of the population.

Policymakers, legislators and urban planners

Responsibility for promoting physical activity begins with policymakers and legislators. For example, the Australian Government provides the initial funding to address the issue of declining physical-activity levels. Similarly, the government is responsible for setting goals in relation to physical activity. By way of funding and goal setting, the relevant authorities are able to come together to discuss ways of achieving improved activity levels. The responsibility is then moved to relevant authorities in each state or territory. In New South Wales, this responsibility lies with NSW Health, the representatives of which liaise with a range of organisations such as schools, as well as individual health professionals, to develop and implement a variety of appropriate plans. Associated organisations include Sport Australia, which is a government organisation that also has a role in addressing the issue of declining physical activity levels.

An example of the collaborative approach that Sport Australia takes is its involvement in the physical literacy project of the Australian Council for Health, Physical Education and Recreation, which is known by its acronym ACHPER. ACHPER is a not-for-profit organisation representing teachers and other professionals working in the fields of health and physical education. Its purpose is to promote active and healthy living for all Australians through education and professional practice. Policymakers and legislators should promote physical activity at a variety of levels.

Urban planners also have an important role in promoting physical activity. Although urban planning is the responsibility of all levels of government, it is at local-government level that it can be seen as a vehicle for promoting physical activity. For example, urban planners can ensure that ‘bike paths’ and designated cycleways are put in place in new housing developments. Urban planners are also responsible for including adequate and relevant sport and recreational facilities for all community members.

Similarly, when urban planners are designing parks and recreational facilities, they must consider the needs of the local population. For example, in their plans, they should include not only traditional sporting fields but facilities such as walking paths, tennis courts, basketball courts, cricket nets and playgrounds. Also, by including facilities such as shaded areas, barbecues, restrooms and childcare centres, they can encourage families to use the local facilities.

Learning activity

1. Explain the main roles of urban planners.
2. Identify how urban planners promote physical activity in new housing developments.
3. Complete this activity in groups of three or four:
   a. Design a new town for which the main focus is on promotion of physical activity. Concentrate on formulating initiatives for making physical activity convenient, safe and enjoyable.
   b. Present your design to the class.
   c. Evaluate each group's presentation.
4. Identify the organisations that work together to promote physical activity in your local area.
5. Create a map of your local community, and on it, indicate any traditional sporting fields and other recreational facilities such as walking paths, tennis courts, basketball courts, cricket nets and playgrounds. Assess the proportion of sport and recreational facilities compared with the proportion of residential dwellings.

Government and private sector funding

Funding can be invested into the promotion of physical activity by governments and the private sector. This funding is transferred and used in advertising and promotional initiatives to develop local sporting clubs and participation opportunities. It is this funding that ensures there are opportunities for people to first participate in physical activity and then perhaps go on to elite and professional competitions. Therefore, funding is invested at grassroots to initially promote physical activity participation, and then form a base for elite sports for men and women.

It is important to note that men and women at a professional level are not equally paid. This pay gap often sees men being paid far more than women. For example, the minimum salary for A-League soccer players in the 2019 season was $64,113, with an average wage of $182,000. In stark contrast, W-League soccer players in the 2018 season had a minimum salary of $10,000, with an average salary of $17,400. This significant gap highlights the emphasis on men in the funding of elite sports. At this level, private-sector businesses often fund sporting teams and events by choosing to sponsor sporting teams or advertise during television broadcasting. Strategically, businesses focus their funding and financial influence on the men's game rather than the women's because they access a larger audience.



Figure 12.18:
Male soccer players are paid far more than their female counterparts.

To continue the involvement and participation of women in physical activity, initiatives and campaigns aimed at supporting women in sport are imperative. This is where, for example, government funding can be used. The Girls Make Your Move campaign from the Australian Government Department of Health aims to inspire and motivate girls to find activities they enjoy. The campaign website offers suggestions of activities girls and young women can participate in to be active, and provides contact details of local clubs and competitions. Government funds the advertising for this campaign and the website to increase young women's awareness of the participation options in the community.

Clearly, the government plays a significant role in funding physical activity opportunities for all Australians, especially women, to effectively facilitate pathways to representative sports, for example. Promoting physical activity participation requires sufficient funding to effectively cater to the needs of the community. Governments and the private sector contribute to funding opportunities that in turn facilitate participation opportunities. Therefore, more money should be spent by governments and the private sector promoting physical activity to allow more people to enjoy the benefits of regular physical activity.



Figure 12.19:
The government plays a significant role in funding physical activity for women.

Learning activity

1. For the following three groups, investigate ways in which physical activity is promoted in the media:
   - **a.** Aboriginal and Torres Strait Islander peoples.
   - **b.** People with disability.
   - **c.** Teenage boys or girls.
2. Compile a list of your local area's service organisations and the services they provide.
3. Describe the roles of fitness-industry representatives in promoting physical activity.
4. Explain the ways in which fitness-industry representatives can overcome the following three issues to increase their membership:
   - **a.** Image.
   - **b.** Cost.
   - **c.** Accountability.
5. Investigate a local health and fitness centre, and:
   - **a.** identify the physical activities offered there
   - **b.** evaluate the centre's code of practice
   - **c.** outline the types of membership the centre has available.

Internet activity

Log on to TitanOnline and complete Activity 12.3 by identifying ways in which people can overcome barriers to participating in physical activity.



Figure 12.20:
It is important to critically evaluate and be selective when deciding on the right exercise options.

Information, products and organisations

Engaging in physical activity is important for the body and the mind. Staying active and enjoying lifelong participation can be achieved by choosing an activity that is enjoyable and convenient. Many activities and sports are available to choose from, with many catering for people of all ages and abilities.

The local community has many options to choose from, including gyms, leisure centres, fitness centres, sports clubs, exercise classes and personal training. It is important to critically evaluate and be selective when deciding on the right exercise options. Following are some general points to keep in mind, and they are applicable to any activity:

- **A free first session:** Asking if there is an option for a free first lesson, a visit or a trial can assist in making an informed decision about whether the centre, class or personal trainer is the right choice – try it before you buy it!
- **Qualifications:** Personal trainers, fitness instructors and group-fitness instructors should be certified by a registration organisation such as Physical Activity Australia or Fitness Australia.
- **Location:** Convenience is important when choosing exercise activities, as people are more likely to attend the fitness centre or class or to work with the personal trainer if travel to these activities is not far from the home or workplace.
- **A code of practice:** Fitness centres should be operated in accordance with the standard code of ethics and business practice as developed for industry and government.
- **Atmosphere:** People need to feel comfortable at the fitness centre and enjoy its atmosphere. Consider the age range and the gender of the other members, the type of music played, and what the other members usually wear for the sessions and classes.
- **Membership:** Ensure that payment schedules meet individual budget needs, and find out the exact membership fee and what it includes.

The fitness industry

Fitness-industry organisations such as commercial gyms and health or fitness centres can promote physical activity. Most centres are operated to make a profit, but some, such as the ones run by the YMCA, are not-for-profit organisations.

In recent years, the fitness industry has undergone rapid development and is now overseen by a national accreditation body, entitled Fitness Australia. Most commercial gyms and health and fitness centres are members of Fitness Australia, the aim of which is to represent the interests of fitness providers and their clients.

When deciding on a commercial gym or a health or fitness centre to join, factors like cost, location, image, activities, accreditation and the centre's code of practice are to be considered.

- **Cost:** Most gyms and fitness centres charge a membership fee and offer a range of payment options, which vary, depending on the centre's membership categories. For example:
  - A casual visit costs about $15–$21.
  - Membership options include continuous-payment plans for a specified time such as six or 12 months.

  Among New South Wales's popular fitness centres, the monthly fee can commonly range from $50 for student membership to $200 for high-class membership.
- **Location:** The location of the gym or fitness centre must be convenient. Centres that are located close to school, the workplace, home or public-transport stations and stops are the most convenient.
- **Image:** Representatives of gyms and fitness centres often portray their centre by way of an image that is specific to the centre's users. To ensure that users are comfortable in a specific environment, they may cater to specific groups; for example, women-only gyms such as Fernwood and Curves.
- **Activities:** Due to the wide range of users who require fitness services, a vast array of activities and facilities should be provided at centres so that all participants' preferences are met. Common facilities include gym equipment such as treadmills, elliptical cross-trainers, exercise bikes, strength and free-weight equipment, and weights. Three examples of common classes are body combat (boxing), body pump (weight training) and Zumba (Latin American dancing).
- **Accreditation:** An informed decision can be made about whether a centre is reputable by asking if it is accredited. Gyms and fitness centres that have been accredited by Fitness Australia are safe choices because they are less likely to have financial problems.
- **A code of practice:** New South Wales has a fitness-industry code of practice that gyms and fitness centres can choose to follow. The aim of the code is to ensure users' health, safety and wellbeing by way of a variety of policies and practices.



Figure 12.21:
Gyms may cater to specific groups to ensure all users are comfortable.

Did you know?

A 2019 Canstar Blue survey found that 46% of people don't use their gym membership as much as they thought they would.

Trainer accreditation has become an important issue in the fitness industry, and a range of courses are now available, outlined as follows:

- **Certificate III (Fitness Instructor):** In this course, knowledge of health and fitness is enhanced through the provision of information on the human body and exercise practices. Graduates are able to correctly prescribe exercise regimens according to a client's fitness level.
- **Certificate IV (Personal Trainer):** In this course, the principles taught in the Certificate III course are developed. Participants learn about aerobic conditioning, resistance training, nutrition and weight management. After successfully completing the course, individuals are able to work as personal trainers throughout Australia.
- **Diploma of Fitness (Fitness Specialist):** In this course, participants are enabled to assess, motivate, educate and train clients, depending on their fitness needs and goals. After successfully completing the course, individuals are able to practise as a fitness instructor, a personal trainer or a fitness specialist.



Figure 12.22:
There are a range of fitness trainer accreditation courses available.

Learning activity

1. Outline the factors a person should consider before joining a commercial gym or fitness centre.
2. Go online and investigate in detail a job description for a:
   a. fitness instructor
   b. fitness trainer
   c. fitness specialist or therapist.
3. Investigate the path a person would need to take to become a personal trainer.
4. Research the timetable of classes conducted at a local gym or fitness centre. List the classes, and describe each type of class.
5. Using the Fitness Australia website, research the fitness community and list your area's accredited businesses.
6. Investigate and evaluate products and organisations that publish information and market their services to the community.
7. Evaluate the role of commercial gyms and health and fitness centres in promotion of an active lifestyle.



Figure 12.23:
Taking the stairs instead of a lift or escalator can help individuals achieve recommended daily activity levels.

Current initiatives that promote physical activity

There are many initiatives and programs promoted and practised in the community to support physical activity participation. In particular, the Australian Government and state/territory governments create opportunities for people to learn about the importance of physical activity, be exposed to sports and physical activities in their local area, and be motivated and encouraged to participate.

For example, Find Your 30 from Sport Australia is a promotional campaign to help every Australian adult commit to at least 30 minutes of activity each day. Find Your 30 is about finding simple, practical ways in which anyone can work half an hour of activity into their day. This is achieved though linking people with local clubs, gyms and competitions. People can also become aware of local activities like walking tracks, parks and outdoor gyms. Finally, suggestions are provided to seamlessly work physical activity into the everyday routine; for example, walking the extra block to work, taking the stairs instead of the lift, and having active family time. Ultimately, this initiative aims for people to get up, get moving and give their health and happiness a fighting chance for the future.

In another example, promoting physical activity participation for children and young people is the specific focus of the NSW Government initiative Healthy Kids. This website gives suggestions and key healthy lifestyle tips for kids and teens, parents and carers, teachers and childcare workers in promoting healthy lifestyles. The Get Active Each Day section of the website offers suggestions on how to help children and teens be more active; for example, encouraging active play and less screen time.

Current trends in physical activity and sport

Understanding the current trends and realities of physical activity and sport participation in the community can significantly influence the types of initiatives employed for health promotion. The ABS 2017–18 National Health Survey reveals the attitudes and adopted behaviours of the community towards physical activity.

Across the ages, only 1.9 per cent of 15–17 year olds, 15 per cent of 18–64 year olds and 17.2 per cent of 65 year olds and over were meeting the physical activity guidelines. To help people increase their physical activity participation to meet these guidelines, Find Your 30 is a key initiative to link people to local clubs, gyms and competitions. This initiative addresses the need for each adult to get 30 minutes of exercise every day. This in turn will improve the trend for physical activity participation. Another key statistic that Find Your 30 addresses is that 28 per cent of people aged 15 years and over reported that they were involved in organised sport and physical activity. This proportion can be greater if Find Your 30 is employed successfully.

Significantly, 43.7 per cent of adults aged 18–64 years described their day at work as mostly sitting, so a high proportion of their day-to-day routine is sedentary. To decrease sedentary time and encourage people to be more aware of their physical activity involvement throughout the day, stand-up desks and smart watches that send reminders to move can be used.

Children and young people aged 5–17 years spent on average 91 minutes per day on physical activity and 136 minutes per day in screen-based activity. Physical activity time decreases and screen-based activity increases as age increases. Clearly, recreational technologies are prominent in young people's day-to-day activities. To address this, ensuring young people are involved with sports and active play takes time away from the sedentary behaviour technology imposes.

Importantly, the initiatives used to encourage physical activity participation are related to the relevant health data and trends.

The Australian Government has developed a set of physical activity and sedentary behaviour guidelines for adults and older Australians, and 24-hour movement guidelines for the early years and for children and young people to outline the recommendations, which are based on scientific evidence. As young people move through school, start work and become more independent, they do not always find it easy to be physically active and limit their sedentary behaviour on a daily basis, but both are possible and important. The government's guidelines, outlined as follows, are for all young people, irrespective of their cultural background, gender or ability.

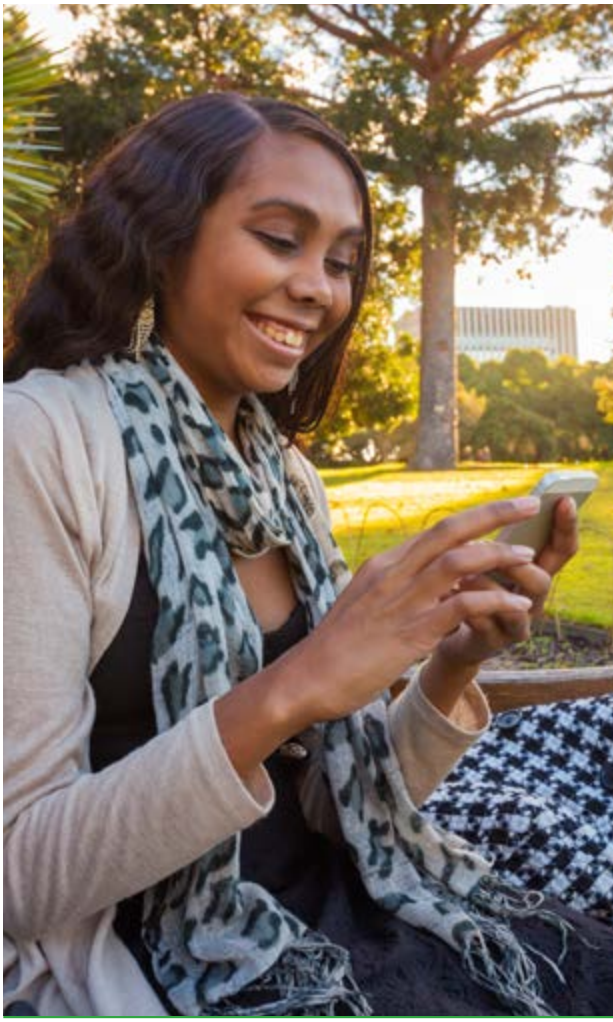


Figure 12.24:
Recreational technologies are prominent in young people's day-to-day activities.

For optimal health benefits, children and young people (aged 5–17 years) should achieve the recommended balance of high levels of physical activity, low levels of sedentary behaviour, and sufficient sleep each day. A healthy 24 hours includes the following elements.

- Physical activity:
  - Accumulating 60 minutes or more of moderate to vigorous physical activity per day involving mainly aerobic activities.
  - Several hours of a variety of light physical activities.
  - Activities that are vigorous, as well as those that strengthen muscle and bone should be incorporated at least three days per week.
  - To achieve greater health benefits, replace sedentary time with additional moderate to vigorous physical activity, while preserving sufficient sleep.
- Sedentary behaviour:
  - Break up long periods of sitting as often as possible.
  - Limit sedentary recreational screen time to no more than two hours per day.
  - When using screen-based electronic media, positive social interactions and experiences are encouraged.
- Sleep:
  - An uninterrupted nine to 11 hours of sleep per night for those aged 5–13 years and eight to 10 hours per night for those aged 14–17 years.
  - Have consistent bed and wake-up times.

Source: Australian Government Department of Health



Figure 12.25:
For optimal health benefits, young people should replace sedentary time with additional moderate physical activity.

Learning activity

1. Explain the relationship between physical activity and health.
2. Explain the relationship between health and quality of life.
3. Explain how leading a sedentary lifestyle can result in a reduced quality of life.
4. Research current trends in the health status of Australians and how this relates to trends in physical activity levels.
5. Assess a current trend in the fitness industry aimed at increasing participation.
6. Outline the physical-activity guidelines for adolescents.
7. Explain why the physical-activity guidelines are different for children and adults.

Marketing strategies in the fitness industry

The fitness industry uses numerous marketing strategies to promote its products and services to the community. Marketing strategies used include television infomercials, billboard advertisements, gym membership apps, social media and discounted merchandise. It is the successful implementation of these marketing strategies that promotes the fitness industry and the benefits of physical-activity participation to the community.

This promotional activity is especially demonstrated in advertising. Advertising presents the opportunity for brand, product or activity exposure to all people in the community through, for example, television advertisements and infomercials. Infomercials are commonly used on television to sell fitness equipment, and lifestyle programs often include a range of infomercials that are presented as program content. The common characteristic of infomercials is that the direct marketer tries to get viewers to purchase the product on impulse, by offering a special deal in an effort to entice the viewers to purchase the product through telephone immediately after watching the product presentation and demonstration. This impulsive behaviour is encouraged to get more people involved with the product or service. Products are often advertised through this marketing strategy; for example, gym equipment, active wear and nutritional shakes.

Additionally, local gyms can advertise their membership deals or options on television advertisements to first encourage people to sign up. Once getting people to commit to a membership, to further this, on newer treadmills at gyms, they have screens that advertise club merchandise like sweat towels and drink bottles, and personal training information and contact details. This is an example of continuous marketing of products and services within the gym community. Television advertisements also promote the fitness industry accreditation process. People can be informed about courses and the related contact details to achieve accreditation though avenues like TAFE.

A lot of criticism exists in relation to infomercials and whether they are ethical, and governing bodies are now recommending that consumers carefully investigate the product claims before they purchase the product. The New South Wales Office of Fair Trading protects consumers and highlights the fact that infomercials are subject to the same laws as for other supplied goods. The Australian Direct Marketing Association (ADMA) also protects consumers by way of administering a direct-marketing code of practice.

Learning activity

1. Identify a range of fitness products that are advertised by way of television infomercials.
2. Explain why companies use infomercials to advertise their product.
3. Watch an infomercial, and identify its features and the marketing strategies the direct marketer has used.
4. Choose a fitness product and evaluate the claims made for it in infomercials.
5. Create an infomercial for a piece of exercise equipment and present it to the class.
6. Critically analyse other marketing strategies used by other organisations such as gyms or retailers of fitness equipment.

Revision questions

1. Describe what an active lifestyle looks like for a young person your age.
2. List the motivating factors for participation in physical activity.
3. Identify the structured settings that are available for physical activity.
4. Identify the recreational settings that are available for physical activity.
5. Explain how the following settings are used to promote participation in physical activity:
   a. Health- and physical-education classes.
   b. Competitive sport.
   c. Access to recreational facilities.
6. Identify two Australian physical-activity settings. For each, give examples of the types of activity that people can engage in.
7. Outline examples of incidental physical activity.
8. Outline the benefits associated with regular participation in physical activity.
9. Identify five health-related problems associated with inadequate participation in physical activity.
10. Describe how physical inactivity among Australians could become a burden on the community in the future.
11. Evaluate the role of commercial gyms and health and fitness centres in promotion of an active lifestyle.
12. Outline the physical-activity guidelines that apply to adolescents.
13. Which of the following is the best example of incidental physical activity?
    a. Jogging around the oval.
    b. Housework.
    c. Resistance training.
    d. Bike riding.
14. Which of the following health problems has the closest link with inadequate physical activity?
    a. Diabetes.
    b. Lung cancer.
    c. Bowel cancer.
    d. Chronic kidney disease.

CHAPTER 13

Coaching



In sport and physical activity, a coach is a person who instructs, teaches, leads, guides and trains individuals or teams. Coaching is undertaken in many realms of sport, from recreational level to professional level. A coach's role is to improve player performance and build on the potential of an individual and/or a team.

Coaching styles and techniques vary according to the coach's personality and the type of sport or physical activity. A coach tends to use a style and technique that stems from their personality; they might vary their style to suit the particular sport or physical activity; and they might tailor their style to an individual athlete's needs.

Coaches should have knowledge of the sport or physical activity they are coaching, and they also need performance-related knowledge including biomechanics, diet and nutrition, and sports psychology.

Coaches are responsible for the health and safety of the athletes they have in their care. They must be able to identify areas of potential legal risk, and be able to minimise legal risk in relation to time, effort and financial cost.

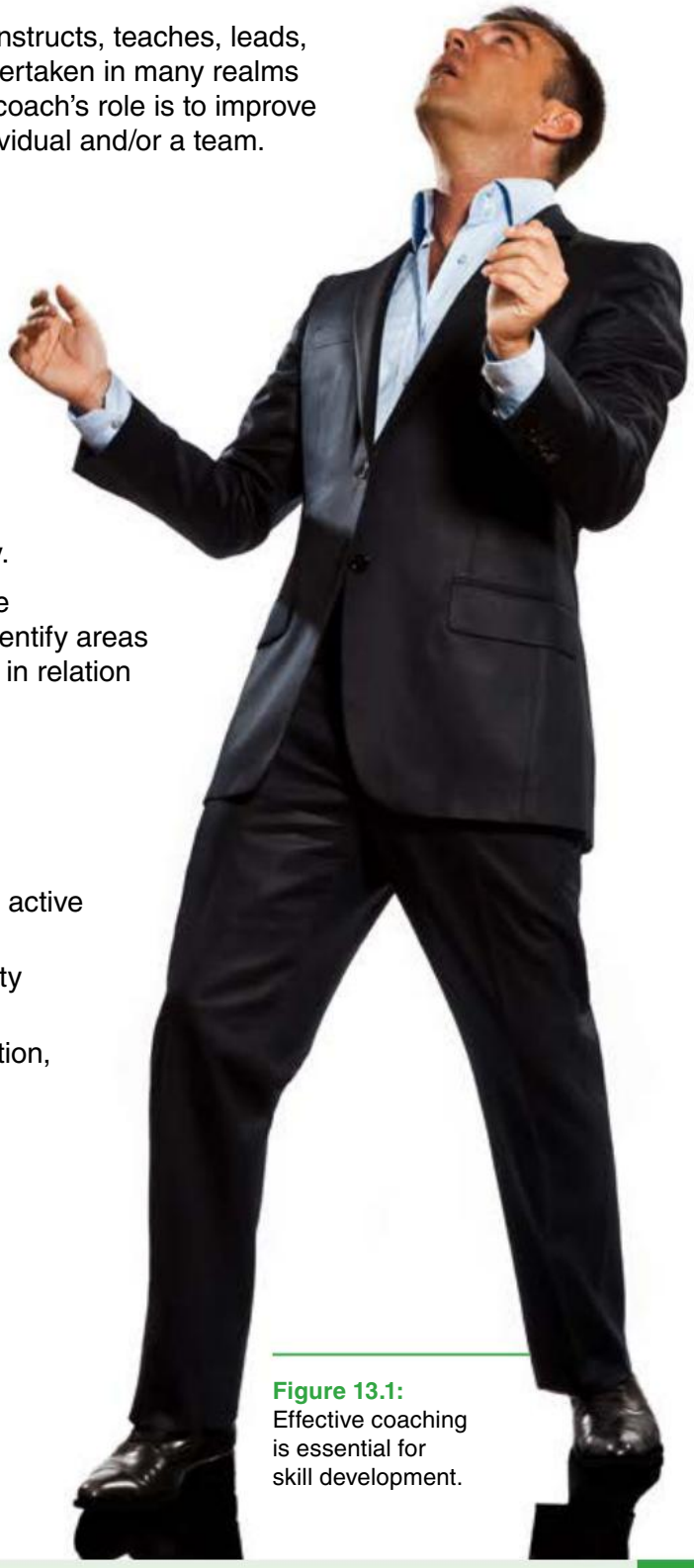


Figure 13.1: Effective coaching is essential for skill development.

Outcomes

A student:

- demonstrates actions and strategies that contribute to active participation and skilful performance (PASS5-5)
- evaluates the characteristics of participation and quality performance in physical activity and sport (PASS5-6)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- displays management and planning skills to achieve personal and group goals (PASS5-8)
- performs movement skills with increasing proficiency (PASS5-9)

Key knowledge

- The qualities of effective coaching
- Coaching roles, responsibilities and ethics
- Short- and long-term planning and evaluation



Figure 13.2:
Coaching provides the opportunity to positively interact with different age groups, skill levels and personalities.

The qualities of effective coaching

A coach is a person who instructs, teaches, leads, guides and trains individuals or teams in sport or physical activity. Coaching is included in many realms of sport, from recreational level to professional level. Ideally, a coach's role is to improve player performance and build on the potential of an individual and/or a team.

Especially in highly competitive sport, coaches are important stakeholders in an athlete's or a team's performance. Coaches can at times be unrecognised or can conversely be blamed for poor player performance. The player–coach relationship is important in sport and physical activity, and coaching can be a rewarding, fulfilling and enjoyable task.

Coaching is a complex task because it can have a tremendous impact on athletes' learning and performance. All coaches should be familiar with the common coaching strategies and techniques. Coaching provides the opportunity to positively interact with different age groups, skill levels and personalities.



Figure 13.3:
The qualities that an effective coach should demonstrate.

Different coaching styles

A coach usually uses coaching styles and techniques that align closely to their personality. However, the type of sport or physical activity, the player's age and ability will also influence the chosen style and strategies a coach will use.

The following is an outline of the three main styles of coaching that have been identified:

1. **Authoritarian:** This style of coaching is demonstrated by a coach who has significant control over all decisions. Coaches who adopt an authoritarian leadership style are usually strict and discipline their players with a 'Do as I say!' mentality. Communication within this coaching style is often limited, with other individuals rarely being included in any decision-making processes. The focus for authoritarian coaches is primarily to win and they do not allow for flexibility in their training or game plans. Due to this, the development of player motivation is often questioned in this style. Authoritarian coaching is common among elite male teams.
2. **Democratic:** Democratic coaching styles are athlete-centred where the decision-making is shared and interaction between the coach and players is quite high. There is also strong focus on communication and cooperation between all members. This coaching style increases player motivation due to an increase in personal relationships that are built between the coach and players. However, coaches must use this style with caution to ensure that they do not become too friendly with their athletes and risk losing their coaching credibility and status.
3. **Laissez-faire:** This style of coaching has a strong focus on enjoyment and player participation, rather than winning competitions. It can be classified as a casual and easy-going coaching style where decision-making is the responsibility of the athletes and what best suits them. Some negative aspects of the laissez-faire coaching style include coaches becoming frustrated by the lack of organisation and commitment from their players, which can also lead to reduced development of their technique and skills.

It is common for coaches to use a mixture of coaching styles to develop their own style, rather than solely coach a team with one style. All coaching styles have significant advantages and disadvantages that must be considered when a coach decides on the way that they are going to approach coaching a specific team.

Learning activity

1. Identify the characteristics of a democratic coach.
2. Identify two groups that would benefit from the authoritarian coaching style.
3. Outline the leadership style that most reflects your personality. Justify your response.
4. Describe the strategies a democratic coach would use to get the best out of their athletes.
5. Explain how a coach could use the laissez-faire approach to improve the performance of young athletes.
6. Describe the differences in coaching styles that would be suitable for an elite athlete, compared to a beginner.

Skills of effective coaches

Coaches need a number of skills to be effective. They must have knowledge of the sport or physical activity, but more importantly, they need to know how to pass the knowledge on to the participants they are coaching. To do so, they need the following skills:

- **Organisation:** In organising training sessions, coaches need to plan in advance how they will manage the athletes, the equipment and the training area. They need to group the athletes according to the number of them, their ability and the particular activity, and to continually check that the plan is being implemented safely during the session.
- **Observation:** In using their observation skills, coaches are able to detect good skill execution and to identify any errors in technique. Coaches who have accurate observational skills should be able to:
  - identify the positive aspects of the performance
  - identify errors in performance
  - judge an athlete's improvement
  - judge the success, or otherwise, of a tactic or strategy
  - identify changes in player motivation.
- **Analysis:** Effective coaches analyse player performance and skill execution. They use videos, statistics and computers to analyse performance and skill so they can: break the action down into phases; focus on one phase at a time; observe the action several times from various angles and distances; compare the action with the technical model; and, if appropriate, determine what corrective action is required.
- **Adaptation:** Coaches adapt and modify their coaching practices and activities to ensure that every participant, regardless of their age, gender and ability level, has the opportunity to participate and improve their skill level. Good coaches adapt and modify aspects of their coaching and create an environment in which they can cater for individual needs and enable everyone to participate. The onus of inclusion rests with the coach.
- **Communication:** When coaches are analysing a performance, they need to communicate with individual learners effectively. They need to successfully explain to each learner what they want them to do; that is, what to alter in their performance and what aspects of their performance should remain unchanged. Fundamentally, to transfer knowledge to the learner, a coach has to:
  - use language that is appropriate to the learner's age and understanding
  - keep the information brief
  - highlight the important points
  - use communication to motivate the learner
  - listen to the learner and remember that communication is a two-way process!

  Coach–player communication can be verbal or non-verbal, and to be effective, coaches must be aware of both forms of communication and use them when appropriate.



Figure 13.4:
Coaches need to successfully explain to each learner what they want them to do.

- **Improvement of player performance:** The main aim of many coaches is to improve their players' performance. Sports coaches often adopt a holistic approach to coaching, which means they look at the whole picture rather than just one part of it. An effective coach will aim to develop their players' skills, fitness, motivation, enjoyment and understanding of the game and will give them opportunities to improve all aspects of their performance.
- **Motivation:** If athletes are to enjoy their sport or physical activity and improve in it, they must be motivated or driven towards being successful. Various people benefit from having various levels of motivation; for example, one child might be motivated by winning whereas another might be less interested in achieving the outcome than in having the coach praise them. Coaches need to understand the various types of motivation that exist; to assess what each of their learners finds motivating; and to use specific types of motivation, in the form of encouragement, praise, rewarding good performance and reinforcement.
- **Leadership:** When coaches are implementing their training programs, they should:
  - have a clear aim
  - demonstrate enthusiasm
  - be able to understand how the athletes feel
  - stick to the principles of fair play
  - have a 'presence' whereby other people want to follow their leadership
  - be a role model in relation to their behaviour and attitude.

  Although leadership skills are evident in some people and not others, coaches can learn the skills to increase their influence over their players.

Internet activity

Log on to TitanOnline and complete Activity 13.1, by researching a successful professional coach and analysing the actions and traits that made them successful.



Figure 13.5:
Coaches need to understand the various types of motivation that exist.

Case study

Dr. Richard (Ric) Charlesworth is one of Australia's great hockey coaches and started his coaching career at 17 years of age. By 22, Ric had led a state team to victory. An accredited doctor of medicine, professional cricket player, Olympic and World Cup Australian hockey team member, federal parliament member and author, Ric had a successful coaching career which included leading the Australian women's hockey team to win a swag of trophies and medals including two Olympic medals.



Figure 13.6:
Dr. Richard Charlesworth coached the Kookaburras to success at the 2014 Hockey World Cup.

In 2016, Ric was appointed Officer of the Order of Australia (AO) for distinguished service to sport and the Parliament of Australia. When interviewed by *Coaching Life* sports magazine in the same year, Ric discussed his coaching techniques that allowed him to become an effective coach. Initially, he focused on the players' strengths, regardless of the team ability level or grade. He combined this with a flexible approach towards how different teams would need to be trained, rather than pre-planning schedules and training regimes before he got to know the players. Ric also used assistive technologies such as video footage to help him make appropriate judgements about game play. He also continually sought advice by reading books, observing other coaching styles and collaborating with other officials to maintain a broad view of the team's needs as well as to improve his own coaching ability.

Ric also set high expectations. He explained how setting achievable standards at the beginning of any coaching role helps to clearly lay out the ground rules, guidelines and expectation for all stakeholders to reduce the chance of any discrepancies occurring.

Instead of solely focusing on skills and technique, Ric facilitated skill drills and technique development of his players in the specific game-play context. This ensured that his players were always given extensive time to practise and implement skills within a very similar context to the real game they were training to play.

Similarly, Ric focused on ways for players to improve their mistakes, rather than dwell on the number of mistakes made. His philosophical view was that mistakes should be considered opportunities for learning and not a point for criticism.

Learning activity

1. Outline the skills a coach requires to coach adolescent athletes to maximise participation
2. Identify and describe three skills a coach would need to apply for professional players and athletes to be successful.
3. Explain why it is important for a coach to have good communication skills.
4. Reflect on an experience you have had personally with a sporting coach and how they positively or negatively influenced your performance.
5. Observe a volunteer coach during a match, and then place a tick in the applicable column (M = mostly, S = sometimes and N = never) in the checklist set out in Table 13.1.

Table 13.1: Coaching-skills checklist.

Coaching style	M	S	N
Did the coach smile at, praise and encourage participants in order to reinforce their actions when they performed correctly?			
Did the coach reward participants for their effort as well as the outcome of the match?			
Was the coach consistent and fair in his/her treatment of all participants?			
Did the coach encourage participants to provide input during the team's decision making, and did he/she listen when they had something to say?			
Did the coach reinforce the team rules fairly and consistently?			
Was the coach patient with the participants and supportive of them?			
While the coach was coaching, did he/she demonstrate the enthusiasm that he/she expects the participants to demonstrate?			
Did the participants have fun during the training and/or the match?			
Did the coach place too much emphasis on winning?			
Did the coach exercise self-control in any situations during which they became angry?			
Was the coach sensitive to each participant's needs?			
Did the coach personally demonstrate good sporting behaviour?			
During the match, did the coach argue with any officials or complain about them?			
Did the coach encourage the players' parents to attend the match?			
Was the coach patient and tolerant with each participant, regardless of his/her skill level?			
Did the coach give each participant equal time during the match or over-play the more skilled participants?			

Table 13.1: Coaching-skills checklist. *(continued)*

Session planning and implementation	M	S	N
Was the coach well prepared and organised for the training session?			
Did the coach keep the participants' level of maturity in mind when planning the training session?			
Was the coach prompt in arriving at the training session and the match?			
For the training session, had the coach organised the equipment, and did he/she run the session smoothly?			
Did the coach make the training session varied and interesting in order to challenge all the participants and develop their confidence?			
At the training session, did the coach demonstrate his/her instructions appropriately? That is, did he/she model the instructions well? Could all the participants see the instructions the coach was demonstrating? Did all the participants understand the instructions?			
Was the coach able to assist a participant in order to correct an error when he/she made one?			
Did the participants have a chance to play with a minimum amount of guided instruction from the coach?			
Did the coach use a variety of teaching and coaching methods?			
Did the coach group the participants appropriately and give all the participants a chance to develop their skills?			
Did the coach give the participants constructive and specific feedback?			
Did what the coach said to the participants match his/her non-verbal actions towards them?			
Did the coach 'over-coach' during the training session and/or the match by giving the participants too many instructions?			
Did the coach change his/her communication methods to suit the participants' needs?			

Adapted from: www.sportaus.gov.au/__data/assets/pdf_file/0007/685033/Coaching_skills_checklist.pdf

Feedback

Feedback is an integral component of learning. Feedback for young children and adolescents should be consistent and positive. Young athletes should be encouraged to provide feedback. A coach can encourage player feedback by:

- being approachable
- being an active listener
- defining roles
- setting goals
- establishing mutual trust
- communicating positively
- empowering athletes
- developing a communication plan.



Figure 13.7:
Participants receive extrinsic feedback from their coach.

Feedback for elite athletes aims to enhance performance through performance analysis. Performance analysis seeks to explore how the innovative application of technology may help performance. Coaches aim to provide systematic and objective feedback to athletes in order to understand, accelerate and develop performance, including optimising existing techniques and learning new skills. It may also be used to analyse competitors for strengths and weaknesses.

The main components of performance analysis include tactical and technical evaluation, analysis of movement and statistical compilation. These components are often facilitated by the use of technology including computer software and video technology. They can also be used to collect statistics and view opposition offensive and defensive structures, strategies and tactics.

Integration into the daily training environment is sport-dependent and individualised for the needs of coaches and athletes. The implementation of a performance analysis system is seen in the daily training environment via technologies (such as video feedback systems); in the expanded skill-set of coaching staff (for example, coaches using software to analyse performance); through the provision of human resources (staff recording performance data); or in a combination of these types of services. Recent innovations such as drones allow coaches to video training sessions and provided feedback of the vision supplied.

Source: Sport Australia

Practical activity

1. Demonstrate your coaching skills by instructing a group from your class in a sporting skill of your choice.
2. Provide constructive feedback to those in your group as they learn the skill.
3. Evaluate and provide feedback to those students who are in the role of coach.

Coaching roles, responsibilities and ethics

A coach helps athletes to develop their full potential. They are responsible for training the athletes in their sport by analysing their performance, instructing them in the relevant skills and encouraging them. A professional coach is also responsible for guiding the athlete in relation to their life and their chosen sport.

The coach will consequently have many and varied roles: instructor, assessor, friend, mentor, facilitator, demonstrator, adviser, supporter, fact finder, motivator, counsellor, organiser and planner.

In sport and physical activity, the coach's two main roles are to create the right conditions for the participants to learn in and to find ways of motivating the participants. Most players and athletes are highly motivated, so the coach's other main tasks are to maintain the motivation and to generate excitement and enthusiasm among the participants.

The coach has to be able to:

- help the participants prepare their training program
- communicate with the participants effectively
- help the participants develop new skills
- use evaluation tests to monitor the progress of the training and predict the players' performance.



Figure 13.8:
A coach has many and varied roles: instructor, assessor, mentor, adviser, supporter, motivator and counsellor.

Maintaining professionalism in sport is a prime focus for all key stakeholders, especially coaches and their players. Ethical practice involves coaches completing accreditation and following a code of ethics which outlines standards that all individuals must abide by. This ensures coaches and players behave in appropriate ways towards themselves and others so that games and training sessions are positive experiences for all. Coaching in an ethical manner also reduces the risk of discrimination occurring towards individuals based on their gender, culture, religion, background and beliefs. A coach who abides by a code of conduct ensures that the welfare of their players is always at the forefront of their coaching style.

Effective coaching, training and instruction

Effective coaching, training and instruction motivates and supports individuals, teams and groups. Coaches who are effective can identify strengths and weaknesses, account for individual differences in ability, and delegate roles and responsibilities successfully.

Identifying strengths and weaknesses

Coaches primarily observe their athletes to record information and provide feedback to individuals so they can improve their performance. This is categorised as observational analysis. Constant repetition of a skill, activity or performance by athletes allows coaches to observe patterns or trends occurring throughout performance. Repeated demonstrations ensure that coaches accurately identify strengths or weaknesses which can be relayed as feedback to the athlete.

To experience quality observational situations, coaches may focus on a specific skill or technique, for example, a basketballer's free throw, within an individual training session or game. For the skill, specific criteria will be developed and the athlete's performance marked against it. For skills or movements that cannot be decreased in speed while still appropriately depicting the movement, coaches may use video to record performances and analyse the motions at a decreased speed.

Coaches may also initially ask their players to highlight their own perceived strengths and weaknesses at the beginning of a season or training session. Coaches may ask their athletes to complete a self-reflection or a SWOT analysis, pointing out strengths, weaknesses, opportunities and threats.

To continue to enhance player motivation, coaches must focus on athlete strengths, while simultaneously addressing their weaknesses. For example, a coach may suggest an athlete continues to keep the same body position and speed of rotation during a baseball swing but suggest adjustment to the angle they hit the ball with the bat. This example illustrates how coaching feedback is positively given with a focus on two strengths while identifying one area of weakness to improve.



Figure 13.9:
Coaches may focus on a specific skill within an individual training session.



Figure 13.10:
Coaches must focus on strengths while simultaneously addressing weaknesses.

Accounting for individual differences in ability

When coaches are designing training sessions, they have to consider the participants' individual differences. These include:

- **Beginners:** Participants who are new to the sport or physical activity tend to have little knowledge of either the required skills or the common mistakes that participants make. The coach has to be patient and understanding and to give clear, brief instructions so the learner can grasp the concept. The coach should encourage the learners and should give them positive feedback to enable them to enjoy their achievements and advance their skills and understanding.
- **Children:** Training sessions for children have to be fun, stimulating, varied and achievable. The coach has to adapt the sessions according to the child's age and skill level. As for beginners, the coach has to be patient and understanding. They need to use appropriate language and terminology and to organise the sessions so they are varied and enjoyable.
- **Adults:** Adult participants generally expect to achieve something out of their coaching sessions. They tend to be critical of coaching and at times reluctant to make changes and/or take on new skills or techniques. The coach might choose to adopt a logical approach to their coaching where they highlight the purpose of the activities. They should establish a range of short- and long-term goals to facilitate measurement of individual and team achievements.
- **Personalities:** A team will always contain a combination of personalities. The coach has to keep the learners' differences in mind and tailor the training sessions to cater for the personality differences.
- **Advanced participants:** People in this group have gained immense knowledge and understanding of their sport or physical activity and have acquired the skills needed for success. They make few errors, perform automatically, and are fluent and coordinated. Because their feel for the skills is based on kinaesthesia – a sense of awareness of the position of the body's voluntary muscles – they are able to perfect strategies and tactics and to concentrate on developing their mental skills by using techniques such as mental rehearsal, formation of imagery and arousal level.



Figure 13.11:
Coaches of young children have to adapt sessions according to the age and skill level of participants.

Effectively delegating roles and responsibilities

The coach has overall responsibility for training individuals and teams, and the task of coaching can be complex. Coaches can choose to delegate their roles and responsibilities to a network of support-staff.

Support-staff members can include the personnel outlined as follows:

- **Trainer:** This person is responsible for identifying the fitness components that are relevant to the activity and for monitoring and improving the participants' fitness. They should help the participants understand the importance of injury prevention and treatment.
- **Assistant coach:** This person works closely with the head coach by way of contributing ideas, running parts of the training sessions and/or working with individual participants or small groups during training sessions. They might have a specific role such as training the forwards of a rugby team while the coach is working with other members of the squad.
- **Manager:** This person is responsible for fulfilling organisational duties, which might include managing the training equipment, facilities and venues; managing the practice matches; managing player transport and accommodation; and liaising with media representatives.
- **Selector:** This person is responsible for selecting the players for club games or representative teams. They usually liaise with other selectors and/or the coach to choose the best players.
- **Medical personnel:** These personnel include first-aid officers, doctors and physiotherapists. They are responsible for administering first aid to injured players. They have to be present at games so they can give assistance immediately. They might also have a role in player rehabilitation.
- **Officials:** These personnel include referees, assistant referees, scorers and timekeepers. They are responsible for the smooth running of the game or competition, so they need to have a good understanding of their role and the rules of the competition.

In a small club, the coach is likely to take on most of the responsibilities. Their delegation becomes more important and effective as the club becomes larger and more professional. As clubs grow, support networks expand to include many specialised personnel, each of whom has a clearly defined role.

Learning activity

1. For a sport of your choice, identify the personnel who contribute to the running of the club. Outline each person's role.
2. Create a flow diagram in which you show the organisation of a small sports club by identifying all the personnel who contribute to the sport or physical activity. Decide who is responsible for making decisions at each level of the club's structure.
3. Create a flow diagram in which you show the relationships that exist in a sporting team. Describe the purpose of each relationship; for example, the relationships between the coach, assistant coach, trainer, manager, players and selectors.

Effective coaching strategies

An effective coach is able to use a range of coaching strategies for the individuals under their guidance. These include instructing and supporting and motivating others.

Instructing

Regardless of the participants' age or experience, when the coach is instructing them and implementing their various strategies during and after a training session, they should adhere to the following guidelines.

During the session

- Briefly introduce the session, explain what is going to happen, and establish a few basic rules.
- Get things moving quickly.
- Spend the first few minutes on the warm-up, and make sure it becomes a habit and fun to complete.
- Allow plenty of time for game play, select a range of games through which to develop the participants' skills, and use questions and challenges to help the participants learn.
- Use skill demonstrations at key points to help the participants understand techniques they might be able to apply so they can perform better, and demonstrate the techniques in the context of how the participants will apply them during a match, not in isolation.
- Give the participants lots of opportunities to practise and learn to master any specific skill, and remember that making mistakes is a natural part of the learning process.

After the session

- Conclude the session properly by including a slower game or activity, or a walk if the session has been especially strenuous.
- At the end of the session, encourage the participants to stretch to help develop their flexibility and reduce their muscle soreness.
- While the participants are cooling down, talk to them and revise the session's key points by asking the participants some questions and giving them lots of praise.
- Give the participants a reminder about the time and venue of the next practice session or competition.
- Distribute any flyers, information sheets or other items.
- Evaluate the session by using self-reflection to answer the following four questions:
  - Was it fun?
  - What could I do to improve the session?
  - Did the participants enjoy themselves?
  - Did everyone participate enough?

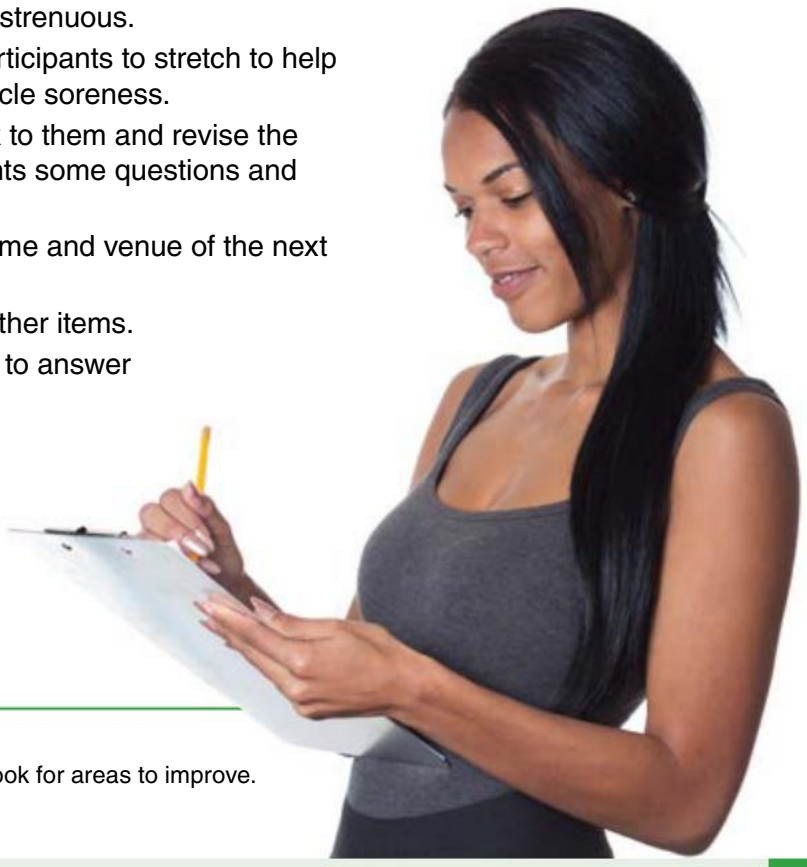


Figure 13.12:
Coaches should evaluate each coaching session and look for areas to improve.

Supporting and motivating others

The word 'motivation' means the will or drive to participate, learn and improve. In sport and physical activity, 'motivation' is a reference to the factors within an athlete or a player where they are able to be aroused in their behaviour and to maintain and channel it towards achieving a goal. Motivation can be classified as being either 'intrinsic' or 'extrinsic'.

- **Intrinsic motivation:** This type of motivation means a person's inner drive to engage in an activity without having any external incentives. Intrinsic motivation is based on the emotion an athlete or a player experiences when they are performing well and want to continue doing so. Coaches can contribute to their participants' intrinsic motivation by generating situations in which they succeed, reach their goals, and experience fun and enjoyment during the activity. Intrinsic motivation is a desirable trait among participants where they train and perform because they enjoy the experience.
- **Extrinsic motivation:** This type of motivation means the rewards an athlete or a player gains for having succeeded. They may be awarded a prize such as a certificate, a ribbon or a medal, or might be praised and congratulated by their coach or parents. Coaches can contribute to their participants' extrinsic motivation by setting goals and providing challenges, prizes and other external treats. Coaches should not use extrinsic motivation to undermine the participants' intrinsic desire to achieve.



Figure 13.13:
Coaches can contribute to their participants' extrinsic motivation.

- **Goal setting:** Participants who set a goal do so to reach a clearly defined state. In setting their short-, medium- and long-term goals, they should make them moderately achievable; that is, neither too hard nor too easy to achieve. Goal setting is the key to motivation. When athletes and players achieve the goals they have objectively defined, they feel they have succeeded and that their training sessions have been worthwhile.

Learning activity

1. Research ways to effectively instruct, develop and support individuals, teams and groups.
2. Analyse strategies used by coaches to motivate players and teams.
3. Explain how a coach can use extrinsic motivation to increase participants' sporting effort and performance.
4. Describe how important extrinsic motivation is for sporting effort and performance.
5. Explain how a coach could undermine a participant's motivation by using extrinsic motivation.
6. Describe how a coach could use goal setting to increase the intrinsic motivation.
7. Identify when goal setting would result in reduced intrinsic motivation.

Safety and safe practices

Under work health and safety laws, coaches have the main responsibility for the health and safety of the athletes and players who are in their care. They have a legal and moral obligation to their participants called a duty of care, which means they must take reasonable care not to cause harm to another person that could be reasonably foreseen. To fulfil their duty of care, coaches should aim to minimise risk and maximise safety by using strategies including the following:

- Have the participants do a warm-up at the start of each session.
- Identify and manage any potential environmental hazards.
- Recognise and manage any potential risks to the participants.
- Develop rules so the participants stay safe.
- Provide spotters when necessary; for example, weight training.
- Distribute written guidelines about how to use any protective equipment correctly.
- Retain knowledge and awareness of the participants' capabilities.
- Be aware of disability, injury or medical conditions.
- Retain knowledge of first aid, injury management and rehabilitation.
- Have the participants do a cool-down at the end of each session.

Ethical coaching

Coaches should behave ethically at all times and ensure that their participants' welfare remains paramount. Sports coaches are increasingly required to face ethical issues such as player conduct (fair play, fairness), doping, cheating, bullying, lack of respect for officials, abuse of power, harassment, and how to judge if a participant is ready to return to their sport or physical activity after sustaining an injury.

Coaches should remain conscious that they are in a position of power in relation to the participants they coach. It is essential that they operate professionally and with integrity in their relationships with the people who are participating in the sport or physical activity and who are associated with it.

Being a positive role model

The coach should be a role model for participants, and parents, carers and guardians, by demonstrating the behaviour they expect. They should display the qualities outlined as follows:

- **Fairness:** Treat all participants equally or in a way that is free from discrimination on the basis of gender, ethnic origin, religion, culture, age, sexual orientation or any other status.
- **Honesty:** Be open and honest; this will help build respect and team harmony.
- **Respect:** Acknowledge that every person has their own views and opinions as well as rights and a sense of self-worth.



Figure 13.14:
Coaches must treat all participants equally or in a way that is free from discrimination.

Recognising individual reasons for participation

The reasons that people participate in sport and physical activity are varied. Coaches should recognise their athletes' or players' reasons and make individualised decisions in relation to player motivation, commitment, expectations and achievements.

The reasons that people attend organised training sessions to participate in sport and physical activity include:

- to become fit
- to improve their fitness
- to lose weight
- to develop healthy habits
- to continue enjoying activities they enjoy
- to continue developing technique and skills in activities they are good at
- to try something new
- that they want to be with their friends
- that they feel good after the activity
- that they enjoy the social aspects of the activity
- to achieve personal goals
- to pursue excellence
- to keep their parents happy
- to compete with their siblings
- to relieve stress
- to fill in free or spare time.

People's attitudes to participation and training can be influenced by the following factors:

- age
- gender
- peers
- likes
- dislikes
- family
- past experiences
- socioeconomic status
- cultural background
- local facilities
- cost
- accessibility
- school
- teachers
- advertising
- the internet
- media coverage.

When someone takes on the role of a coach, they are agreeing to respect the rights of every person they are coaching, irrespective of the person's reasons for participating. The reasons a person decides to become a coach, and the factors that can influence their decision, can be equally as diverse as the reasons that people participate in and attend organised training sessions.

Learning activity

1. Identify three athletes or players who put across a positive image for their sport or physical activity. Explain their behaviour and how they display good sporting conduct (fair play, fairness).
2. Identify three athletes or players who display negative images for their sport or physical activity. Explain their behaviour and/or their unsporting conduct.
3. Critique a code of conduct for coaches in a sport or code of your choice and explain how it supports and guides the coach, player and spectator.
4. Research and create your own code of behaviour for players and spectators.

Equal opportunity, fairness, honesty and respect

Our behaviours lead to varying consequences, which is why it is important for all those involved in sport to behave ethically. Coaches especially need to abide by ethical coaching practices to ensure equal opportunities are provided to their participants in fair, honest and respectful ways.

Ethical coaching involves coaches encouraging all athletes to participate in activities and potentially take turns in leadership positions. Coaches also critically consider the athletes they are working with; for example, younger athletes may not be physically able to participate in activities that matured adult bodies are able to. Therefore, providing activities that cater for different ability levels within team members encourages the development of ability in all players, not just those already gifted or skilled. Ethical coaches also understand the different reasons their athletes have for being involved in the sport activity. Despite winning competitions being a favourable outcome, a coach may need to accept that some individuals may solely be participating in the sport to improve their own fitness or to increase their socialisation with others.

Athletes are not the only individuals who benefit from coaches who adopt ethical approaches. The community of individuals involved in the sport, such as parents and spectators, are also more likely to be positively motivated, and may volunteer to take on positions required for the team to be able to participate and function on a weekly basis.

Promoting the development of core team values throughout training and competitions is one way coaches are able to improve a team's respect and trust for one another. Regular team-building activities can help to improve team cooperation, tolerance for others, friendship and the effort that individual players invest in their sport.



Figure 13.15:
Providing activities that cater for different ability levels encourages the development of ability in all players.



Figure 13.16:
Regular team-building activities can help to improve team cooperation.

Internet activity

Log on to TitanOnline and complete Activity 13.2 by researching specific examples of how a coach could demonstrate responsibility, trust, competence, respect, safety, honesty, professionalism, equity and good conduct (fair play, fairness).

Legal implications

Coaches and administrators must be able to identify potential legal risks as well as identify potential strategies to minimise legal risk, while considering the required time, effort and financial cost.

When coaching a team, coaches and other staff are required to abide by legal duties, including duty of care over their players. This involves checking environments prior to activity or games, enforcing safety guidelines including rules and associated regulations, and ensuring constant supervision of participants. Adhering to duty of care procedures helps to reduce the chance of legal risks occurring.

To minimise risks, coaches and staff initially must identify possible hazards including environments such as playing surfaces and personal dangers such as skill level and fitness of athletes. After identifying the potential risks, the next step is to do a risk assessment. This involves rating the potential risks on a scale from 'very unlikely' to 'very likely'. After each risk is assessed a management plan is developed. This involves specific strategies that can be implemented and used to reduce the risk occurring and initial procedures that will be used to identify the risk if it were to occur.



Figure 13.17:
To minimise risks, coaches must identify possible hazards including environments such as playing surfaces.

Coaching opportunities and qualifications

Opportunities in coaching range from having parents volunteer to coach their son's or daughter's sporting team to having an appropriately accredited professional coach undertake coaching duties at international level. A sports coach's workload varies, depending on who they are coaching and the type of sport or physical activity.

A coach who is working with a school or community group:

- plans fun, engaging coaching activities, sessions and programs in a safe environment
- gives the participants feedback about their performance and helps improve their technique
- works with young people, schools, community groups and sports organisations to promote the sport or physical activity.

A coach who is working with young people who are engaged in a competitive sport:

- designs a basic training program
- works to develop more-advanced techniques and tactics
- develops effective teamwork
- supports the participants at events and competitions
- maintains records of the participants' performances
- advises the participants about how their lifestyle choices can affect their performance.



Figure 13.18:
Good coaches always seek to learn more about their sport or physical activity.

A coach who is coaching at national or international level:

- designs an innovative training program
- monitors each participant's physical condition and mental attitude
- helps the participants to peak during competitions
- works with sporting experts, including sports scientists, nutritionists, physiotherapists and program managers
- mentors other coaches.

The role of volunteers must not be underestimated, and in actuality, many clubs would be unable to continue without volunteer support. However, it is necessary that volunteers impart the correct information to the athletes or players, and to that end, all volunteer coaches are encouraged to achieve a standardised qualification; for example, aspiring coaches can obtain the Level 0 qualification to gain sport-specific education and training.

Courses about coaching will generally include the following types of information:

- **Principles of coaching:** the fundamentals of coaching; for example, the importance of warming up and cooling down.
- **Sport-specific skills:** new approaches to coaching the skills and techniques that are specific to the sport or activity in question, and can include scientific and technological approaches.
- **Practice at coaching:** how to apply the approaches and skills in practical situations.

Courses for aspiring or practising coaches are graded, and in most sports, the following order is adhered to:

- **Level 0:** At this level, the basics of coaching are covered. The course is aimed at teachers, parents or people who are beginners at the sport, and it has theoretical and practical components informing individuals of basic skills and knowledge of the sport.
- **Level 1:** This course is for the developing coach, who has previously attained Level 0 and wishes to acquire a broader knowledge of coaching in the sport and how the coaching skills are applied in practice.
- **Level 2:** This course is for coaches who have already been awarded Level 1 accreditation and wish to advance their skills and knowledge. Coaches who are aspiring to coach at regional level and higher should be qualified at this level.
- **Level 3:** This course is for coaches who have already been awarded Level 2 accreditation and wish to coach at national or international level.



Figure 13.19:
Participating in an accredited course can increase a coach's confidence in their coaching abilities.

The benefits of participating in an accredited coaching course include increasing your:

- knowledge of the activity
- confidence in your ability to coach
- competence as a coach
- range of coaching styles or techniques
- knowledge of safety requirements
- own and your participants' enjoyment of the sport or physical activity.

Internet activity

Log on to TitanOnline and complete Activity 13.3 by researching issues relating to the career of a professional coach in a sport of your choice.

Good coaches always seek to learn more about their sport or physical activity and the people who are in their care. They keep up to date in relation to new initiatives, and constantly strive to provide their participants with variety and new learning experiences.

Learning activity

1. Working in pairs, choose three sports or physical activities, and for each:
   a. record the state/territory and/or national governing body that is responsible for it
   b. identify each organisation's main aims
   c. research the coaching qualifications that can be obtained.
2. Outline the benefits of achieving a recognised coaching qualification.
3. Identify how an athlete or a player could benefit from gaining a recognised coaching qualification.
4. Explain the importance of professional development for coaches.
5. Reflect on your own experiences with sporting coaches and describe the qualities that you found most effective in encouraging you to participate and improve your performance.

Short- and long-term planning and evaluation

Short-term and long-term planning and evaluation are essential for all coaches. Each training session should be planned and structured and be an integral component of a long-term goal. Planning should include:

- adequate warm-up and cool-down
- skill development and practice
- acknowledging pre-season, in-season and post-season training
- macro-cycles and micro-cycles
- recovery methods
- evaluation.

Structuring a training session

It is important that a coach takes time to plan each training session. A coach should develop each training session by basing it on two or three goals that they have identified. All coaches should include the following elements in any training session:

- an introduction
- games and activities aimed at development of skill and fitness
- a warm-up and a cool-down
- an evaluation.

In relation to the session's content, the coach should:

- over-plan rather than under-plan, because it is easier to omit drills than to add unplanned drills
- include a variety of activities so the participants stay active and enthusiastic; they must also look for new ideas and adapt old favourites or games from other sports.

In relation to appropriate activities to include, the coach:

- should avoid activities that promote inactivity and drills where participants are eliminated, because it is likely that the participants who are first eliminated will be the less skilled ones. This group needs the most practice.
- should use groups that have a small number of participants rather than use a few groups that have a large number of participants
- should make the activities appropriate for each participant's ability and age
- must remember that even younger participants are capable of working independently in small groups. They should develop activity-station cards which explains the drill to be practised.

In relation to progression, the coach should:

- plan so that the activities flow smoothly from one to the next
- have the necessary equipment close at hand
- develop a routine so that the participants know what to do next.

In relation to practice, the coach:

- should give the participants enough time to practise the activities and experiment with them
- have the participants practise in small-sided games to develop player skills and technique.

Source: Sport Australia

Introduction and demonstration

Any coaching or training session begins with an introduction. The introduction should include a discussion that includes an overview of activities that are going to occur in the specific training session as well as upcoming events. The lesson focus and aim should also be communicated so all individuals are aware of any potential goals they are trying to achieve. Physical or pictorial demonstrations of what players are required to do usually follow an initial discussion. This ensures that athletes have a physical and mental image of specific skills or technique requirements. Learners gather a more in-depth analysis of the movement when they are able to observe another individual complete the skill; for example, a tennis coach who shows the position of the racquet during the back swing – that is, demonstrates part of the skill by holding the racquet in that position for the learners to see – can help learners to gain a deeper understanding and image of what they should work towards achieving.



Figure 13.20:
Any coaching or training session begins with an introduction.

Skill development and practice

At this stage, the coach develops and practises sport-specific skills and tactics with the participants. They will often introduce simple skills and, as the session develops, make the drill more complex to challenge the players.

Most of the training session is taken up with skill practice. The coach should aim to revise the skills the participants have already learnt and practise new skills with them. Skill practice should include individual work and group work. Many coaches incorporate the training session's conditioning phase and skills practice in one component in an effort to simulate the game situation.

Warm-up and cool-down

Coaches should begin all sessions by having the participants warm-up to raise their heart rate, respiratory rate and body temperature and to physically and mentally prepare them for the upcoming activity. The warm-up should take at least 10 to 15 minutes and should include whole-body movements, such as running, specific stretching exercises and sport-specific skills.

Coaches should conclude all sessions by having the participants cool down. The cool-down should last for five to 10 minutes and should consist of light, whole-body movements, such as walking, and stretching, so the participants are able to recover and to remove the lactic acid that has built up in their muscles.



Figure 13.21:
Coaches should conclude all sessions by having the participants cool down.



Figure 13.22:
By conducting an effective evaluation, coaches are able to eliminate ineffective practices and improve performance.

Evaluation

When a coach evaluates a training session, they analyse its strengths and weaknesses. By conducting an effective evaluation, they are able to eliminate ineffective practices and improve the participants' performance and their own performance.

Questions a coach would aim to answer during their training-session evaluation should include:

- Were the aims and purpose of the training session clearly communicated to the athletes at the beginning of the training session? Evidence of how this is demonstrated?
- Were the session goals achieved by the athletes?
- Were individual athlete goals achieved throughout the session?
- What activities worked well for the development of skills and technique?
- How can progress made throughout this training session be included in future training sessions?
- What new areas could be improved on for future sessions?

A coach should use a scaffold throughout the session to ensure their focus is continually drawn to the specific aims of the session. Coaches may also provide their athletes with individual feedback surveys to gather specific data from the players on how they felt the training session was delivered.

Internet activity

Log on to TitanOnline and complete Activity 13.4 about planning a training session.

Safety considerations

All coaches must create a safe and positive environment for their participants.

According to the results of Australian studies, each year about a million Australians injure themselves while engaging in sport or physical activity, and the highest rate of injuries is among children between five and 14 years of age.

To promote safety for participants, coaches should:

- create an environment that encourages fair play and playing within the rules
- plan all coaching sessions and keep records
- be aware of child protection responsibilities
- ensure that key medical information about the participants is collected and taken into account before participation
- conduct a warm-up before activity
- include activities that are appropriate for the participants' physical and skill levels
- progress activities at a rate suitable for all participants, and match participants in physical contact situations
- set and enforce rules for activities
- check playing areas, facilities and equipment to ensure they are safe for use
- ensure that safety equipment and protective devices are used during training and competition
- take the environmental conditions into account and modify activities if necessary (such as hot/humid or cold/wet conditions)
- provide adequate instruction and supervision
- consider individual needs and adapt/modify activities if required
- consider different athlete growth rates and maturation when planning activities
- undertake ongoing professional development.

Adapted from: Sports Medicine Australia



Figure 13.23:
All coaches should ensure that key medical information about the participants is collected and taken into account before participation.



Figure 13.24:
Safety equipment and protective devices such as helmets and gloves must be used during training and competition.

Learning activity

1. For a sport of your choice:
   a. Describe a warm-up that would be appropriate for the training session, and make sure you include a pulse raiser, some stretches and a sport-specific activity.
   b. Outline the skill-development drills and practice drills you would include for a specific skill during the session.
   c. Design an appropriate cool-down.
2. Outline the importance of including an 'overview' in the structure of training sessions.
3. Consider three people who participate in a team sport of your choice. Choose a skill, and explain how the training session could be adapted to cater for all three players.
4. Design a training session for a sport of your choice. Plan for the session to last for about 30 minutes, and remember to include all the elements of a training session. Use the session-plan template set out in Table 13.2 to record your training session.

Table 13.2: Training session-plan template.

Training session plan		
Date	Duration	
Venue		
Attendance	Equipment needed	
Introduction		
Warm-up activities	Cool-down activities	
Drills and games		
Coaching tips / challenges	Safety considerations	Review / evaluation

Long-term planning in coaching

Successful coaches know that failing to plan, is a plan for failure. A coach should have a long-term plan in which they outline the aims and goals they have formulated for each participant and the team. Effective long-term planning is not a set and forget exercise, rather it develops over time and sets benchmarks for consistent improvement. The key to successful long-term planning is to set out a 'big picture' or vision and then break this down into smaller, measurable short-term goals.

Long-term planning is dependent on the sport in question. Major sports such as rugby, soccer, netball and hockey are played during a competitive season that is at the same time each year. It often is convenient and effective to arrange long and short-term planning around splitting the competition into three phases: pre-season training, in-season training and post-season training.

Pre-season, in-season and post-season training

During pre-season training, the coach focuses on physical preparation for the upcoming season. They plan the training sessions to increase the participants' cardiovascular endurance, muscular endurance, strength and flexibility. Pre-season training should last a minimum of six weeks. The coach should use it to identify areas of individual fitness strength and weakness and adapt the training as appropriate.

During in-season training, the coach focuses on skill acquisition, application of tactics and maintenance of fitness. In-season training is skill specific, and during this phase, the coach concentrates on developing the participants' teamwork and basic fitness. They should modify and adapt the practices and drills to maintain the participants' interest.

During the finals or play-off season, the participants need to rest and recover, so the coach should lower the intensity of the training sessions. During this phase, participants have the chance to peak if the training sessions are fewer in number, shorter in time and/or lower in intensity.

During post-season training, the coach focuses on rest and rehabilitation. They train the participants to gradually reduce their participation and to in effect cool-down from the intense level of activity. Post-season training should include breaks from intense training so the participants stay motivated and in good physical and mental shape for the following season.



Figure 13.25:
During in-season training, fitness is maintained but the focus is on skill development, teamwork and tactics.

Did you know?

The term that is given to a coach's planning of training-session content over a year or more is 'periodisation'.



Figure 13.26:
The key to successful long-term planning is to set out a 'big picture' and then break this down into smaller goals.

Macro- and micro-cycles

Each of the three phases of training can be divided into smaller parts, which are called macro-cycles and micro-cycles. Table 13.3 shows the relationship between the phases and cycles.

Table 13.3: The relationship between the phases of training and the macro- and micro-cycles.

	Pre-season (Weeks 1–16)				In season (Weeks 17–40)				Post-season (Weeks 41–52)	
	General preparation		Specific preparation		Competition			Finals	Recovery, rehabilitation	
Macro-cycles (5–6 weeks each)	Prep	Base	Build	Build	Maintain	Maintain	Peak	Peak	Rehab	Recover
Micro-cycles (1–2 weeks each)										

Macro-cycles are generally of six weeks' duration and are usually characterised by a specific objective or goal. For example, at the start of pre-season training for professional football players, the coach might gradually increase the endurance demands they place on participants. The aim of this macro-cycle is to increase cardiovascular fitness. Conversely, a volleyball coach might use a macro-cycle to teach participants a new team formation in preparation for the following season's competition.

Micro-cycles are generally of one week duration, and the coach has specific short-term goals for each micro-cycle. For example, a hockey coach might spend the micro-cycle concentrating on penalty-corner drills. The focus is on repetition and practice of previously established set plays.

The coach might combine the short-term micro-cycle goals with a long-term macro-cycle goal. Table 13.4 contains an outline of six micro-cycles a coach could combine with a longer-term macro-cycle goal.

Table 13.4: Macro- and micro-cycles in practice.

Micro-cycle	Aim/s during the micro-cycle	Aim during the macro-cycle
1	Players participate in one-versus-one game scenarios to promote understanding of attack and defending roles.	To improve players' awareness of zones in invasion games such as basketball.
2	Players participate in small-sided games; for example, three versus two players, to promote tactical awareness.	
3	To introduce marking players where individuals closely guard their opponents	
4	To introduce players marking opponents while in specific zones during play.	
5	Rotating players throughout multiple zones to increase player understanding of different defending requirements for different zones.	
6	To conduct modified games to practise defending and attacking opposition within varying play zones.	

Recovery methods

Recovery is a vital part of any training program, and the coach plans periods of rest to minimise over-training, stress injuries, and player burnout and dropout. The coach should incorporate rest days in heavy-training programs and a recovery period after competitions or post-season activities to refresh the participants so they are ready for the start of the new season.

Cryotherapy, active recovery, stretching, compression garments and massage are used after training sessions and competitions to improve an athlete's recovery.

Cryotherapy involves immersing the body in cold temperatures after a competition or training session. Ice baths and specialised facilities allow part- or whole-body immersion in cold environments to target soft-tissue recovery. They are used to reduce muscle swelling and stiffness after intense physical movement. Athletes who use cryotherapy as a recovery technique will often incorporate three cryotherapy sessions throughout a week.



Figure 13.27:
Resistance bands aid recovery after training or competition.

Active recovery involves athletes continuing moving or participating in similar movements required by the training session or game at a decreased intensity afterwards. It significantly depends on the sport played and is done to continue encouraging the blood to circulate throughout the body to reduce muscle wastes, such as lactic acid, from settling in the muscles.

Stretching involves continuing to lengthen the muscles used to move within the sport. It encourages blood flow to increase the amount of oxygen and nutrients returned to muscles after the training session or competition game is complete. Stretching after movement is used to improve individuals' range of motion. Individuals are more likely to be able to stretch further than they could before because they have warmed up prior and during training or game play. Dynamic (moving) and static (stationary) stretches are involved in assisting athletes with quick recovery from performance.

Compression garments are designed to aid waste product removal, minimise swelling and decrease muscle soreness, and can be worn during and after sports participation. Some examples of compression garments include tights, socks, shirts and sleeves. Some are made with moisture-wicking material to help with the body's temperature regulation. The tight garments are a relatively easily accessible recovery method for athletes. However, they should be used in addition to other forms of recovery.

Athletes commonly receive massages or massage parts of their own body to promote positive recovery. Massaging muscles helps to reduce tension stored in the muscles and inflammation. Using a foam roller is a relatively inexpensive way for athletes to massage their muscles and reduce tight areas. Similar to stretching, rolling the muscles also promotes lengthening them and can help improve flexibility.

Learning activity

1. Choose a team sport and answer the following questions about it:
   a. Describe three activities that could be included in a pre-season training session. Explain why each of the activities is included and the goal or aim that the participants are to achieve by engaging in each activity.
   b. Divide the phase into macro-cycles and identify a short-term goal for each macro-cycle.
   c. Divide each macro-cycle into micro-cycles. Plan the training sessions for each micro-cycle, and identify a short-term goal for each micro-cycle.
   d. Choose a skill and describe a drill that could be used to develop it during the in-season phase of training. Explain why you have included the drill.
2. Choose a sport and design a pre-season session, an in-season session and a post-season session for it.
3. Research a training plan for your chosen sport. Compare and contrast the training plan with your own training plan, and analyse the similarities and differences between the two.
4. Explain how a recovery period could be used to enhance an athlete's performance.

Case study – training plans

Soccer player Steven Vogel follows a strict training plan to effectively prepare and maintain his performance. Steven's diet involves consuming six small meals each day to maintain a regular metabolic rhythm. He consumes sufficient amounts of protein through lean meats and supplements to aid muscle generation and recovery. Foods containing substantial amounts of refined sugar and saturated fats are avoided.

Five days a week, Steven participates in between three and four hours of training. This involves various exercises to improve his cardiovascular fitness and endurance, ranging between 25 and 30 minutes in duration. In addition to technical skill drill practice, high-intensity sprints are also part of Steven's training schedule. Training with his team members also contributes to a significant time of his schedule to promote improvements in tactical implementation, strategic awareness and communication.

Also part of Steven's routine is at least eight hours of sleep a night to foster recovery.



Figure 13.28:
Training programs should combine skill and fitness components.

Strength training that involves targeting specific muscle groups throughout each session is another part of Steven's daily routine. An example of a typical gym training session completed by Steven for one week would involve repeating the following circuits three to four times:

- **Day 1: Leg focus**
  - 8 barbell squats
  - 10 box jumps
  - 8 broad jumps
  - 8 jumping lunges per leg
  - 15 medicine ball toss.
- **Day 2: Rest day**
- **Day 3: Core stability**
  - 10 burpee pull-ups
  - 20 bench dips
  - 20 push-ups
  - 15 medicine ball passes
  - 15 push presses.
- **Day 4: Cardiovascular focus**
  - 5 power cleans
  - 8 x 200-metre sprints.
- **Day 5: Abdominal focus**
  - 10 dumbbell one-legged deadlifts
  - 10 tuck jumps
  - 10 hanging leg raises
  - 5 one-arm side deadlifts.
- **Day 6: Rest day**
- **Day 7: Cardiovascular focus**
  - 10 x 2 minutes skipping
  - 10 x 50-metre sprints.

Revision questions

1. Identify and describe the three styles of coaching.
2. Outline three coaching skills an effective coach will have mastered.
3. Describe the characteristics of a good leader, and analyse why that type of leader is so effective.
4. Explain the advantages a coach has if they have good observational skills.
5. Outline the problems a coach potentially has if they have poor communication and motivational skills.
6. Summarise the components of an effective training session for:
   a. children
   b. elite athletes.
7. Demonstrate how a coach can delegate tasks and responsibilities to a network of support personnel.
8. Distinguish between intrinsic motivation and extrinsic motivation.
9. Outline the strategies a coach could use to minimise risk and maximise their own and participants' safety.
10. For a sport of your choice, propose activities that should be included in a pre-season training session, an in-season training session and a post-season training session.
11. Explain the relationship between the phases of training, macro-cycles and micro-cycles.
12. Design a 30-minute coaching session on one skill for a sport of your choice. Include your organisation and basic instructions.
13. What is the most valid reason why coaches would delegate some of their responsibilities?
    a. To use the expertise of other support staff.
    b. To have someone to blame if things go wrong.
    c. To give ex-players an ongoing role with the club.
    d. To expose players to varying styles of coaching.
14. Which word does not associate with ethical coaching?
    a. Honesty.
    b. Fairness.
    c. Respect.
    d. Sarcasm.

CHAPTER 14

Enhancing performance: strategies and techniques

People who participate in a sport or physical activity learn valuable lessons to do with aspects such as discipline, teamwork and fair play.

Sport scientists and coaches are constantly looking for new techniques and training methods to give their athletes or players a competitive edge. Technique is dynamic, so it is constantly being changed as new developments and technologies become available.

The strategies and tactics that individuals and teams use are designed so the participants can gain a competitive advantage over the opposing team. Strategies and tactics are common in most sports and involve a considerable amount of pre-game preparation. Relevant statistical information is collected, analysed and applied so that opportunities for ratings of players and teams, game simulations and evaluation of tactics can be facilitated. Coaches use the statistical information to help determine a players or team's strengths and weaknesses.

Outcomes

A student:

- demonstrates actions and strategies that contribute active participation and skilful performance (PASS5-5)
- evaluates the characteristics of participation and quality performance in physical activity and sport (PASS5-6)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- displays management and planning skills to achieve personal and group goals (PASS5-8)
- performs movement skills with increasing proficiency (PASS5-9)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Rules and etiquette
- Movement skill, technique and performance
- Strategies and tactics
- Analysis and evaluation of performance



Figure 14.1: Effective practise is essential for increased proficiency and performance.

Rules and etiquette

Players, coaches and officials have to follow the rules of the sport or physical activity to participate equitably and safely. The rules can be official, local or modified, and everyone involved in the activity can follow the applicable code of behaviour to exhibit the appropriate standard of behaviour. The rules and codes of behaviour are a behavioural guide; they form the basis of expectations and are used to promote commitment to ethical and professional behaviour.

The term 'etiquette' is defined as being a code of ethical behaviour where people follow a convention and adhere to the norm. In sport, the term is defined as being an unwritten code that athletes, players, officials and spectators are expected to adhere to. Accepted etiquette may vary from sport to sport.

Official, local or modified rules

For game objectives to be achieved in a fair and respectful manner with minimal injury to players and spectators, rules are implemented by various governing bodies. When the rules are adhered to by participants and spectators, consistent decisions can be made by referees to encourage a fair playing environment. Without rules, the desired goals of each game would remain unclear to players and spectators and this would ultimately lead to reduced participation in sport and physical activities.

Rules are also created to ensure local, national and international clubs run their sporting organisations in an appropriate manner. Codes of conduct and disciplinary ruling procedures are generated to clearly dictate how organisations will conduct themselves throughout various events. The three main types of rules are official rules, local rules and modified rules.

Official rules

These types of rules are established and sanctioned by the governing body for the sport or physical activity in question. The International Netball Federation established a clear set of guidelines primarily focusing on ensuring all netball games are conducted in a fair manner while player safety is always considered as a priority. Players are responsible in ensuring that they are physically ready to participate in the game, while coaches are accountable for ensuring their players have an adequate understanding of the rules and the ability to participate according to them. Game umpires are in charge of enforcing the rules throughout game play.



Figure 14.2:
Official tennis rules are sanctioned by the International Tennis Federation.

The International Tennis Federation (ITF) is the regulatory body of tennis. It regulates 205 national associates, which include the Association of Tennis Professionals, Women's Tennis Association and the United States Tennis Association. These associations primarily focus on governing tennis throughout individual countries, ensuring that official tournaments and grand slams are organised according to regulations defined by the ITF.

The International Swimming Federation (FINA) regulates all aquatics sports including open water and indoor swimming, diving, water polo and artistic swimming. FINA developed a set of rules and regulations which ensure independent associations conduct competitions in a uniform manner. The World Swimming Coaches Association is responsible for providing all coaches with the necessary information and training to ensure coaches are universally training athletes under the same guidelines and against the same standards.

Local rules

These types of rules vary between competitions and are specific to the local area in question. Local rules are often used in competitions where the participants' age and the grade of competition are the determining factors.

The time that games are played for varies depending on the physical environment. Indoor games may be slightly longer in duration due to the ability to potentially regulate the temperature with air conditioning or heating. This allows players to be sheltered from weather elements such as wind, rain and heat. Depending on facilities, local clubs may decrease the time various games are played for and increase the number of intervals that occur.

Local rules will also vary in terms of management and disciplinary action that occurs following incidents. Certain clubs may be more lenient towards players; however, those with strict selection processes are likely to promptly respond to any negative behaviour.

Oztag rules state a maximum of eight players per team are to participate at once and it is recommended that teams contain equal numbers of male and females. However, clubs may decide to create smaller teams to encourage players to spend more time actively participating. Rules change depending on the age and grade of players. For example, in games with players under the age of 10, the defensive lines are unable to initiate movement until the ball has been passed at least once among the opposing team. This rule is in contrast to all other age grades, where the opposition can move as soon as the dummy half has contacted the ball.

Playing by local rules can also include rules that are specific to the playing conditions; for example, if large trees that are close to the boundary are an encroachment on the playing field, a ball that a cricket player has hit into the trees can be considered a 'six'.



Figure 14.3:
Local clubs may increase the number of rest breaks during games on hot days.

Modified rules

Modified rules are followed due to a range of factors such as the participants' age, gender, skill level or disability. As children are still physically developing, their body's ability to regulate their own temperature does not function as effectively as an adult body does. Therefore, in promoting safe participation in sport and physical activity, children often participate in activities with increased intervals and rest breaks to ensure that their body temperature is regulated. Also, in rugby league, children under 15 years of age are not permitted to perform tackles where an individual is lifted off the ground, to primarily enhance player safety.

The AFL Auskick program is a modified version of Australian football designed to enhance skill development rather than test a player's endurance. The field size is reduced and fewer players are on the field at any one time. This allows players to be in contact with the ball for longer periods of time. To ensure all players maximise participation, only one bounce is permitted. This modification encourages players to pass the ball more often among their team members.

Did you know?

'Reverse inclusion' is a growing trend in wheelchair basketball – allowing people with and without disability to play the game together socially.

Internet activity

Log on to TitanOnline and complete Activity 14.1. Research three modified sports and explain how the modifications would help develop the skills of children and encourage participation.

Kanga Cricket is a version of cricket in which modified rules are used so that children are encouraged to participate in cricket. It has been designed so that children can participate safely and have an equal chance of achieving success in the game.

The rules commonly used in Kanga Cricket are listed as follows:

- Each side must include at least six players but no more than eight players.
- The pitch must be between 14 and 16 metres long.
- The batters must bat in pairs for four overs and change either after a player is out, an over is complete or no run is scored from three consecutive bowls.
- Everyone in the team is to bowl a similar number of overs.
- The fielders must field in a circle around the pitch and must be rotated for each over.
- The score for each team must be the total number of runs divided by the number of wickets taken, whereby the winning team is the one that has the highest average.

Learning activity

1. For a sport other than cricket:
   a. Outline the existing rules.
   b. Discuss how local associations might use the game's rules to suit their own requirements.
   c. Investigate modified versions of it and evaluate their effectiveness.
   d. Design a new, modified version of it and outline the purpose and benefits of the modified game.
2. Participate in a range of modified sports. Assess the advantages and disadvantages of each for children who wish to participate in a sport or physical activity.

Codes of behaviour

A code of behaviour is a set of consistent guidelines in relation to an acceptable standard of conduct. Its main purpose is to ensure that everyone involved in the sport or physical activity exhibits an appropriate standard of behaviour. It is a both a guide and the basis of the expectations of everyone involved, and is used to promote commitment to ethical and safe and fair behaviour.

To establish codes of behaviour, sporting club committees can use or modify codes of behaviour that are developed by their respective sporting associations. Examples of codes of behaviour that apply to different stakeholders are shown in Table 14.1.

Table 14.1: Sporting codes of behaviour.

Stakeholder	Code of behaviour
Players	▪ Understand and follow the rules of the game. ▪ Respect officials, opponents and volunteers. ▪ Play fair and always put in your best effort. ▪ Be a good sport. ▪ Respect and cooperate with teammates.
Parents	▪ Encourage rather than criticise. ▪ Address your comments to your own child. ▪ Respect officials and volunteers. ▪ Show zero tolerance for violence or verbal abuse. ▪ Act as a role model and encourage children to be good sports.
Coaches and teachers	▪ Ensure a fair go for all participants. ▪ Make safety a priority. ▪ Seek qualifications and training to keep knowledge up to date. ▪ Encourage parents to provide support in a positive manner. ▪ Adhere to the rules and encourage players to play by the rules. ▪ Respect officials and volunteers. ▪ Keep communication with players open and fair.
Officials	▪ Encourage players and acknowledge good behaviour. ▪ Ensure decisions are fair and inclusive of all participants. ▪ Be proactive to avoid unsporting behaviour and ensure all participants are aware of their respective codes of behaviour. Make safety a priority.
Spectators	▪ Keep feedback, applause and comments positive and respectful. ▪ Show respect to officials and avoid questioning decisions. ▪ Avoid ridicule or negative criticism. ▪ Have zero tolerance for violence, verbal abuse and aggressive behaviour. ▪ Act as role models by showing respect to opponents, regardless of results or on-field behaviour. ▪ Encourage players to adhere to the rules and officials' decisions.

Accepted etiquette

The term 'etiquette' is defined as being a code of ethical behaviour whereby people follow the relevant convention and the accepted norm. In sport, 'etiquette' means an unwritten code that the athletes, officials and spectators are expected to adhere to.

Golf is a sport that is characterised by many unwritten codes of behaviour, and following is a list of examples of the behaviour expected of golfers:

- **Safety:** Before playing a stroke, ensure that no one will be hit by the club or ball.
- **Quiet:** Allow all players to concentrate; don't move excessively, talk or create a disturbance while other players are hitting the ball.
- **One at a time:** Ensure that strokes are played one at a time; walk quickly between shots, and be ready and willing when it is your turn to play.
- **Divots:** If possible, carry a sand bucket so divots can be repaired by filling the indentation with sand and replacing the displaced grass.
- **Bunkers:** After the shot, rake the sand and always leave the bunkers smooth.



Figure 14.4:
Individuals playing golf should be aware of the many unwritten rules of behaviour while on the golf course.

Internet activity

Log on to TitanOnline and complete Activity 14.2. Analyse several examples of golf etiquette, other than those listed below. Explain how these examples contribute to good sporting behaviour and enjoyment of the game.

Learning activity

1. Describe what etiquette is and its role in sport.
2. Identify three sports, other than golf, that etiquette has an important role in. List the points of etiquette for each.
3. Predict the effects of failure to adhere to a sport's etiquette.
4. In pairs, invent a sport. Briefly describe it and outline its governing rules. Give a detailed description of the etiquette that participants should adhere to, such as 'Bow before entering the field of play', 'Shake hands with each teammate after scoring a goal' or 'Form a guard of honour for an opposition player if they score'.

Games which incorporate rules from different sports

Games which incorporate rules from different sports are devised to increase participation, improve skills and increase enjoyment.
An example of a game which incorporates rules from different sports is 'Speedaway'.

Speedaway incorporates aspects of touch football, basketball and soccer. It is played using a soccer ball and teams consist of 11 players. Teams are broken down into forwards, midfielders, defenders and a goalie. The field is set up with two halves, broken up into quarters and a 'D' at either end where the goalie is situated. Instructions on how to play Speedaway are shown in Table 14.2.



Figure 14.5:
Speedaway incorporates aspects of touch football, basketball and soccer.

Table 14.2: Speedaway rules and scoring procedures.

Rules	▪ Each team must start on their side of the midline. ▪ The game begins with the ball on the ground like in soccer. ▪ If the player with the ball is tagged by the opposing team, they must drop the ball and hand possession to the other team. The opposing team must then kick the ball off from wherever it was dropped on the ground. ▪ To pass to a teammate, a kick, throw or bounce pass can be used. ▪ If using a bounce pass, it must only bounce once or possession will be changed over. ▪ When the ball goes out of the playing field, the team which touched it last loses possession. ▪ Only the goalie can pick the ball up with their hands; other players can kick the ball up to themselves, or catch a ball that is kicked into the air.
Scoring	▪ 3 points for kicking the ball through the other team's upright goals (like in rugby league). ▪ 2 points for kicking the ball through the goals but below the crossbar. ▪ 1 point for running across opponent's line with possession of the ball.

A player or team may be penalised for a number of different things. A free kick to the opposition is awarded if a player is overly aggressive, either when tagging the opposition or in general play. If a player picks the ball up off the ground and is not the goalie, possession will change over. Also, if a player takes too long to place the ball on the ground after being tagged, their team is penalised.



Figure 14.6:
Modifications can assist players to enjoy participating in physical activities by providing a more equitable environment.

Modified games

To increase participation in sport and physical activities, games have been modified to allow for people with diverse needs to participate. Modified games consider the different developmental stages of students, including physical, cognitive and social. One group that games may be modified for is young children. The modifications recognise that young children may need smaller fields, shorter game durations and lighter equipment. For example, modified cricket formats now include shorter pitches, shorter boundaries, less players on the field and a guaranteed opportunity to bowl and bat. Walking Football is another modified game; individuals play football but at a reduced speed. This helps to reduce the chance of injury that potentially could occur and encourages greater skill acquisition due to the decrease in speed.

In making sports more inclusive to individuals with exceptional needs, specific equipment and modified rules accommodate for individuals to participate. Individuals with spinal cord injuries, spina bifida, cerebral palsy and lower extremity amputations or joint disorders may find that wheelchair basketball is a suitable sport. Wheelchair basketball has some different rules from running basketball; for example, wheelchair basketball does not have a double-dribble rule. The traveling rule also differs in that a violation is called in wheelchair basketball if the player takes two more pushes while in possession without bouncing the ball. These modifications assist players to enjoy participating in physical activities by providing a more equitable environment.

Handcycling encourages people with disability to become involved in a modified form of cycling. While seated in a modified bike that has similar gears to other bikes, individuals use their upper body rather than lower body to propel themselves. Handcycling has been recognised as an excellent way to improve cardiovascular fitness and upper body strength.

Importantly, these sports are not exclusive to people with disability but allow all people to participate when using the specific equipment.

Movement skill, technique and performance

A skill is a learnt ability to practise and perform movements with confidence and success. Skills within physical activity and sport contexts, including sport-specific actions and movements like catching, dodging and jumping, are the foundation of quality movement performances.

Movement skills are practised in a range of physical activity and minor games contexts. For example, learning a new skill or improving a previously learnt skill allows safe participation in physical activity, opens new opportunities to participate in new sports and engage with new social groups, and develops self-worth and value because of a new ability.

Movement skills are often not limited to specific sports, and can be applied to, and developed in, a range of movement contexts. Often, movement skills start at a basic level, and as individuals become more experienced, these skills are used to learn more specialised skills in more complex movement contexts. Ultimately, fundamental movement skills are the foundation for more specialised movement skills and sport-specific performances.

Importantly, some sport-specific movement skills cannot be transferred across all sports; for example, the fundamental movement skill of sprint running is not transferable to a sport such as lawn bowls. However, within specific sports, these skills can be refined and developed to practise more specialised versions of the movement skill, to therefore enhance the quality of the performance.

Mastering movement skills allows for an improvement in technique and performance.

Did you know?

Transfer of skills has enabled 48 footballers to reach dual-code international status, meaning they have represented their country at both rugby league and rugby union.

Movement skills

Specialised movement skills

People develop specialised movement skills when they have mastered the fundamental movement skills. Development of specialised movement skills is highly dependent on whether the person has the opportunity to practise using them, receive feedback and is encouraged to practise them.

An example of the many specialised movement skills that exist is fielding a ground ball in softball or climbing a rock wall. Specialised movement skills can also result from combination of fundamental motor skills in order to create a new skill, such as the spike in volleyball, whereby jumping and striking are combined into one movement.



Figure 14.7:
Fielding in softball uses multiple specialised movement skills.

Activities that develop movement skills

Activities, games, physical activity and sport are used so that people's movement skills can be developed. Once a person has mastered the FMSs, more complex skills can be learnt. Activities such as dancing and gymnastics are excellent activities for development of movement skills because participants are required to create, rehearse and perform movement sequences. People who engage in activities such as these are also enabled to respond to feedback and to provide appropriate feedback to improve their own performance and/or another participant's performance.

Transfer of movement skills

The transfer of movement skills can be positive or negative. This means that when learning a new skill the understanding of a previously learnt skill can be applied to learning a new skill.

Positive transfer occurs when the two skills are similar, for example gymnastic and diving skills. Having successfully performed skills such as tumbling and rotation in gymnastics makes the transfer of skill easier when learning the skills involved in diving. Positive transfer of skill is most effective when similar skills are being practised, and learning environments are similar. The positive transfer of skill is further enhanced when the individual understands the similarities of the skills and they have mastered the original skill before transfer occurs. When similar skills are being practised and learnt, it allows the development of a learnt skill, rather than learning a completely new skill from scratch, hence increasing the speed of transfer.

Negative transfer occurs when the two skills are similar, but the execution of the skill is different. For example, when you are playing the squash and tennis forehand – even though the strokes involve similar tracking and timing, the biomechanics and execution of the skill are completely different. The squash player will generally use their wrist to 'flick' the ball in a lot of shots, while the tennis player uses their racquet grip and arm motion to generate spin on the ball.

Learning activity

1. Choose a sport which you have had experience in and explain how the skill you have mastered in that sport could transfer to another sport.
2. Explain the difference between fundamental movement skills and specialised movement skills.
3. Complete a Venn diagram in which you compare the similarities and differences between fundamental movement skills, specialised movement skills, locomotor movement skills and manipulative movement skills.
4. Design a circuit that includes 10 stations. For each station, focus on a specialised movement skill such as a volleyball spike, a cricket cover drive or a hockey flick pass. Incorporate a locomotor movement skill in the transition between each station.
5. Choose a sport or physical activity and create a list of the specialised movement skills that participants must have for it.
6. In your own words, describe movement skill transfer. Provide examples of sports or physical activities and the specific skills for them – for example, the chest pass in netball and basketball – whereby the movement skill transfer is positive.



Figure 14.8:
Poor technique and form in diving can lead to inefficient movement and skill execution and possibly to serious injury.

Correct techniques for effective skill execution

In every sport or game, one of the most important things for achievement of good results is mastery of proper technique. If participants don't perform each movement correctly, they will never reach their full physical potential. It takes a lot of time and effort to perfect technique.

Participants who have poor technique and form limit themselves in relation to reaching their full potential. Poor technique and form lead to inefficient movement and skill execution and possibly to serious injury.

Participants who wish to perform well at any level of sport must acquire a number of skills. The learning of a skill begins with mastery of the basic skills and techniques, and progresses to application of the skills in increasingly competitive situations.

One of a coach's main responsibilities is to give their participants opportunities to learn and practise their skills in a positive and constructive environment. In facilitating appropriate learning of skills, and especially at junior level, the coach can set the platform for the participants' future, potentially elite, performance.

One of the coach's most important roles is analysis of a participant's skills, which means ability to look at a participant, evaluate what they are doing and know what they should do next. Skill analysis can be divided into the following three parts:

1. Observation of the participant when they are performing the skill.
2. Analysis of the performance's effectiveness.
3. Detection and correction of errors to improve the performance and skill execution.

To analyse a participant's performance effectively, coaches must plan what to observe and how to observe it so they can give the participant feedback, correct their technique and help them effectively execute their skills.

In applying the technique correctly, participants can also maximise the economy of an action or a skill by eliminating unnecessary movement and thereby eliminating wasted motion or effort.

Errors in technique

Incorrect technique can increase the chance of individuals sustaining injuries. Overuse injuries are primarily a result of individuals repeatedly completing a movement or action without correct technique. Correct technique places less strain on the body, especially in sports where particular movements are continually repeated, such as a tennis serve.

Errors in technique may initially be a result of improper equipment, clothing or footwear. Athletes should always seek professional advice about correct playing equipment and attire. For example, if a gymnast's clothing is too tight, it reduces the range of motion that they can achieve and potentially cause injury by restricting movement.

Incorrect technique may also be identified by athletes or coaches videoing themselves as they perform specific movements and then reviewing their performance in slow motion. This may be necessary for movements that are crucial to performance yet completed in an extremely fast motion, such as a tennis serve or kick in football. For other movements, such as basketball layup, coaches or athletes may break down the whole movement into parts, including the dribbling, leap and release of the ball movement to analyse the components separately to ensure that correct technique is being used.

By receiving correct coaching from accredited coaches, individual athletes are likely to minimise injury and improve their performance by performing movements with correct technique. For a gymnast, coaches may give suggestions to increase movement success and efficiency including 'jump higher', 'tuck the body tighter when rotating' and 'swing arms more forcefully during take-off'.

Previously, swimmers were encouraged to pull their hands back through the water in a linear motion to propel themselves forwards. However, by observation and technique refinement, coaches have identified a more efficient way for swimmers to improve their speed – by moving their hands in a short sweeping motion instead of a singular linear movement.

The Fosbury Flop now used in high jump was another technique development that has allowed athletes to improve their performance. Unlike the straddle technique or Western roll, the Fosbury Flop allows athletes to approach the jump with faster speed and elevate their body higher.



Figure 14.9:
By receiving correct coaching from accredited coaches, athletes are likely improve their performance by performing movements with correct technique.



Figure 14.10:
The Fosbury Flop technique has improved results in high jump competitions.

Changes in technique and skill execution

Players and athletes use variations in their technique and skill execution to either gain an advantage over their opponents or combat changes in the environmental conditions. Some examples of variation in technique and skill execution include:

- placing spin on the ball in cricket
- use of the fade or draw in golf
- pitching in baseball or softball
- swing or seam bowling in cricket.

Technique is commonly varied in golf, where the golf ball might end up lying behind a tree and the player has to use a special technique or skill execution during their shot to curve the ball around the tree.

Variation of technique is also commonly used in cricket, where the bowler's main goal is to dismiss the batter. They can often do this by delivering the ball in a manner the batter is not expecting. It is essential that batters not know what the next delivery is and that bowlers surprise them by using a range of deliveries, including the techniques known as the outswinger, the inswinger, seam bowling, the off cutter, the leg cutter, the slow ball, the reverse swing, the off spinner and the leg spinner.

Baseball is another sport in which the players, especially the pitchers, commonly vary their technique and skill execution. The common pitches in baseball are the fastball, the curveball, the knuckle ball and the slider. Pitchers achieve variances in technique and skill execution by varying their finger placement and their grip on the ball.

Dynamic nature of technique

Due to the importance of sporting technique, sports scientists and coaches are constantly trying to evolve techniques and training methods where participants will gain a competitive edge. The term 'the dynamic nature of technique' means that technique is always evolving as new developments and technologies become available.

Swimming is a sport in which technique has significantly changed over time. Today, with increased awareness of the adverse effects of frontal drag, there is significant emphasis on performing techniques that reduce drag. No significant reversal or removal of techniques has occurred; rather, there has been greater refinement of advantageous ways to improve performance. There is now an increased emphasis on the kick in freestyle being tighter and occurring in both directions, while increased body rotation is now common to increase power and distance. The freestyle pull has also developed – from a large and deep S-shape to a straighter motion with shorter sweeping movements of the wrist – to improve speed by the swimmer moving their hands in a short sweeping motion instead of a singular linear movement.

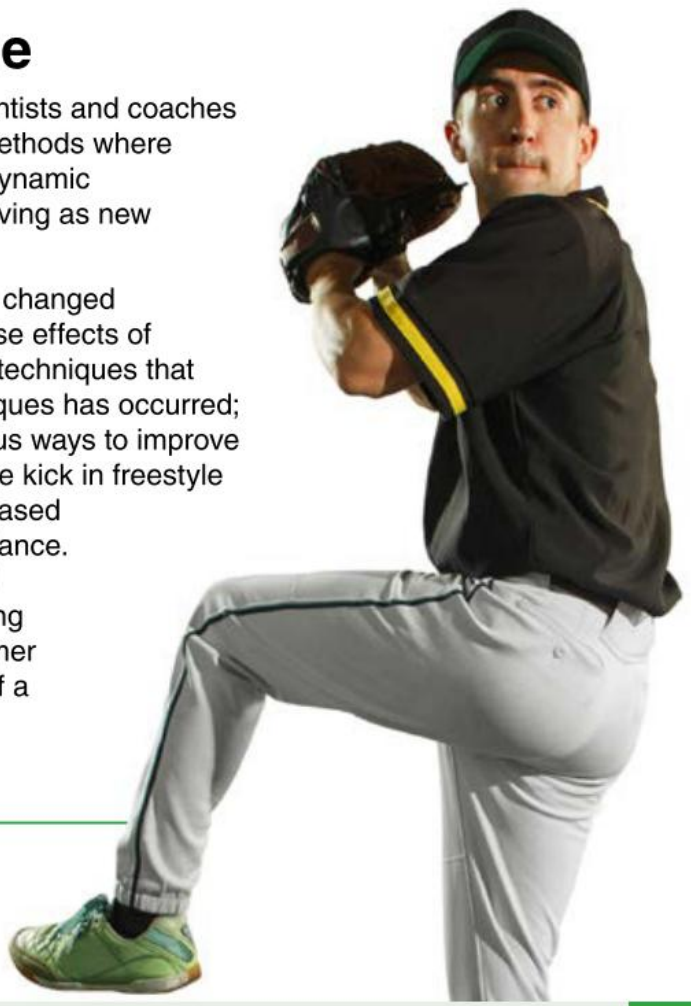


Figure 14.11:
Baseball pitchers achieve variances in technique and skill execution by varying their finger placement and their grip on the ball.

Learning activity

1. Examine video footage of a sport or physical activity such as gymnastics or diving. Watch the routine or dive in slow motion, and identify any errors in technique.
2. Watch a video of a skilled golfer in action and analyse their stroke. Determine why they are a skilled performer.
3. For a sport of your choice, create a checklist for a coach to use when they are evaluating technique in relation to a variety of skills.
4. Research how professional golfers can change their technique and execution to achieve different performance goals (for example, to hook the ball right to left around a tree or to hit the ball low to counteract an oncoming wind).
5. Investigate how to bowl a range of deliveries in cricket, including the inswinger, outswinger, the slow ball, leg spin and off spin. First practise the deliveries individually and then practise them against a batter. Describe the difficulties you faced in mastering the deliveries.

Strategies and tactics

‘Strategy’ can be defined as being the pre-game decisions that are based on the known strength of your own team and/or knowledge of the opposition team. ‘Tactics’ can be defined as changes made to the original plans because of occurrence of events during the game.

The strategy is the overall game plan, and tactics are how it is executed or implemented. In coaching, viewing of match videos has been a much used tool since the 1980s whereby coaches and support personnel view and analyse the videos to design their game plan and prepare their team for the next match and the individual opponents in that team.



Figure 14.12:
Volleyball players may tactically swap positions according to the players’ roles in the team.

Strategies and tactics for improved performance

Existing strategies and tactics

The strategies and tactics that individuals and teams use are designed so the participants can gain a competitive advantage over the opposition. They are now becoming more of a science, and involve a considerable amount of pre-game preparation. Table 14.3 contains an outline of some examples of the strategies and tactics that are used in a range of Australian sports.

Table 14.3: Examples of the strategies and tactics used in sport.

Sport	Strategy or tactic
Football	▪ Expand on offence and use the whole field. ▪ In defence, become a compact unit; enclose the area in which your opponent has possession of the ball and thereby make the ball difficult to pass.
Hockey	▪ Set plays on short corners. ▪ Use defensive combinations, according to the opposition's attacking skills.
Basketball	▪ Use player-to-player defence and zone defence. ▪ Use screens and fast breaks to set offensive plays.
Rugby union	▪ Re-position players in the attacking line to create a mismatch. ▪ Use a running game to recycle possession at the attacking end of the field. ▪ Use set plays from line-outs and scrums.
Australian football	▪ Use flooding, whereby all the players come back to the defensive end of the field. ▪ Use tagging, whereby you identify playmakers and mark them very closely. ▪ Keep the ball wide and in open space rather than kick it to a contest.
Softball	▪ Walk big hitters. ▪ Use the bunt to progress players on bases.
Tennis	▪ Use attacking and defending formations in doubles play. ▪ Use the serve-and-volley technique. ▪ Play shots to a perceived weakness in the opposition; for example, their backhand.
Volleyball	▪ Use setters and hitters in attacking plays where four players are designated as hitters and the other two as setters; this method is known as the four–two system. ▪ Use back-court switching, where players swap positions according to the players' roles in the team.
Netball	▪ Use switching in the defensive goal circle. ▪ Using screens in the attacking circle to free up the goal shooter.
Cricket	▪ To batters, bowl a line or length that has historically caused them difficulty or uncertainty. ▪ Set the field to prevent the opposition batters from playing their favoured or stronger shot, such as the cut shot.
Water polo	▪ Use an umbrella offence. ▪ Set plays when the defensive team is down a player due to a penalty.
Touch football	▪ Use various defences such as the umbrella or the sliding defence. ▪ Design attacking plays to target the same defender or a perceived weaker defender each time.

Designing new strategies and tactics

Each team will have different perceived strengths and weaknesses. New strategies and tactics need to be devised for each different opponent. Teams now use a range of strategies to gain an advantage over their opposition. One of them is use of scouts to watch for any upcoming opposition and take notes about any specific tactics used throughout the game. The teams then use the information to devise a game strategy and any possible individual and team tactics. During training sessions, the players practise using the tactics and put into place any variations, in readiness for the upcoming game.

Internet activity

Log on to TitanOnline and complete Activity 14.3. In small groups, compete in a sport of your choice, videotape the games and complete the activity about developing tactics, strategies or set plays.

Coaches try to prepare their participants not only physically but psychologically. Coaches will show their team video footage of games their upcoming opponents have played in or notes about the opponents' strengths and weaknesses so that the participants can mentally prepare for the types of strategies and tactics they will be using to enhance their performance.

Strategies and tactics have to be evaluated so an improved performance is ensured. Notes are taken about what did or didn't work against the opposition, and practice sessions should be evaluated so that what was effective can be determined. It is important to make improvements and learn from poor results and performances.

Improvisation

Improvisation is an activity that people engage in without preparing for it. In sport, it involves decision-making during the course of the game. Participants react instinctively to what they see happening in the game, and then try something new or different to achieve success.

Participants need to be flexible in implementing their planned strategies and tactics. Sometimes a strategy or tactic will not work or will have to be modified, depending on how the opposition responds to situations and plays. Improvisation might be used where a tactic is substituted with another or with a variation on the tactic.

Learning activity

1. Identify the strategies and tactics that are used to enhance performance in a sport or physical activity.
2. Watch video footage of a professional sport or physical activity, and analyse the strategies and tactics that the individuals or team used. Identify any examples of improvisation.
3. Provide examples of tactics, such as time wasting, that would be considered indicative of unfair play.
4. Design, perform and evaluate some strategies and tactics aimed at improvement of participants' performance.
5. Describe an example where you have improvised to gain a competitive advantage during a game.

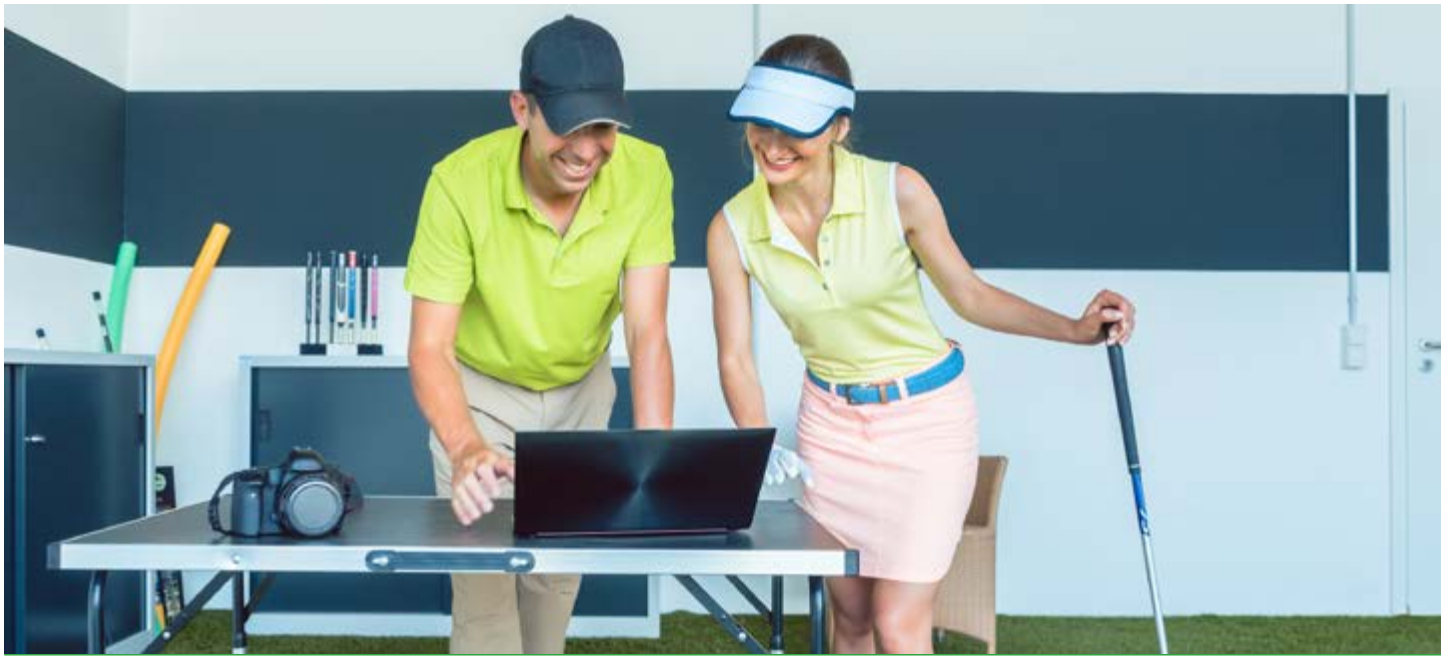


Figure 14.13:
A coach may use measurement and testing results to motivate the participant.

Analysis and evaluation of performance

In sport and physical activity, the term 'performance' translates to assessment of how well a task is executed, where a training program's success is mostly dependent on achievement of the performance aims associated with the program.

Testing and measurement are the means by which information is collected. This is used as the basis of analysis and evaluation of subsequent performances, and the basis of future decision making.

It is important that tests are constructed to measure the factors that have to be tested and that they are objective rather than subjective. All tests should therefore be specific (that is, designed to assess a participant's fitness or skill level for the activity in question), valid (the extent to which the test can actually be used to measure what it is claimed to measure), reliable (able to be consistently repeated) and objective (lead to a consistent result, irrespective of the tester).

A coach might use a participant's test results to:

- predict the participant's performance
- evaluate the performance
- indicate the participant's weaknesses
- measure the participant's improvement
- motivate the participant
- enable them to assess the success of their training program
- place the participant in an appropriate training group.

The coach may also use the test results to break up the training program and add variety to it.

Evaluation methods

Feedback

Feedback is an integral component of learning. Coaches provide it to their participants to:

- reinforce a successful performance or movement skill
- remove any errors
- motivate the participants.

Providing constructive feedback is an essential skill for any coach. It is the accepted process for relaying the effects of a participant's performance for their benefit and learning. If participants did not receive any feedback, they would find it difficult to progress and to reach their potential. The two purposes of giving feedback are to reinforce positive performance and to improve future performance.



Figure 14.14:
The coach gives concurrent feedback while the participant is performing the skill.

The various types of feedback are outlined as follows:

- **Intrinsic feedback:** This type of feedback is in the form of information a participant receives from their senses in relation to how they are performing a movement skill. Participants can use intrinsic feedback to develop a kinaesthetic sense or 'feel' for the movement by way of their muscles, joints and balance.
- **Extrinsic feedback:** This type of feedback is also known as augmented feedback. A participant receives it from outside sources such as the coach, a teammate, a spectator or a parent. The two categories of extrinsic feedback are outlined as follows:
  - Knowledge-of-performance feedback consists of information about the participant's technique and performance, whereby the focus is on the success of the performance. An example is the information gained from analysis of the throwing technique used in a javelin throw.
  - Knowledge-of-results feedback consists of information about the result of the performance. An example is the distance of the javelin throw.
- **Concurrent feedback:** The coach gives this type of feedback while the participant is performing the skill. An example is when an athlete is performing a somersault. The brain receives information and processes it so that if the person is over-rotating or under-rotating while in flight, they can make the adjustment needed to still land on their feet.
- **Delayed feedback:** The coach gives this type of feedback after the participant has performed the skill. An example is the putting action in golf, whereby the player does not receive the feedback until after the ball has either gone into the hole or missed it.

When coaches are considering feedback during a competition, they must consider the amount and type of it. They must provide accurate feedback in a timely way while encouraging the participants to develop their own intrinsic feedback. If a participant relies too heavily on external feedback and subsequently minimises their own intrinsic feedback, their performance can suffer in game situations in which opportunities for external feedback might be limited.

The guidelines for giving feedback are as follows:

- Encourage participants to self-reflect, because they will be more willing to accept criticism if they have recognised their own strengths and weaknesses. Start by encouraging them to appraise themselves, and then build on their insights.
- Emphasise what you see and hear the participants do, and make your feedback descriptive rather than evaluative.
- Concentrate on the participants' specific areas of performance, and make your feedback specific.
- Outline the positive points of the performance, because by making your feedback constructive rather than just telling participants what they are not doing right, you will be helping them find out what they have to do. Rather than focus on what went wrong, always look for areas of improvement.
- Indicate what the participants can do and should do. Make your feedback practical so the participants can do something about it, and include specific ways in which they can improve.
- Work on giving the right amount of feedback at the right time. Be aware of the participants' emotional needs when you are considering when, what and how you will deliver feedback.
- Take time to explain things to participants properly and give them opportunities to contribute their thoughts so you enable them to show they understand what you have said. By doing this, you can identify and rectify any misconceptions in relation to the participants' performance level.



Figure 14.15:
Trainer and coaches should take time to explain things to participants properly.

Learning activity

1. Investigate the difference between intrinsic and extrinsic feedback. Give examples of how the two types of feedback are applicable to a young child, an adolescent, an adult and an elite athlete.
2. Practise hitting softballs from a batting tee. Have a partner evaluate your technique and performance by giving you appropriate feedback when necessary. Provide constructive feedback, using technology if possible; for example, slow-motion video.
3. Outline how an athlete could use intrinsic feedback to evaluate their own sporting performance. How could they benefit from receiving that type of feedback in a game situation?
4. In some sports, such as tennis, coaching from the sideline during a match is not permitted. List the advantages and disadvantages of this regulation in relation to provision of feedback and formulation of strategies and tactics.



Figure 14.16:
Extensive statistical information is recorded for each cricket player during all of their matches.

Statistics

In collecting, analysing and applying relevant statistical information, coaches have an opportunity to rate players and teams, simulate games and evaluate tactics. They obtain information which gives them a clearer idea of an individual's or team's strengths and weaknesses.

In the National Rugby League (NRL) competition, information is gathered regarding points scored, number of attacks and tackles as well as those missed, passes, kicks, line break assists, try assists and metres gained throughout games. These statistics are provided to the general public online and available to view since 2013. The statistics gathered during each game allow individuals to compare the achievements and performance of each NRL player within and against all teams in the competition.

Cricket is a sport in which coaches, players and supporters can acquire extensive statistical information. Although cricket statistics have been being recorded since the late 1800s, they have mainly been used for comparisons of players' batting and bowling averages. Statistics are recorded for each player during all their matches and are aggregated over their career. At professional level, the statistics for Test cricket, one-day internationals (ODI) and Twenty20 (T20) cricket are recorded separately. Professional cricket coaches use computer records of ball-by-ball analysis to obtain more-detailed statistical information about players' performances. International batting and bowling averages of top Australian cricketers (as at August 2019) are set out in Table 14.4.

Table 14.4: The international batting and bowling averages of top Australian cricketers.

Steve Smith's batting averages

	Matches	Innings	Not outs	Runs	High score	Average	Strike rate
Tests	66	120	16	6577	239	63.24	55.93
ODIs	118	104	12	3810	164	41.41	86.31
T20s	30	25	5	431	90	21.55	122.44

Table 14.4: The batting and bowling averages of top Australian cricketers. *(continued)*

David Warner's batting averages

	Matches	Innings	Not outs	Runs	High score	Average	Strike rate
Tests	77	143	5	6442	253	46.68	74.16
ODIs	116	114	5	4990	179	45.77	95.55
T20s	70	70	3	1792	90*	26.74	140.10

Mitchell Starc's bowling averages

	Matches	Innings	Balls	Runs	Wickets	Best innings	Best match
Tests	51	97	10,532	5,951	211	6/50	11/94
ODIs	85	85	4,315	3,611	172	6/28	6/28
T20s	23	23	525	592	31	3/11	3/11

Nathan Lyon's bowling averages

	Matches	Innings	Balls	Runs	Wickets	Best innings	Best match
Tests	89	170	22,799	11,506	357	8/50	13/154
ODIs	29	29	1,626	1,334	29	4/44	4/44
T20s	2	2	30	48	1	1/33	1/33

Source: www.espncricinfo.com

Learning activity

1. Explain how coaches can use graphic and statistical information to evaluate their participants' performance level. Explain how the coaches can use the information to predict the participants' performance level.
2. For a sport of your choice, compare a current superstar's statistical information with a retired champion's. What are the limitations of using statistics to compare athletes from different eras?
3. For a sport of your choice, select and watch a game. Determine a list of measurable qualities that are associated with the sport, and throughout the performance, record one player's statistical information. Table and graph the information, and evaluate the player's overall performance.

Use of technology

Over the past two decades, information technology has had an impact on almost every aspect of our life and has become increasingly used in sport. Computers are now an essential component in designing sports resources and equipment, from Formula 1 cars to golf clubs and training shoes.

The internet is used to access a myriad of information about diet and fitness as well as tailor-made training schedules. Fitness-testing equipment, biomechanical analysis, simulators, communication devices and training aids are just a few examples of the technological advances that have been made in relation to sports performance.



Figure 14.17:
Information technology has become increasingly used in sport.

Internet activity

Log on to TitanOnline and complete Activity 14.4. The activity involves teaching a skill to a classmate and videotaping their progress, with and without feedback.

Judging criteria

Sports can be evaluated using personal and prescribed criteria. Personal criteria are subjective and influenced by a judge's personal knowledge and opinions of the performance. It is common for spectators to appraise sporting performances by using personal criteria. Such decisions are purely based on dynamic feelings and involve a significant amount of bias. Determining the most valuable player or player of the match requires coaches or officials to use personal criteria to determine the outcome.

In contrast, prescribed criteria are often developed by governing bodies or officials and can include checklists or rating scales. Prescribed criteria are very specific and clear about how the performance will be assessed, helping to eliminate judging bias in performance. It is still possible for prescribed criteria to involve subjective measurement. For example, it may use terminology such as 'effective' or 'average', allowing for the assessor to personally determine what that physically looks like throughout a performance.

Criteria are used less significantly in sports such as soccer, where scores are clearly demonstrated by the score of a goal. However, in performance sports such as diving and gymnastics, despite criteria being used, assessment is influenced and determined by the judge's knowledge and opinions.



Figure 14.18:
Despite criteria being used, assessment can be influenced by a judge's opinions.

Objective or subjective evaluation

Two common techniques that are used for analysis and evaluation of sporting performance are objective and subjective measurement of skill. During an objective measurement of skill, an athlete's performance is measured without being influenced by a judge or an observer; for example, the 100-metre sprint. During a subjective measurement of skill, the measurement of the performance is influenced by the feelings, impressions, belief or bias of a judge or an observer; for example, in the case of a gymnastics routine.

Various methods such as use of marking criteria, checklists, rating scales and multiple judges are used in an effort to make subjective measurements as objective as possible.

Some examples of the objective and subjective measurements that are used in cricket, soccer, basketball and golf are set out in Table 14.5.

Table 14.5: Examples of objective and subjective measurement.

Sport	Objective measurement	Subjective measurement
Cricket	Batting (runs scored)	Leg before wicket (LBW) decisions
Soccer	Proportion of penalty shots that are successful	Positional play
Basketball	Proportion of free-throw points	How well an opposition player is marked
Golf	Number of shots taken on a specific hole	Quality of the swing

In many sports, rule changes and/or new pieces of technology have been introduced in an effort to increase the level of objectivity. They include the following initiatives:

- **Cricket:** the 'third-umpire review' system for LBW, run out and stumping decisions.
- **Tennis:** Hawk-Eye.
- **Athletics:** the photo finish.
- **Rugby league and rugby union:** the video referee.
- **Fencing:** electronic scoring and sensor pads.
- **Swimming:** sensor touchpads at the finish.

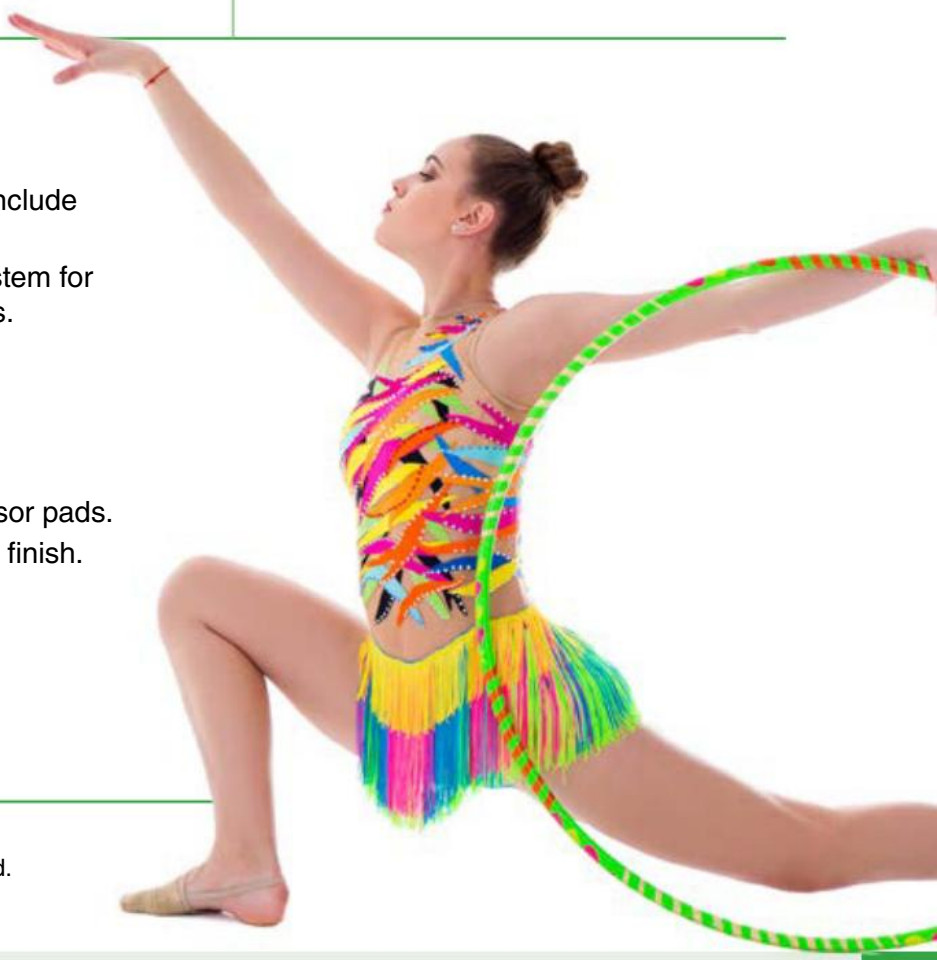


Figure 14.19:
Gymnastics routines are subjectively evaluated.

Technology to analyse and evaluate performance

Sports science underpins the human body's movement, and slow-motion playback has become a tool for analysing the smallest movements, all of which influence participants' performance. Over the past five years, this work has been taken a step further due to improvements in computers' speed and graphic capabilities. It is now possible for a computer to be used to analyse a video of an athlete at work, by way of construction of detailed three-dimensional simulations of exactly how the human body moves.

An athlete's body is modelled as a linked system of segments, and in any set activity such as hurdling or shot putting, individual movements can be compared with the optimum movements required for the perfect throw, jump or hurdle. Training movements can then be analysed repeatedly until individuals can perform the technique correctly.

At the Australian Institute of Sport (AIS), the science of performance analysis is reaching new levels of sophistication. By adopting new technologies, the AIS is able to give its athletes a competitive edge. It recently established a dedicated Performance Analysis Unit (PAU) to support athletes and coaches in their use of technology in training and competition. The PAU officers evaluate and advise coaches about some of the many software packages that are now available for aiding performance analysis.

Virtual reality programs have been developed to allow athletes to practise their sporting movements while specialists analyse their movements in a simulated environment. Instead of coaches having to view athletic performance from the sidelines of the sports field, virtual reality allows coaches to view their athletes at a closer range, increasing their accuracy of judgements.

Heart-rate monitoring chest straps give accurate heart-rate readings for athletes while they participate in physical activity or sports. Typically, the straps are fitted with Bluetooth facilities which allow information to be transferred quickly to computers or phones for analysis. A primary benefit of a chest strap is its wireless ability that allows the individual to freely move while data are gathered.

The 'Hawk-Eye' technology is commonly used to analyse competition games. Initially designed to increase the viewing opportunities of sports for television viewers, 'Hawk-Eye' is now commonly used to enhance the accuracy of decisions made by game officials.

Gym equipment is becoming more sophisticated in relation to the physiological information it can generate about a workout. As well as the speed, time and distance covered, it can display the number of kilojoules burned, heart rate and power output. Athletes can receive this information from sports watches such as Apple Watches and Fitbits. These technologies are worn by athletes and can either display information regarding steps, heart rate and kilojoules on the watch itself or on athletes' phone apps.

Many gyms now have software where workout information can be linked to a record of nutrition, exercise and weight management so a more precise reading of kilojoule input and output is available. Also, touchscreens located on treadmills and bicycles, for example, give athletes a personally tailored program each time they visit the gym.

Case study

Mitchell had tried so hard in the past to establish a fitness routine, but something always seemed to undermine his determination. Whether it was his running partner pulling out due to injury or work commitments, or just his own lack of discipline, there was always some excuse that interfered with his running schedule.

That was until he discovered an app called Strava, a 'social network for athletes' that is incredibly popular with runners and cyclists. By using his fitness tracker and the app, Mitchell was able to upload his times for particular routes and compare his times with other athletes. It motivated him to compete with their times and he could even follow the performances of others, comment on their efforts and join in challenges.



Figure 14.20: Technology can be a motivational running partner.

One of the challenges Mitchell found really motivating was a task where he joined a group of over 1000 runners who committed to running 200 kilometres in one month. By entering this challenge, Mitchell was able to connect with new friends with a similar passion for running, watch their training efforts and give and receive 'kudos'.

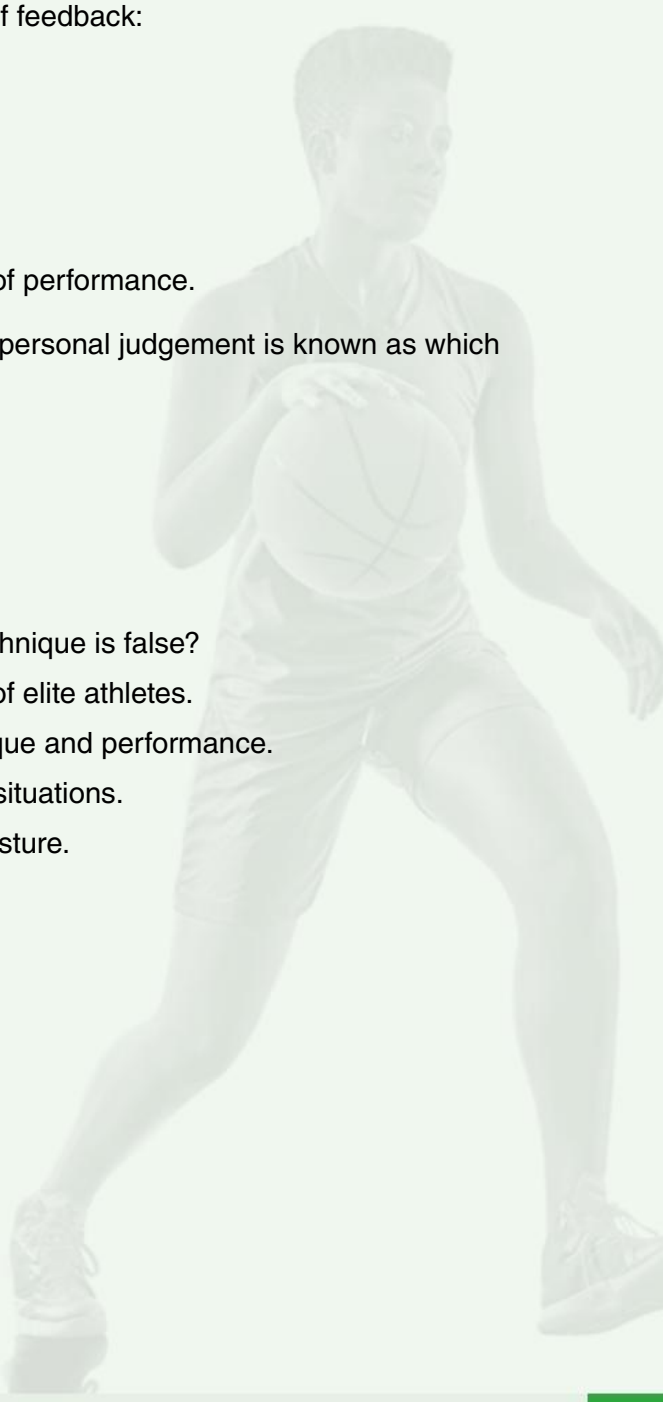
Mitchell found that technology was the running partner he had needed all along. It not only let him track his running routes, distances, times, heart rate, incidental physical activity and sleep patterns, it also provided a social platform for him to engage and be supported by other like-minded athletes.

Learning activity

1. Research the range of technologies that are now on the market whereby some of the features described in the case study would be included.
2. Discuss the advantages and disadvantages of technological advancement in relation to sporting participation and performance.
3. Predict how use of technology might come to have an impact on elite athletes and physical-activity participants.
4. Explain how technology could potentially be used to determine an athlete's sporting success.
5. Choose a sporting performance, and use ICT to analyse and evaluate it.
6. Develop the judging criteria for a diving, gymnastics or dance competition.
7. For the sport or physical activity you chose in Question 7, go online to find the international-competition judging criteria, compare them with the judging criteria you developed, and list the similarities and differences between the two sets of criteria.

Revision questions

1. Define the term ‘etiquette’.
2. Distinguish between etiquette and rules.
3. Explain the purpose of a code of behaviour.
4. Demonstrate how movement skills can be transferred between sports.
5. Choose a sport and identify three strategies or tactics that are commonly used in it.
6. Explain how improvisation is used in team sports.
7. Describe and provide examples of each of these types of feedback:
   a. Intrinsic.
   b. Extrinsic.
   c. Concurrent.
   d. Delayed.
8. Discuss how ICT is used in the analysis and evaluation of performance.
9. Evaluation of a performance that contains some level of personal judgement is known as which of the following terms?
   a. Objective.
   b. Adjective.
   c. Subjective.
   d. Obstructive.
10. Which of the following statements regarding sporting technique is false?
    a. Athletes must always strive to mimic the techniques of elite athletes.
    b. There is a direct relationship between correct technique and performance.
    c. Technique can be varied for special effect in certain situations.
    d. Correct technique is often associated with correct posture.



CHAPTER 15

Technology, participation and performance

Athletes can gain a competitive edge and training technologies can be developed as a result of sports-science fields such as physiology, nutrition, psychology and medicine. Training technologies can be used to prevent injury and reduce the amount of time it takes players and athletes to recover between workouts.

Scientific and technological advances affect all aspects of modern life, one of which is sport and physical activity. Players and athletes are able to use new and advanced technologies to perform and compete at standards that were once considered impossible.

Technology is a vital component for improvement of performance. Technological advances have an impact on coaches' techniques, data gathering, use of equipment and clothing, nutrition, injury prevention and rehabilitation. The impact of technology has become a contentious issue in sport because athletes and players who have access to technology are able to benefit compared with athletes and players who have limited access to it but greater natural ability.



Figure 15.1: Technological improvements have led to benefits for sport and physical activity.

Outcomes

A student:

- evaluates the characteristics of participation and quality performance in physical activity and sport (PASS5-6)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Contribution of technology to participation and performance
- Impact of technology
- Ethical implications of technology
- Evaluation and management of technology



Figure 15.2:
Pole-vault poles have improved with modern technological advances.

Contribution of technology to participation and performance

The term 'technology' encompasses the knowledge and application of specialised equipment and the latest modern technologies to perform tasks more efficiently. In sport and physical activity, technology is a means by which athletes and players attempt to improve their training and competitive surroundings to enhance their overall athletic performance. Some examples of sporting technologies are golf clubs, tennis racquets, pole-vault poles, athletics clothing and footwear, advanced computer simulations and motion capture.

Recent developments in sporting technologies have led to a variety of products aimed at improving and increasing athletic performance. Athletes' and players' health can be maintained and observed, and their injuries treated, by way of modern sporting technologies such as heart-rate monitors, pedometers and body-fat monitors. Through these technologies, knowledge of the human body has increased and athletes and players are able to train and compete in their sports for longer. It has also made it possible to keep participants safer by way of development of specific sporting equipment and clothing such as helmets and body protection, which are used in sports such as cricket, boxing and ice hockey to prevent injuries. Also, competition judging has been made easier and more accurate as a result of modern sporting technologies, and spectators' interest and excitement are enhanced as a result of broadcasting and in-stadium displays (scoreboards).

Contributions

Preparation

In Australia, so that athletes and players can be better prepared for competition, millions of dollars have been spent on the development of new technology that is specific to sport. A portion of the money is used to equip laboratories with sensors, cameras, computers, software and other devices for supplying precise data. For example, cyclists have their bike's components and their body positions tested in state-of-the-art wind tunnels to minimise drag so they can gain an advantage over their competitors. Another example is swimmers training in high-tech pools so they can use their feet to get a greater grip for kick turns off the wall, and the pools have been set up to have minimal wave interference.

Improvements in sport-science fields such as biomechanics, physiology, nutrition, psychology and medicine have occurred so that training technologies can be developed to allow athletes to gain a competitive edge. Training technologies can be used to prevent injury and reduce the participant's recovery time between workouts. For example, specialised equipment can be used during training sessions so that the velocity of an athlete's or player's movement can be precisely controlled and damage to his or her joints can thereby be prevented.

Scientists aim to make the most of technological advances by tailoring perfect techniques for each athlete or player. For example, in aquatic events, coaches can use computer simulations to manipulate dives or swimming strokes and to discover changes through which efficiency can be increased and water resistance can be reduced.

Athletes, players and coaches use an array of technological devices to determine optimum participation levels. A number of the devices are explained in the following text.

Heart-rate monitors

These devices are used to enable people to monitor their heart rate in real time. The devices consist of a transmitter and a receiver. When the electrodes contact skin, the heart's electrical impulse is monitored.

Due to technological advances, a heart-rate monitor can be used to measure heart rate during an exercise period and the amount of time the person has spent in a specific heart-rate zone, and it can also be used to indicate the number of kilojoules they have burned during the exercise session. A person can monitor their heart rate during exercise, and has the opportunity to download the data from the device to a computer.



Figure 15.3:
Many athletes will integrate the use of heart-rate monitors during training.

Many athletes and their support staff will integrate the use of heart-rate monitors during training. Data collected are used to gauge athletes' heart rate during work and help determine how much harder the body can be pushed without risking injury. Use of heart-rate monitors during professional training will usually be routinely included in general training and fitness tests. This allows support staff to monitor progression in athletes' fitness. For example, if an athlete performs the same test, under the same conditions and receives the same time but performs this with a lower heart rate, this could indicate their body was not working as hard. This indicates they are now fitter than previously and should be performing at an increased level.

Heart-rate monitors have been integrated into various types of general-population fitness-related technology, such as elliptical trainers, rowing machines, treadmills and stationary bikes. The exercise machines feature a built-in heart-rate monitor where the person's heart rate can be measured and monitored during exercise so they can maximise the training session. People are better able to stay motivated because the monitor 'tells' them when they have reached their weekly target, reviews how close they are to achieving their goals, and provides them with written feedback about the outcomes of their training session.

With new technology continually being developed, advances in heart-rate monitoring via smart watches are also becoming increasingly common. Many people now wear smart/fitness tracking watches throughout the day and exercise sessions. Data from the watch link up to apps on phones, and can provide information such as fluctuations in resting heart rate and heart rate during exercise, indicating periods of rest or work.

Technique analysis

Technique analysis includes testing done in a laboratory (under controlled conditions), field testing (where the athlete's or player's performance is analysed either during training or while a performance is being simulated in the usual sport setting) and competition analysis (analysis of an athlete or player while they are performing in a competition).

Because most sports and physical activities benefit from improved technique, technique analysis is used in a broad range of sports and physical activities. It is widely used in sports such as track-and-field athletics, swimming, rowing and kayaking.

Individualised technique analysis can also be of benefit in relation to specific skills in team sports, such as kicking in rugby, bowling in cricket and serving in tennis.

Coaches can use technique analysis to diagnose issues where an athlete's or player's performance is poor. Once they have done the diagnosis, they can implement ways to overcome the problems, such as incorporation of specific drills in an athlete's or player's training program to rectify their error/s in technique.



Figure 15.4:
Individualised technique analysis can also be of benefit in relation to specific skills such as serving in tennis.

Video analysis

Once considered a tool for only the biomechanist or the high-performance coach, video analysis is now becoming a technology used by many coaches who are working with athletes of all ages and standards. Video-analysis software has grown enormously, and coaches are now able to improve their qualitative technical and performance analysis of their athletes and players.

At present, software programs are being used to capture video, edit, compare and allow for graphical overlays. Each program has its own variations in relation to how these components work, including up to four comparison windows and, in some programs, blending of one video over another for more-exact comparison. Some software (for example, Dartfish) comes in different 'packages', known as 'multi-model', which have specific (or extra) components such as SimulCam™ (superimposing one athletic performance over another) or StroMotion™ (frame-by-frame breaking down of an athletic movement). Programs such as Sports Clip Maker and Coach's Eye are also becoming popular. These programs allow individualised coaching reviews on sections of games and training and the coach can add voice recordings over clips so that athletes can watch their separate sections outside of training hours. Coach's Eye also assists in analysis of technique and play by allowing the coach to view slow-motion clips and add analysis measurement tools such as body and joint angles, velocities, angles of ball release and optimum technique. These can be obtained by way of video analysis and can be viewed by the athlete or player. Basic programs do not have these specific components.

Learning activity

1. Outline how a heart-rate monitor works. Describe how an athlete or coach might use one to undertake an analysis.
2. Using a heart-rate monitor, participate in a moderate-intensity activity for 20 minutes. Monitor your heart rate before, during and after the activity. Analyse the results, and justify the differences in your heart rate.
3. Explain the benefits of the following technological devices/systems for improvement of athletic performance:
   a. Heart-rate monitor.
   b. Video analysis.
   c. Technique analysis.
   d. Three-dimensional motion-analysis.
4. Use a range of fitness equipment that has been designed so that people can improve their fitness level. Determine which devices suit you in relation to your own interest in physical activity.
5. Use video analysis to analyse a class member's golf swing. Compare the footage with footage of a professional player's swing, and suggest modifications for helping the class member improve their technique.
6. For a sport or event of your choice, predict how technological improvements will lead to improved athletic performance.

Performance

Scientific and technological advances affect all aspects of modern life, of which sport and physical activity are two examples. Using new and advanced technologies, athletes are able to perform and compete at standards that were once considered impossible. Performance is improving due to the new developments. For example, new materials such as stronger, lighter carbon are now being used for sailboat masts, and for competing sailors, these developments can mean the difference between winning a gold or silver medal.

Below are some examples of recent sporting innovations:

- Ultra-light running shoes.
- Newly designed rowing oars that feature blades that can move more water with each stroke.
- Softball bats made from an ultra-light metal alloy so balls can be propelled further and faster.
- Competitive swimsuits designed to reduce water friction.
- Snow skis equipped with sensors for measuring vibrations from the changing snow surface.
- Altitude chambers where athletes train in a simulated high-altitude environment.
- On-field player tracking devices.
- Moisture-wicking sports clothing.
- Zero gravity treadmills.



Figure 15.5:
Many people strongly believe that compression garments enhance recovery by reducing swelling in muscles and joints.

Internet activity

Log on to TitanOnline and complete Activity 15.1 by researching the technological advancements in swimsuit design.

Clothing

Clothing used by athletes in various sports plays a significant role in their performance. The clothing and footwear worn should be user friendly and include valuable properties such as strength, flexibility, density, thickness, durability, toughness and resistance to moisture. Technology has meant that athlete clothing for various sports has dramatically evolved and improved, making athletes more comfortable, faster and more efficient than ever before. Examples of this include moisture-wicking clothing, used by many athletes including those competing in athletics. This clothing is designed to wick sweat away from the body by evaporation instead of absorption. This material manipulation is similar to the Under Armour CoolSwitch technology that reduces body heat when exercising by removing sweat. Other advances in sport clothing include compression and breathable garments. Despite a lack of quality evidence supporting compression garments and recovery, many people strongly believe that compression garments enhance recovery by reducing swelling in muscles and joints, preventing delayed muscle-onset soreness and aiding recovery of soft-tissue damage, to therefore improve performance. These garments are generally made of quality high-lycra material. This makes it elastic and cling tightly to the skin, which is generally very comfortable for athletes to wear. Compression garments are also used in other sports clothing; for example, swimwear that creates a more streamlined and buoyant swimmer and compression clothing in sports such as cycling to create a more aerodynamic athlete. Technology has also been assisting development of breathable and lightweight but still protective clothing for cricket players to wear. If they are able to remain cool and their sweat is wicked away as they play, they are more likely to feel comfortable in extreme heat and perform better.

Equipment

Specialised equipment is used to improve participants' performance, and technology has had an impact on various recreational activities.

High-tech sonar and sounding equipment are now commonplace in many fishing vessels. Anglers use sonar technology – commonly known as fish finders – to locate schools of fish and to position their fishing gear accordingly. They use various technologies in conjunction with global positioning systems (GPS), digital charts and personal computers to create detailed models of the waters they operate in.

Other technological advances in sporting equipment include the following:

- **Composite tennis racquet:** created so that players can enhance ball speed and reduce the vibration that can lead to a condition known as tennis elbow, which is damage to the small blood capillaries in the muscles and ligaments that surround the elbow joint.
- **Golf clubs:** the overall mass of clubs has been decreased so that players can achieve a greater distance in their shots and possibly more-precise shots.
- **Helmets:** may now include sensors and magnets that assist in detecting impacts of collisions and potential brain trauma and concussion.
- **Bicycles:** modern-day advances include specialist wheels, pneumatic tyres, brake levers and pedals, all of which aim to increase the bike's stability and rigidity.



Figure 15.6:
Technological improvements in softball-bat construction and design have improved performance and 'feel'.

Playing surfaces

Tactics, strategies, playing style and results are affected by the playing surface being used. At major stadiums throughout the world, 'next generation' artificial playing surfaces that have sand and/or rubber infill are being used. From a distance, the surfaces are virtually indistinguishable from grass. Artificial grass is considered to be as safe to play on as real grass and is effective for reducing the ongoing costs associated with traditional surfaces. The most common type of artificial surface is polyethylene 'grass', each fibre of which is about five centimetres long. After being lubricated with silicone, the 'grass' is sewn into a rubberised plastic mat and the surface is infilled with a four-centimetre layer of sand and rubber granules. The infill is used so the fibres stay upright and have the right level of shock absorbency and deformability.

In sports such as athletics where track events including running are held, the quality of the track surface makes a considerable impact on athlete performance. Elite runners for track events wear specific shoes that don't have cushioning. Instead, athletes rely on the track to absorb the impact of their movement. The track needs to be shock absorbent to ensure safety of pressure on joints and ligaments, as well as to provide a supportive, strong and stable base to aid forward propulsion of the athlete. Modern tracks are made of many levels including renewable resources, polymer materials and recycled rubber from sources such as car tyres. These modern tracks are made to be immune to environmental conditions and are spike, UV and water resistant. The greater absorption of these tracks encourages support and spring momentum, increasing performance of athletes.

Portable playing-court systems are an innovation for indoor arenas. The systems are used so an arena can have maximum usage and are engineered so they can handle the punishing demands of a multipurpose facility. For portable courts, rubber granules are integrated in base layers of urethane so a cushioning effect is created where the risk of injury is reduced and performance is enhanced. Outstanding value is achieved from the systems because they can be left in place during a sporting season and stored elsewhere when they are not required. Also, spectators find the sporting events more appealing as a result of the improvements that have been made to the playing surfaces, because the athletes' and players' performance is improved as well.



Figure 15.7:
Modern tracks are made to be immune to environmental conditions and are spike, UV and water resistant.

Learning activity

1. Choose a sport, and research and evaluate a new piece of equipment that is used in it. Outline how it is used to improve the participants' performance.
2. Investigate the latest types of clothing that athletes and players are wearing. Outline how the clothing is used to enhance the participants' performance.
3. Research and graph a '100-metre sprint' world record (women's or men's) for the past 80 years. Suggest reasons for the improvements.
4. Explain how the playing surface affects athletic performance in:
   a. hockey b. tennis.
5. Describe how GPS can be used to monitor athletic performance.

Judging and officiating

One criticism of how technology is used is that it can cause slowdowns in the progress of a game. However, many people find the game more enjoyable because they are able to see that correct decisions are made.

In most professional sports, technology such as high-tech aids and instant replays has been implemented so that referees find it easier to make the right decision. In gridiron, video-replay systems have been used for many years to check referees' decisions. Basketball referees use replay systems to make sure players are shooting within the time they are allotted by way of the shot clock.

International cricket uses third umpire, who sits off the ground and has access to television replays of specific situations, such as disputed catches and boundaries, so they can advise the two central umpires. The umpires who are out on the field use wireless technology to communicate with the third umpire, who is also asked to adjudicate in the case of run-out, stumping and leg before wicket (LBW) decisions.

Soccer is one sport in which use of high-tech assistance has been resisted. Replays can instead be used to make offside decisions, determine whether a ball passes over the goal line, and clarify penalty decisions. This is known as video assistant referee (VAR), and has been employed to help referees correct possible in-the-moment human errors. When using VAR, the video referee and the on-field referee mainly communicate through headsets. The on-field referee will draw a rectangle with their arms to replicate a television screen. This signals to the VAR to review the incident. The on-field referee will put their hands up to pause play while a decision is being reviewed. If there is no error, they will signal for play to restart. There may also be an 'on-field' review, where more subjective decisions are reviewed. The video referee will instruct the on-field referee to watch a replay on a pitch-side screen. VAR use has recently been trialled in the English Premier League. It made its World Cup debut in the 2018 men's competition in Russia and the first women's competition to feature VAR was the Women's World Cup in France in 2019.

Hawk-Eye is the name of a computer and camera system for tracing a ball's trajectory. It is being used in international cricket and tennis and is being considered for many other sports. It is also being used in soccer as part of goal-line assessment. The system is used so a definitive decision can be made as to whether the ball has crossed the line. In the Hawk-Eye system, a camera is used that takes 600 frames a second on the goal line, and the information is then computer analysed and sent to the referee's headset or a device on their wrist.



Figure 15.8:
Technology such as high-tech aids and instant replays has been implemented so that referees find it easier to make the right decision.

In the following sports, technology has been introduced as an aid to judging and officiating:

- **Tennis:** At the major tennis tournaments, it is now standard practice for a line-review system to be in place, whereby the players are given the power to challenge what they believe are contentious line calls. The system is powered by the Hawk-Eye ball-tracking system.
- **Soccer:** At major events goal-line technology has been introduced to determine whether the ball does or does not pass over the line. VAR has been employed to assist referees to correct possible in-the-moment human errors such as potential penalties and offside calls.
- **Basketball:** The National Basketball Association (NBA) uses replay vision to review 'last touch' decisions during the final two minutes of games and also to determine whether players release the ball before the shot clock expires.
- **Cricket:** Technology in cricket has been driven by advances in the television coverage of the sport. Aspects that were once 'extra information' provided by the television networks are now being incorporated in the Decision Referral System (DRS), in the form of, for example, Hawk-Eye, Snicko and Hot Spot.
- **Australian football:** The 'umpire review' system has also been implemented in this sport, whereby in specific circumstances and using video evidence via multiple camera angles, an off-field umpire adjudicates as to whether the ball passes over the line or is touched.



Figure 15.9:
Technology such as Snicko, once 'extra information' provided by television networks, is now being used by umpires.

- **Rugby league and rugby union:** In these two sports, use of video referees to help adjudicate questionable tries was implemented early on.
- **Swimming:** In this sport, touch pads are used to accurately record the swimmers' finish times. Sensors that are embedded in the starting block are used to record when a swimmer leaves the block, and ultra-thin plastic touch pads that are located on the wall under the water are used to calculate – within hundredths of a second – when the swimmer touches the wall. The touch pads are specifically designed to ensure that the swimmer's fingertip trips the sensor.

Learning activity

1. Identify some sports in which video referees and replays are used in the making of official decisions.
2. Evaluate whether use of video referees and third umpires is an aid or a hindrance in sport.
3. Outline any new technologies that have been used for enhancement of judging and officiating.
4. Discuss technological 'judging and officiating' modifications that could lead to improvement in sport in the future.

Participation

Inclusion and use of technology enhances sporting and physical-activity experiences. Developments in current technology have led to popularity of smart fitness watches. These watches can link to apps on mobile devices and motivate individuals to participate in sport and exercise by creation of individual challenges and reward systems, as well as reminders to move to achieve these goals. Mobile devices also offer modern online exercise programs to encourage individuals to become more active.

Technology has also opened the door to an increased social media exposure, which can allow individuals to connect with different sporting groups, gyms, coaches and training programs that they otherwise may never have found. Access to a wide variety of options means that individuals are more likely to find something they enjoy participating in. For those who are already involved in sport and exercise, technology such as apps that allow replays which coaches can slow down and draw on will give participants more accurate and timely feedback. This feedback can be used to improve performance and compared with previous sessions or performances. With improved individual performance comes a higher degree of satisfaction and an increase in participation.

Technological advances are also making it easier for people with injury or disability to participate in sport or physical activity; for example, assistive devices such as hoists and platform lifts that help people into pools, and specially designed sporting prosthetic limbs.

Applications of technology in physical activity and sport

In physical activity and sport there is a widespread application of technology. Technological advances date back centuries; however, significant advances have only been seen within the last few decades. With the education of sports-science personnel and technology developing, advances in player-assistive technology have followed. This includes technology that increases athlete and player safety, improves performance and training, and makes sport and physical activity more accessible. Applications of increased skill level and use of technological devices can also lift spectator appeal.

Applications of technology in physical activity and sport can be seen in many sports. The timeline shown in Table 15.1 relates to swimming.

Did you know?

Swimmers sweat when they swim, but are less likely to notice because the water washes the sweat off.



Figure 15.10:
Swimsuits, goggles and caps have evolved with technological advances.

Table 15.1: Affects of technology on competitive swimming.

1896	▪ Traditional swimsuits were about modesty rather than athlete performance. This meant suits covered the majority of the body. Swimming was often difficult as the clothing worn would absorb water and becoming increasingly heavy throughout the race.
1928	▪ The racerback swimsuit by Speedo was introduced. It was bought into prominence in the late 1920s by Swedish swimmer Arne Borg. Borg won Olympic gold in the 1500-metre freestyle at the Amsterdam Olympic Games in 1928 and broke multiple world records over the following years.
1928	▪ Using a full-face mask of motorcycle goggles sealed with paraffin wax, Gertrude Ederle became the sixth person, first woman and fastest swimmer to swim the English Channel, and the first using front crawl (freestyle).
1920–1930	▪ The start of the many changes to Olympic swimming pool regulations occurred. These regulations included the move from outdoor to indoor competition pools and pool-deck drainage systems allowing pool water to be on the same level as the concourse. This, along with changes of pool depth to be between two and three metres helped athletes move faster through the water by reducing turbulence and reflected waves. Other changes included modern lane ropes that are now designed to not be disrupted by instability of the water and help absorb wake from other swimmers. These ropes replaced the former solid pole-like ropes.
1936	▪ Bare-chested swimming for males become common. New designs in swimsuits began using as little material as possible. This lead to development of the trunks and men's competitive swimsuits.
1946	▪ The giant pace clock was introduced. Created by Forbes Carlile, an Australian pioneer in swimming worldwide, the pace clock was a solution assisting the new way of swimming training. This consisted of athletes making repeated efforts over training and racing distances, and self-measurement of heart rates at selected intervals. Prior to this, most swimming training consisted of athletes swimming continuously at a relatively slower pace, and distances per session were low. The large pace clock allowed swimmers to track their own pace and time cycles without having to get out of the pool to get a stopwatch or rely solely on the coach. It has become a staple in swimming training, and now has many new additions.
1940s and 1950s	▪ Open-water swimmer Florence Chadwick and several others began using their own versions of goggles that had large rubber seals and double-lens glass. ▪ Nylon was used in swimwear. A stronger and smoother fabric, it reduces water resistance. From this, swimsuits made of nylon or a blend of nylon and lycra became the norm as the development of faster swimwear gathered pace.
1967	▪ Touchpad technology was used at the Pan American Games in Winnipeg. Created by OMEGA, the touchpads allow the swimmer to 'stop' the clock when their hand touches the wall, at the end of their race. This eliminates human error in stopping the clock. Three poolside timekeepers per line are still used but act as a backup. The touchpads work with wireless timekeeping systems, such as DOLPHIN, that start automatically as the starting signal goes off. They send times wirelessly to a computer-based system, and create final results and placings.

Table 15.1: Affects of technology on competitive swimming. *(continued)*

1968	▪ Electronic timekeeping was becoming common. Digital stopwatches replaced analog watches. This made times more accurate and reliable.
1969	▪ In the UK, a man named Thomas Godfrey manufactured Godfrey Goggles. Godfrey tested several types of plastic before selecting one that had not been used for sports: polycarbonate. The make-up of this plastic contributed to thin, light, highly durable and shatter-resistant goggles that could be used in competition.
1972	▪ At the 1972 Commonwealth Games, Scotland's David Wilkie became the first ever competitive swimmer to wear a cap and goggle combination and won silver in the 200-metre breaststroke. Wilkie went on to become the only swimmer ever to have held British, American, Commonwealth, European, World and Olympic records at the same time. ▪ Goggles became standard swimmer equipment. Anti-fog, UV protection and streamlining were all added to original designs. In the mid-70s, an alleged rip-off of the Godfrey Goggles from Sweden was released. Partly due to the now common use of goggles, swimming training sessions started becoming longer; tumble-turns became more efficient; and overall times became faster. For example, the men's 1500-metre time dropped by two minutes (13 per cent) over three consecutive Olympics.
1980s	▪ Lycra material for swimwear became more common, providing firmer fitting and less water-absorbent attire. Swim caps were now available in the modern latex, silicone and lycra, used for recreational and competition swimmers of all abilities.
1990s	▪ Underwater windows were built into pools so that spectators, coaches and other support staff could view athletes training from a different angle and therefore improve training.
1996	▪ At the Atlanta Olympic Games, tracks were put along the bottom of the pool. This allowed for underwater cameras to follow and film swimmers in competition. Cameras at different angles were introduced such as behind the blocks, underwater, birds-eye-view, other end of pool. This creates different perspectives to be televised for several programs. All of these continue to be used today.
2008	▪ Full-body LZR Racer suits were introduced. These suits covered the torso, arms and legs, were highly water resistant and made of a blend of very lightweight materials including nylon, lycra and the non-textile polyurethane. It was the addition of polyurethane that made a significant difference to swimmers' overall speed in the water due to an extreme increase in buoyancy and the smoothness of the suit reducing drag by up to eight per cent. ▪ The International Swimming Federation (FINA) approved new dive blocks to be used in competition. These new starting blocks included a design that has a slanted platform with grip pads near the back of the block. This added footrest, also known to swimmers as a 'fin' or a 'kickplate', is adjusted to different positions individually by the swimmer. This allows each swimmer to place their back foot in a position where the knee is at about 90 degrees, giving the athlete a more powerful push and start. This replaced original dive blocks that were flat and slippery.

Table 15.1: Affects of technology on competitive swimming. *(continued)*

2010	▪ The controversial full-body LZR Racer suits were banned as 'technology doping' by FINA after the Beijing Olympics. They are now illegal, after swimmers wearing the suits broke nearly all world records in little more than a year.
2013	▪ The FINA technical committee approved a new backstroke starting system which promised to bring higher swimmer reliability to backstroke starts. To create these backstroke 'blocks', FINA worked with OMEGA and Myrtha Pools. The system uses the grooves of the existing blocks to hang a small grippy ledge into the water. These are used to prevent athletes slipping, and assist in the starting propulsion off the wall.

The technological advances included in swimming are not limited to what is presented in this timeline. Other technological innovations include developments relating to training aids such as pull-buoys, hand paddles, fins and drag equipment, high-altitude training and simulations, small single-lane pools with water pressure, timekeeping, computer-based programs, live-streaming and televised programs, and pool chemical testing.

How technology has increased participation in sport

Technology has now facilitated increases in participation in sport by people with disability. Virtual reality creates an environment where the individual feels as though they are in another environment. This means that people with disability can participate in physical activity via virtual reality, in places and locations they may not be able to access or visit.

The competitive sport of e-gaming is also rapidly increasing in popularity. In e-gaming, players require athletic skills such as coordination, reaction time and resilience to compete online against other players for extended periods of time. This can include playing games such as Wii Sports on the Wii device. Other forms of assistive technology have given people with disability the opportunity and ability to participate in physical sport. Wheelchairs created for specific sport purposes have now been developed. There are light-wheeled wheelchairs available for fast-paced wheelchair sports such as basketball, tennis and racing. There are also wheelchairs available that have rugged frames and wheels that can be used for unpaved surfaces such as hiking trails, snow and sand. Other assistive technologies which encourage participation people with disability include weights and modified gym equipment that can be used in various ways. Some sports such as softball and tennis include balls that create beeping sounds. These sounds aid people with sight disabilities to participate as they can identify where the object is via sound. Recent advances have also led to the development of energy-storing prosthetic limbs that make it easier for individuals without a limb or limbs to engage in sport.



Figure 15.11:
Access to social media makes it possible for people to be more aware of activities in the local community.

Impact of technology

Although developments in technology have been linked with increasing rates of sedentary leisure-time behaviour, technology also has a significant positive impact on sport and physical activity. As mentioned earlier in this chapter, technology has made it possible for individuals with disability or injury to participate in sport where they previously may not have been able to. Technology and access to social media also makes it possible for people to be more aware of sports and activities in the local community, increasing the chances of them finding sports they like participating in.

The experience of spectators in new stadiums has also become more enjoyable due to advances in technology. New and improved upgrades including heated seats, wireless in-seat food orders and e-tickets are making their way into many new sporting stadiums. Cashless stadiums are also becoming common, as spectators are using physical cash less often, so stadiums either offer card payment options or wristbands that spectators can add credit to online.

Many spectators also enjoy the live and instant updated player statistics that can be viewed on game apps. A final incorporation that adds to the viewing experience is giant HD screens present at most sports stadiums. These screens allow spectators to see what is happening up close, as well as replays and what is happening on other sides of the field. There are often several other aspects regarding players and the game present on these screens, such as decisions made by the video referee, that add to the atmosphere of the game.

Advances in technology within sport have also made significant impacts on athlete training, safety and injury rehabilitation. Modern technology has enabled in-depth body measurement and analysis opportunities that break down movements and allow an athlete to become more in touch with their body. These assessment scans can help prevent and manage injury by monitoring movements and identifying imbalances, so that support staff can assist. An example of this is the Athlete's Foot fitting service that measures foot movements and pressure points to determine what shoe would suit the foot best. Modern technology is also beginning to provide resources such as compression tights, injury-detecting sensors and helmets that calculate the risk of injury and inform medical staff on the possible severity of the impact and injury.

Impacts

Levels of participation

In the 21st century, children have become fascinated with technology, with ease of access resulting in higher engagement in technology-based activities. Children traditionally spent large amounts of time outside involved in incidental physical activity such as playing, running and kicking balls. They are now engaging less in physical activity outside of school hours. In 2017, only 56 per cent of children aged 0–14 engaged in organised sport or physical activity once a week and 20 per cent engaged in organised sport or physical activity three or more times per week. There is a slow transition to more and more children being involved in more sedentary types of behaviour. Children are spending more of their free time on digital platforms, with their lives being dominated by technology.

Young people are generally spending large amounts of their free time messaging/calling friends, watching television, browsing the internet and social media, studying, playing sport and playing computer games. The video-game industry is one of the world's most popular industries, and the time that children spend in front of screens, playing electronic games (e-games), is being blamed as being one of the causes of the obesity epidemic that seems to be spiralling out of control.

Although technology has been a contributing factor in the decline in physical activity, it is also a factor in:

- proactive recruitment of large populations in relation to participation in physical activity
- individualisation of large-scale interventions or health promotion
- delivery of activity-promoting interventions to large populations via various channels.



Figure 15.12:
Children are spending more of their free time on digital platforms.

Internet activity

Log on to TitanOnline and complete Activity 15.2. List the common types of passive leisure that young people are increasing engaging in and the role technology has in this trend.

Support is emerging for delivery of individualised, interactive physical-activity interventions to large groups of people. Two areas, as yet untested, in which technology may have a beneficial impact on adoption and maintenance of physical activity are interactive television and virtual reality. As a result of the increased focus being placed on environmental strategies, technology could also be used to modify home environments so that physical activity could be incorporated in everyday life. Technology is also having a larger role on the business side of physical activity. Health and fitness centres are adopting high-tech entertainment capabilities to serve each client. Combining the individualised technology with the existing infrastructures in health and fitness centres could lead to increased participation at the centres.

Improved standards

Technology is a vital component of improvement in performance, and technological advancement has an impact on:

- techniques used in coaching
- data gathering
- the nature of feedback
- sporting equipment and clothing
- nutrition
- injury prevention
- participants' rehabilitation and technique.

Sporting performance is approaching the limits of its potential, so participants and coaches are now depending on technological advances to make improvements on an ongoing basis. Advanced technology is leading to improvements in sporting clothing and equipment, so athletes are becoming faster, more efficient and better at their sports. For example, improvements in the technology of soccer boot construction has enabled extra agility, manoeuvrability, touch, control and comfort.

Technology is aiding injury prevention, management and rehabilitation, as new methods and techniques are continually evolving. Feedback from coaches is becoming more advanced and personalised, allowing athletes to have a greater understanding of ways to improve, as athletes can view themselves and where they should be positioning themselves during play action, or what components of their technique needs adjustment. This visual representation encourages efficient process of adaptation, meaning athletes are progressing faster and their results and performances are improving to a higher standard.

The impact that technology will have in the future has become a contentious issue in sport. Some people argue that more intervention by way of technological advancement might be detrimental to competition because athletes and players who are better able to access the advanced will benefit from sports scientists' knowledge. Competitors who have limited access to the technology but have greater natural ability may not be able to reach their full potential.



Figure 15.13:
Technology is aiding injury prevention, management and rehabilitation.

Levels of enjoyment

Innovative and engaging teaching methods can be used to motivate school students to participate in sport or physical activities, especially in the case of students who either are not natural athletes or do not enjoy sport or physical activity. During physical-education lessons, two motivating factors can be use of technology for enhancement of individual skills and having the students learn how to monitor their own fitness level. Occasionally incorporating physical activities such as Wii sports and Just Dance may be a suitable alternative to engage students who prefer playing on video devices. In schools and sports coaching, using technology such as iPads and coaching apps, students and athletes can film each other and watch themselves perform certain movement skills. Peer feedback or feedback from the coach can be provided through these apps, and changes can then be physically applied in play. This provision and application of feedback means students and athletes are more likely to improve their understanding and physical movement skills, and therefore find more enjoyment in participating as they continually improve.

Technology in the form of smart watches and sports watches may also contribute to levels of enjoyment in physical activity and sport, as they provide a means of collecting data from the session and motivation to improve. Other forms on motivation via technology may include online workout programs such as Keep It Cleaner. With such programs you can work out with the trainer, via recorded workouts, so as they progress through the workout, so do you. This creates a motivating and enjoyable workout environment.



Figure 15.14:
Using technology such as iPads, individuals can film and watch themselves perform certain movement skills.

Technology has also led to improvements in clothing and equipment used in sports and activity. This includes more-comfortable, functional and practical attire such as warmer clothing for winter sports, cooling systems within Formula 1 (F1) race suits and shoes manufactured differently for specific activities such as hiking or running. If people can purchase and use clothing and attire that makes them feel more comfortable when participating, they are more likely to find enjoyment.

Learning activity

1. In relation to use of technology to promote physical activity, evaluate the effectiveness of the Nintendo Wii or a similar product.
2. Evaluate how technological advances have been used to both promote and hinder physical activity among adolescents.
3. Create an e-game aimed at promoting sport and physical activity.



Figure 15.15:
Numerous technologies have been developed so that spectators can be connected with their sports.

Spectator appeal

In sport and physical activity, spectator viewing has been enhanced as a result of technological improvements. By way of various developments such as camera positioning and drones, spectators are able to feel physically close to the athletes or players. In cricket, for example, the 'stump cam' is used to show a bowler running and delivering a ball from the perspective of the batter. By way of the positioning of the camera, the feeling is brought about that the spectator is the batter and is watching the ball being directly bowled at them. Underwater cameras are used in swimming; and in car racing, cameras are positioned in the cars' headlights and on the cars' dashboard.

Spectator appeal is also heightened as a result of live scoring, where the spectator can receive play-by-play updates without having to be physically present at the game or watch it live on television. Live scoring is available on the internet as well as by way of SMS updates. Spectators who engage in interactive viewing are able to watch their favourite sport or physical activity and to choose between various interactive options such as pausing the live television and 'rewinding' the live television to view replays. Many sporting organisations now also have specific sports apps, where all the information regarding that particular sport can be found. For example, the Australian Football League (AFL) has an app called 'AFL Live'. This app allows members to stream games live; receive live updates; and access many player and game statistics, ladders and general AFL-related news. This means that fans can continually be updated with what is happening in games throughout the season, which encourages engagement.

Numerous other technologies have been developed so that spectators can be connected with their sports and physical activities. In tennis, radar guns are used to tell spectators the speed of the serve. In cycling races, a transponder is clipped to a spoke on each bike's front wheel so that judges and spectators can be informed of cyclists' positions along the route and of their finish time. In diving, a DiveMotion device is used where video replays of two competitors who are on the same dive are simultaneously superimposed so viewers are able to see exactly where the divers differed. StroMotion is used to break the action down into frame-by-frame photo sequences. Hawk-Eye tracks the ball to determine if it is in or out in sports such as Grand Slam tennis and cricket in LBW decisions.

Finally, with many sporting organisations and clubs now engaging in social media platforms such as Instagram, Snapchat and Facebook, spectators are becoming increasingly engaged. Continual updates of 'behind the scenes' create a unique atmosphere for fans to explore, on platforms they are already commonly involved in. This includes informal interviews of players and interactive videos of them warming up, having half-time discussions, and training tips.

Injury rehabilitation

Technology has affected the sport and physical activity 'injury industry', and as a result of developments in rehabilitation equipment and techniques, athletes and players are now able to recover faster and more successfully. Following is an outline of the developments:

- **Shortwave machines:** These devices emit electromagnetic energy whereby the temperature of the injured area is increased and blood flow is aided.
- **Ultrasound:** This technique can be used to relieve pain and stimulate repair of soft-tissue injuries by way of heat production.
- **Real-time ultrasound:** This is a diagnostic ultrasound machine that allows the observation of how layers of muscle contract, relax and function together. This tool enables correct assessment and diagnosis of muscle function and develop treatment plans.
- **Laser therapy:** This type of therapy can be used to decrease pain and inflammation, increase vascularisation, accelerate collagen synthesis and control microorganisms.
- **Traction equipment:** This type of equipment can be used to provide tension for the spine's cervical and lumbar regions and thereby reduce pressure in the area.
- **Compression devices:** These devices, such as SKINS compression clothing, can be used to prevent and reduce swelling after injury.
- **Prostheses:** Prosthetic devices mimic real body parts, in the form of synthetic bones, tendons and ligaments, and scientifically developed materials have been used in design of artificial mechanical joints.
- **Graded Motor Imagery (GMI):** GMI is a brain-based treatment which targets activation of different parts of the brain to assist with complex pain and movement problems.
- **NormaTec:** This is a recovery system, often used by triathletes, football athletes and runners. The attachments use compressed air to massage limbs, to speed up recovery by mobilising fluid from the limbs to the core.

In combination with up-to-date surgical techniques and equipment, these technological developments have led to:

- improvements in the rehabilitation process
- a decrease in the chance of re-injury
- speed up recovery time
- a decrease in the severity of injury.

They have also led to the opportunity for members of groups, such as athletes and players with disability, to participate in a range of sports and physical activities and to succeed in them.

Although developments can be beneficial to athletes and players, the design of some new equipment has led to an increased chance of injury. In tennis, inclusion of power strings on racquets has led to an increase in shoulder and elbow strain. In boxing, development of gloves that have been designed to reduce cuts has led to an increase in more-serious 'blunt force' injuries. In skiing, as a result of development of wind-resistant but slippery materials for downhill ski suits, skiers who have crashed are at risk of continuing to slide treacherously downhill.

Internet activity

Log on to TitanOnline and complete Activity 15.3, by outlining the benefits that injured athletes and players can gain from using hyperbaric chambers.

Safety

Many types of technology are now being used to collect weather-forecasting data. Computers, advanced radars, GPS tracking and weather satellites are all used to forecast the weather and obtain information in relation to weather-reliant activities. For example, weather technologies have a great impact on the Sydney to Hobart Yacht Race, which is an always dangerous, weather-dependent event. These types of technology can be used for weather mapping and predictions, and the participants can choose to alter their course to avoid any potential weather problems.



Figure 15.16:
Weather technologies have a great impact on the Sydney to Hobart Yacht Race.

Protective clothing has also become more advanced as a result of technological developments. Thermal clothing such as ski parkas, hiking jackets and underwear can now absorb heat, whereby at molecular level, the encapsulated material is able to 'change phase' from solid to liquid and to thereby either store or release the heat in response to the temperature next to the skin. By efficiently holding onto the heat and distributing it evenly within the fabric, a thermal barrier that is thinner but more dynamic and protective is yielded between the body and the exterior environment.

Did you know?

Kevlar fibre is used in a range of sporting equipment, including helmets, racquets and boots and is five times stronger than steel.

The purpose of protective equipment is to prevent and reduce the severity of any injuries an athlete or player incurs. Protective equipment is now mandated in a range of sports and physical activities so that injury can be minimised and medical and litigation costs are avoided. One example of regulated use of protective equipment is compulsory use of helmets for snowboarding competitions. The aim of the latest helmets is to prevent a skull fracture or concussion by deflecting or spreading the energy on impact. Such helmets are also manufactured to measure the amount of impact that might cause a concussion, and results can be used with typical concussion tests to decide whether an athlete can continue competing.

Learning activity

1. Choose a sport or physical activity and identify the technology that is used to enhance its appeal for its spectators.
2. For the same sport, identify how the technology is used to increase its participants' safety.
3. Explain why athletes and players are willing to risk incurring injuries in the name of improvements made to their technology and performance.
4. Explain how GPS tracking is used to forecast the weather for events such as sailing.
5. Choose a sport or physical activity and describe three pieces of equipment that have been improved so participants can stay safe.
6. Explain how technological advances in injury rehabilitation have affected athletes' and players' longevity in relation to their sporting career.

Positive and negative impacts of technology

Developments in technology in sport have made many positive and negative impacts. Technology has enabled more participation for people with disability and significant infrastructure modifications have made sporting complexes more inclusive and engaging. Specialised equipment has enabled athletes to become faster and more efficient, which is better for spectators to watch. Technology has also contributed to decision-making assistance for referees such as video refereeing and advances in recovery and injury prevention/management methods. Coaches have been able to implement technology in their coaching regimes, use programs that provide in-depth analysis of game play and training sessions, and use technology to give personalised verbal and visual feedback to their athletes in an efficient manner.

However, with these positive impacts come several negative consequences that need to be considered. For example, not all countries, schools and clubs have equal access to the latest technological devices and equipment. This leads to a situation where athletes among wealthier areas are more likely to improve faster and to a greater extent than those who do not have the same access. Those from wealthier areas are more likely to be exposed to higher quality training and technology improvements, which may provide an unfair advantage. Technological advances may also lead to difficulty in detecting performance-enhancing drugs in sport. There is also an increased possibility of injury due to an increase in speed of the equipment, such as balls being hit and athletes hitting equipment harder and further.

The media and technology

Developments in technology in sport apply not just to use by athletes and support staff but to the media as well. Technology has enabled media coverage to become interactive and innovative, enhancing spectator appeal. Camera drones have been included in sports coverage and provide a whole new aerial perspective of the game for spectators. Camera drones are commonly used in sports coverage such as in the Olympic Games and National Rugby League (NRL), and provide an interesting perspective of the games atmosphere. The ability to include different camera angles, such as in F1 race cars, extreme sports and on the referee in many football codes, also creates the illusion of the spectator being a part of the game, event or activity. Slow-motion video is also useful for replays and can show faults or successful plays such as in basketball, when a player takes a three-pointer shot. These slow-motion replays are often played on huge HD screens at games and accompanied by a referee decision. Advances in technology have allowed media outlets the possibility to livestream broadcast sporting events such as the AFL, NRL and F1. This interactive broadcasting ensures fans can watch their favourite sports even if they can't make it to the event. Social media utilises a range of technologies and apps to distribute information. Many professional sporting clubs now employ social media personnel to manage their social media accounts. These staff consistently update social media pages such as Instagram, Facebook, Snapchat and Twitter. This builds hype and excitement for game day.



Figure 15.17:
Camera drones provide a whole new aerial perspective of games and sports.

Ethical implications of technology

In relation to ethics in sport, participants should have four key virtues: fairness, integrity, responsibility and respect. Sporting competition is viewed as a means for cultivating personal honour, virtue and character and is a contributing factor in maintaining a community based on respect and trust between sporting competitors and the members of society. In sport, the goal is not simply to win; it is to pursue an honourable victory by putting in your best effort.

The positive effects of technology in sport and physical activity have been identified but various types of technology have been detrimental to sport. Increased incidence of injuries, exclusion of athletes or players, experimentation with new technology against ethical guidelines, loss of tradition and the notion of genetic modification are some examples of the negative effects that technology has had on sport and physical activity.

Despite the negative effects that have transpired, the aims of any new technology that is designed for sport or physical activity are to:

- achieve the ultimate human performance
- use the modern technology as an aid to performance
- facilitate faster times
- help athletes break records
- promote faster recovery from injuries
- make performance more efficient
- make sport and physical activity safer.



Figure 15.18:
Technological advances make it impossible to compare the 1912–1919 javelin world record of Eric Lemming to records set by modern athletes.

Implications

Comparability of performances

Due to technological advancement, it is difficult to compare modern-day performances with past performances. Today's cricketers are continuously being compared with Sir Donald Bradman, Australia's most recognised cricketer. Although his feats are clearly astounding when compared with those of any other cricketer, his performance is now being questioned as follows:

- Would he have scored the same number of runs now, against faster bowlers who are using the latest technology for training and analysing opposition batters?
- Could he have been even better if he had been able to use modern training techniques and equipment?



Figure 15.19:
Australian athletes have more access to sporting goods and technology than athletes from developing countries.

Technological advances in sport make it impossible to compare early world records with the recently recorded ones. Training techniques have been developed and superior playing surfaces are now used that can have an effect on performance and results.

Limitations also exist today in relation to making comparisons between modern-day performances. For various reasons, athletes and players have differing levels of access to technology, and access can be the determining factor in differences that occur in performance and results. Access to technology in sport for physiological testing, biochemical analysis, training facilities and equipment is expensive. Clubs and athletes among elite major competition such as the NRL and AFL usually have similar access to technology to assist performance. However, many international sports competitions do not have the same level of equity. Athletes from developing countries cannot afford the same technologies and do not have the same access as athletes from developed countries. An example of this is competition at the Olympic Games. Athletes who come from countries such as the USA, UK, Australia and Russia, which have large amounts of money and place a high value on sport, have more access to sporting goods and technology. Athletes from such countries usually have higher representation and win more medals than those from developing countries.

Access and equity

In sport and physical activity, equity is about fairness, equality of access, recognition of any inequalities, and deciding to take steps to address these inequalities. It is about changing the culture and structures that exist in sport and physical activity so the activities can be equally accessed by all members of society, whatever the people's age, ability, gender, race, ethnicity, sexuality or socioeconomic status.

In relation to ethics, the aims of any sport or physical activity should be:

- to strive for natural human performance without use of drugs or genetic engineering
- to never compromise the athlete's or player's physical, mental or emotional wellbeing
- for the activity to be accessible to people of any age, economic background and cultural background
- to promote fair competition where all non-human aspects of the sport are equal so the participants have an equal chance of achieving victory.

Some scientific and technological advances lead to a compromise of these ethics. Generally, athletes who have a lower socioeconomic status tend to be excluded from competition because they can neither afford nor access the latest sports technology. They might not have access to the expensive equipment and advanced training technology that are necessary for them to be able to achieve their best. Participants can also be excluded from recreational activities such as skiing, rock climbing and mountain biking due to the expense of the high-tech gear needed. On a larger scale, people who live in developing countries are often restricted to activities for which they require little money and limited resources. In relation to access, participants in those countries are hindered due to their country's geographical location or economic success.

By contrast, developed countries have the means to finance large-scale technological projects. An example is that the United States was able to develop a $5-million 'pursuit bike' to use wind-tunnel technology and thereby minimise air resistance. Participants who have a higher socioeconomic status are able to access these advanced technologies and improve their performance.



Figure 15.20:
People who have a lower socioeconomic status may struggle to access the latest sports technology.

Learning activity

1. Compare and assess the positive and negative impact of technology on physical activity and sport.
2. In relation to tennis, compare and contrast the types of playing surface that are used: grass, clay and synthetic.
3. Discuss the degree to which technology has created equity for participants in sport. For example, refereeing or drug testing.
4. Choose a sport or physical activity and outline the sporting career of two competitors from different eras.
5. Identify the training techniques and equipment used by the two competitors you wrote about for Question 3.
6. Explain how individual athletic success is affected by:
   a. money
   b. equipment
   c. geographical location
   d. sponsorship.

Illegal use of technology

In relation to emerging technologies, the problems that stem from the increasing availability of technologies that are used to enhance sporting performance have ethical implications. The potential exists for emerging technologies, in the form of drugs, genetic modification and drug masking, to be used illegally for enhancement of sporting performance, now and in the future.

Drug use and prohibited substances

Drug use and prohibited substances continue to be a major problem in competitive sport. Technology is continually being developed so competitors can stay one step ahead of the drug-testing procedures.

Drug testing is an important element in relation to ensuring equity in sport. In Australia, drug testing is conducted by the Australian Sports Anti-Doping Authority (ASADA) and is reliant on testing protocols for its administration and for provision of accurate results. While the testing technology is being developed for identification of a range of drugs, athletes and players are also using it to find ways to avoid detection and to create drugs that cannot be detected by way of existing drug-testing methods.

Prohibited methods

The banned methods that are listed on ASADA's website are outlined as follows:

- **Enhancement of oxygen transfer:** This method includes blood doping and use of products for enhancement of oxygen use.
- **Chemical and physical manipulation:** This method includes intravenous infusion and tampering with samples.
- **Gene doping:** This method includes modification of cells, genes and other genetic elements.

Media, marketing and profit

People are increasingly spending their time using technology rather than pursuing traditional physical-leisure activities. Consider how much time people spend completing the following actions, all of which have become a part of many people's daily routine – and these actions are only a selection from a wide range of related options:

- Using mobile phones to send text messages, phone someone or use apps.
- Listening to podcasts on phones.
- Using Facebook and/or Twitter accounts to socialise, by updating personal details and/or follow other people's posts and/or tweets.
- Reading, composing and sending emails.
- Watching television shows, DVDs and/or YouTube clips.
- Using Instagram and/or Snapchat to distribute photos and promote products, events and activities.
- Browsing online sale catalogues to relax.
- Playing games in the form of Xbox or Wii, or online.

Internet activity

Log on to TitanOnline and complete Activity 15.4. Investigate the mission and priorities of WADA. Discuss the ethical issues associated with doping in sport.

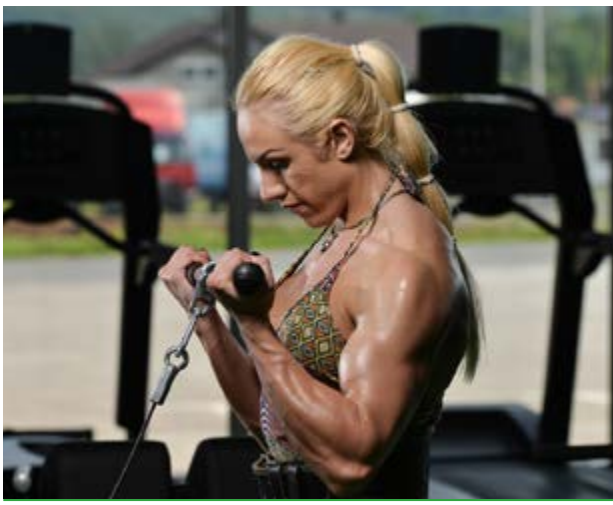


Figure 15.21:
The potential exists for technologies, in the form of drugs, to be used illegally for enhancement of sporting performance.



Figure 15.22:
Technology-based industries are extremely profitable.

Technology-based industries are extremely profitable, and their representatives aggressively market their products to members of the younger generations. In becoming physically inactive, children are not burning off the kilojoules required to lose weight or maintain their normal weight. As a result, obesity is increasing at an alarming rate, a fact that is evident throughout Western nations.

The types of technology listed are in high demand among consumers due to their perceived enjoyment and entertainment value, which must be partly attributed to continuous promotion and advertising in various media. As technology continues to be developed, leisure pursuits based on physical inactivity will continue to undergo progression and expansion.

The main issue is how to analyse the expense of the younger generation's physical inactivity. In sport and physical activity, participation rates will no doubt continue to suffer and health issues associated with physical inactivity will continue to increase.

Copyright and intellectual property

Technology has always had its place in sport. However, significant advances in technology within the sporting context have created a greater number of athletic opportunities and spectator experiences than ever before. These technological advances include training technology; sports stadium experiences; sophisticated ICT embedded in sports clothing and equipment; smart tracking technology, protective gear, sports materials and designs; and innovative ways to share sporting experiences.



The designs, inventions, trademarks and copyrights of these advances are known as intellectual property (IP) and are protected by IP rights and a range of laws including copyright laws. IP rights allow rights holders (which could be organisers of sports events; sports federations; athletes, their team and trainers; manufactures of sports equipment; broadcasters and media/social media platforms; and corporate sponsors) to prevent other people or organisations from copying or using their IP without their permission. Rights holders can also charge others for the right to use their IP, such as different sport clothing companies or broadcasting programs. IP rights encourage creativity and innovation by ensuring inventors and creators receive a fair reward for their work. This guarantees a continuous flow of enhancements in athletic performance and sporting experiences. Infringement of copyright and IP such as using images, videos or commentary from licenced sports events on another platform without permission can lead to legal problems and disagreements. It may result in media scrutiny, sporting sanctions, heavy fines and prison sentences.

Figure 15.23:
Technological advances in sports clothing and equipment are protected by copyright laws.

Technology and equity

There is a series of ethical issues related to the use and implementation of advanced technology in sport. Many people support the positive impact technology has had; however, many others debate and challenge the equity for all participants in physical activity and sport as a result of technology. Drug testing is one example of how technology has been used to create a fair and equal sporting context. Significant developments in drug testing make it more efficient and accurate, deterring potential doping to occur. This promotes clean sporting environments for all participants to engage in. The inclusion of assistive referee technologies also contributes to an equitable physical activity and sporting context, as referees and umpires are able to make more informed decisions, which are supported by replayed video footage. This means decisions should be more accurate and referees are less likely to become targets of public scrutiny and accusations of bias. Technology has the ability to provide people living in remote locations or areas away from elite training programs access to specialised training, coaches and information; access they otherwise may not have. However, people may not have the funds, ability or their circumstance may limit their ability to travel. This means several groups of people from less wealthy areas, clubs and countries may not have access to innovative technology and therefore a larger divide is created between athlete performances. This is similar to technological developments in sporting clothing and equipment, which are continually advanced for athletic performance. Those who have the means to access advanced clothing and equipment can benefit; however, those who can't may struggle to compete.

Technology has also created a more accessible and inclusive environment for people with disability to engage in physical activity and sport, such as developments of assistive technology and athletic prosthetic limbs.

Learning activity

1. Research the existing technologies that are used for drug testing.
2. Visit the ASADA website and outline the authority's drug-testing protocol.
3. Evaluate the reasons for and against legalisation of performance-enhancing substances in sport.
4. Investigate the practice of blood doping in sport, especially:
   a. its purpose
   b. the risks associated with it
   c. the sports it is most commonly used in.
5. Explain the implications of gene doping in sport.
6. Evaluate a range of sport-based computer games that have been designed by various manufacturers. How accurate are the games in relation to their presentation of the sport, including their graphics and interactivity?



Figure 15.24:
Golf's governing body has forbidden players from adopting advances in ball and club technology where improvements to performance outweigh the traditions and rules of the sport.

Evaluation and management of technology

Technology in sport and physical activity is constantly changing, and whether the changes equate to an advantage or a disadvantage, it is having a big impact on sport and physical activity.

Participants are constantly seeking technology they can access to gain an advantage over their opponents. However, before technology can be used in sport and physical activity, the impact and contribution in relation to participation and performance as well as its ethical implications need to be identified and monitored.

Groups responsible for monitoring technological advances

A range of government and non-government groups are involved in monitoring technological advances, and sporting bodies scrutinise and develop policies in relation to them. When the sporting bodies are making their decisions, they need to consider the following questions:

1. What effect does the technology have on safety in the sport?
2. Is the technology affordable and accessible?
3. Does the technology have an undesirable effect on the game?
4. What effect do the changes have on the sport's history and traditions?

The sporting bodies consider all four issues when they are deciding to either accept or reject use of the technology in question, regardless of the fact that it can result in improved performance. In golf, for example, the governing body has forbidden players from adopting advances in ball and club technology where improvements to performance outweigh the traditions and rules of the sport.

The Department of Health is responsible for providing policy advice about issues to do with sport and anti-doping and introducing initiatives to complement the programs and functions of other agencies and authorities. One of the department's roles is to work closely with Sport Australia, which includes the Australian Institute of Sport (AIS) and ASADA.

The AIS has used science and technology for its athletes' benefit by identifying and developing the latest scientific technologies and applying them to the participants' training programs. Researchers are now developing methods where the aim is for miniature sensors, radio transmitters and data loggers to be used to monitor participants' exercise and competition more efficiently and unobtrusively.

At international level, the structure of the AIS is unique in that its coaches, athletes and service providers all operate at a single geographical location, in Canberra. Also, the AIS is an ideal environment to conduct research because the research is applied directly to the physical outcomes that the coach desires and that the athlete needs to perform at their best. If Australian athletes are to achieve success at international level, they must be given the opportunity to work in environments that provide technological assistance. Researchers also work in the same environment to develop, test and analyse new technologies.

Rule modifications to reduce the impact of technology

Sporting bodies base their equipment-modification rules on three objectives:

1. To protect sport's traditions.
2. To prevent the participants from becoming overly reliant on the technological advances.
3. To ensure that skill remains the dominant element of success in the sport or physical activity in question.

In golf, for example, researchers have been progressively developing the types of club and ball that players have available to them. The restrictions that have been placed on the clubs and balls are to do with their size, weight, length and markings. Design of golf courses also includes restrictions, where the aim is to prevent any specific style of player from being suited to the game in question.

In 2014, many fans of traditional F1 motor racing were dismayed at the prospect that heavier, slower and quieter cars will result from the sport's embracing of 'green technology'. The most fundamental change of all has been made to the engine, which changed to a 1.6-litre V6 turbo rather than a 2.4-litre V8. A consequence of these technological advances is that the F1 event will no longer be all about aerodynamics.



Figure 15.25:
F1 cars are now being run with less fuel.

The energy-recovery system that has replaced KERS (kinetic energy recovery system) is a more integral piece of equipment that generates twice as much power, where F1 is now at the cutting edge of technology and innovative design. In the system, energy and more power are generated under braking where waste heat from the engine's turbocharger is used.

A fuel limit was introduced for F1 cars where they use less fuel and much of their power comes from the hybrid technology. On average, the cars are now being run at about two-thirds of the fuel load they carried in 2013. However, from 2019, drivers may use up to 110 kilograms of fuel in the race – an increase of 5 kilograms. This change to the rules was made to allow drivers to use the engine at full power at all times, so they do not need to worry as much about conserving fuel and can therefore push harder.

In recent Olympic history, no technology has been more effective or more controversial than the full-body Speedo LZR Racer swimsuits that dominated swimming events at the Beijing 2008 Olympic Games. Worn by swimmers who won more than 92 per cent of the medals, and as an aid to setting dozens of world records, the suits became the target of intense scrutiny. By 2010, they had been banned and a whole new set of swimsuit regulations was put in place for future Olympic swimming events.

The LZR Racer suits were not only waterproof; they aided the swimmer so they could have a more hydrodynamic shape. As a result of the water-shedding 'human torpedo' streamlining, race times were reduced by as much as two per cent – enough time to constitute the difference between a silver medal and a gold medal. Under the new rules, in an attempt to reduce the impact of swimsuits on the sport of swimming, the suits' manufacturers are restricted to making them out of textile fabrics only and to making them only as high as the waist for male competitors and as high as the shoulders for female competitors.

In cricket, rules were enforced in relation to bat size. Technological advances of cricket bats were leading to players comfortably hitting the ball harder and further. In response to this, the International Cricket Council announced in 2017 that to maintain the balance between bat and ball and the integrity of the game, changes to enforce smaller bat sizes would be made. This included the rule that players would no longer be allowed to use bats with edges thicker than 40 millimetres while the depth has been limited to 67 millimetres.



Figure 15.26:
Full-body swimsuits were banned by FINA in 2010.



Figure 15.27:
Rules about cricket bat sizes have been enforced to maintain the integrity of the game.

Learning activity

1. Identify a technological advance that has been made in sport, and comment on:
   a. its safety
   b. its affordability and accessibility
   c. whether it has any desired effects on the sport in question
   d. how the technology has led to changes in the tradition of the sport in question.
2. Describe Sport Australia and its role in Australian sport.
3. Investigate ASADA's role in Australian sport.
4. Examine some sports, other than the ones mentioned in this chapter, to determine how rule modifications are used to reduce the impact of technology.
5. Explain to what extent you believe that the determinant for athletic success is access to the technological advances that have been made rather than the athletes' or players' ability.

Strategies to limit or enhance future technological advances

There are several strategies that are put in place to limit and enhance future technological advances. To maintain equity and integrity of sporting environments, technological advances need to be moderated. This means that rules and regulations are put in place by sporting organisations in response to technology developments. These provide information on what can and cannot be included in sporting clothing, equipment, training and game play. These rules and regulations may include the materials used in sports clothing, such as legal materials for swimwear in competition, and designs in equipment such as cricket bats, golf clubs and tennis racquets. Such rules and regulations must continually be updated and reflect current developments.

However, not all technological innovations need to be limited. Developments in technology can add exciting components to general physical-activity engagement, as well as sporting environments. Strategies such as developer rights and copyright protect the designs and innovations of developers. This means that original developers own the rights of their products and designs and are guaranteed to continue earning an income from their intellectual property. Knowing their designs are protected, along with large sums of money and emphasis placed on technological advances, means new sporting technological innovations are more likely to continually develop.



Figure 15.28:
Augmented and virtual reality could improve athlete training.

Future technologies

The world of sport and physical activity will continue to develop due to future technologies which, for example, can continually be used to assist referees. Such technologies will become particularly useful for quick decision-making from areas that may be difficult to assess. As drones can provide video from any angle, they can send information to support pitch-side referees and link directly to what a referee is looking at during a game, to help them make a more informed decision.

Another area of technological development is in the Formula E motor racing movement. This includes the continuation of electric race cars, which have track-powered technology. This could be made possible by inductive loops being present in the track that transfer energy to capacitor banks as cars pass over, thereby powering them throughout the race. This energy supply system reduces issues of heavy battery packs – weight issues which F1 drivers currently have with electric cars – and contributes to a cleaner and more environmentally friendly sport.

There is also possibility of using shock-absorbing gear to prevent injury. In contact sports such as rugby union, rugby league and Australian football, using military developments of smart fabrics and ceramic mixes can give high levels of protection. This protective gear could absorb the force from dangerous collisions that may otherwise cause a broken bone or head injury.

In horseracing, remote medical monitoring could also be introduced. To ensure horses are not being overworked and therefore experience an injury or even death, data could be relayed in real time to track authorities or the vet. These data would allow the horse to be monitored and riders instructed to stop or slow down to protect the horse and jockey.

In human injury rehabilitation, the development of anti-gravity treadmills could enable athletes to maintain the same levels of aerobic fitness while recovering, without having to put large amounts of physical strain on the body. This would speed up the recovery of many athletes, allowing them to return to play sooner, reducing costs and increasing player happiness.

Technological advances may also include genetic testing that can identify athletes' susceptibility for injury, ideal nutritional preferences and their most appropriate training regime. Augmented and virtual reality may also develop. This could allow spectators to experience the game from the player's perspective, as well as improve athlete training as they can be put in situations that require quick decision-making by projecting a game-like scenario in front of them.

Learning activity

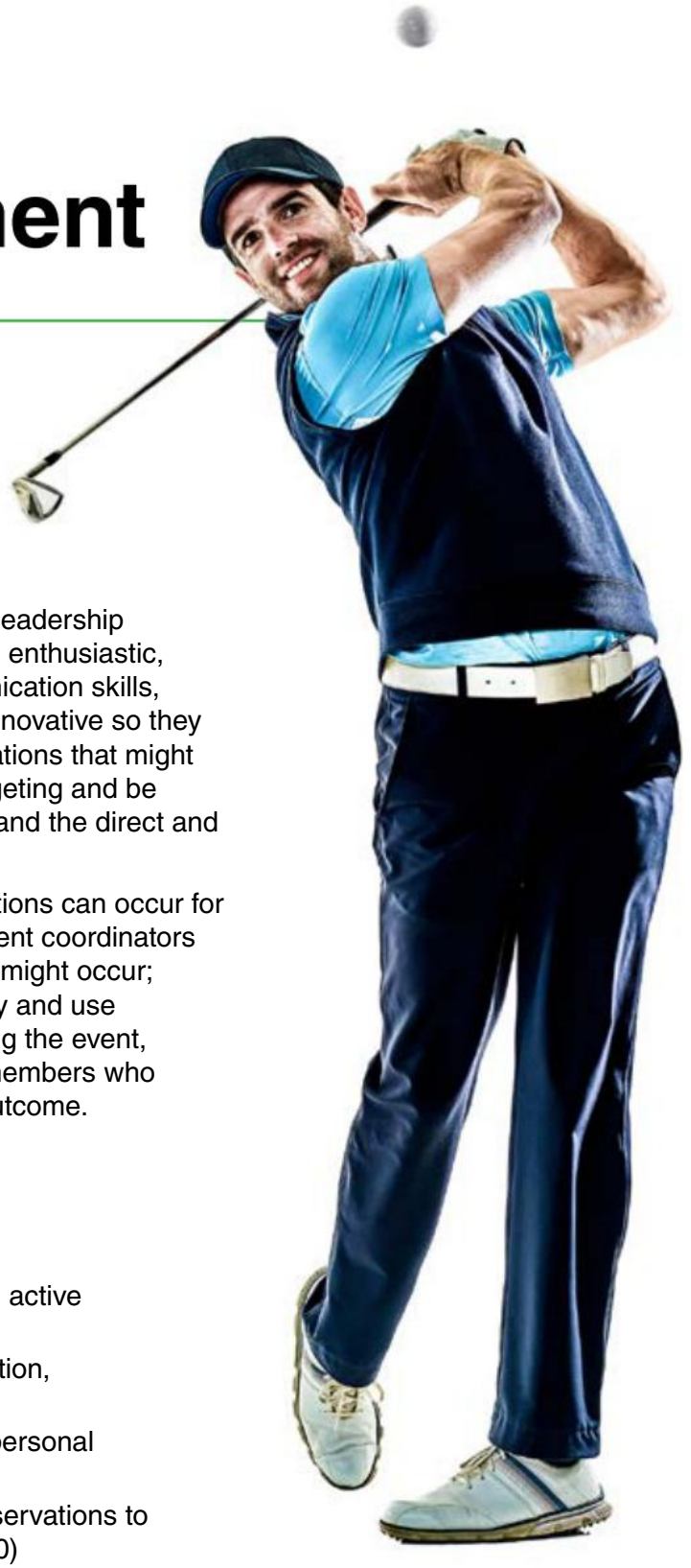
1. Discuss the social implications of online sports gambling.
2. Identify sports in which the participants use the latest types of technology, and list the technologies they use.
3. Choose a sport and discuss the technological advances that might be beneficial and detrimental to it.
4. Identify a traditional sport and explain how it could be adapted for new technology platforms.
5. Identify a popular video game and describe the aspects of play that could be converted to physical activity.
6. Investigate the practice of involvement in 'fantasy leagues' and explain how it can result in an increase in spectators' understanding of the sport in question.

Revision questions

1. Explain how each of the following technological advances can be used to improve athletic performance.
   a. Heart-rate monitors.
   b. Video analysis.
   c. Technique analysis.
2. Describe how participants' performance can be affected by:
   a. their clothing
   b. their equipment
   c. the playing surface they are using.
3. Discuss the advantages and disadvantages of subjective analysis in sports such as diving, in which the results are determined in part by judges recommending a score between one and 10.
4. Identify new technologies that have been used for enhancement of judging and officiating.
5. Evaluate how technological advances have been a promotional tool and a hindrance in relation to physical-activity levels.
6. Identify the types of technology that are used to:
   a. enhance spectator appeal
   b. improve participant safety.
7. Identify the technological advances that have been made in relation to injury rehabilitation. Explain how they have affected athletes' and players' career longevity.
8. Explain the concept of equity and access as it is associated with technology and athletic performance.
9. Explain a range of rule modifications that have been introduced to reduce the impact of technology in sport and physical activity.
10. Debate the extent to which technology has led to creation of equity for people who participate in a sport or physical activity.
11. Propose and evaluate strategies whereby future technological advances could be limited or enhanced.
12. Choose a sport that has had significant technological change. Outline the changes for coaches, players, officials and the media.

CHAPTER 16

Event management



Event management is an expanding field, mostly because events increasingly have to be prepared and coordinated. In sport, event management encompasses competitions, fundraisers, sporting tours, carnivals and sponsors' product launches.

Event managers and coordinators must have excellent leadership skills to run any event efficiently. They must be positive, enthusiastic, well-organised and reliable and have excellent communication skills, and they must promote teamwork and be flexible and innovative so they are able to address all the planned and unplanned situations that might arise. They must undertake financial planning and budgeting and be aware of all the known costs, the items of expenditure, and the direct and indirect income.

When an event is being implemented, a myriad of situations can occur for which a decision has to be made urgently. However, event coordinators cannot hope to make a decision for every situation that might occur; instead, whenever possible, they should delegate wisely and use the resources of the relevant subcommittee. In delivering the event, they greatly rely on having individuals and committee members who know their role and who strive to achieve the desired outcome.

Outcomes

A student:

- demonstrates actions and strategies that contribute to active participation and skilful performance (PASS5-5)
- works collaboratively with others to enhance participation, enjoyment and performance (PASS5-7)
- displays management and planning skills to achieve personal and group goals (PASS5-8)
- analyses and appraises information, opinions and observations to inform physical activity and sport decisions (PASS5-10)

Key knowledge

- Structures and formats
- Enterprise and organisational skills
- Roles in event management
- Planning, conducting and evaluating an event

Figure 16.1: Major sporting events such as golf tournaments require a lot of planning in order to run successfully.

Structures and formats

When event managers are structuring a physical activity or sporting event, they can utilise one of several models. Determining which model to use depends on the following range of factors:

- objectives of the tournament; for example, 'to determine a winner' and 'to promote participation'
- participants' characteristics, such as their age and ability
- available facilities
- time constraints
- type of event.

Common sporting formats include: knockout, round robin, pool, carnival of events, handicapping and seeding, and tabloid reports. Recreational activities may be structured as an expedition. Each has its own advantages and disadvantages, outlined as follows.

Common sporting formats

Knockout

The most recognised and popular tournament model that event managers use is the knockout competition, where the winner of an event progresses and the loser is eliminated. Also known as 'single elimination' and 'sudden death', knockout competitions work well in post-season play-off formats and after the participants have engaged in round-robin competitions. An example of a knockout competition is the Australian Open tennis.

The advantages of knockout competitions are that:

- they are the simplest type of tournament to conduct
- limited facilities are needed for them
- a large number of entries can be accommodated in them
- they are the most appropriate format for a one-day event
- a champion is determined within the shortest possible timeframe.

The disadvantages of knockout competitions are that:

- participation for all teams or individuals is not promoted
- emphasis is placed on victory
- the best individual or team might not be identified if seeding has not been used
- they are the least flexible type of tournament for participants.

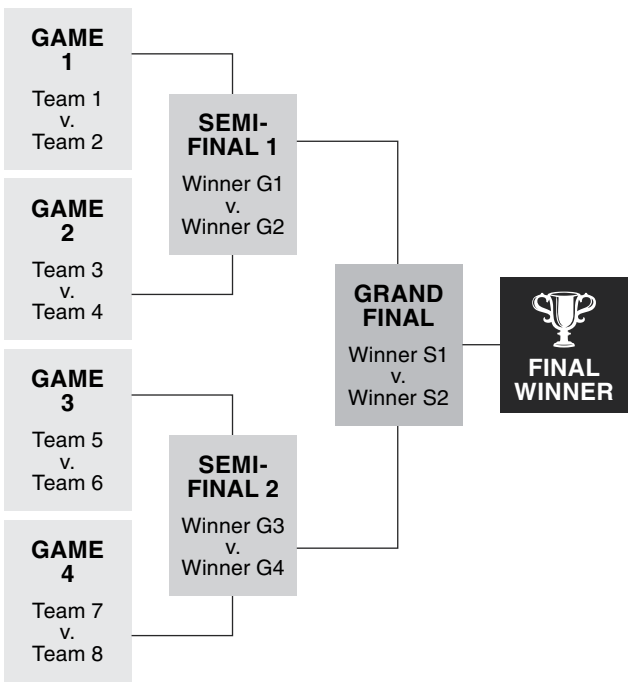


Figure 16.2:
An example of a knockout draw.



Figure 16.3:
Many local soccer competitions use a round-robin format followed by a post-season knockout finals series.

Round robin

Round-robin competitions are group tournaments in which a team or an individual plays all the other teams or individuals who are involved in a competition, an equal amount of times.

The winner of a round-robin competition can be decided by the team that, or the individual who, has the most competition points when the tournament concludes. Conversely, top teams or individuals can participate in a post-season knockout competition so a winner can be determined. Examples of round-robin competitions include the English Premier League, National Rugby League (NRL) and Australian Football League (AFL).

The advantages of round-robin competitions are that:

- participation can be maximised
- the model is one of the fairest ways to determine an overall champion
- teams' 'off' days are allowed for.

The disadvantages of round-robin competitions are that:

- they usually takes longer to complete
- more facilities are needed for them
- difficulties arise in relation to accommodating a large number of teams.

An example of a six-team round-robin draw is shown in Table 16.1.

Table 16.1: An example of a round-robin draw.

Round 1	Team 1 v. Team 2	Team 3 v. Team 5	Team 6 v. Team 4
Round 2	Team 5 v. Team 1	Team 4 v. Team 3	Team 2 v. Team 6
Round 3	Team 1 v. Team 6	Team 5 v. Team 4	Team 3 v. Team 2
Round 4	Team 4 v. Team 1	Team 2 v. Team 5	Team 6 v. Team 3
Round 5	Team 1 v. Team 3	Team 4 v. Team 2	Team 5 v. Team 6

Pool

Pool competitions are a combination of the features of knockout tournaments and are usually used when time constraints are a factor. Generally, teams are seeded and placed in a pool of equal teams. Each team plays every other team in the pool, and the top teams go through to the tournament's knockout stage.

This type of competition is used in the football World Cup, and the pool draw that was used for the 2019 FIFA Women's World Cup is set out in Table 16.2.

Table 16.2: The pool draw for the 2019 FIFA Women's World Cup.

Group A	Group B	Group C
France	China PR	Australia
Korea Republic	Germany	Brazil
Nigeria	South Africa	Italy
Norway	Spain	Jamaica

Group D	Group E	Group F
Argentina	Cameroon	Chile
England	Canada	Sweden
Japan	Netherlands	Thailand
Scotland	New Zealand	USA

Source: FIFA

Learning activity

1. Explain the role and importance of event management in sport.
2. Outline the reasons that an event manager would choose a knockout competition rather than a round-robin competition.
3. Identify the advantages and disadvantages of pool competitions.
4. Imagine that you are in charge of organising a knockout basketball tournament. You have four courts available for three hours' play each day. The games will commence at 4 pm, 5 pm and 6 pm. The Round 1 games will begin on Monday, and the final game will be on Friday. Determine:
   a. the number of teams you will have in the tournament
   b. the draw
   c. a schedule for the matches, including the days, times and court numbers.



Figure 16.4:
Participants are able to enter as many or as few events as they wish at a traditional swimming carnival.

Carnival of events

Athletics, cross-country events and swimming carnivals are examples of carnival of events competitions. These types of carnivals are commonly used in school carnivals. Each carnival is unique in relation to the number, type and structure of the events that they offer. There are three common ways of structuring this type of event, outlined as follows:

- **The traditional carnival:** Typically, the participants are able to enter as many or as few events as they wish. Its main disadvantage is that participation is not promoted; for example, a poor swimmer could choose not to participate in swimming-based events.
- **The tabloid carnival:** Participants are divided into teams and are rotated through a number of activities. Emphasis is placed on having all participants remain actively involved, and ideally, all the participants are challenged.
- **The novelty carnival:** Traditional events are either partially or totally replaced with novelty events. Emphasis is placed on enjoyment and on having all participants remain actively involved in a number of events.

Deciding which type of carnival is most suitable is dependent on the:

- type of carnival it will be: athletics, swimming or cross-country
- age of the competitors
- number of participants
- competitors' ability level.

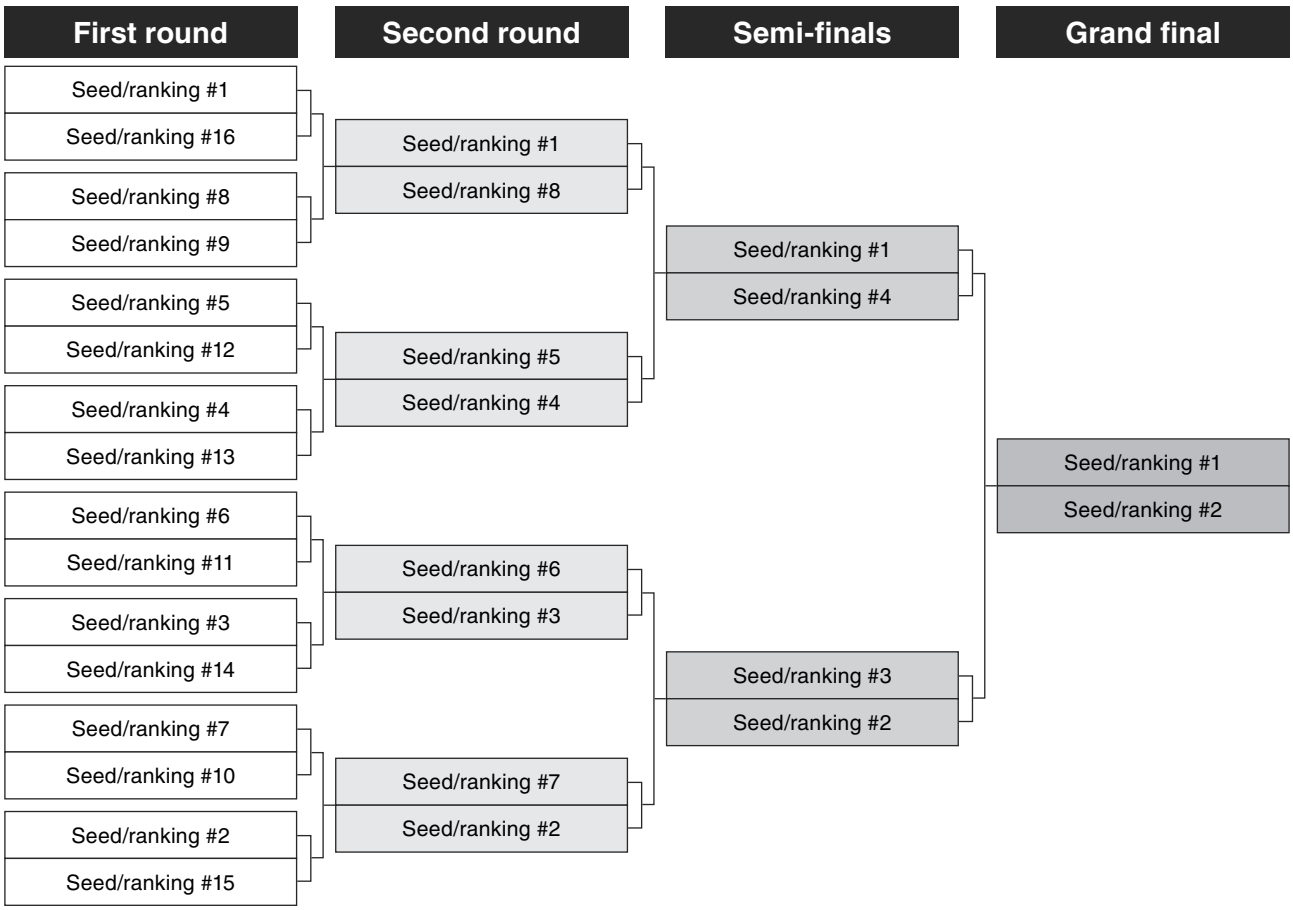


Figure 16.5:
An example of a seeded draw where the highest ranks have won their matches.

Handicapping and seeding

In sport, **handicapping** is used so that all competitors have an equal chance of winning. It is the practice of assigning an advantage to less experienced or skilful competitors. Usually, a more experienced individual or team is handicapped so that less experienced competitors are given the chance to compete on a 'level playing field'. Handicapping is used in sports such as sailing, golf and horse racing. For example, if a golfer with a handicap of six was playing a golfer with a handicap of two, they would receive a four-shot advantage at the end of the round before the winner was determined.

Seeding is used so that top teams are prevented from eliminating each other during a competition's early stages. The main component of seeding is the setting up of 'brackets' or 'seeds' so that top teams or individuals do not meet until the final rounds. Seeding is commonly used in knockout and pool tournaments.

Some examples of international events that use seeding include the:

- FIFA World Cup
- Australian Open Tennis
- World Golf Championships
- Rugby World Cup.

Tabloids

Tabloids emphasise enjoyment, experience and participation. They allow individuals to experience a number of sports in a non competitive environment. Teams are organised to ensure that they consist of an equal number of players while they rotate among a variety of novelty events and activities. Points are scored throughout the competition; however, the main goal of this style of event is for all individuals to be actively involved and enjoy their participation. The time spent at each activity is the same for each group.

Activities in a tabloid report do not focus on a specific skill or sport. Rather, they are designed to allow participants to experience and develop a range of skills that are transferable to many sporting and physical-activity environments. In addition to physical skills, social skills such as teamwork are encouraged. Due to the vast array of activities individuals participate in while involved in a tabloid report, an individual's sporting ability does not significantly influence the outcomes achieved.

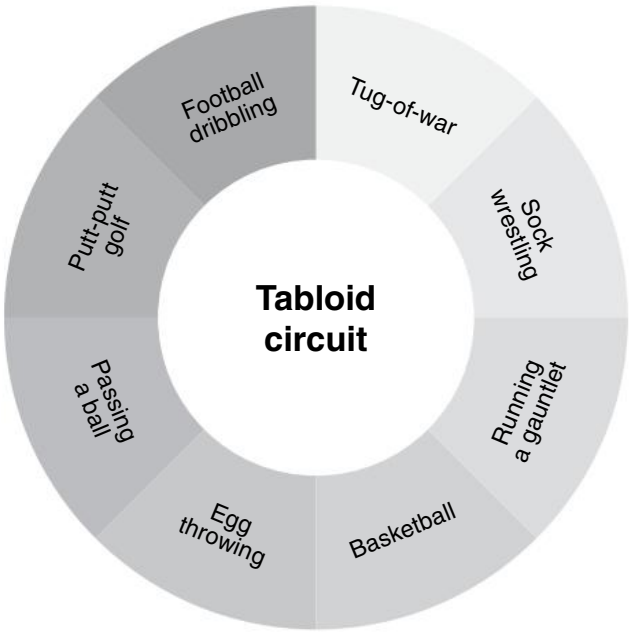


Figure 16.6:
An example of a tabloid circuit.

Expeditions

Organised outdoor sports and recreation expeditions which involve adventure can be arranged by tourism and resort companies. Individual and group expeditions are available. The types of expedition that experienced and/or accredited companies arrange are:

- hot-air ballooning
- whitewater rafting
- fishing
- canoeing
- mountain climbing
- hiking
- cruising
- safaris.

Companies that coordinate the above activities stringently plan for groups or individuals participating in them. For example, an itinerary is organised so individuals are aware of all tasks and activities they will undertake including methods of transport to and from them. The companies also provide guided tours, support individuals, answer any questions and complete administrative tasks. If equipment is needed for the expedition, some may be included in purchased packages; however, companies are likely to detail all extra requirements before a departure.



Figure 16.7:
A great way to engage in a hiking expedition in an unknown area is to join an organised hike.

Learning activity

1. Evaluate the advantages and disadvantages of the traditional, tabloid and novelty carnival formats.
2. Explain how seeding can be used to determine the draw for an event or a tournament.
3. Give two examples of how handicapping is used to create a 'level playing field' in sport.
4. In pairs, design a program for a traditional athletics carnival and a tabloid athletics carnival. Remember to include the types of event, various age groups, required equipment, required officials, number of tabloid stations and a diagram of your tabloid.

Enterprise, organisational skills and roles in event management

In any enterprise, creativity and development of ideas are brought together along with problem-solving skills, communication and the action needed for things to happen.

Organisational skills are one of the most important transferable job skills that an event manager can have. Event managers need to be organised and to focus on the projects at hand. Organisational skills can include general organisation, planning, time management, scheduling, coordination of resources and meeting deadlines.

A manager will be effective and adaptable if they recognise, develop and apply organisational and enterprise skills to the wide roles that are possible in event management.

Skills and qualities required for effective event management

Communication, teamwork and leadership

An event coordinator must have excellent leadership skills to run an event efficiently. They must be positive, enthusiastic, well organised and reliable and have excellent communication skills.

Event coordinators who have these attributes are able to:

- develop, plan and implement short-term and long-term goals
- manage and administer event staff members
- organise and facilitate planning sessions
- develop and effectively communicate the relevant policies
- coordinate and inform all event stakeholders
- establish and maintain systems and procedures
- coordinate and produce reports about the event.



Figure 16.8: Event managers need skills in planning, organising, goal-setting and communicating.

Event management is a complex task and has many components. To ensure success, the event coordinator must promote teamwork and build team harmony. Teamwork should be an opportunity for team members to undertake self-development, to embrace and reward innovation and to observe and celebrate their achievements.

Team members should establish a positive working relationship with each other, become familiar with each other, and recognise and respect each other's needs. Teamwork is successful when everyone appreciates each other's efforts. There are certain characteristics that allow teams to be effective and successful. The following outlines these characteristics:

- **Team unity:** Individuals within the team work towards achieving a common goal. All individuals are well aware of the shared goals and aims and ways to achieve them.
- **Social organisation:** Individuals are aware of their specific roles and how their efforts impact on the achievements of other group members.
- **Interdependence between the team members:** Each team member succeeds only if all the members succeed and put in the same level of effort when achieving their tasks.
- **Provide support:** Individuals are supported so they can make an equal contribution to the desired aims and goals by identifying their resources and skills early on to use them effectively.
- **Communicate clearly:** Decisions are made by general consensus and all individual contributions are considered.
- **Effective communication and interaction:** Team members communicate face to face and engage in other modes of communication to monitor the group's processes and dynamics, drive creativity and facilitate productive work practices.
- **Shared interest:** Team members identify and focus on the interests of the group as a whole to avoid personalising problems or differences of opinion. Clear discrepancy procedures are developed by group members to follow if a discrepancy was to occur.
- **Collective consciousness:** Team members perceive themselves as belonging to the group even when the group is not together.
- **Mutual trust:** Team members listen to each other, respect each other's contributions, help each other clarify ideas and show interest in each other. Members guide other members through activities and tasks.
- **Coherence:** Team members make their group activities function smoothly with minimum intervention and are able to contribute equally to produce something greater than if all members were to complete their tasks as individual parts. Each individual contribution is collated together before an activity is finished or submitted.
- **Shared achievement:** Individuals assist each other to work to nominated deadlines, and all the members feel they have learnt something from the process and from the other team members.

Success is not always determined by the outcome or specific result achieved. The development of the above social skills is just as important for individuals to aim to achieve when working in a team.

Internet activity

Log on to TitanOnline and complete Activity 16.1 by researching the employment opportunities for event managers and outlining the qualifications, experience and personal characteristics that are needed in the roles.

Flexibility and innovation

Many sporting and recreation organisations are involved in event coordination. For event management to be effective, managers have to be flexible and innovative so they can deal with all the planned and unplanned situations that might arise. By remaining flexible and innovative, they can quickly and effectively respond to challenging situations such as unexpected weather changes, injuries among participants or spectators, equipment failure and breakdown of communication technology.

It is important for managers and sport and recreation organisations to foster a positive workplace environment to successfully and quickly overcome challenges that arise. Reflecting on completed activities will also help organisations to be better prepared for future events – to anticipate challenging situations and respond to circumstances that suddenly emerge. An example where a lack of flexibility by event organisers resulted in disaster was evident in the 2011 ultramarathon in the Western Australia's Kimberleys. Turia Pitt was a competitor in the race and suffered horrific burns when trapped by a bushfire that event organisers failed to consider when starting the race.



Figure 16.9:
By remaining flexible and innovative, event managers can effectively respond to challenging situations.

Time management

The term 'time management' means the techniques used to plan and schedule time effectively. In an effort to manage their time effectively, event coordinators aim to increase their efficiency and usefulness in relation to how they spend their personal and corporate time.

A common practice among people who manage their time effectively is to set up goals and break them down into achievable steps. These smaller steps might include identifying short-term goals, creating an action plan and/or making a 'to do' list. Once people have distinguished between the steps, they must set priorities by focusing on the high-value tasks.

People who manage their time effectively maximise their efficiency. They learn to work smarter, not necessarily harder, and have more job satisfaction. In managing their time effectively, they can lower their stress level and empower other people. Following are some tips for managing time effectively:

- Make a list.
- Delegate responsibilities.
- Use downtime effectively.
- Set deadlines.
- Reward yourself.



Figure 16.10:
People who manage their time effectively maximise their efficiency.

Managing others and delegating responsibilities

To manage other people, a person needs to be able to handle, govern and guide the members of a group. The individual must organise, plan, lead and coordinate activities. They also need to engage in effective, fair practices; have good communication skills; and know something about human nature. Because managers are in a position of immense responsibility, they are authorised to sanction, promote or restrict most aspects of their team's daily activities.

Delegation is the practice of allocating a task to another person, who is usually in a role of less importance in the organisation's hierarchy. However, the person who delegated the task is still the one who is responsible for ensuring it is completed and that it is done well.

If a manager distributes the necessary tasks proportionately, they can use the opportunity to delegate to develop each worker's skills and confidence. Conversely, if a manager distributes the tasks unreasonably, the result can be an imbalanced workload and other negative consequences. Team members might either abdicate responsibility altogether or pass their allocated task on to a worker who does not have the appropriate skills or resources for completing the task.

A coordinator who multiskills an event-management team must organise to develop and promote a range of skills for each worker. In having a multiskilled team, managers are able to reallocate trained staff members if necessary, to promote greater job satisfaction and to improve the group's teamwork.

Learning activity

1. Explain the importance of the following skills and attributes in relation to event coordination.
   a. Time management.
   b. Flexibility.
   c. Innovation.
   d. Creativity.
   e. Delegation.
2. Write a report in which you explain how you, as an event coordinator, would overcome barriers to communication such as:
   a. language barriers
   b. working in an environment that has severe background noise
   c. working with team members who are easily distracted and who often misunderstand your verbal instructions.
3. Imagine that you have been put in charge of organising your school's athletics carnival. Brainstorm the factors or incidents that could lead to interference in relation to the efficient running of the carnival, and propose how you would respond to address each situation.
4. Imagine that you have been put in charge of organising your school's sporting calendar for the week. Working in pairs, design a checklist of everything that has to be done so the program can run smoothly. Remember to include details of the transport that is available to and from all the venues, how you will communicate to the students and staff members, and a competition draw.

Financial planning and budgeting

Financial planning and budgeting are essential in event management, because the expenses that are associated with an event cannot be met until revenue has been received, and in many cases, the revenue will not be received until the day of the event. To undertake effective financial planning, event managers must:

- identify all the known costs
- list all the items of expenditure
- list all the hidden costs, such as the cost of hiring extra officials
- set aside a contingency plan to meet any unforeseen costs
- list any direct income, such as takings received at the gate to the event
- list any indirect income, such as income from event sponsors.

Most small non-profit organisations and associations, such as local tennis clubs, do not have employees; their treasurer is the person who does the work of organising bank accounts, depositing cash and cheques, paying the bills, 'keeping the books balanced', drawing up a budget and regularly keeping track of the organisation's incomings and outgoings throughout the year so that the organisation knows how well it is 'keeping to budget'.

In larger organisations that have a professional staff, the treasurer is usually supported by a finance committee, and in relation to financial matters, they are a link between the staff members and the board members. The treasurer maintains the monthly accounts and must ensure that the appropriate procedures are in place so that they can keep things running smoothly and not allow any surprises to arise.

Promotion and sponsorship

Event promotion is essential to attract people to an event, whether they are to be spectators, officials or participants. Promotion and marketing are crucial activities when any event is being publicised, and anyone who is involved in them must:

- price the event appropriately
- advertise in a way to effectively reach the event's target audience
- use a variety of media, including social media, to publicise the event
- promote recognition of the event and/or the event's reputation
- ensure that the event runs as smoothly as has been promised.

Event promotion can involve the following main types of promotional material:

- advertisements
- brochures and leaflets
- posters and other point-of-sale items
- merchandising
- newsletters
- media releases
- emails and websites
- social media.



Figure 16.11:
Promoters use a variety of media, including social media, to publicise sports events.

Sponsorship allows supporting business brands to be advertised to vast audiences, while assisting events by providing increased funding or funding at a subsidised price. It allows businesses to associate with broader audiences. For example, Holden, ANZ Bank, NIB, Canterbury and Steeden are a few of the partner sponsors for rugby league's State of Origin. These business brands are advertised on associated social media posts, player jerseys and stadiums where games are played. This can potentially increase a business's reputation within the community as they can be perceived as helping promote local or national events. Sponsors may also provide finance to support awards or prizes given to participants to either encourage greater participation or reward players for their efforts. Without sponsorship, events would have to source finance themselves.

Organisation and management of a major event

For the purposes of researching a major event, the Olympic Games will be covered in detail.

Structure and format

The structure of Olympic athletic running events involves preliminary round heats, round one heats, semi-finals-finals and a final race. The fastest individuals from the heats progress to compete within the semi-final-final round and then the eight fastest competitors' race in the final. This structure is also used for athletic throwing events, however but instead of the fastest competitors advancing towards the final, the individuals who achieve the greatest distance in the javelin throw, discus, shot put or hammer throw qualify. Importantly, results achieved in qualification rounds do not carry over into the final, therefore, all competitors who advance to the final are able to compete for the gold medal. However, for throwing events, each competitor is allowed three attempts to achieve the greatest distance. Due to the plethora or sports undertaken at the Olympics, various structures are used among the different events. For example, water polo uses a different structure to the athletic events. Up to 12 teams qualify; these are then sorted into two pools of six teams which compete in a round-robin style organisation to advance to the quarterfinals-finals.



Figure 16.12:
In Olympic running, results achieved in qualification heats do not carry over into the final.



Figure 16.13:
A host city's Organising Committee is responsible for conducting the Opening and Closing Ceremony of the Olympic and Paralympic Games.

Leadership and managerial roles

The host city for future Olympics is usually named many years in advance to enable the local Organising Committee for the Olympic Games (OCOG) to plan, develop resources and fill leadership and managerial roles. For example, in 2017 it was announced that Los Angeles will host the 2028 Summer Games. During this planning and development time, event managers must fulfil a number of roles to run each event successfully.

An OCOG is formed by the National Olympic Committee (NOC) of the country of the host city to communicate with and receive instructions from the International Olympic Committee (IOC). Each OCOG executive body includes:

- the IOC member or members in the country
- the President and Secretary General of the NOC
- at least one member representing, and designated by, the host city.

Did you know?
The 2016 Summer Olympics in Rio de Janeiro were the first Games to ever be held in South America.

In addition, it generally includes representatives of the public authorities and other leading figures. Organising Committees grow from small organisations of tens of employees to reach several thousand within several years.

Source: International Olympic Committee

Leaders and management within an OCOG form teams and explicitly set responsibilities and roles. They manage timelines so that progress can be monitored and transparent to both the NOC and IOC. The teams plan, organise and deliver on a range of tasks, such as the:

- construction of the Olympic Village to accommodate athletes
- billeting of athletes' families and/or officials
- catering at events and the specialised diets for athletes
- construction of sporting facilities and purchase of equipment
- security of venues, athletes, spectators and officials
- transportation of athletes, officials, spectators
- media rights and management
- promotion of the event and ticketing
- recruitment, training and management of volunteers and employees
- financial management and reporting
- Opening and Closing Ceremony organisation.

Role of volunteers

Volunteers are crucial to enable the Olympics to run smoothly, with more than 10,000 athletes from 200 countries participating in more than 306 events at nearly 40 locations across the host country. There are many roles which volunteers can apply for to assist at during the Games. For example, volunteers are used to guide spectators to around events and facilities, provide mobility support by transporting athletes around venues, provide personal and operational support by distributing uniforms and handing out identification cards, as well as providing medical assistance to participants and spectators.



Figure 16.14:
Over 200,000 people registered their interest in volunteering at the 2014 Olympic Winter Games in Sochi.

Promotional strategies

On average, more than two billion people view the Olympic Games, which are one of the largest profitable global media events that occur. Promotion for the Olympics varies, with television, internet, radio and social media platforms utilised to advertise the events, athletes and records to be broken. For example, sports clothing brands such as Nike use the Olympic Games as a way to advertise new ranges and equipment that are going to be worn by athletes. Media companies purchase rights to video and present live coverage of the Games to viewers at home. Therefore, any other streaming is banned. Other businesses or companies wishing to advertise throughout Olympic coverage must purchase time from the company that holds the recording and transmission rights.

Internet activity

Log on to TitanOnline and complete Activity 16.2, researching the financial reports about Sydney's Olympic Games in 2000.

Finances, budgeting and sponsorship

Finances

Finance for the Olympic Games is managed by the International Olympic Committee (IOC) and primarily sourced from broadcasting partnerships, domestic sponsorship, ticket sales and licensing from the host country. The IOC contributed US$833 million towards the 2014 Sochi Winter Olympic Games, US$887 million towards the 2018 PyeongChang Winter Olympic Games, US$1.374 billion towards the 2012 London Summer Olympic Games and US$1.531 billion towards the 2016 Rio Summer Olympic Games.

Budgeting

About 90 per cent of the revenue the IOC raises from Olympic Games is distributed to organisations throughout the Olympic Movement to support the staging of the Olympic Games and to promote the worldwide development of sport. Areas included in the budget include world programs; technical support services; administration; subsidies; and continental and Association of National Olympic Committees (ANOC) programs.



Figure 16.15:
The Olympic flame-lighting ceremony started the countdown for the 2018 Olympic Winter Games in PyeongChang.

Sponsorship

To maintain the Olympic Games' integrity, limited ways to raise revenue from advertising and sponsorship are available for purchase by businesses. The majority of advertisements are sponsors, which provide vital funds to support athletes and their coaches as well as provide necessary equipment and products. Sponsorship revenue contributes more than 30 per cent of the total revenue raised through marketing. Coca-Cola is an example of a company significantly investing in utilising the Olympic Games for its marketing campaigns. It has spent billions on advertising throughout each Olympic Games throughout its 90-year sponsorship relationship.

Cultural protocols

Continuing historical and cultural traditions of the Olympic Games is extremely important for maintaining the original purpose of the Games. The Olympic flame is a symbol of friendship and unity that dates back to the ancient version of the Games and was introduced for the first time in the modern Games in 1928. The lighting of the Olympic flame at Olympia is now an integral part of the lead-up to each Games and it, along with the Olympic torch relay, links the ancient and modern versions of the Games. The torch relay takes inspiration from the torch races of Ancient Greece but was not introduced until the 1936 Games in Berlin. The torch usually travels through multiple countries on its relay to a host city, with the final torchbearer using the flame to light the Olympic cauldron at the Opening Ceremony of each Games.

According to the Olympic Charter, the host country's head of state must begin the Opening Ceremony and officially declare the Games open. This is followed by the Olympic flag entering the venue, after which an athlete, judge and coach recite the Olympic Oath. Other typical parts of the Opening Ceremony include a performance of the host country's national anthem and a parade of nations. These protocols are created by the International Olympic Committee and outline many specific requirements for all host countries. Similarly, the traditional part of the Closing Ceremony starts with a parade of all participating countries' flags, and after athletes have entered the stadium the final medals ceremony is held. Other parts of the Closing Ceremony include thanking the volunteers and lowering the Olympic flag, which is handed to the mayor of the next host city, and a speech by the IOC president. The final protocol to occur is the extinguishing of the Olympic flame in the venue.

Accessibility for participants and spectators

It is imperative that Olympic Games are designed and run with a focus on ensuring that all venues are accessible by spectators and participants with various needs by abiding by the three principles of equity, dignity and functionality, which underpin the Accessibility Guidelines. For example, wide paths and ramps throughout venues help to enable access by people using wheelchairs, and tactile maps and signs that include braille lettering help to ensure that individuals with visually impairment are supported in a safe manner. Seating with backrests should be included throughout all Olympic venues to increase spectator comfort and safety. Importantly, venue exits must be clearly signposted to ensure that evacuation procedures can safely occur. Host cities will also increase available public transport to and from event venues to reduce traffic congestion and the number of parking spaces needed at venues.



Figure 16.16:
It is imperative that all venues are accessible by spectators and participants with various needs.

Introduction of innovative ideas

The Organising Committees for each Olympic Games strive to stamp their own games as 'bigger and better' than their predecessors. Tokyo's efforts for the 2020 Games introduced initiatives to engage the Japanese population, by asking them to submit ideas for the Olympic and Paralympic mascots. Locals were also asked to donate used electronics to create the Olympic medals. The Opening and Closing Ceremonies are also a prime example of how cities use innovative ideas to not only entertain, but to showcase their culture and heritage.

The facilities that are constructed for competition and other events showcase best practice innovation. An example of innovation that is often discussed is swimming pool design, where factors such as water depth, lane ropes, pool wall design, water quality and starting block design all play a role in lowering turbulence and improving performances. Examples of innovation in stadium design include the provision of free Wi-Fi access, video screen technologies, televisions in bathrooms, luxury corporate suites, all-weather roofing and playing areas/surfaces that can easily transform for different sports.

Learning activity

Choose a major event (other than the Olympic Games) and analyse:

- its structure or format
- the roles of the leaders and managers who are involved in it
- the roles of the volunteers who are involved in it
- the promotional strategies used for it
- the finances, budgeting and sponsorship associated with it
- how any innovative ideas have been implemented for it.

Roles available in event management

Event managers must fulfil a number of roles to run an activity successfully. Their main responsibilities are to:

- develop, produce and deliver the project from proposal to delivery
- deliver the event on time, within budget, and meet and hopefully exceed the expectations for it
- set, communicate and maintain the timeline and priorities
- communicate and develop and maintain relationships with the clients involved
- manage relationships with the suppliers associated with the event
- manage the operational and administrative functions to deliver any specific projects efficiently
- lead, motivate, direct and support the team members
- inspect the event site and manage any events associated with the project
- be responsible for all project budgets, from start to finish
- ensure excellent customer service and quality delivery of the project.

Event management entails many roles, each of which is characterised by a set of distinctive skills and qualities. The types of job and areas of responsibility that are available in event management are listed as follows:

- event coordination
- coaching
- refereeing
- financial advising
- choreography
- catering
- marketing
- communications
- volunteering
- security
- support services
- programming of results and coordination of awards
- transport.



Figure 16.17:
Event managers lead, motivate, direct and support their team members.

Factors that maximise participation and promote enjoyment

Demonstration sessions and classes are a valuable way for individuals to trial sports or events at either a reduced cost or free of charge. These types of classes encourage individuals to participate in an activity before they are required to sign a contract or agreement to participate in the event long term.

When sporting events collaborate with numerous businesses or sporting brands, individuals are able to interact with multiple brands in the one specific location. This can increase participation numbers as individuals become exposed to a range of local, national or international brands and activities, allowing for them to compare against their individual needs.



Figure 16.18:
Events should be held at facilities that are located close to public transport routes.

Social media is a way to promote and advertise an event prior to it occurring as well as congratulate and showcase participants and results achieved throughout the event. Live video coverage can allow individuals to view the event from regional or distant locations, allowing them to observe part of the action so they would know what to expect if they were to participate in the future.

To maximise participation among the event's target population groups and allow for easy access, events should be held at local facilities such as outdoor parks or community halls that are located close to public transport routes.

Learning activity

1. Choose a team sport and outline how you could promote it so it appeals to a wide audience and attracts increased crowd numbers.
2. In relation to the event-management process, explain how important it is for all people and subcommittees to understand their roles and responsibilities.
3. Discuss how poor communication can have an impact on event coordination.
4. Imagine that you have been put in charge of managing the finances for your school's swimming carnival. Identify all the costs associated with running the carnival. Include the amount and type of income that is generated from the carnival.
5. In relation to the financial-management role you took on for Question 4, work out how much you need to charge each participant so you 'break even'.
6. Imagine that you have been put in charge of organising a concert at your school.
   a. List the roles you will have to fill and the responsibilities of the people in each role so that your event will be a success.
   b. Discuss the factors you will have to consider to maximise participation and enjoyment.

Planning, conducting and evaluating

Planning is the most important part of running a successful event. Event managers need to address crucial planning elements such as fundraising, advertising and booking any performers or athletes well in advance of an event, so it is essential that they start planning as early as possible. The best way to approach planning is to develop a detailed management plan that includes a timeline schedule of what has to be done by when and by whom.

To ensure that the event runs smoothly, all staff members must fulfil their roles successfully, and all staff members and volunteers must be motivated and responsive in their roles.

When the event concludes, the event manager must evaluate it against the aims and objectives. By doing so, they can build on successes as well as identify any mistakes made and apply appropriate changes to future events to improve processes and outcomes.

Requirements necessary to successfully manage an event

Requirements before the event

The event coordinator's main role is to ensure that the event runs smoothly. They have to cover all aspects of the event and ensure that areas such as sponsorship, catering, security and equipment have been dealt with.

Before the event, the coordinator might have to confirm that:

- all venues have been booked and that any necessary permits have been obtained
- the event is running to budget and that accurate records have been kept
- the event is adequately catered
- a contingency plan has been established if a larger than expected crowd attends the event
- security has been booked
- transport has been arranged
- any necessary equipment is accessible and is in safe working order
- a wet-weather contingency plan has been established
- sponsorship has been obtained and that the event has been promoted.



Figure 16.19:
Event coordinators need to have a wet-weather contingency plan in place.

Internet activity

Log on to TitanOnline and complete Activity 16.3 about marketing and promotional activities of professional sporting clubs.

Pre-event, the event manager has to schedule standard meeting dates and times so they can liaise with the subcommittees, officials and volunteers and ensure they are meeting their obligations. The minutes of all the scheduled meetings should be recorded, and all parties involved are expected to follow up in relation to their tasks that have been agreed. The records of the meetings will constitute documentation of all the decisions, policies and commitments that will be useful during the post-event evaluation.

In relation to the pre-event requirements, most tasks and responsibilities are interrelated. The tasks and responsibilities are generally dependent on each other, so it is crucial they be completed both on time and within budget. If one component is incomplete or lies outside the budget, it might affect any or all of the other components.

Learning activity

1. Working in pairs, design an advertisement for a sporting event of your choice. Present the advertisement to the class in an ICT format, and in it, include the type of event, when and where it is to be held, target audience, objectives, any necessary diagrams or pictures, and the event's attractions.
2. Prepare a media release for the event you advertised in Question 1. Remember that the media release should be short (maximum 250 words), interesting and informative and that its focus should be on 'human interest' or a celebrity-guest participant.

Requirements during the event

This is the most frenetic stage of managing any event, where efficient timing and delivery are vital.

Most issues or problems that occur during an event are avoidable. To ensure that the event runs as smoothly as possible, staff members and volunteers should be motivated and responsive in their roles.

Sufficient food and beverages must be readily available at any event, and first aid should be accessible, such as St John Ambulance officers. In the wet-weather contingency plan, which is to be organised before the event, consideration should be given to the participants, spectators, and access to the facilities and any presentations. Sufficient staff members and volunteers must be made available, and a plan must be devised where any staff members or volunteers who are absent on the day can be replaced.

Did you know?

Many event organisers require participants in an event to sign a waiver of liability to avoid litigation in case of injury.

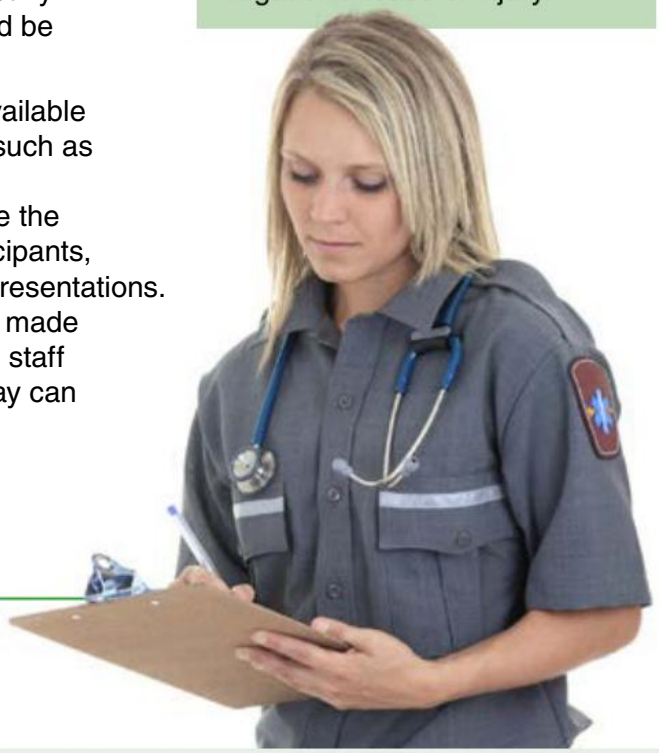


Figure 16.20:
First aid should be accessible at any event.

Scheduled programs must run to time, and there must be no unexpected pauses during the proceedings. Cultural protocols should be followed and visitors, sponsors and VIPs must be made to feel welcome and must be acknowledged appropriately. The relevant authorities must be informed, permissions must be granted and the necessary insurances must be secured. The public-address system has to be operational, and procedures have to be put in place to ensure that all rubbish is removed and that the toilet facilities are cleaned and accessible.

During any event, a myriad of situations can occur for which a decision has to be made urgently. The event coordinator neither can hope to nor should try to make a decision in relation to every situation; instead, they should delegate wisely and use the relevant subcommittee's resources whenever possible. They will do so by way of carefully planning, monitoring, communicating and training before the event takes place. Event delivery is greatly reliant on having individuals and subcommittees knowing their role and striving to achieve the desired outcomes.

For events to be successful, it is common for the coordinator to meticulously devise a list of every activity that is to occur, where it will occur within a stringent timeframe. The list should include details of:

- the timing of all the events
- the responsibilities of all individuals, subcommittees and volunteers
- all the activities involved
- the location of all events
- the necessary equipment and facilities.

Everyone involved in delivering the event should have a copy of the list, which can be used to check the event delivery during training and rehearsing.



Figure 16.21:
Coordinators may develop a stringent timeline of their event to ensure everything runs smoothly.

Learning activity

1. Working in groups of seven, elect a president, vice-president, treasurer, secretary and three committee members to coordinate a lunchtime indoor-soccer competition.
2. Prepare a report for the class in relation to the work you completed for Question 1, and in it, outline how the committee is planning to conduct the competition.
3. Outline the responsibilities involved in the following six roles when an international sporting event is being staged:
   a. Promotion.
   b. Choreography.
   c. Marketing.
   d. Catering.
   e. Communications.
   f. Transport.
4. Outline methods that could be used in evaluating whether the event was a success.

Requirements after the event

Many tasks have to be finished after any event, and the requirements for them are the same regardless of whether the event was a success or failure.

Consider the following post-event tasks:

- Conducting the presentation ceremony.
- Cleaning the facility.
- Thanking all the parties involved, including the subcommittees, volunteers, participants, media organisations and sponsors.
- Conducting a debriefing session.
- Sending reports and/or evaluations to the relevant stakeholders, including the sponsors.
- Evaluating all the event's components, including the personnel involved in it.
- Sending out the event results to the relevant organisations.
- Keeping records to use for future event management.
- Balancing the financial records.
- Paying any outstanding invoices.

Organisation of an event is a learning experience, and no two events are the same. Even if the event might was a success, the event manager will have to make modifications to it while planning for upcoming events. Once they have dealt with all the requirements that are associated with the event in question, they must evaluate it and focus on improving their processes for planning future events.



Figure 16.22:
The presentation ceremony will usually be conducted after a competition has ended.

Learning activity

1. Explain what an event coordinator can do to develop and maintain relationships with event stakeholders before, during and after an event.
2. Design and implement an evaluation questionnaire in relation to your school's sport program. Include at least 10 questions for the respondents to answer. Summarise the responses, and deliver a 250-word presentation to the class.
3. Choose a sport or physical activity and imagine you have to manage an event for it. As part of your management:
   a. adopt or allocate specific event-management roles
   b. design and implement a schedule or draw
   c. conduct the event
   d. evaluate the event
   e. use ICT whenever appropriate.

Key components in organisation

When organising a sporting event, such as a netball gala day, there are many organisational components that need to be considered prior to the event. Key organisational components include planning, budgeting, recruiting sponsorship, event promotion and advertising as well as role identification and delegation. Planning for the event initially requires identifying the objectives of the event. Budgeting will involve investigating venue hire costs as well as extras such as referee payment. How funds will be accumulated will need to be identified, including sponsorship and/or admission fees by participants or spectators. Identifying a reasonable budget early on in the planning stage is important in ensuring the event is organised in an achievable manner. If sponsorships are going to be sought, organisers need to contact proposed sponsors well ahead of the event.



Figure 16.23:
Key organisational components include planning and budgeting as well as role identification and delegation.

Allocating and adopting specific roles and responsibilities

A successful netball gala day requires multiple people taking on specific roles and responsibilities to ensure that all activities and procedures run smoothly throughout the carnival day. It is imperative that all duties that need to be completed throughout a gala day are spread around multiple individuals as this allows people to specifically focus on the tasks allocated to them. For example, a master of ceremonies will specifically manage the running order of games and be responsible for teams being aware of what teams they will be playing against throughout the day. A facilities coordinator would be responsible for managing the place where the gala day is being held, courts being used and any food and beverage facilities. Multiple umpires would be specifically responsible for umpiring the games. Individuals should volunteer to work in roles they feel comfortable to do or are suitably qualified for.

Designing and implementing a schedule/draw

Scheduling a sports draw can be a complicated process and there are many considerations that must be evaluated prior to the draw being completed. Initially, the number of teams competing in the gala day will have to be identified. Depending on the number of teams involved and the time or days available for the gala event to take place, a single or double round-robin tournament schedule will be organised. Organisers would start by identifying the final (which involves two teams) and work backwards, creating the semi-finals, quarterfinals and rounds prior to these until all teams included in the draw potentially start in the first round. Byes may have to be included in the draw if there is either an odd number of teams in the competition, if the organisers want to balance the competition and try to prepare the most fair and accurate draw or if there are not enough courts for all teams to initially play at the same time during the first round.

Conducting the event

At the beginning of the day, all competitors should be required to sign in so that the number of individuals involved in the gala day is identified for player safety and for the organiser's records. Teams are directed by volunteers or committee organisers to their delegated areas to remain throughout the day when not competing. Many day schedule sheets should be printed and put around the venue so that individuals can be aware of the day's procedures to follow. Team coaches or managers should be provided with the list of the team's games, court allocations and opponents. Morning tea and lunch breaks may be included depending on timetabling, and these breaks as well as the beginning and ending of each game or round should be clearly communicated over a public-address system by the master of ceremonies. At the conclusion of the day a ceremony will congratulate all participating teams as well as award the top teams with their medals.

Evaluating the event

After the gala day is completed, organisers should evaluate how well the day's proceedings went. Committee organisers must have a meeting where they identify the positives, negatives and areas of the gala day that could be improved. A SWOT analysis which identifies the event's strengths, weaknesses, opportunities and threats helps organisers to clearly identify changes or improvements that may need to occur for following gala days. As well as the manager's own evaluation, feedback from attendees is important in gathering the perspective of the players, spectators and team managers or coaches. Post-event surveys may be physically handed out to those involved at the end of the day or subsequently in the form of an electronic survey emailed to all those involved. Questions included in the survey would involve rating the gala day's organisation, facilities and time schedule of events. It is important that all feedback is read and commonly identified areas for improvements are included in the organisation's process for future events.

Using technology where appropriate

Data recorded throughout the day's events, including number of goals scored by teams, will be recorded in a database on a computer. This will ensure that winning teams play the correct teams and progression throughout the competition is run correctly. Results may be shared online throughout the day so that all competitors and spectators are able to view and keep track of results. Stopwatches will be used by timekeepers to ensure that play time is adhered to throughout the scheduled events. Cameras and video recording equipment may be used to capture the players competing in games throughout the day to be used for later promotion of future events.

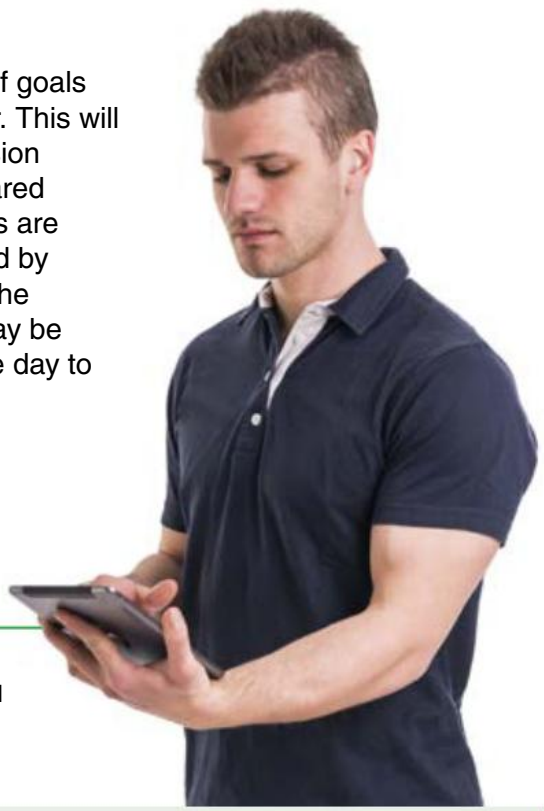
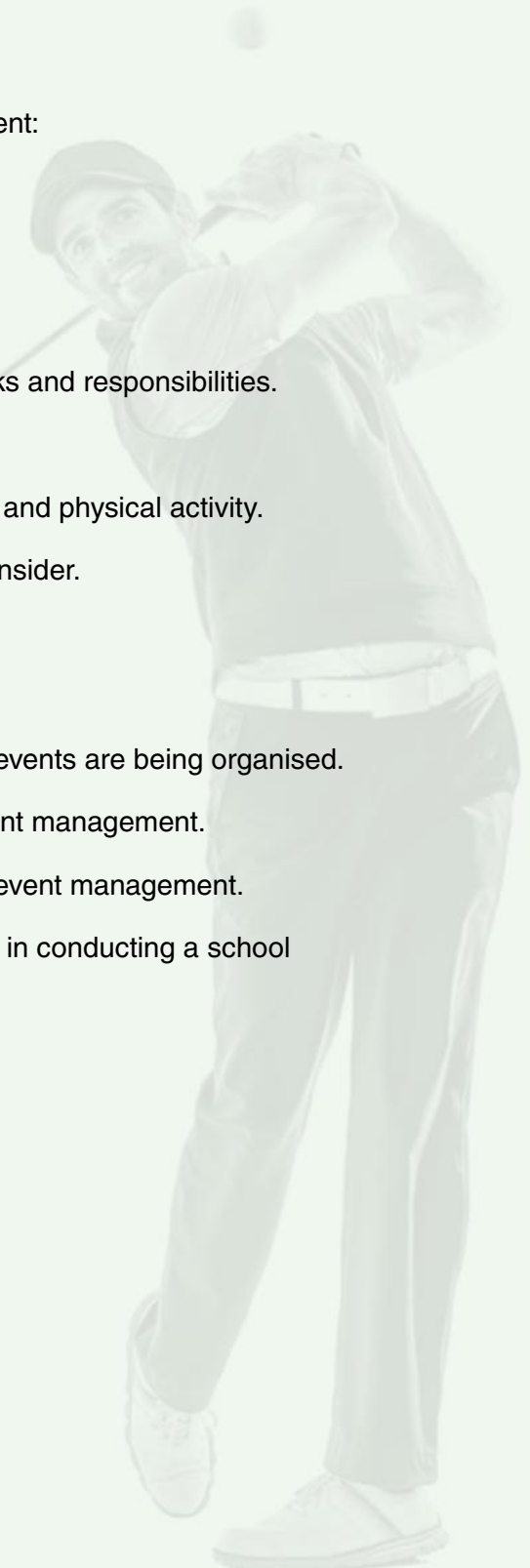


Figure 16.24:
Results may be shared online throughout the day so that all competitors and spectators are able to view and keep track of results.

Revision questions

1. Describe the role of event managers in the sport and physical-activity industry.
2. Compare and contrast the knockout, round-robin and pool competition formats.
3. Explain what ‘seeding’ is and how it is used in competitions.
4. Explain what ‘handicapping’ is and how it is used in competitions.
5. Describe the importance of the following skills in event management:
   a. Communication.
   b. Teamwork.
   c. Innovation.
   d. Flexibility.
6. Give examples of how an event manager could delegate their tasks and responsibilities.
7. Define the term ‘risk management’.
8. Explain how you could reduce the potential risks involved in sport and physical activity.
9. Identify the financial-planning factors an event manager has to consider.
10. Identify five event-management roles.
11. Explain the purpose of event promotion and marketing.
12. Outline the importance of having a contingency plan when major events are being organised.
13. Describe the personal skills and qualities needed for effective event management.
14. Explain the term ‘multiskilling’ and why is it essential for effective event management.
15. Outline the organisational and officiating tasks that are necessary in conducting a school athletics carnival.



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