

 Titan Education

EXPLORING SLR

Sport, Lifestyle and Recreation for Years 11–12



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Indigenous Australians and Torres Strait Islander peoples are advised that this publication may include images or names of people who are now deceased.

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Introduction to Exploring SLR

Using Exploring SLR

Exploring SLR enables students to develop knowledge and understanding of the value of activity, increased levels of movement skill, competence in a wide variety of sport and recreation contexts and skills in planning to be active.

Learning activity

Exploring SLR features a series of learning and practical activities that address the major ideas of the course. The activities focus on key concepts to promote understanding of the content.

Internet activity

Exploring SLR features internet-based activities that build upon skills and reinforce key concepts. These boxes are buttons/hyperlinks that lead students directly to the activity on TitanOnline, our digital learning platform. (Note: log in required, see below for details.)

Case study

Exploring SLR features case studies that apply key concepts to various situations. They emphasise key concepts to strengthen unde

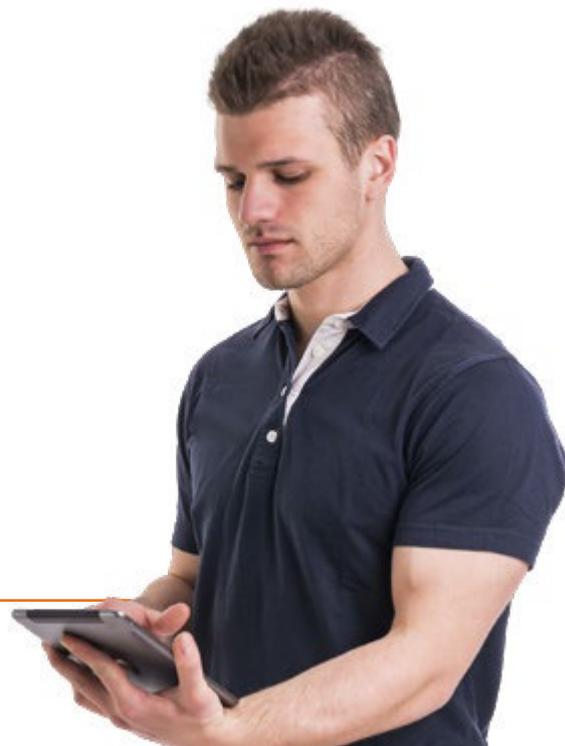
Accessing TitanOnline

Internet activities throughout this textbook direct the re: in to TitanOnline, Titan Education's digital learning acti These activities supplement the text and engage stude thinking, research and analysis. The internet activity bc buttons/hyperlinks that lead students directly to the rel TitanOnline webpage.

To receive access to TitanOnline, to please see yo (or email slr@titaneducation.com.au with your sch

Figure 0.1:

Internet activities engage students in critical thinking, research and analysis.





CHAPTER 1

Aquatics

Throughout this unit, students will discuss and participate in various activities to develop their aquatic knowledge. They will learn common features of each competitive stroke, as well as the correct technique for survival strokes. Students will learn to identify safe and unsafe water environments, as well as how to stay safe for themselves and others in these environments. They will assess situations where a rescue is needed and learn how to conduct an appropriate rescue. Students will also research various aquatic activities, both recreational and competitive, and learn the benefits of each.

Syllabus outcomes

A student:

- applies the rules and conventions that relate to participation in a range of physical activities
- demonstrates ways to enhance safety in physical activities (1.3)
- analyses the fitness requirements of specific physical activities (2.2)
- selects appropriate strategies and tactics for a range of movement contexts (3.1)
- assesses and responds appropriately to emergency care situations (3.6)
- demonstrates competence and confidence in a range of movement contexts (4.4)
- recognises the skills and abilities required to participate in activities that support health, safety and physical activity

Focus areas

- Swimming
- Lifesaving
- Aquatic activities



Figure 1.1:

Swimming and being around water is an integral part of the Australian culture.

Swimming

Swimming and being around water is an integral part of the Australian culture. Being a continent surrounded by water, many Australians have easy access to beaches, lakes, rivers, creeks and public and private swimming pools. With easy access to water, learning to swim is extremely important in order to prevent drowning. There are a number of swimming strokes people participate in, both competitively and recreationally.

Features common to all strokes

There are four competitive swimming strokes as well as survival strokes. All of these strokes have their own particular style and characteristics, although there are a number of similarities. Having a streamlined body when swimming is paramount in improving speed and minimising resistance. A streamline position involves the body being horizontally straight across the surface of the water. The forehead, shoulders, buttocks and knees should be in a straight line. The closer the body is to the surface of the water, the lesser the resistance against the water. This allows an individual to swim faster. When a swimmer takes a breath when swimming freestyle, they should roll their head to the side rather than lift it out of the water.

Another common feature across all strokes is hand placement into the water. Hand strokes are used to propel the body forward and while all strokes differ, in general the fingers should remain relatively close together.



Figure 1.2: Having a streamlined body when swimming helps to minimise resistance.



Figure 1.3: Freestyle is the most common stroke, as it is the fastest stroke to swim.

Learning activity

1. Explain the characteristics of a streamlined body position.
2. Discuss the importance of hand entry and exit in relation to efficient stroke technique.
3. Analyse the negative results of not using a streamlined body position.
4. Explain how body position, hand entry and hand exit all work together to make a stroke most efficient.

Stroke technique

There are a number of strokes, each with their own unique technique. Techniques include body and hand position, arm and leg movements and breathing patterns. The four recognised competitive strokes are backstroke, freestyle, breaststroke and butterfly.

Backstroke

Backstroke is the only stroke in which swimmers are face up in the water, as opposed to other strokes which are face down. It involves swimming with the face out of the water, in a streamline position. A swimmer's shoulders should be still and stable. The chest, navel and hips should be near the surface of the water. Arms should be straight and should move in large, circular motions. Both arms should constantly be moving, that is the swimmer should have one arm leaving the water at their hip as the other arm enters the water above their head (rather than having one arm creating a full circle before the second arm leaves the water). The smallest finger should leave the water first and the same finger should enter the water first as the arm re-enters, meaning that the hand will need to be turned up under the water. Fingers should be close together. The strokes should be close to the body, rather than out to the sides. The backstroke kick involves pointed feet and fast, little kicks. Knees should remain relatively straight throughout the movement.

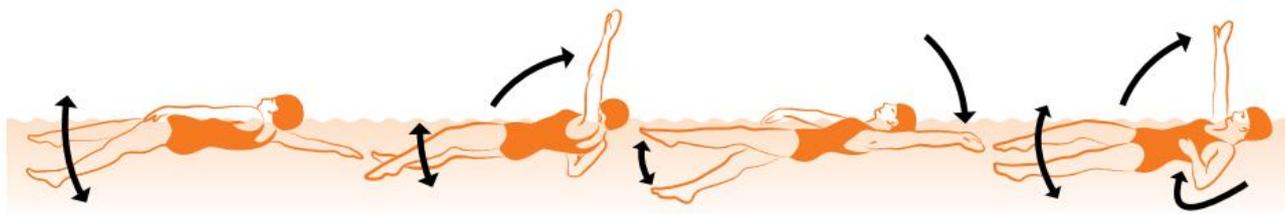


Figure 1.4:
Backstroke swimming technique.

Freestyle

Freestyle is the most common stroke, as it is the fastest stroke to swim. Freestyle involves a swimmer being in a streamlined, face down position with the waterline on the forehead. Their face should be fully submerged in the water, breathing out by blowing bubbles. The arm action is alternating, with one hand entering the water in front of the same shoulder. The fingers should not splash the water when they enter as this creates resistance. The arm extends out and the wrist bends to 'catch' the water and begin the pull part of the cycle. The pull should continue until the hand moves close to the hip. During the recovery phase the elbow is kept high and the hand remains close to the water surface.

Did you know?

Elephants can swim up to 30 kilometres a day, using their trunks as snorkels.

Internet activity

Log on to TitanOnline to complete Activity 1.1 by reviewing the video on freestyle swimming technique.

Every second or third stroke the swimmer will need to take a breath. Breathing in happens on the same side as the recovering arm. During the breath in, the head turns but remains partially submerged, with the mouth just above the surface of the water. The kicking action is similar to backstroke, with the feet pointed and relaxed, and the movement coming from the hips rather than the knees.

Did you know?

Freedivers can hold their breath for more than 10 minutes.

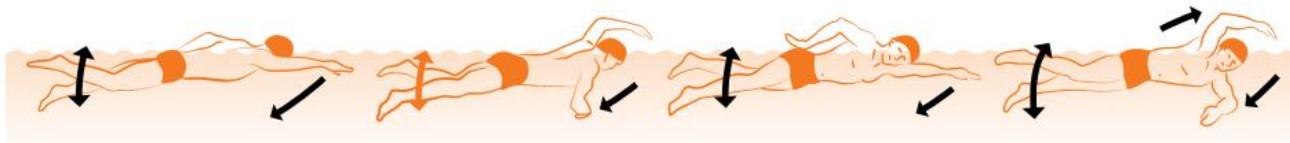


Figure 1.5:
Freestyle swimming technique.

Breaststroke

Breaststroke is swum facing down in the water. Both arms move at the same time in short, circular movements. The entire arm action happens underwater. It begins with a glide phase where the swimmer is gliding face down, horizontal in the water with their arms and legs extended straight and together. This is followed by the 'outsweep', with palms turning outwards and the arms beginning to separate. The next arm action is the 'catch', where there is a flex at the elbows, forearms move downward and the swimmer prepares to pull. This is followed by the 'insweep', which propels the swimmer forward with the arms moving backwards, then inwards and upwards. At the end of the insweep the palms should be back close together in front of the chest, recovering their position, ready for the next glide.

The leg action begins with the glide, with the toes pointed and the legs straight and together. This is followed by the recovery phase which happens at the same time as the end of the arm stroke as the head and shoulders have risen above the water. The knees bend and the feet move towards the buttocks. The knees then start to move away from each other and the feet rotate outwards. Then push the legs straighter and outwards, followed by further straightening and a quick movement of legs squeezing together.



Figure 1.6:
Breaststroke swimming technique.

Butterfly

Butterfly is one of the hardest strokes to learn. The two main points to consider are timing and keeping the head in the water to allow for optimal arm strokes.

The swimmer should be on their stomach, with the face fully submerged in the water. Both arms should simultaneously enter the water just in front of the shoulders. Once in the water, the swimmer should pull their hands back under their torso all the way to the thighs. Once at the thighs, the swimmer should bring their arms back up out of the water, over their head and back in just in front of the shoulders. They keep repeating this arm movement.

The butterfly kick (or dolphin kick) requires a swimmer to keep the legs out straight and together. Both legs kick at the same time, in a wave like motion, from the chest and hips all the way down to the feet and toes. The wave like kick should create an up and down motion that will propel the swimmer forward. The more a swimmer uses their chest and hips to create a wave like movement, the more powerful and fast they will swim.



Figure 1.7: Swimming butterfly requires upper body strength.



Figure 1.8: Butterfly swimming technique.

Internet activity

Log on to TitanOnline and complete Activity 1.2 by reviewing the video on the correct butterfly stroke technique.

Practical activity

Practise the following strokes, focusing on developing the correct technique:

1. Backstroke.
2. Freestyle.
3. Breaststroke.
4. Butterfly.



Figure 1.9: Learning to swim is extremely important in order to prevent drowning.

Lifesaving strokes

While the previously detailed swimming strokes are used competitively, they are not the only strokes. Sidestroke and survival backstroke are ideal to use if the rescuer is ever in a swim rescue situation or they need to swim a long distance and want to conserve energy.

Sidestroke

Sidestroke is an energy efficient stroke that also provides the opportunity to have an improved view of the surroundings. It is effective for fatigued swimmers and swim rescues. Table 1.1 outlines the correct technique for the body, legs and arms as well as extra tips to consider.

Table 1.1: Technique for sidestroke.

Body	Legs	Arms
<ul style="list-style-type: none"> ▪ Lie on the side of the body and extend the lower arm above the head with the palm face down. ▪ The side of the head is in the water. ▪ The top arm is resting down the body near the thigh. 	<ul style="list-style-type: none"> ▪ Scissor kick the legs: <ul style="list-style-type: none"> – Bend both legs at the knees and hips with one leg in front of the other. – Point the toes, straighten the left leg out forwards and sweep it backwards in a circular, kicking motion. – Bring the legs together, glide and repeat with the right leg. 	<ul style="list-style-type: none"> ▪ Pull the bottom arm downwards so it extends out from the shoulder. ▪ The top arm raises to the chin and then pulls back out to the side of the body, using the palm to move the water.

Tip: Swap the sidestroke to different sides of the body when one side becomes tired.

Survival backstroke

Like sidestroke, survival backstroke does not use as much energy as other competitive strokes. In addition to this, most people find it easier to float on their backs, which makes survival backstroke ideal for rescuing and survival situations. Table 1.2 outlines the correct technique for the body, legs, arms as well as extra tips to consider.

Table 1.2: Technique for survival backstroke.

Body	Legs	Arms
<ul style="list-style-type: none"> ▪ Lie flat on the back, face up. ▪ Keep horizontal in the water. 	<ul style="list-style-type: none"> ▪ Use an inverted breaststroke style kick: <ul style="list-style-type: none"> – Keep knees under the water to help float horizontally. – Kick the legs apart, bring the legs together and whip them back in, in a circular motion. 	<ul style="list-style-type: none"> ▪ Extend the arms sideways under the surface and bend the elbows. ▪ Flatten and relax hands, circling them outwards and then inwards. ▪ Continue sculling the arms.

Tips: Practise the breaststroke kick by submerging the bottom half of the body in water and holding onto the side of the pool. Practise the technique by lying with the back in the water, face up and holding a floatation device.

Practical activity

Accurately and efficiently demonstrate the following lifesaving strokes:

1. Sidestroke.



Figure 1.10: Children and toddlers may need additional assistance, such as while learning to swim.

Lifesaving

Lifesaving concerns any situation in which an individual or group of people find themselves in danger when in or around water. Australia has various organisations dedicated to the prevention and treatment of water accidents and injuries, such as AUSTSWIM and the Royal Life Saving Society Australia (RLSSA). Issues to consider when around aquatic environments include water safety, personal survival techniques, rescue principles, categories of drowning casualties, non-swimming rescues, swimming rescues and resuscitation.

Water safety

Water safety involves precautions taken around various water environments to ensure safety is maintained and optimised. In order to promote water safety, it is important to understand potentially unsafe water environments.

Water environments around Australia include:

- beaches
- lakes
- rivers
- creeks
- waterfalls
- swimming pools
- bath tubs
- spas.

Among the above water environments, individuals should be cautious of:

- rips
- currents
- undertows
- unstable sand banks
- animals, such as sharks, eels, crocodiles and blue bottles
- submerged objects, such as broken glass and broken branches
- low temperatures, wind chill and hypothermia
- unclear waters
- water depth
- slippery or collapsing surfaces
- unsafe or changing weather conditions when boating
- unreliable boating equipment, missing safety equipment, overloaded boats.



Figure 1.11: Lifesavers are required up and down Australia's coastline.

Did you know?

In the decade up to 2021, 80% of all drownings were male.

Source: RLSSA 2023

Internet activity

Log on to TitanOnline and complete Activity 1.4, based on the RLSSA data about drownings in Australia.

Learning activity

1. Research the Royal Life Saving Society Australia Aquacode and how the information promotes safety in water environments.
2. Create a list of water environments and list the dangers associated with each environment. Discuss with a partner and add to your own list.
3. Research how to identify a rip at the beach.
4. Outline the strategy for a competent swimmer caught in a rip.
5. How could a swimmer safely identify the depth of a river without entering the water?

Personal survival techniques

There are specific skills and knowledge that individuals learn at an early age to ensure they are better able to protect themselves and others in and around water. These are called personal survival techniques and include water entries, survival swimming, floating and signalling for help.

Entries

There are a number of entry methods that individuals can use when entering water environments. Depending on the situation and the type of water, specific methods may be more suitable than others. These include wade, slide in, stride in, dive and jump in. An individual should assess which method is the safest and poses the least amount of risk. It's also important for individuals to know what to do if they accidentally fall into water. Table 1.3 on the following page details the different styles of entry.



Figure 1.12:

Diving provides a quick entry in a rescue situation, shallow waters.

Table 1.3: Water entries.

Method	When it is safe	How to do it
Wade	It is known the water is shallow on entry, but the depth further into the waterway is unknown.	Walk cautiously into the water, feeling for any objects with feet and hands.
Slide-in	Unable to walk into the water and unsure of depth of the water or what lies below the surface.	Sit on the edge, with feet entering the water first. Place body weight on arms and shoulders and slowly lower the body into the water.
Stride-in	Water depth is known and there are no sharp or hidden objects under the surface. Used in situations where the head should remain above the water, e.g. to maintain sight of a person in need of rescue.	Hold arms out to the sides with palms facing down. Step one foot forward and slightly bend the knee of the back foot. When the arms hit the water, push against the surface to keep the head above the water.
Dive	Water depth is deep enough to avoid hitting the bottom and there are no sharp or hidden objects under the surface. Provides a quick entry in a rescue situation, but should never be used in shallow waters.	Arms together with fingers pointed. Push off the surface with toes like a spring board. Hands enter first, then head, shoulders, torso, hips and legs.
Jump	When there is a large drop (greater than one metre) from the edge into the water and water depth is sufficient to avoid hitting the bottom.	Close the mouth and block the nose with one hand to prevent water entering. Place the other hand across the chest. Jump and then quickly bring both feet together. After entry, tuck the body to stop the descent. If wearing a flotation device, hold it down tight to prevent it rising up upon impact with the water.
Accidental fall-in	When entering the water unexpectedly from a push, slip, trip, etc.	Tuck the body up into a ball and place hands over the head to prevent head injuries.

Practical activity

Accurately and efficiently demonstrate the following water entries:

1. Wade.
2. Slide-in.
3. Stride-in.
4. Dive.
5. Jump.
6. Accidental fall-in.



Figure 1.13:

Keeping clothing on, and the body and limbs submerged, can help swimmers avoid wind chill while waiting for rescue.

Survival swimming

Survival swimming can be used in any situation where the person is in danger. It aims to preserve energy, keep the body as warm as possible and maintain buoyancy. There are some key points to remember when swimming for survival:

- Make a survival plan. For example, if caught in a rip, the plan would be to swim parallel to the beach to a point where the waves can assist a return to the beach.
- Use any available buoyant object to remain afloat. For example, in a capsized boat scenario there may be debris, eskies, buckets, an upturned hull or life jackets to use.
- Keep as warm as possible by keeping clothing on if possible. Keep body and limbs submerged to avoid wind chill.
- Keep the body and breathing relaxed and swim with slow, minimal effort strokes.
- Keep the eyes open and choose an object, landmark or sun/moon to maintain the desired direction if possible.
- Signal for help by shouting or raising one clenched fist in the air.

Floating

In survival situations where a person spends an extended period of time in the water, fatigue will develop and swimming will become increasingly difficult. Survival floating enables the person to rest and regain energy. Some individuals find it easier to float than others, but in most cases floating is possible with correct body position, lungs full of air and if necessary a hand sculling motion. Individuals should try the following if floating does not come naturally:

- Lie on back, the head back with the ears in the water.
- Use the levels of air in the lungs to remain afloat.
- Outstretch the arms straight, either side of the head with the back of the hand in the water. Arms placed in this position counterbalance the position of the legs.
- Remember the legs usually have greater density than the rest of the body, making them more likely to sink than the air filled torso. If the legs sink, try to:
 - arch the back and keep the stomach up
 - complete the occasional kick if necessary to raise the body level
 - allow the legs to bend at the knee rather than keeping them straight and dragging the whole body down.

These steps help shift the centre of buoyancy, making it easier to stay afloat.

Treading water is an alternative to floating in some survival situations. Treading water may allow for better vision and manoeuvrability than floating, although it does consume considerably more energy. The body position remains upright, with the legs using an egg beater kick and the arm and hands using a figure-eight sculling motion.

Internet activity

Log on to TitanOnline to complete Activity 1.5 and learn the correct technique for floating.

Practical activity

1. Test how long you can tread water for.
2. Practise floating.
 - a. Were you able to float on your back?
 - b. Were you able to float on your stomach?
 - c. Did you find it harder or easier to float when you tried the technique of bending your arms and legs?

Signalling for help

If a swimmer requires assistance, the signal for help is one clenched fist raised straight up in the air. Depending on swimming ability and energy levels, the swimmer needs to adopt a floating position on their back or tread water to enable the arm to be raised.

Rescue principles

When performing a rescue, there are four important principles to consider: awareness, assessment, action and after care.

Awareness

Awareness involves recognising and realising when something is 'not right'. This may involve recognising that someone is caught in a rip with their arm up, that there was a group of five swimmers at the local pool and now there is only four, or that the backyard pool gate is open when it is normally always shut.

Assessment

Assessment involves deciding what course of action to take. If there are two people underwater, who receives priority? How can the rescuer get to them without putting themselves at further risk? What are the risks? Does the rescuer have the swimming ability or resources to affect a rescue? Is there someone else around who is able to help? Are there any floatation devices available?

Action

Action involves carrying out a course of action that was decided upon through the initial assessment.

A realistic assessment, which takes into account all the variables and options, must place the priority first and foremost on the safety of the rescuer. Most rescue situations will involve strong emotions and many people feel the need to rush into a swim rescue, often without acknowledging that they do not have the swimming ability required to complete the rescue. The action plan must take into account both the assessed dangers and other unexpected dangers that may arise in the course of the rescue.

The range of actions that a rescuer can decide upon may range from simply getting help, to conducting a non-swimming rescue or a more difficult swimming rescue.

After care

After care is the course of action taken after the rescue is complete. This could involve DRSABCD, reassurance, first aid, transportation to hospital or monitoring while awaiting arrival of an ambulance.

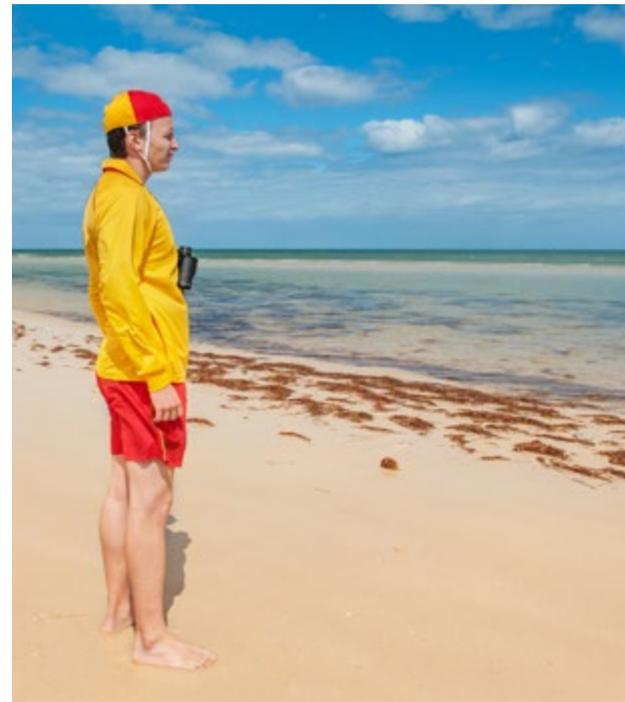


Figure 1.14: A drowning situation should be assessed before any action is undertaken.



Figure 1.15: After care actions, such as DRSABCD, may be necessary after a rescue has been completed.

Learning activity

Read the following scenario and answer the related questions.

“You are a lifeguard at the local swimming pool. You have stopped supervising for a moment to help an elderly man out of the pool. When you look back up, two children come to your immediate attention. One child is face down and not moving, approximately 10 metres from you. The other child is about 30m away, is frantically calling for help and looks like he might go under very soon.”

1. Explain who you would help first.
2. Explain how you would use ‘the four As’ in this situation.
3. Outline the type of rescue to use for each child.

Categories of drowning casualties

When assessing rescue situations, it is important to recognise the different types of drowning casualties. The state of the casualty will influence how they react to the situation, and may make rescuing them either easier or more difficult. The four categories include non-swimmer, weak swimmer, injured and unconscious.

Non-swimmer

The non-swimmer is exactly that, someone who cannot swim. These casualties will most likely be very distressed, may be going underwater and will display no swimming skills. They will probably not be signalling for help, may not cooperate with instructions and may grab onto anyone – even a potential rescuer – in the desperate attempt to stay above water.

Weak swimmer

A weak swimmer may show all the signs of a non-swimmer if they are fatigued. They may be less distressed than the non-swimmer and may have enough skills to signal for help. They are more likely to listen to instructions during the rescue and may be easier to help.



Figure 1.16: Struggling non-swimmers are likely to be distressed and may be going underwater.

Did you know?

Between June 2021 and June 2022, 339 Australians lost their lives to drowning.

Source: RLSSA 2023

Internet activity

Log on to TitanOnline to complete Activity 1.6 on how to spot the key signs of drowning.

Injured

An injured swimmer may be identified by the unusual way they position themselves in the water. Depending on their swimming ability, the injured swimmer may be able to float or perform survival swimming and may be able to signal for help.

Depending on the injury, the swimmer may be uncooperative and fail to follow instructions due to the level of pain.

The swimmer may be showing signs of pain such as screaming and holding the injured site. The rescuer may have to provide emergency care during the rescue and the planned rescue may need to be adjusted to avoid aggravating the injury.

Unconscious

An unconscious swimmer will be limp, possibly submerged, unresponsive and often face down in the water. Resuscitation during the rescue may be necessary and as with any unconscious person, spinal injuries should be suspected. The rescuer will find it very difficult to move an unconscious person without assistance.

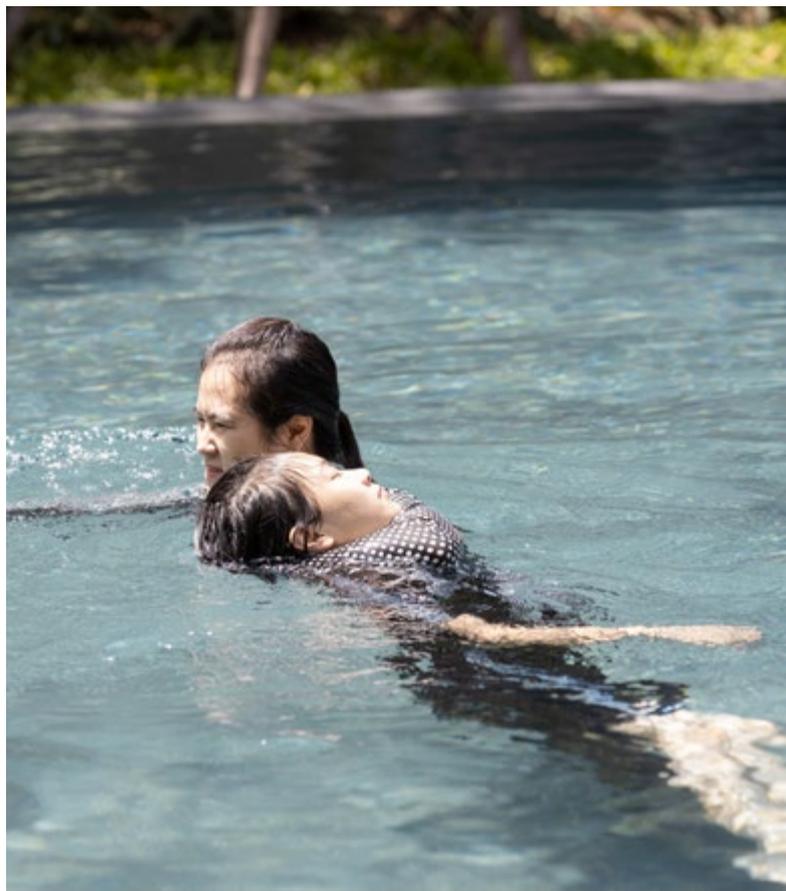


Figure 1.17:
An unconscious swimmer will be limp and unresponsive.

Internet activity

Log on to TitanOnline and complete Activity 1.7 about promoting the benefits of life saving and first aid.

Practical activity

1. Students are to be broken up in groups of four.
2. Each group is given a scenario detailing what type of swimmer they will be dealing with.
3. Students take turns rescuing each other, using the correct rescue technique.
4. Students are to identify the type of swimmer requiring the rescue and how safe each rescue was.

Non-swimming rescues

Non-swimming rescues are safer than rescues that require the rescuer to enter the water. These are the rescue types of choice and should always be used, even by experienced rescuers, if the situation allows. In these cases, the reach or throw methods should be used.

Reach

A rescuer would use the reach method when the swimmer is close to the edge of the water. The rescuer should assume a low to the ground position and extend their hand or leg out towards the swimmer. The rescuer can grip an immovable object or an assistant to avoid being pulled in.

If the person is out of reach, the rescuer can improvise and use any available resource to extend their reach, e.g. a branch, swimming noodle, towel, kickboard, floating ring. If at any stage the rescuer feels that they are at risk of being pulled in, they can release their grip and restart the rescue.

Throw

A rescuer would use the throw method when the swimmer is too far away from the edge of the water to enable a reach rescue. In this situation, the rescuer would throw an object to the swimmer, such as a rope or a flotation device attached to a rope and instruct them to grab hold. An accurate throw should land beyond and just to the side of the swimmer and take into account any current. The rescuer should then assume a balanced position, with knees bent and feet apart, a few steps away from the edge. They then pull the swimmer to safety. It is important to communicate effectively with the swimmer and reassure them throughout the rescue.



Figure 1.18:
A non-swimming rescue, such as reach rescue, is safer than a swimming rescue.



Figure 1.19:
A throw rescue can be used when the swimmer is too far away from the edge of the water to enable a reach rescue.

Learning activity

1. Create a swimming scenario where someone needs a non-swimming rescue.
2. Share the scenario with a partner.
3. After reading each other's scenarios, discuss how the rescuer should respond.

Swimming rescues

Swimming rescues are used when there is no way to help a swimmer without entering the water. Great caution should be used when carrying out these rescues because if the rescuer gets into trouble, there will now be two casualties and no rescuer. At all times the rescuer must put their safety ahead of the swimmer. In all rescues, it is safest to avoid physical contact with the swimmer. They could be distressed, scared and irrational, which means they may be likely to put the rescuer in danger by latching on and pushing them under in order to keep themselves afloat.

Wade

Wade rescues are ideal where there is shallow water not too far from the person needing rescue. The rescuer should reassure the swimmer, and walk out cautiously towards them without going any further than waist deep. When the rescuer is close enough to the swimmer, they should extend an aid such as a noodle, kickboard or ring. Drag the swimmer back to safety but avoid physical contact with them if possible.

Tow

A tow rescue requires the rescuer to swim out to the swimmer, retrieve them and bring them back to safety. The rescuer should use an aid to assist them, such as a noodle, board or ring. When the rescuer reaches the swimmer, they should adopt the defensive position, reassure them and extend the aid out and instruct them to hold on tightly. This non-contact towing avoids physical contact and the potential danger of being held by the swimmer.

Defensive position

If a non-contact tow rescue is not possible, the rescuer should adopt a defensive position and ensure their own safety before progressing. The defensive position allows the rescuer to approach the person in difficulty, but remain at a safe distance to determine if it is safe to proceed. From a safe distance, the rescuer tucks their legs up and out in front of them, ready to quickly propel themselves away from the person, or even kick the person away if they lunge or attempt to grab the rescuer.

Internet activity

Log on to TitanOnline to complete Activity 1.8 on tips for performing a rescue contact tow.

Learning activity

1. Create a swimming scenario where someone needs a swimming rescue.
2. Share the scenario with a partner.
3. After reading each other's scenarios, discuss how you would respond appropriately if you were the rescuer in this scenario.
4. Outline how you would respond if you are mid-rescue and the swimmer starts to lean and push on you, making you go under the surface.

Resuscitation

Resuscitation is used in situations where the swimmer has stopped breathing. The purpose of resuscitation is to preserve life and limit damage to the brain due to lack of oxygen. Resuscitation must continue until breathing recommences or until a doctor or other qualified medical assistance arrives to provide care.

Did you know?

It is not uncommon for a patient's ribs to be broken during CPR.

Cardiopulmonary resuscitation (CPR)

Cardiopulmonary resuscitation involves giving emergency chest compressions and breaths to a person who is not breathing. Before carrying out any compressions or breaths, the rescuer should have carried out the previous steps in DRSABCD, including clearing the airways. DRSABCD is explained in detail in Chapter 3.

The ratio used in CPR is as follows: 30 chest compressions to two breaths, at a rate of 100 compressions per minute.

Rescue breaths involve using the pistol grip to ensure airflow reaches the airways. The pistol grip requires the rescuer to extend their index and middle finger with the thumb up straight. They position the index and middle finger on the swimmer's chin and tilt their head back. After giving each breath, the rescuer should turn their head towards the swimmer's chest to look for movement and to have their ear hovering over the swimmer's mouth to hear and feel movement.

Compressions require the rescuer to interlink their fingers with both hands facing palm downwards. Position the hands on the lower half of the sternum (also called the breastbone). The rescuer should push down hard on the chest, with each compression being about one third of the chest depth. During compressions, it is not uncommon to injure the swimmer because of the force of the compressions, but the main priority is to restore life and bring back breathing.

For infants, the rescuer may need to put their mouth over the casualty's nose and mouth to enable an air tight seal. To complete compressions, the rescuer may use just the index and middle finger of the hand.

As mentioned earlier, the first aider or rescuer has a duty of care to continue CPR until breathing recommences or qualified medical assistance arrives. Compressions can be very strenuous and tiring, particularly if carried out for any more than a couple of minutes. Rescuers who are tiring should enlist the help of bystanders to continue CPR.

Practical activity

Using CPR manikins, demonstrate the following resuscitation procedures:

1. Breathing technique and rate for an adult.
2. Breathing technique and rate for an infant.
3. Compression technique and rate for an adult.
4. Compression technique and rate for a child.
5. One person CPR for an adult.
6. One person CPR for an infant.



Figure 1.20:

Lifeguards commonly render assistance in aquatic emergencies.

Emergency services

The term ‘emergency services’ usually applies to public organisations that respond in emergency situations, such as police, ambulance and the fire brigade. Within these organisations there are groups such as the water police, rescue squads and swift water rescue teams that are specifically trained for aquatic emergencies. Other organisations that commonly render assistance in aquatic emergencies include lifeguards, Coastal Patrol and the State Emergency Services (SES). Most of the individuals providing these services are paid employees, but some are involved on a voluntary basis.

Apart from lifeguards, who can be approached directly, the best way to receive the appropriate emergency support is to call triple zero (000) from any phone. 112 can also be used on a mobile phone and 106 is the number to ring if an individual has a hearing or speech impairment.

Emergency services should always be contacted if a person has:

- required CPR
- experienced breathing difficulties
- suffered a head injury or been unconscious
- been treated or suspected of having secondary conditions such as extreme blood loss, shock, heart attack, spinal injury, etc.

Internet activity

Log on to TitanOnline to complete Activity 1.9 by researching the variety of emergency services available in NSW.

Aquatic activities

Aquatic activities are very popular in Australian society, particularly along the coastlines. Individuals can participate in a wide range of aquatic activities that are recreational or competitive, with many benefits to be gained from both.

Recreation vs competition

Recreational aquatic activities are defined as activities that people engage in for fun or enjoyment. Competitive aquatic activities are defined as activities where people are striving to win, trying to break a record or beat another individual.

There are a range of activities that can be classified as recreational, competitive, and some activities can be classified as both. Table 1.4 highlights these activities.

Table 1.4: Recreational and competitive aquatic activities.

Recreational	Competitive	Both
<ul style="list-style-type: none"> ▪ Swimming at the beach ▪ Swimming at a private or public pool ▪ Aqua-aerobics ▪ Jet skiing ▪ Snorkelling ▪ Scuba diving 	<ul style="list-style-type: none"> ▪ Water polo ▪ Diving ▪ Synchronised swimming ▪ Rowing ▪ Swimming 	<ul style="list-style-type: none"> ▪ Swimming ▪ Surfing ▪ Kayaking ▪ Water skiing ▪ Fishing ▪ Yachting



Figure 1.21: Aquatic activities such as water polo are very popular in Australian society.

Learning activity

1. Research the activities offered at your local swimming centre and list the opportunities for recreational aquatic activities and competitive aquatic activities.
2. Expand on the list in Table 1.4, identifying various aquatic activities as recreational or competitive.
3. Investigate one aquatic activity available in your local area. Provide information on the:
 - health benefits of participation in this aquatic activity
 - cost and other factors that may affect participation in this activity
 - skills and techniques necessary to participate effectively and/or competitively
 - the rules of competition associated with the activity. (If there are none, design your own rules that could be used to enable competition.)

Benefits of aquatic activities

There are many benefits of participating in aquatic activities. First and foremost, participating in these activities facilitates learning to swim, which is an invaluable skill in a culture that offers so many water based social opportunities. In addition to the safety aspect, participating in aquatic activities has benefits for all components of health as detailed below.

- **Physical improvements** to cardiovascular and muscular endurance, lung capacity, weight loss, body toning, injury rehabilitation.
- **Emotional benefits** such as improved confidence, stress management, increased sense of accomplishment, happiness.
- **Social benefits** include forming new friendships, engaging with existing friends and developing social skills.
- **Spiritual benefits** include the development of mindfulness and a connection with the natural environment.
- **Mental health** benefits such as problem solving, improved cognitive skills and stress management.

Learning activity

Investigate the following groups and outline the specific benefits that aquatic activities offer:

1. Toddlers.
2. Elderly.
3. Asthmatics.

Types of aquatic activities

An individual's geographical location will, in many instances, dictate what types of aquatic activities are available.

For example, individuals living in areas on or near the coast will have easy access to the beach and other aquatic resources common

areas, such as private and public pools. Others living in rural areas may have less aquatic resources but may still have access to pools, lakes, rivers and dams.

Examples of aquatic activities include water polo, synchronised swimming, surfing, biathlon, snorkelling and aqua-aerobics. Each of these activities requires specific skills, techniques and rules.

The next section will look at techniques and rules specific to water polo.

Internet activity

Log on to TitanOnline to complete Activity 1.10 by researching the benefits of surfing and Australia's aquatic resources.



Figure 1.22:

Water polo is one of the most physically demanding aquatic activities.



Figure 1.23:

Throwing and catching the ball in one hand is a vital skill for water polo players.

Skills

Water polo requires many specific aquatic skills. It is known to be one of the most physically demanding sports, and attaining these specific skills can prove to be very important to successful participation. Some of the skills necessary for water polo include:

- treading water
- swimming specific strokes including freestyle and backstroke
- throwing and catching the ball in one hand
- shooting the ball towards the goal
- swimming without losing control of the ball.

Techniques

In order to complete the above skills efficiently, players must use specific techniques. These may include:

- **Baulking** – is when a player pretends to pass the ball by acting out the motion of throwing it without actually releasing it, which can throw the defender off and create a new option of where to pass the ball.
- **Wet and dry passing** – dry passing involves throwing the ball straight into a teammate's hands, whereas wet passing involves throwing the ball into the space in front of a teammate in the water, so that they can swim onto the ball.
- **Egg-beater kick** – technique for treading water that involves alternating circular movements of the legs, which helps the player stay elevated in the water.
- **Swimming with the head up** – swimming with the head above water may be slower as the body is not in a streamline position but is necessary in order to see the game and evaluate where teammates and opponents are positioned.

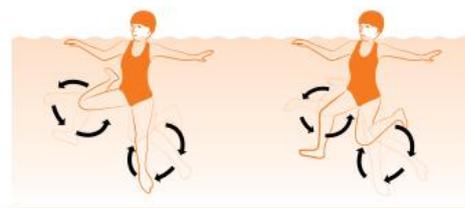


Figure 1.24:

Egg-beater kick technique.

Rules

Water polo is a team water sport. The field is divided into quarters with each team having a scoring end and a defensive end. At either end there is a goal, which is an area players need to throw the ball into in order to score. The aim is to pass the ball between teammates until they are close enough to shoot the ball into the goal to score a point. The only player allowed to handle the ball with two hands is the goalie; all other players must carry the ball with one hand only. Players are not allowed to stand in the pool and must tread water.

Two metres in front of either goal is a marked line, signifying the space in which an offensive player cannot cross over without the ball. Once one offensive player enters this space with the ball, another team member may enter also, but cannot go closer to the net than the player with the ball. There is also a marking for five metres from the goal, which signifies the space in which an offensive team are allowed to take a penalty shot if the defensive team commit a foul (within this space) and that foul prevents a likely goal.

Positions include centre, wings, flats, point and goalie. Throughout the game, players will be penalised for breaking specific rules (fouls). There are minor fouls and major fouls, depending on the infringement. Fouls result in free throws and shots at goal.

Selected activities

Within the sport of water polo, there are many specific activities players can practise to improve their skills and techniques. Commonly used activities that aim to further develop a water polo player's ability and competency include:

- stroke practice
- sprints with a ball (in the water)
- treating water
- changing direction and dodging drills
- player marking.

Internet activity

Log on to TitanOnline to complete Activity 1.11 by researching information about water polo.

Practical activity

1. Practise the skills and techniques in water polo (or another aquatic activity of your choice) to improve personal skill level and physical fitness.
2. Participate in a competitive game of water polo (or another aquatic competitive activity) in accordance with the rules.

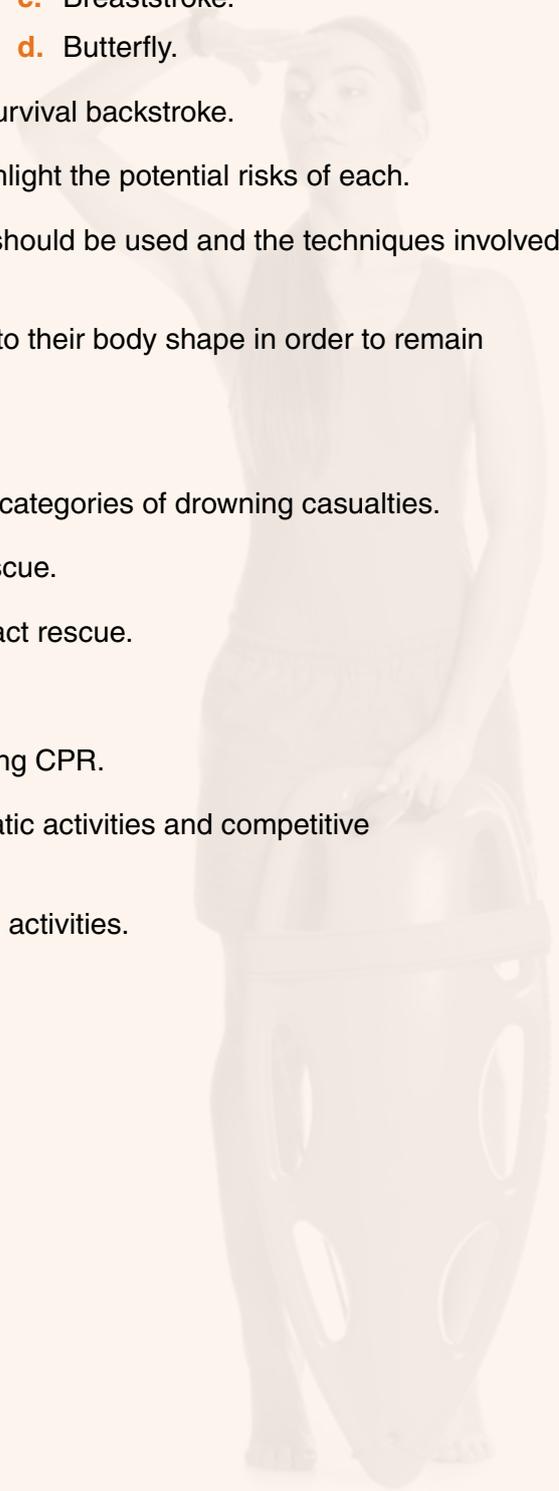
Learning activity

Research the skills, techniques and rules for the following aquatic activities:

- Synchronised swimming
- Surfing
- Biathlon
- Snorkelling
- Aqua-aerobics

Revision questions

1. Provide a brief description of each of the following strokes:
 - a. Backstroke.
 - b. Freestyle.
 - c. Breaststroke.
 - d. Butterfly.
2. Explain the differences between sidestroke and survival backstroke.
3. Select three different water environments and highlight the potential risks of each.
4. Select two entry types. Explain when each entry should be used and the techniques involved in each.
5. Explain the modifications a swimmer could make to their body shape in order to remain horizontal in the water while floating.
6. Discuss the four rescue principles.
7. Evaluate what you could expect to see in the four categories of drowning casualties.
8. Distinguish between a reach and a throw style rescue.
9. Explain the dangers associated with using a contact rescue.
10. Describe the defensive position.
11. List five key points to remember when administering CPR.
12. Explain the differences between recreational aquatic activities and competitive aquatic activities.
13. Discuss benefits of regular participation in aquatic activities.



CHAPTER 2

Athletics

Throughout this unit, students will develop appropriate skills and knowledge surrounding athletics. They will discuss various types of athletic events – including both track events and field events – as well as the appropriate techniques and practising these events. Students will explore how a range of components relating to advanced technique, training plans and body maintenance can influence and improve performance. They will discuss the appropriate roles and responsibilities of both athletes and athletics administrators.

Syllabus outcomes

A student:

- applies the rules and conventions to the performance of physical activities (1.1)
- demonstrates ways to enhance safety during physical activities (1.2)
- describes administrative procedures and their impact on performance outcomes (1.6)
- explains the principles of skill development (2.1)
- analyses the fitness requirements for different physical activities (2.2)
- selects and participates in physical activities based on personal needs, interests and abilities (2.3)
- describes the relationship between physiology and performance (2.5)
- selects appropriate strategies and techniques for different movement contexts (3.1)
- design programs that respond to personal needs and interests (3.2)
- measures and evaluates physical performance (3.3)
- demonstrates competence and confidence in physical activities (4.4).

Focus areas

- Types of athletic events
- Improved performance
- Participant roles and responsibilities



Figure 2.1:
Athletics can be enjoyed by everybody.

Types of athletic events

Athletics comprises various disciplines categorised as track, field, road, and combined events. Track events include sprints, middle distance and long distance races, hurdles and relays. Field events encompass jumps (such as long jump, triple jump, high jump, and pole vault) and throws (such as shot put, discus, javelin, and hammer throw). Road events are marathon and race walking. Combined events, like decathlon and heptathlon, require athletes to excel in multiple track and field disciplines. Each event demands distinct skill sets, physical strength, and endurance, showcasing a diverse spectrum of human athletic ability.

Body composition and somatotype significantly influence an individual's suitability for specific athletic events:

- **Endomorphs:** Characterised by higher fat storage and a rounded body, endomorphs may be more suitable for strength and power sports, where extra weight can be an advantage. However, they often struggle in endurance events due to the extra weight carried.
- **Mesomorphs:** With their naturally muscular and well-defined bodies, mesomorphs are often ideal for many sports. In athletics, they excel in sprinting and field events like shot put and discus, due to their strength and power. Their natural lean muscle composition contributes to explosive movements necessary for these events.
- **Ectomorphs:** Slender and bone structures perform better in endurance events. Their lighter frame is ideal for long distance running and high jump, where lower body mass reduces the energy expenditure and improves performance or helps in clearing the bar.

A balance of mesomorph and ectomorph traits can be beneficial for combined events. While it is important to consider an individual's natural body type, training and event selection, proper coaching in athletics can be exper-

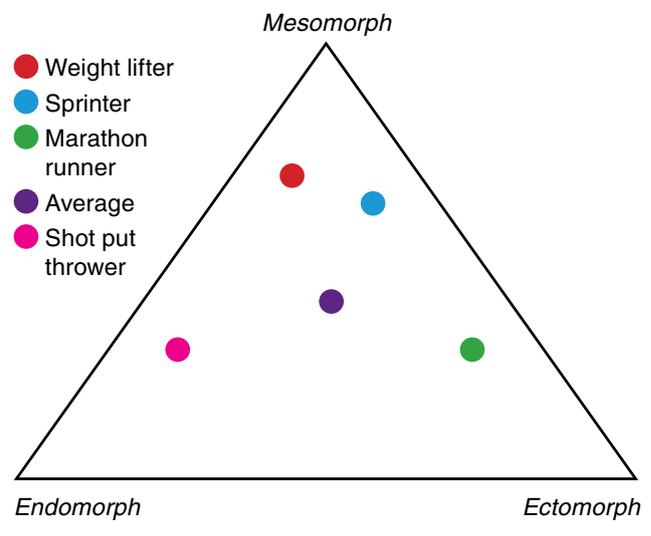


Figure 2.3: Each athletic event requires distinct skill sets and physical strength.

Track events

Track events consist of sprint, middle distance and long distance races, hurdles and relays that are competed on a track, as well as the marathon. The track is regularly 400 metres and six or more lanes wide. Short distance track events such as sprints require speed and explosive power, whereas the longer track events require speed and endurance.

Sprint

Sprinting refers to running at, or near, maximum speed over a short distance.

There are three sprint races held:

- 100 metres
- 200 metres
- 400 metres.

An athlete begins a sprint event by crouching at the starting line, leaning forward and gradually transferring to an upright position when they begin the race to gain the maximum momentum to accelerate forwards. When racing in a sprint race, athletes must stay in their assigned lanes. The 100 metres is a sprint that requires explosive power and speed, with limited room for error. It requires an athlete to have fast reaction times and the ability to quickly accelerate to maximum speed. This is also true for the 200 metres. The 200 metres and 400 metre use speed and power, but also incorporate elements of endurance as the body may struggle to maintain high speeds.

Sprint events are common for those with a mesomorph body composition, due to the elements of speed and strength, ultimately being able to gain maximum momentum and provide fast speeds. There are techniques in which an athlete can adopt when sprinting to improve performance. They should have an upright body with full extension of the back and legs as well as running on the balls of their feet. The shoulders, hand and necks should be relaxed whilst the arms are swinging by the athlete's side in coordination with the leg movements. The body is in forwards movement as the rear leg pushes off the ground to assist acceleration.

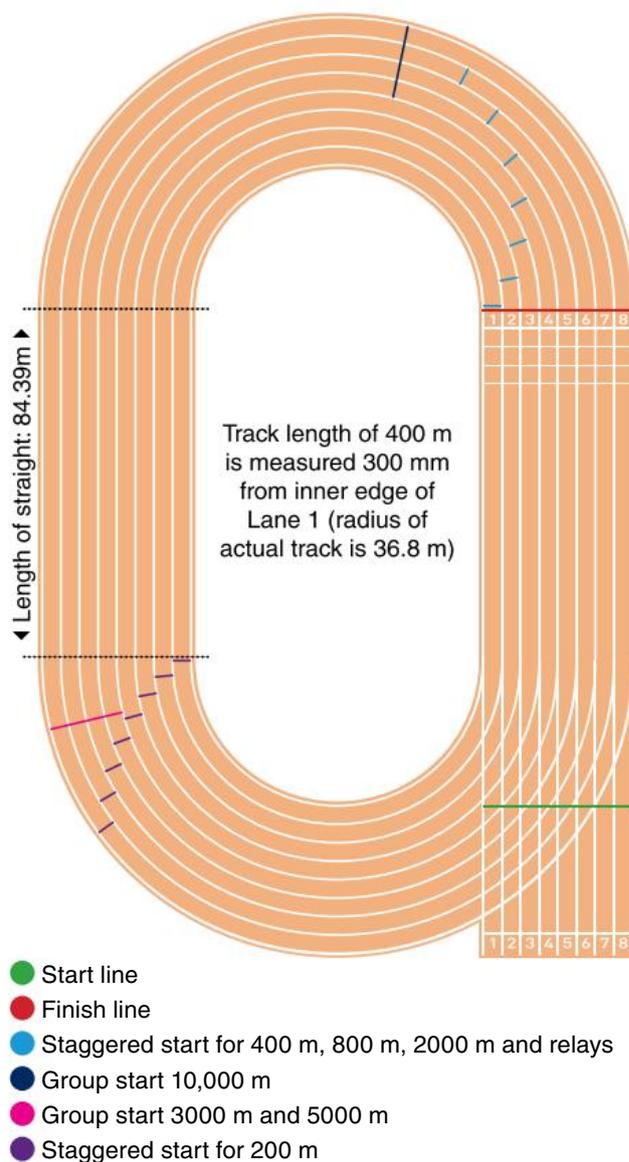


Figure 2.4:

The starting points for races on a standard 400-metre track vary according to the distance being run.

Middle distance

There are typically three middle distance races:

- 800 metres
- 1,500 metres
- 3,000 metres.

These races are set aside from the sprints, as although they still require speed, the body cannot stay at maximum speed over a longer amount of distance. An athlete running a middle distance race requires the ability to pace themselves and maintain a steady stride, allowing for a final burst of speed towards the finish line.

Middle distance races usually have a mix of ectomorph and mesomorph body types. This is due to the elements of speed and endurance, which can suit both somatotypes. When racing, an athlete should work on developing a steady, rhythmic and coordinated stride. The body should maintain upright and extended but with a minimal lean forward.

Long distance

There are three long distance races:

- 5,000 metres
- 10,000 metres
- marathon (42 kilometres).

Long distance running involves a high level of endurance, stamina, mental strength and overall physical fitness. An athlete that is competing in a long distance event must undergo high levels of training in advance to build their endurance and fitness.

Athletes who compete in long distance races typically have an ectomorph body composition as these races do not rely on speed as much as the other races. Their body is also known to be better at thermoregulation (the ability to maintain core body temperature), which is important for endurance events.

Hurdles

Hurdling is a sprint race that involves running and jumping over a set of obstacles known as hurdles. Hurdles are set up at specific intervals along the track. An athlete must jump over the obstacles and if they fail to do that, they will receive a disqualification. This means that a hurdler must have good technique when jumping over the hurdles. The length of the race and height of hurdles differs for different gender and ages. Hurdling is common for the ectomorph/mesomorph somatotype due to their long, slender body giving them the ability to clear the height of the hurdle and strength and power for sprinting.

Table 2.1: Hurdle specifications.

Group	Distance	Number of hurdles	Height of hurdles	Distance to first hurdle	Distance between	Distance to finish
Men	110 m	10	106.7 cm	13.72 m	9.14 m	14.02 m
Women	100 m	10	84 cm	13 m	8.5 m	10.5 m
U18/17 Men	110 m	10	91.4 cm	13.72 m	9.14 m	14.02 m
U18/17 Women	100 m	10	76.2 cm	13 m	8.5 m	10.5 m

Source: Athletics Australia

Relays

There are two types of relay races:

- 4 × 100 metres
- 4 × 400 metres.

Relays are the only group race in track events. The relay teams comprise of four runners who each run a section of the race and pass the baton onto the next person. The baton is passed blindly to each person, as quickly as possible. For example, in the 4 × 100 metre relay, the first runner starts carrying the baton and runs their 100 metres, the second runner stands in the changeover zone. Relay teams usually include the best sprint runners who have worked on their technique and teamwork.

As the first runner approaches, the second runner will begin running in the 10-metre acceleration zone. The first runner will then pass the baton into the hand of the second runner who has reached backwards. This process repeats until the baton is with the fourth runner who runs the baton over the finish line. The baton cannot be dropped and the exchange must happen within the changeover area, otherwise a team will be disqualified.



Figure 2.5:
Relays are the only group race in track events.

Internet activity

Log on to TitanOnline to complete Activity 2.1, which involves researching the historic changes to athletics over time.

Learning activity

Describe the following events and discuss how body composition affects each:

- sprints
- middle distance
- long distance
- hurdles
- relays.

Practical activity

Identify and practise the correct technique for each of the following track events:

- sprint
- middle distance
- long distance
- hurdles.

Field events

Field events consist of discus, javelin, shot put, hammer throw (throwing events) and triple jump, long jump, high jump and pole vault (jumping events). Field events require one or more of the following fitness components:

- speed
- power
- agility
- flexibility
- coordination
- balance.

Javelin

The javelin throw is an athletics event in which competitors throw a spear-like object made of metal, fibreglass, or carbon fibre. The men's javelin must weigh at least 800 grams and be 2.6–2.7 metres long, while the women's must weigh 600 grams and be 2.2–2.3 metres long. Athletes run within a defined runway before launching the javelin, aiming to achieve the greatest distance.

Several rules govern this event. The athlete must hold the javelin by its grip and it must be thrown overhand, not slung or hurled. They must not cross the boundary line at the end of the runway during the throw, or it's counted as a foul. Also, the javelin must land tip-first for the throw to be recorded. The distance is measured from the throwing line to where the javelin first contacts the ground. The competitor with the longest legal throw during the competition wins. If there's a tie, the second best throw is considered. These rules, defined by the International Association of Athletics Federations, ensure fairness and safety.

Table 2.2: Javelin weights for competition in Australia.

Competitor	Male	Female
Open	800 g	600 g
Under 18	700 g	500 g

Source: Athletics Australia

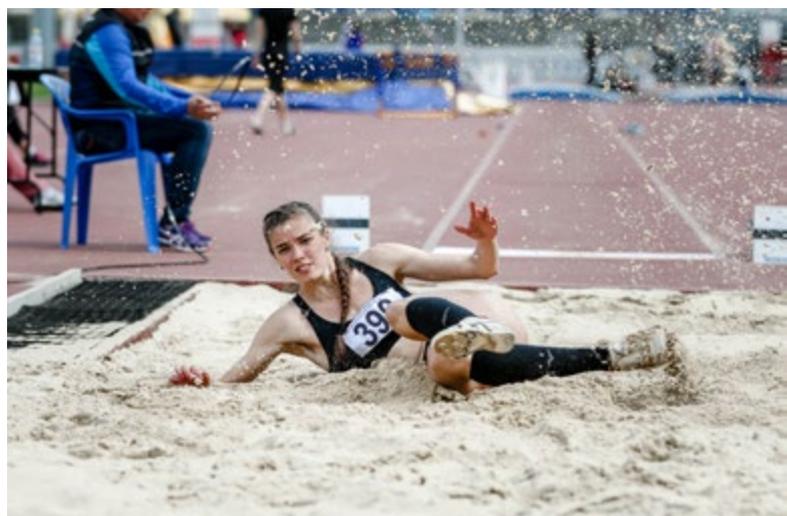


Figure 2.6: The distance of a long jump or triple jump is measured from closest body part to the end of the take-off board.



Figure 2.7: Javelin throwers must build up strength in their shoulders, arms and chest, and speed for the run up.

Competitor	Male	Female
Under 16	700 g	500 g
Under 14	600 g	400 g

Discus

Discus requires an athlete to throw a disk-like shaped apparatus from a defined circle, into the air to gain maximum distance. Discus heavily relies on the technique that releases the discus so that it travels aerodynamically through the air. The athlete must have proper footwork, completing one and a half rotations in circle, moving in a forwards direction to create speed and power for a forceful throw. A cage surrounds the circle, protecting spectators and officials. The athlete must enter and leave from the back of the throwing circle for the throw to be considered legal.

Table 2.3: Discus weights for competition in Australia.

Competitor	Male	Female	Competitor	Male	Female
Open	2 kg	1 kg	Under 16	1 kg	1 kg
Under 18	1.5 kg	1 kg	Under 14	1 kg	1 kg

Source: Athletics Australia

Shot put

The shot is a steel ball that is aimed to be thrown the furthest from the starting position. There are two main techniques in which an athlete can gain the appropriate power and momentum to throw the shot put. The 'glide' is a technique that involves the athlete beginning in a squat/crouch position with the shot put pushed underneath the chin. They then push backward, taking a large step and turn the body and unwind the legs to release the shot put up and out as far as they can. People who are beginning shot put usually master the gliding technique before graduating to the spin. The spin technique is where the athlete will do one and a half rotations before letting go of the shot put from the circle. They often hop on one foot once they have released the shot put from the edge of the circle to keep themselves balanced.

Table 2.4: Shot put weights for competition in Australia.

Competitor	Male	Female	Competitor	Male	Female
Open	7.26 kg	4 kg	Under 16	4 kg	3 kg
Under 18	5 kg	3 kg	Under 14	3 kg	3 kg

Source: Athletics Australia

Safety tips for throwing events

- The javelin should be held and carried in a vertical position when not in use.
- Never run with the equipment.
- Do not throw equipment to another competitor.
- Always stay behind the thrower or cage.
- Only retrieve the equipment after the last person has had their turn and the 'all clear' has been given.

Long jump

In long jump, the aim is to jump the farthest. It uses an athlete's strength, speed, agility, flexibility and power. The long jumper must run and catapult their body to the furthest end of the sandpit. An ectomorph or mesomorph body type is best suited to the long jump.

The long jumper should begin their run on the runway approximately 40 metres from the jumping point. In the approach run, the athlete should accelerate and reach their maximum running speed to gain momentum towards the take-off board. The take-off board is located one metre before the end of the runway where the runner should arrive with one foot at the end of the board, then leaps into the air in a horizontal direction to land in the sand pit. The most commonly used techniques are called the 'tuck' and the 'hitch-kick'. The tuck is a technique in which the athlete brings their knees into their chest during the jump and extends them to land. The hitch-kick involves a running type action in the air before landing the jump.

The landing is an important part of the jump. The legs must be brought together and move beyond the rest of the body, in order to gain increased distance. The distance of the jump is measured from closest body part to the end of the take-off board.

Triple jump

The triple jump event is made up of three different elements; hopping, stepping and jumping. These skills have to be performed in a continuous action at high speed. The mesomorph body type is best suited to triple jump due to the need for a considerable amount of power and strength in their legs and back to help them propel forwards and execute the movements successfully. A triple jump has four phases:

- **Approach phase:** The objective of this phase is to create maximum speed that can be controlled through the next three phases.
- **Hop phase:** The hop helps keep the momentum and speed in the movements. When hopping, the take-off leg should be extended and the jumping knee must go into the air with the thigh parallel to the ground. Then the take-off leg should come forward to meet the other. The athlete should then drive the foot down to take-off for the step phase.
- **Step phase:** The step phase is similar to the hop phase. The jumping knee propels into the air and the opposite leg extends backwards with the heel up. The opposite foot then moves forward to land and prepares for transition into the next phase.
- **Jump phase:** The athlete then jumps and throws their legs together in front of them much like the long jump event.

The aim is to create the most distance from the beginning of the hop phase to the landing of the jump phase.

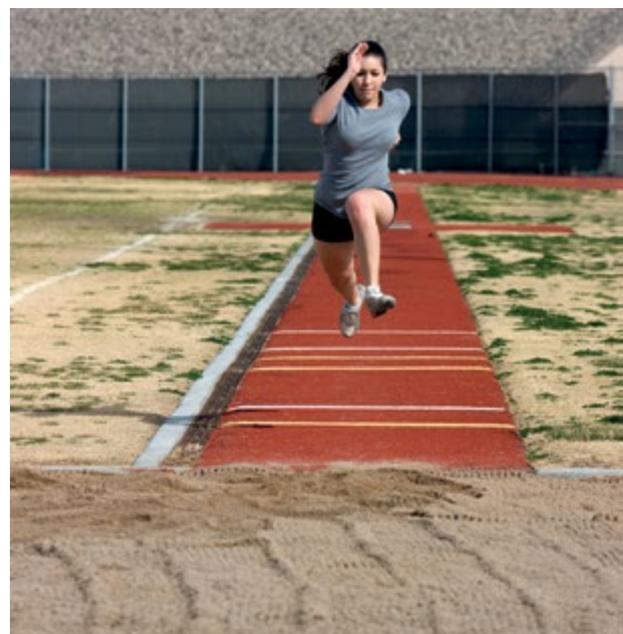


Figure 2.8:
A jumping athlete should also train for sprinting.

Internet activity

Log on to TitanOnline to complete Activity 2.2 by reviewing the video and analysing the triple jump event.

High jump

High jump involves athletes running and jumping over a four-metre long horizontal bar. The aim is to attain height and jump over the bar without knocking it down. The best suited body type for this event is both ectomorph and mesomorphs. An ectomorph body composition allows their body to be easily propelled through the air and their long, slender limbs make it easier for them to miss hitting the bar. A mesomorph body composition allows strength, force and power within the jump to gain maximum height.

When a bar of a certain height is cleared, the bar is then extended in height and the athlete must then jump over the bar at an increased height.

There are three phases of a high jump:

- **Approach phase:** The goal of the approach phase is to gain speed and momentum for the take-off phase. The athlete should take five to eight strides, and the last three strides should create a gradual curve towards the bar. The strides should be performed at a fast, controlled pace to prepare for the jump.
- **Take-off phase:** The take-off is an important step as it creates the power to jump over the high jump bar. For a successful jump, the athlete should plant their foot close to the high jump and the knee should tuck up, turning the body onto its back. The athlete should arch their back and tuck their chin in while jumping over the bar.
- **Landing:** Athletes will have a padded mat to land on. They should land high up on their shoulders to make sure their back is supported.

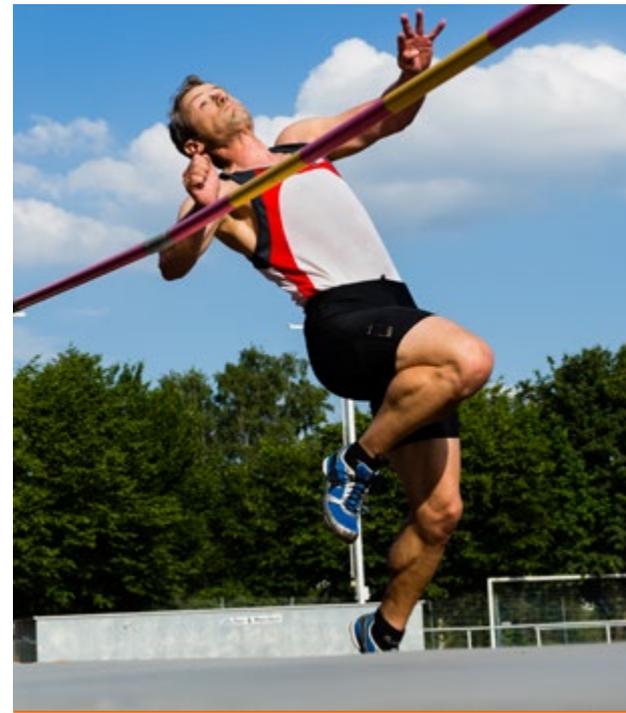


Figure 2.9: Jumping events require speed and power in the legs to propel the body.

Did you know?

In the 1950s, shoes were built with a sole of up to 5 cm to help the athlete's jump higher. These were later banned.

Learning activity

Describe the rules of the following events and discuss how body composition affects performance in each:

- | | | |
|-----------|-------------|---------------|
| ▪ javelin | ▪ shot put | ▪ triple jump |
| ▪ discus | ▪ long jump | ▪ high jump. |

Practical activity

Identify and practise the correct technique in performing each of the following field events:

- | | | |
|-----------|-------------|---------------|
| ▪ javelin | ▪ shot put | ▪ triple jump |
| ▪ discus | ▪ long jump | ▪ high jump. |



Figure 2.10:

The skills that are required in the a different phases of a high jump require an athlete to have strong leg muscles.

Improving performance

The criteria for success in athletics is usually measured by the time taken to cross the finish line, the distance jumped or how far an implement can be propelled. Modern athletics has come a long way in the last 50 years and athletes now have access to knowledge, resources and technology that was previously unavailable. The most significant changes include:

- advanced techniques
- training plans
- body maintenance.

Advanced technique

Elite athletes use advanced techniques to gain a competitive advantage when competing at the highest levels. These techniques can include:

- biomechanical principles
- a range of techniques for each event
- the impact of technology
- tactics.

Internet activity

Log on to TitanOnline to complete Activity 2.3 by reviewing the video on biomechanics.

Biomechanical principles

Biomechanics is the study of the structure, functions and movements of living things, predominantly in humans. In sport, biomechanics refers to study and analysis of body movement and posture in sports. Observing the body's action during sports can help us understand the phases that are involved in movements and rectify technique errors for improved performance.

Each stage of movement involves the functioning of precise biomechanical principles. When coaches and trainers have access to this information, they can gain greater understanding of athletic performance, help individuals develop efficient sport techniques and critically evaluate the skills that are involved in sport movements. The knowledge of biomechanical principles involved in sports, has changed the way people train and prepare for athletic events and has improved the performance of athletes dramatically. Coaches are now able to choose the most effective training exercises and equipment that match an athlete's needs, reduce and prevent injuries and increase efficiency of movements.

There are many biomechanical principles used to improve performance, including:

- Limbs on the same side of the body move in an opposite direction, this means that opposing limbs on opposite sides of the body will move in the same direction. For example, a hurdler's arm will be moving upwards as the opposite knee is in the air.
- Stability is increased by increasing the base of support and lowering the centre of gravity. For example, a shot putter will start their throw at a low level with a wide stance to provide stability and power.
- For each action, there is an equal and opposite reaction. For example, a sprinter must exert force backward in order to propel forwards.
- Increase the rate of rotation by moving the mass of the body to the axis. For example, a hammer thrower aims to maximise their rotational speed to improve performance.
- The further the apparatus from the body, the faster it will travel. For example, a javelin will be thrown at full arm extension.

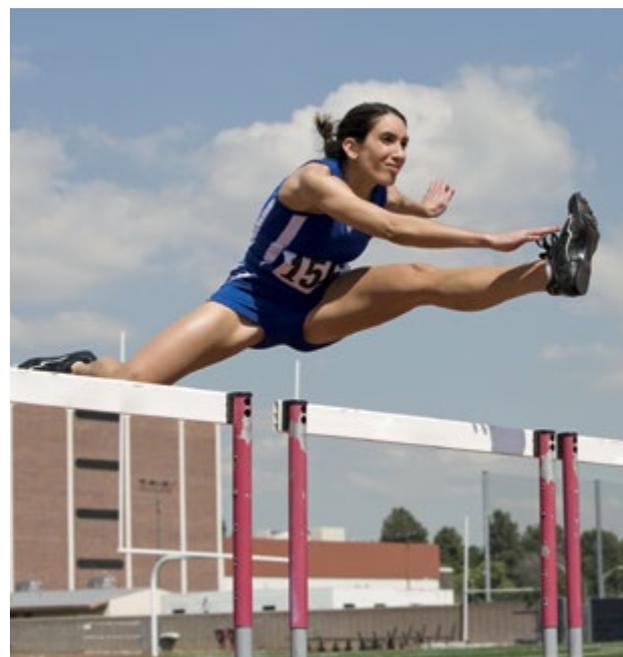


Figure 2.11: Knowledge of biomechanical principles can help to improve a hurdler's technique.

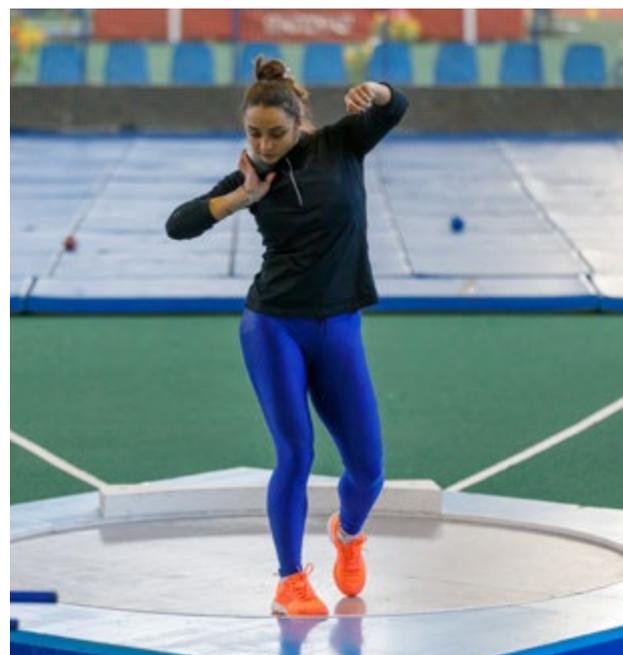


Figure 2.12: Stability is increased by lowering the centre of gravity in shot put.

Range of techniques for each event

A successful athlete must be aware of the techniques and skills that are involved with each specific event. Learning and mastering these techniques can improve the performance of the athletes and help them achieve their desired results. An athlete can actively change and improve their technique through increasing knowledge and practising skills. Each athletic event varies within the types of techniques and training that must be done to be increasingly successful. Knowledge of a range of training plans and specific skills practice can help with understanding how the best results can be achieved.

Sprinting

Sprinting can be broken up into specific phases that an athlete can work on separately. A runner can increase their speed through practising the different techniques that are involved with sprinting. Incorporating the use of the following elements in drills will improve performance:

- **The action of the arm:** relaxed, at around 90 degrees flexion and keeping rhythm with the legs.
- **Foot work:** running on the balls of the feet rather than the heels.
- **Body posture:** leaning slightly forward, head still and body relaxed.
- **Stride:** increasing the length of each stride.

A person who is training for sprinting also needs to develop strength and power. This can be developed by using weights when training or learning to run on steep inclining surfaces to build up muscles in their legs.

Middle distance running and long distance running

There are several techniques in running that can help improve performance. Improving endurance can be done through increased intense cardio training and by practising proper breathing techniques. Practising the following techniques through drills and training will improve a person's middle and long distance running:

- **Posture:** straight, extended spine.
- **Leg motion:** knees bent at 90 degree angle, medium pace.
- **Flexibility:** particularly in the legs, hips, gluteus maximus and back.
- **Mind:** strong mental focus and concentration.

When training for a running event, an athlete should have sessions of sub-maximal intensity training to increase lung capacity and endurance and working to correct muscle imbalances, thereby improving flexibility and rotation.



Figure 2.13: Sprinting athletes need to have fast reaction times.

Internet activity

Log on to TitanOnline to complete Activity 2.4 by researching sprinting technique and associated training drills.

Did you know?

Each step taken in a run engages over 200 muscles.

Javelin

Javelin is a power throw event and athletes therefore must build up strength in their shoulders, arms and chest, and speed for the run up. Technique that will benefit performance includes:

- correct running posture with the javelin held around head height
- an efficient crossover of the legs and positioning of the arm, just prior to the throw, to maintain speed and to place the body in a side on position
- a strong drive off the back leg to provide additional force to the upper body rotation
- a whipping action as the javelin is released, pivoting off the opposite leg to the throwing arm and effectively transfer the weight forward
- avoid over-running the mark by allowing the trail leg to come through and counter act forward momentum.

This can be done through weight and strength exercises such as resistance training and using explosive power movements such as weight lifting and plyometrics.

Javelin technique can also be improved through practising throwing with a weighted medicine ball at a specific target.

Discus

The correct grip is essential for proper release and flight of the discus. Fingers should be evenly spread and the last knuckle of each finger (not the thumb) should be just over the edge of the discus. Begin the movement positioned at the back of the ring, assuming a wide stance, a low centre of gravity and with the back to the target area. Swing the discus several times to establish a rhythm. The spin involves rotations and changes to the pivot feet, with the non-throwing arm extended out and the throwing arm trailing and straight, causing tension and coil in the upper body. The weight continues to move forward, with a final pivot of the hips and a throw that begins around hip height and releases the discus at about shoulder height, making a launch angle of about 35 degrees. Follow through with a rotation to avoid fouling.



Figure 2.14:

The javelin must land tip-first for the throw to be recorded.



Figure 2.15:

Proper discus technique involves rotating one and half times before release.

Internet activity

Log on to TitanOnline to complete Activity 2.5, learning about correct discus technique.

Shot put

The technique of the shot put relies heavily on using all body parts to generate explosive force. The starting position at the back section of the ring involves a strong, wide stance, a low centre of gravity with the shot put gripped in the base of the fingers rather than the palm. The shot must be positioned in the crook of the neck, elbow high and the thumb pointing down. Whether using the glide or the spin, the leg drive is vital as is a high elbow position throughout. A transfer of weight, uncoiling of the body and a final wrist flip complete the movement. The shot should be launched at about 38 degrees. Continue to rotate after release to dissipate the force and avoid fouling.

Jumping events (long, triple, high)

Jumping events require speed and power in the legs to propel the body. Long jump and triple jump require the athlete to use techniques that allow them to travel further horizontally, whereas high jump requires vertical height. Once in the air, techniques can also be practised that help the body to travel further. Most of the technique and skills that are required in the approach and take-off stage require an athlete to have strong leg muscles and a fit, lean body to attain enough power and speed to lift off the ground. This can be practised through resistance training in the legs, particularly drills that require explosive movements such as weight training and plyometrics. A jumping athlete should also train for sprinting. These elements will help an athlete catapult their body into the air.

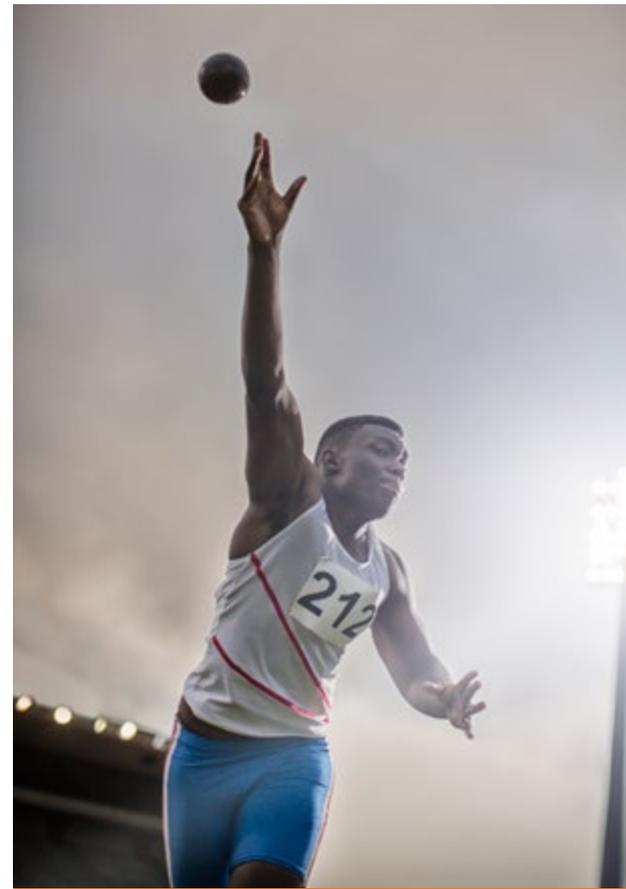


Figure 2.16: Shot put relies heavily on using all body parts to generate explosive force.

Learning activity

1. Define the term 'biomechanics'.
2. Discuss how biomechanics can improve performance.
3. Research two more biomechanical principles and draw a diagram explaining how they work.
4. Discuss the difference in training programs for hurdlers, sprinters and distance runners.
5. Analyse how training using proper technique can improve performance.

Practical activity

Participate in two athletic events and complete the following activities:

- Record and review your performances.
- Research the correct technique for the event and compare it with your own performance.
- Practise to improve your technique, record your performance again and evaluate.

Impact of technology

Technology has impacted dramatically on many aspects on life, especially in recent years. The use of technology in sport is rapidly developing and changing the way people relate to sport. Athletes have had advances in the way they train for and compete in sports through improvements of analysis programs, training techniques and the design of sport equipment. It has also allowed coaches to improve the quality of feedback to athletes and allowed sport officials to make accurate decisions regarding the infringement of rules.

New technologies create new opportunities for coaches and innovation is making these new technologies cheaper and more accessible to the wider community. Some coaches in the past may have had access to expensive video cameras and needed an indoor venue to view performances on a television. Now anyone with a smart phone can record and instantly review footage in extreme slow motion or use a range of apps to analyse performance.

Other examples of ways technology has impacted sport include:

- Altering the surface of the running track to contain rubber particles and cushion support to absorb shock to minimise stress injuries.
- Electronic timing controlled by computers allows the accurate reading of performance times. Different sectors of a race can also be analysed.
- Shoe technology that improves grip and support, reducing weight and drag. Clothing that reduces weight and compression garments that support muscles to reduce injuries.
- Creating a smooth, aerodynamic surface on prosthetics to improve performance.
- Human prosthetic advances, allowing people to compete in athletic events.
- The development of video replay systems, giving officials an improved view to accurately judge and review foul play.

Internet activity

Log on to TitanOnline to complete Activity 2.6 by reviewing the information about technology and



Figure 2.17:

Human prosthetic advances allow people with disability

Tactics

Tactics refers to a strategy or action that has been carefully organised and planned in order to achieve a specific goal. In competition-based areas, such as athletics, tactics are used regularly to get a competitive edge over the other participants. Tactical preparation is an important component in an athlete's planning and preparation for athletic events.

Learning a range of tactical strategies requires the athlete to practise a range of techniques in training settings so they can be adapted in competition. For each athletic event and situation within that competition, there are specific solutions and strategies. It helps to make the physiology of the body work to gain an advantage.

Developing tactical skills influences many components of an athlete. It draws on their knowledge and skills of the athletic event including knowing the rules and tactical actions or strategies. It also works on their thinking and decision making skills in a game-like scenario and their ability to create solutions.

Before an athlete begins practising these tactical skills, they must first study the theoretical background, involving creating a strategic plan that solves situations that an athlete will be faced with when competing. This helps the athlete to draw on this knowledge when practising the skills, and helps them better adjust to expected situations in a competitive environment. Strategies are usually devised by the coach and the athlete working together to analyse situations and develop strategies that could potentially provide an advantage. Strategies may focus on taking full advantage of a perceived strength of the athlete or to try and annul the strength of the opposition. The tactics may aim to create a psychological advantage or a physiological advantage. Tactics can be quite specific or more fluid and adaptable depending on the situation as it arises. Some athletes may have the experience and confidence to change tactics mid competition if the need arises, while others may defer to the knowledge of the coach and stick to the pre-arranged tactics regardless of the situation.

When creating a strategic plan the coach and athlete must consider the aim, skill and strategy of the other competitors as well as individual skill, and information about the environment and conditions of the place of participation.



Figure 2.18:

Long distance running involves a high level of endurance and mental strength.



Figure 2.19:

Throwing athletes may use early throws to secure a good distance, then take more risks in later attempts.

Tactics used in athletics events

Sprints and hurdles

- A good start in the race gives an athlete a significant advantage.
- Negotiating for the centre lanes (in certain events), as they often have an advantage.
- Check the surface of the track for any dips or uneven surfaces.
- Reserve energy for the finals.
- Be aware that headwind can cause shorter strides and tailwind can cause longer strides.

Distance races

- The front runner must perform with reduced sight of other runners, must decide on a set pace and must encounter wind resistance. Sitting just back from the front runner is usually a good tactic.
- Position the body to avoid getting blocked in and wait for the right moment to accelerate to the finish line.
- Use variations in speed to unsettle the pace and test the stamina of competitors.

Jumping and throwing events

- Mental preparation that helps with concentration and composure. Mental preparation can help an athlete manage stress, maintain focus, and execute technique under pressure.
- Seek consistency. The ability to consistently perform quality throws and jumps without fouling can help maintain a psychological edge over competitors.
- Pacing themselves across multiple attempts enables an athlete to use early throws to secure a good distance, then take more risks in later attempts.
- Manage levels of arousal to ensure a competitor remains relaxed and only 'switches on' just prior to the performance.
- Manage energy levels and recovery times to maintain optimal performance levels throughout the competition.



Figure 2.20:

Consistently performing quality jumps without fouling can help an athlete maintain a psychological edge.

Learning activity

1. Discuss the effect that technology has had on athletics.
2. Research the latest technology in shoe and clothing design that aides athletic performance.
3. Describe how tracking technology and heart rate monitors are used as a training tool.
4. Research and review apps that specifically target athletic performance.



Figure 2.21:

Training plans are developed for each individual athlete, catering to age, gender, strengths and weaknesses.

Training plans

Training plans are constructed to help an athlete meet their fitness goals and requirements. Each athlete is different; therefore training plans are developed for each individual athlete, catering to age, gender, strengths and weaknesses. It also takes into consideration the level of experience and the chosen event of the athlete. Creating a plan for training will help ensure the athlete is prepared for competition and is performing at peak levels. The plan must take into account an athlete's goals, the development and practise of event-specific skills, the fitness requirements of their chosen event, undertaking a specific warm-up and periodisation.

Goal setting

Goal setting is an important aspect of an athlete's training plan. It helps provide a basis for the training session. For an athlete, setting goals allows them to focus on specific areas, increase the effort they put into their training and help them track their progress. Short-, medium- and long-term goals should be challenging, yet achievable and realistic. Goal setting is the key to motivation. When athletes achieve the goals they have objectively defined, they feel they have succeeded and that their training sessions have been worthwhile.

There are many goal-setting tips that can allow an athlete to successfully achieve their goals. These include:

- Goals should be realistic and achievable.
- Create specific goals that can be measured.
- Track the progress of goals and modify them if required.
- Share goals with the coach, friends and family to get support and encouragement.
- Create goals for training and recovery periods as well as competitions.
- Set positive, not negative goals. In high jump for example, an athlete should say "I will jump high enough to clear the bar", instead of "I will not hit the bar".

Skill development

Skill development is often the most important part of a training session, especially for younger or inexperienced athletes. It allows the athlete to practise skills through a range of drills that resemble an event-like scenario.

The coach will develop and organise sport-specific skills and tactics with the athletes. They will often introduce simple skills and as the session develops, the drills will become more complex in order to challenge the athletes.

Athletes should revise the skills they have already learnt and practise new skills. Many coaches incorporate the training session's conditioning phase and skills practice in one component, in effort to simulate the event situation.

Specific fitness requirements

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 in order to determine which fitness components are most relevant to the athlete's effective performance. The training program for a marathon runner for example, would primarily focus on muscular endurance and cardiovascular endurance. Body composition and flexibility would also be a consideration to a lesser degree, while strength training would be of least importance.

Specific warm-up

A warm-up should be done at the beginning of each training session. It should involve whole-body exercises and stretching exercises so that the athlete has:

- the ability to get mentally prepared
- an increased core body temperature
- an increased blood supply to the muscles
- promoted flexibility
- reduced chance of injury.

A warm-up should include stretching, increasing the heart rate and mobilisation as well as sport-specific activity (i.e. performing movements that mimic the activity of the athlete's chosen athletic event). It allows the body to practise the skill before performing the movements in a training or event style situation. For example, a discus thrower may loosely move through the actions of throwing a discus to warm-up their back, shoulders and arms. Once the athlete has been through these movements, they will be able to safely execute them faster and harder during training.



Figure 2.22:

A discus thrower may loosely move through the actions of throwing a discus to warm-up their back, shoulders and arms.



Figure 2.23:

A training program is most effective when it is designed so that specific aspects of the athlete's chosen sport are targeted.

Internet activity

Log on to TitanOnline to complete Activity 2.7 by researching sport-specific training.

Periodisation

When designing a training program, a coach and athlete must consider the division of the training year into certain periods. Periodisation means breaking down the training year into specific phases – pre-season, in-season and post-season. It is not uncommon for an athlete to train all year round. For example, even though a high jumper will compete in the summer, they will train throughout the winter season in preparation for competition. Periodisation also allows an athlete to develop their skills and performance to be at a physical peak during major events.

Pre-season training

Pre-season training generally falls around eight to 12 weeks before the competition or event season begins. The focus is on endurance, strength and technique. The main aims of the pre-season phase are to improve all aspects of fitness especially endurance and strength, develop sport-specific techniques and improve performance. There is a shift from low intensity training in post-season, to high intensity training. In the last weeks of pre-season phase, the athlete should have a high level of skill execution and physical condition.

In-season training

The in-season phase varies in length depending on how long the competition lasts. There is a general increase in the intensity of the exercise, but there is lower-volume. The main priority of the phase is to maintain the fitness components and general skills that were developed in the pre-season and further develop specific skills and specific fitness issues as the need arises. In athletics, this phase is primarily concerned with aspects of tactics, injury prevention and peaking at the right time.

Post-season training

Post-season training usually varies with the different types of athletic events. The aim of this phase is to allow the body time to recover from vigorous training and competition. The goals of post-season training are to maintain aerobic fitness and endurance on a low intensity scale, maintain strength in the muscles, keep an average skill level for the athletic event, prevent gaining weight and to repair any injuries. It also gives athletes a time to rejuvenate mentally.

Training should be undertaken at a lower intensity. The athlete should also concentrate on weaknesses in technique or performance during this period.

Internet activity

Log on to TitanOnline to complete Activity 2.8 by researching how periodisation is applied in athletics.

Learning activity

1. Research PNF stretching and develop a warm-up activity that includes a variety of these exercises, specifically designed for a sport of your choice.
2. Design a typical pre-season training session for a professional sprinter.
3. Research the training program of a field competitor and report on how their training specifically meets the needs of their event.

Body maintenance

Athletes who adequately monitor 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 should be the basis of the diet. Water is a great choice of fluid for athletes to aid their performance and prevent them from becoming dehydrated.

Safety procedures to prevent injuries should be undertaken regularly, especially before or after an athletic event. The athlete must ensure that they adequately warm-up, have functioning equipment and perform correct technique as well as undertaking a cool-down of the muscles and joints after the event or training session.

Nutrition

Nutrition plays an instrumental role in an athlete's performance and recovery. An ideal diet fuels the body, supports tissue repair, strengthens the immune system, and maintains overall health. Here are the key components of an athlete's nutritional strategy:

- **Kilojoule intake:** Athletes require more kilojoules due to the high energy expenditure from training and competing. The exact number of kilojoules needed depends on the athlete's sport, training intensity, body size, and individual metabolic rate. However, it's not just about consuming kilojoules but choosing nutrient-dense foods.
- **Carbohydrates:** Carbohydrates are the primary energy source for athletes. They fuel muscles and help the body recover after strenuous activity. Depending on the intensity and duration of the activity, carbohydrate intake should range from three to 12 grams per kilogram of body weight. Whole grain breads, brown rice, pasta, fruits, and vegetables are excellent sources. Timing carbohydrate intake around exercise can maximise performance and recovery.
- **Protein:** Essential for muscle repair and growth, proteins should constitute 10–20 per cent of an athlete's diet, or 1.2–2.0 grams per kilogram of body weight per day. Good sources include lean meats, fish, poultry, eggs, dairy products, legumes, and nuts.

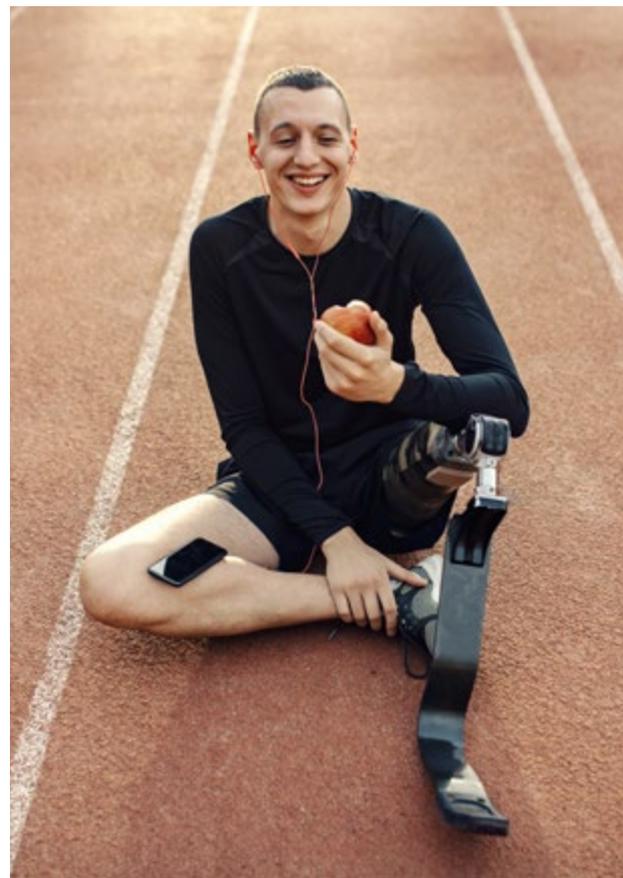


Figure 2.24: Fruits, and vegetables are excellent sources of carbohydrates.

Internet activity

Log on to TitanOnline to complete Activity 2.9 reviewing the nutritional and hydration tips and video.

Did you know?

Excess protein intake does not build extra muscle tissue. Muscle mass is increased with extra kilojoules and strength training.

- **Fats:** Athletes shouldn't shy away from fats, which are important for hormone production and nutrient absorption. They provide a valuable energy source, particularly for endurance events. Approximately 20–35 per cent of daily caloric intake should come from fats, focusing on unsaturated fats found in avocado, nuts, seeds, and olive oil, while limiting saturated and trans fats.
- **Hydration:** Staying hydrated is critical for maintaining performance. Water regulates body temperature, lubricates joints, and aids in nutrient transport. Hydration is discussed in more detail on the following pages.
- **Micronutrients:** Vitamins and minerals are crucial for energy production, haemoglobin synthesis, bone health, immune function, and protection of the body against oxidative damage. They can be sufficiently obtained through a varied and balanced diet. However, some athletes might need supplements under certain circumstances, such as iron for runners prone to deficiency.
- **Meal timing:** Consuming meals and snacks at the right time, particularly around training sessions, can optimise energy levels and muscle recovery. A blend of carbohydrates and protein prior to and following exercise can enhance performance and speed up muscle repair.
- **Individualisation:** Each athlete is unique, with different metabolism, tolerance, and preference. Therefore, personalised nutrition plans are crucial. It's often beneficial to work with a registered dietitian or nutritionist specialising in sports nutrition.
- **Event-specific nutrition:** Depending on the type of sport (endurance, strength, team), event duration, and environmental conditions, nutritional strategies will differ. For example, marathon runners need to focus on carbohydrate loading before a race, while a weightlifter might focus on protein intake.
- **Balanced diet:** It's essential to remember that athletes, like everyone else, need a balanced diet for overall health. This includes a variety of fruits and vegetables for antioxidants and fibre, dairy for calcium and vitamin D, and lean protein sources for muscle repair and recovery.
- **Moderation and variety:** Embracing a range of foods and not eliminating food groups or following restrictive diets can prevent nutrient deficiencies and disordered eating.

Maintaining peak physical condition isn't just about the hours spent training; it's about fuelling the body with the right nutrients. Athletes can optimise their performance and recovery by developing a healthy relationship with food.

Learning activity

1. Discuss the importance of appropriate nutrition for athletes competing in athletics.
2. Recommend the pre-event and post-event meals and snacks that would be suitable for a middle distance runner competing in a two-day carnival.

Figure 2.25:

Consuming meals and snacks at the right time can optimise energy levels and muscle recovery.





Figure 2.26:

Water is the best source of hydration and is the best thirst quencher.

Hydration

Water is an aid to all cell functions, temperature regulation, and transportation of nutrients and waste. Water is lost as sweat, during evaporation from the lungs, and by way of excretion. Drinking plenty of fluids is an important aspect 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.

The only time many people drink is when they are thirsty; however, thirst is an indication of dehydration. It is important to consume fluids regularly. Drink water before exercise, and continue drinking water after the exercise to aid recovery.

During physical activity, more fluid is lost as sweat and additional fluid must therefore be consumed to replace what has been lost. The respiratory rate also rises with vigorous exercise. The amount of fluid lost through respiration increases and must also be replaced. The amount of fluid lost, and therefore to be replaced, will depend on the following:

- **The length of the activity:** the longer the activity, the more fluid lost and the more the athlete has to replace.
- **The intensity of the 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.
- **The temperature:** when the surrounding temperature is high, the athlete will sweat more because the sweat does not cool the skin as quickly. Conversely, breathing rate increases in low temperatures, therefore more fluid is lost through the water content in exhaled air.
- **The humidity level:** when the level of humidity is higher, 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 larger athlete has additional fluid requirements.

Water is the best source of hydration and is the best thirst quencher. Sports drinks are also good, because they contain glucose, which fuels exercise, and sodium, which aids fluid retention. Sports drinks are especially good for distance events. Carbonated drinks are not recommended because they tend to cause the stomach to be gassy and uncomfortable.

Each of the three main types of sports drink on the market has a specific purpose:

- **Isotonic drinks:** these types of drink are the most common sports drinks. 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, because it is unlikely the body's stores of these minerals will be depleted during normal training. If, however, athletes exercise in extreme conditions over three or four hours or longer, as in a marathon or ultra-marathon, they may choose to add a sports drink that contains electrolytes.
- **Hypertonic drinks:** these types of drink generally contain a quantity of carbohydrates and are mainly intended to supply 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.
- **Hypotonic drinks:** these types of drink generally contain fewer than four grams of sugar (carbohydrates) per 100 milligrams and are intended to be a thirst quencher. For the athlete, hypotonic drinks are the source of little energy, in the form of sugars. 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.



Figure 2.27: Sports drinks contain glucose, which fuels exercise, and sodium, which aids fluid retention.



Figure 2.28: Marathon runners may choose to add a sports drink that contains electrolytes.

Learning activity

1. Discuss the importance of keeping hydrated during physical activity.
2. Research and describe the effects of dehydration on the body.

Nutrition and hydration for physical activity

What an athlete consumes before, during and after exercise is important for their comfort and performance during the exercise. On a day-to-day basis, athletes must provide their body with essential nutrients for good health and must have enough energy in order to meet the demands of physical activity, including during post-exercise recovery. They must elevate their energy level before, during and after the activity.

Before physical activity

Some of the nutritional aspects to consider before competition 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. 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 easy digestible light meal – such as a banana, cereal or a smoothie – approximately two hours before the competition. Athletes should also avoid foods with high refined sugar content as they may influence variations in blood sugar levels.

The foods that an athlete should consume must be both high in carbohydrates and easy to digest. Examples of those types of foods are pasta, fruits, breads, energy bars and energy drinks. An athlete should also keep hydrated to perform effectively, and minimise the need to drink during the event by drinking small amounts frequently. Clear urine is a good indication that the athlete's hydration level is adequate.

During physical activity

Keeping hydrated is the most important aspect of nutrition during events. Dehydration can cause a rapid increase in heart rate and body temperature and a decrease in performance. To sustain rapid movement of fluid into the small intestine, it is ideal to take three to four sips of water every 10 minutes during strenuous exercise. If an athlete is competing in an event lasting more than one hour, they may need to use sports drinks and/or supplements to replenish electrolytes and sugars.

After physical activity

During the recovery phase, it is important to replace fluids and consume carbohydrates, such as fruit or juice, within 15 minutes of completing the exercise to help restore glycogen levels. According to research, eating 100–200 grams of carbohydrate within two hours of completing the exercise allows training to continue.



Figure 2.29:

It is important to consume carbohydrates after physical activity.

Injury prevention strategies

A person's fitness level is directly linked to their safety. High fitness levels delays the onset of fatigue, and avoiding fatigue greatly reduces the incidence of injury. Compared with sitting at rest, exercise does involve more risks; however, the benefits of being physically active far outweigh the risks. During exercise take care and follow safety procedures.

An injury prevention checklist can include:

- Undertake a medical check-up and/or a pre-screening questionnaire, to assess fitness level and training requirements.
- Wear clothing and footwear that are appropriate for the activity.
- Stay hydrated by having a bottle of water and sipping it frequently.
- Warm-up before engaging in any strenuous activity to reduce the chance of sustaining a soft-tissue injury.
- Analyse technique to identify any errors that are being made.
- Use protective equipment, if appropriate, and do not use faulty equipment.
- Abide by activity rules and listen to the officials.
- Cool-down after the activity, to enable the body to slowly return to its pre-exercise state and to reduce muscular soreness.
- Stop exercising immediately if dizziness, nausea, undue fatigue or injury occurs.



Figure 2.30: Long jump techniques should be analysed to identify any errors that are being made, to prevent injury.

Internet activity

Log on to TitanOnline to complete Activity 2.10 by reviewing the video on injury prevention.

Learning activity

1. Describe pre-event and post-event body maintenance procedures for injury prevention.
2. Create two more safety dot points to the injury prevention checklist.

Participant roles and responsibilities

The sport of athletics provides a range of roles for both the athletes and administrators. Athletes are primarily concerned with their competitive role, focusing on their fitness, training and performance. In addition, they may also be involved in supporting other athletes or acting as role models for younger, less experienced athletes. They may have involvement in team events and could have the added responsibility of representing their club, district or country. Administrators are involved in a wide range of roles and responsibilities, including officiating, coaching and managing.

Athletes

Athletes have a variety of roles and responsibilities within their sports. They are generally required to:

- conduct themselves with dignity, sportsmanship, and sense of fair play, follow the activity program and coaches' rules and regulations
- be prompt and attend all practice sessions and events
- respect the authority of coaches and sports officials
- maintain a high level of physical fitness and training
- show proper use and care of equipment
- use appropriate attitude and language in communicating with coaches, athletic officials and peers.

Commitment

Commitment is a long-term promise that an athlete makes to themselves, and others, to dedicate their time and effort to achieve their goals. An athlete must give their training and competition high priority. The success of sports performance relies on an athlete being committed to their goals. Commitment will allow an athlete to maintain motivation and stick to heavy training and competition demands even through tough periods and setbacks. The higher the level of competition, the more commitment and investment that is required due to high demands of the athlete. If an athlete is not motivated and committed during this time, it can cause distress and have a negative impact on the success of the athlete and their reputation. It will also impact on those around them, such as their coach or manager.



Figure 2.31:
An athlete must give their training and competition high priority.



Figure 2.32:
Athletes are required to maintain a high level of physical fitness and training.



Figure 2.33:

Athletes are expected to respect their competitors, officials, and spectators.

Ethical practice

Ethical considerations for athletes span a range of issues, many of which concern the principles of fairness, respect, and integrity. Some key ethical considerations include:

- **Doping and performance-enhancing substances:** It is unethical and against the rules for athletes to use substances or techniques that artificially enhance their physical capabilities or performance. This also includes refusing to undergo mandatory drug testing.
- **Respect and sportsmanship:** Athletes are expected to respect their competitors, officials, and spectators. This includes accepting decisions made by officials, shaking hands with competitors before and after events, and avoiding unsportsmanlike behaviour such as taunting or sledging.
- **Cheating:** Any form of cheating, such as tampering with equipment or intentionally breaking rules for advantage, is unethical.
- **Equality and non-discrimination:** Athletes should be treated equally, regardless of their gender, race, religion, sexual orientation, or other personal characteristics. Discrimination or harassment of any kind is unethical.
- **Exploitation:** Athletes, especially young and vulnerable athletes, should be protected from exploitation. This could include over-training, pressure to lose weight, pressure to win and/or financial exploitation.
- **Role modelling:** Professional athletes often serve as role models for young people. They have a responsibility to uphold ethical standards and to promote good behaviour both on and off the field.

Safety

Safety is an important aspect of sport and is the responsibility of many people including the coach, officials, organisers, but most importantly the athlete. Athletes must always consider safety in training and competitions and have their own welfare as a priority. This is especially important for athletes who are prone to injury, have an injury or are recovering from an injury. There are many safety issues that athletes are exposed to. They must:

- make sure that they have adequately warmed-up and cooled-down
- not push their body past its limit or work too hard
- stop training if they are extremely fatigued or disorientated
- know the correct technique to execute movements properly
- compete at a level that is suited to their ability
- make sure they can properly use any equipment necessary for the event
- know the basic rules of the competition
- have a basic knowledge of first aid and injury management.

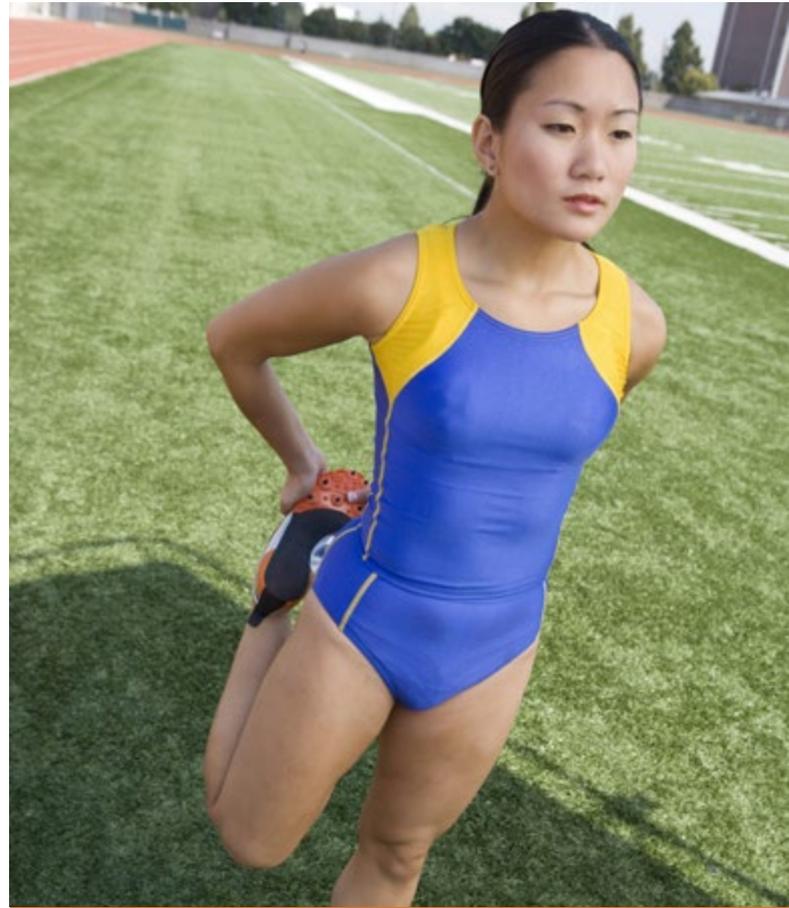


Figure 2.34: Athletes should make sure that they have adequately warmed-up and cooled-down.

Learning activity

1. Outline strategies athletes can use to maintain motivation and commitment over a period of time.
2. Explain how athletes and trainers use psychological training to improve performance.
3. Describe what you understand as ethical behaviour in athletics.

Practical activity

In groups of two, plan a training session based on one athletics event. Consider the following aspects:

- appropriate safety procedures
- safe movement around the track or field
- warm-up/cool-down
- correct handling of equipment.



Figure 2.35:

The starter must ensure that each athlete has a fair start in the race or event.

Administrators

Administrators work to ensure that sporting organisations run smoothly. Their roles vary and can range from reception or administration work at a local sporting club to human resources or marketing.

Sports administrators have a similar range of responsibilities to administrators in other fields, but are likely to focus on organising events and running sports facilities. Additional duties are likely to include promotion of the services of their club, responding to users, fundraising, and possibly working with budgets and dealing with the media.

Event officials

Starter

The starter is the official who controls all things at the start of the race. During events, there is one starter and one assistant starter. Their decision cannot be overruled by anyone else. The starter must ensure that each athlete has a fair start in the race or event, and not being disadvantaged by anything out of their control. All races must start with the fire of the gun, when all athletes are still on their marks. If an athlete leaves their mark before the gun is fired, the starter will declare a 'false start'. This may even result in disqualification. The starter must position themselves so that they have full vision of all the competitors during the starting procedure. They may also have a loudspeaker to give the competitors instructions, recall signs and provide any other information.

Timekeeper

The timekeeper's role is to measure the time between the start and the end of a race. There is usually one timekeeper for each athlete that is competing. The timekeepers must be in line with the finish line and ensure that the time measuring device is working properly. They must begin the timing when the chief timekeeper advises, and begin from the flash or smoke of the gun, not that actual sound. It is important that they concentrate at all times and know which lane their athlete is in. Timekeepers will give their times to the chief timekeeper, who collates the results and sends them to the recorder.

Judges

The judges must decide in which order the athletes finished the race. This is usually determined by a number of judges who analyse which athlete's torso was the first to cross the finish line. Judges will sit in a row to one side of the finish line. The chief judge will note the person who finished first. The first judge will note the first to finish and checks second place. The second judge notes second place and checks third. The third judge notes third and checks fourth place. This continues through the judges for all athletes. If the judges cannot come to a decision, they will then refer to the referee who will make a decision.

Field event officials

Field event officials oversee and record field events. Each field event has its own rules and judging requirements but their roles are generally to: note down all competitors, allocate time for the competitors to warm-up and practise before competing, inform competitors of the rules and running of the event, record necessary numbers and record any fouls.

Referee

There are both track referees and field referees. Track referees check the markings of the lanes of the athletics track and are in charge of checking the positions of the judging and timing stands. They also ensure track rules are followed and watch for any violations or fouls from the competitors. Field referees ensure that all field rules and regulations are being followed and make sure that all records have been correctly measured and written down.

Recorder

The recorder is responsible for recording the competitor's place and time. They also check registration of the athletes and process the paper work received from the judges and timekeepers.

Announcer

The announcer is responsible for informing spectators and athletes of approaching events and calling of athletes to the marshalling area. They may also introduce athletes to the spectators at the beginning of an event and may announce results.

Manager

The manager is the person that is in charge of the event. Their three major duties are to plan the competition day, oversee all the technical aspects of the day and 'wrap up' the carnival.

Marshalls

Marshalls are in charge of assembling competitors for track events, arranging for them to move to the starting area in an organised fashion and in some events, arrange for lane allocations.

Learning activity

Create a series of fact sheets outlining the roles and responsibilities of the following event officials:

- starter
- timekeeper
- judges
- field officials
- referee
- recorder
- announcer
- manager
- marshalls.



Figure 2.36:
Coaches are important stakeholders in an athlete's performance.

Coaches

A sports coach helps athletes in developing their full potential. They are responsible for training the athletes in their sport by analysing their performance, instructing them in relevant skills, and encouraging them. A professional coach is also responsible for guiding the athletes in relation to both their life and their chosen sport. The coach will consequently have many and varied roles: instructor, assessor, friend, mentor, facilitator, demonstrator, advisor, supporter, fact-finder, motivator, counsellor, organiser and planner.

In highly competitive sports in particular, coaches are important stakeholders in an athlete's performance. Coaches can sometimes be unrecognised or can conversely be blamed for poor athletic performance. The athlete–coach relationship is important in sport and physical activity, and coaching can be a rewarding, fulfilling and enjoyable task.

Motivating and supporting others

'Motivation' is a reference to the factors within an athlete or player where they are able to be aroused in their behaviour and channel it towards achieving a goal. Motivation can be classified as either intrinsic or extrinsic. Intrinsic motivation refers to a person's inner drive in the event, in which a coach can enhance by generating situations in which they succeed, reach their goals and experience enjoyment.

Ethical coaching

Coaches should behave ethically at all times and ensure that their athlete's welfare is most important. Coaches are increasingly required to face ethical issues such as sportsmanship (fair play), doping in sport, cheating, bullying, eating disorders, lack of respect for officials, abuse of power and whether an athlete is ready to return to competition after an injury.

Instructing and training

During a training session, a coach should do the following:

- Briefly introduce the session, explain what is going to happen and establish basic rules.
- Spend time on a warm-up and cool-down, making sure it becomes a habit.
- Allow plenty of time for game play, select a range of games that will develop the athlete's skill and use questions and challenges to help the athletes learn.
- Use skill demonstration to help athletes understand technique and give them lots of opportunities to practise and master the techniques.
- After the session, talk to the athlete and revise the key points by asking questions and giving them praise.

Safety

Coaches are responsible for the health and safety of the athletes who are in their care. They have both a legal and moral obligation to their participants where they have a duty of care to them in order to minimise their risk and maximise their safety.

Being a positive role model

The coach should be a role model for both the athlete and their parents and carers, and should demonstrate the behaviour they expect from the participants. Coaches should be positive, dedicated, hard-working, reliable, fair, honest and respectful at all times.



Figure 2.37:

Coaches should give their athletes lots of opportunities to practise and master the techniques required for their sport.

Internet activity

Log on to TitanOnline to complete Activity 2.11 by researching the roles and responsibilities of effective coaches.

Learning activity

1. Describe the importance of a coach to an athlete's success.
2. Discuss the various roles and responsibilities of a coach.
3. Critically examine the role of coaches in creating a safe environment.

Practical activity

1. Demonstrate competence in roles such as measuring, timing, recording and judging.
2. Analyse your own and another person's performance in a range of athletic events and provide feedback.

Revision questions

1. Discuss the body composition suitable for the following track and field events:
 - a. sprints
 - b. hurdles
 - c. javelin
 - d. shot put
 - e. high jump.
2. Describe the key technical elements that an athlete could focus on during the long jump, in order to improve performance.
3. Describe how coaches and trainers use biomechanics to improve an athlete's performance.
4. Describe a range of tips on technique for the following events:
 - a. middle distance
 - b. relay
 - c. discus
 - d. javelin
 - e. triple jump.
5. Provide three examples of how technology has improved performance in athletics.
6. Discuss some of the considerations a coach would think about when creating tactics for an athlete.
7. Discuss the advantages of periodisation.
8. Explain the nutrition and hydration requirements prior to a middle distance race.
9. Describe what measures a coach can take to improve the safety for an athlete.
10. Assess the role of event officials when running a school athletics carnival.
11. Describe the various roles a coach may be required to fill.
12. Explain how to establish appropriate and effective short- and long-term goals.

CHAPTER 3

First aid and sport injuries

Throughout this unit, students will discover ways to maintain and enhance safety throughout their involvement in physical activity. Students will practise emergency care procedures, including DRSABCD and CPR. They will learn about and practise managing various first aid conditions, such as unconsciousness, shock, bleeding, asthma, epilepsy and diabetes. Students will learn how to manage a number of injuries common to physical activity pursuits, such as fractures, dislocations, concussions and cramps. Students discuss how to prevent injury from occurring, as well as follow up treatment should an injury occur. They explore different types of sports injuries and how to manage them through the use of restricting mobility and the RICER procedure. Students discuss hypothermia and hyperthermia.

Syllabus outcomes

A student:

- demonstrates ways to enhance safety in physical activity (1.3)
- describes the relationship between anatomy, physiology and performance (2.5)
- assesses and responds appropriately to emergency care situations (3.6)
- demonstrates leadership skills and a capacity to work cooperatively in movement contexts (4.2)
- demonstrates competence and confidence in movement contexts (4.4)
- recognises the skills and abilities required to adopt roles that support health, safety and physical activity (4.5).

Focus areas

- Emergency care
- Managing conditions
- Managing injuries
- Principles of sports injury management
- Types of sports injuries
- Managing sports injuries



Figure 3.1: Soft-tissue injuries are a common occurrence when playing sport.



Figure 3.2:

If a person is not breathing, or is breathing abnormally, it may indicate a cardiac arrest or respiratory distress.

Emergency care

Emergency care is the aid given to the injured or suddenly ill. A rescuer must act quickly, calmly and correctly in order to save the life of a person and prevent, if possible, the condition worsening. Emergency care should commence immediately and continue until medical help arrives.

Basic emergency care aims to:

- Perform a basic emergency care management assessment.
- Apply the DRSABCD principles of resuscitation – danger, response, send for help, airways, breathing, compression and defibrillation.
- Monitor the situation when the patient is in the recovery position.
- Recognise and treat common first aid scenarios such as fractures and dislocations, bites and stings, asthma, choking and cramps.
- Apply treatment to burns, wounds, shock, bleeding and eye injuries.
- Recognise and treat common medical conditions, such as heart attacks and diabetes.

Assessment of the situation

Before treatment is undertaken, a quick and careful assessment of the situation must be made. Individuals should engage the help of bystanders to telephone for medical assistance, comfort the casualty, help obtain necessary supplies and control traffic flow if necessary. When it comes to first aid, assessing the situation properly is crucial. Call for help early on.

Incidents involving traffic, fire, electricity or water can put the first aider's own life at risk. They must be sure it is safe to approach. There is a range of important questions the first aider must ask themselves:

- What are the present or potential dangers to the first aider, casualty and bystanders?
- Is there any protective clothing or equipment available?
- Is it safe to approach the casualty?
- What has caused the accident or situation?
- How many casualties are there?
- What happened?
- How many people are involved and how old are they?
- What injuries are suspected?

Individuals should minimise the risk of danger to themselves, the casualty and any bystanders.

For example, the possible dangers around a road accident may include:

- oncoming traffic
- fuel leaks
- vehicle fire
- fallen power lines
- gas leaks or fumes
- other vehicles.



Figure 3.3:

First aiders must be sure it is safe to approach incidents involving traffic.



Figure 3.4:

When it comes to first aid, assessing the situation properly is crucial.

Learning activity

1. Assess the danger to yourself, the casualty and others in the following first aid situations:
 - a. A three car accident on a city road.
 - b. A friend collapses next to you suffering an epileptic fit.
 - c. Two people at the beach are caught in a rip.
2. Prioritise the management of multiple casualties in the following first aid situations:
 - a. A class is overcome by gas fumes in the science lab.
 - b. The school sports bus crashes into a power pole.

DRSABCD

DRSABCD is used in first aid and emergency response to outline the steps to follow in a medical emergency. It serves to help individuals remember the critical actions to take in order to assess and assist a person in need. Each letter in DRSABCD represents a specific step:

- **D – Danger:** The first step is to assess the immediate danger to yourself, the person in distress, and others in the vicinity. Ensure that it is safe to approach the situation. If there are any ongoing hazards, such as traffic, fire, or violence, take appropriate measures to eliminate or minimise the danger before proceeding.
- **R – Response:** Once you have confirmed the scene is safe, check the person for a response. Gently tap their shoulders and ask loudly, “are you okay?”. If there is no response, it indicates a loss of consciousness, and immediate medical attention is required.
- **S – Send for help:** If the person is unresponsive or requires urgent medical attention, call for triple zero (000) for an ambulance, or ask someone nearby to call for help. Mobile phones can call 112 for emergencies. Provide clear and concise information about the situation, the person’s condition and the location. If possible, provide specific instructions or delegate someone to make the call while you continue with the next steps.
- **A – Airway:** Open the person’s airway to ensure they can breathe properly. Place one hand on their forehead and gently tilt their head back while lifting their chin with your other hand. If there is an obstruction place the person in the recovery position and remove any foreign objects with the fingers. This manoeuvre helps to clear any obstructions and allows air to flow freely into the lungs.
- **B – Breathing:** Check for normal breathing. Look for chest rise and fall, listen for breathing sounds, and feel for air coming out of their mouth or nose. If the person is breathing place them in the recovery position. If the person is not breathing, or is breathing abnormally, it may indicate a cardiac arrest or respiratory distress. Begin CPR.
- **C – CPR:** If the person is not breathing or not breathing normally, initiate cardiopulmonary resuscitation (CPR) immediately. This involves providing chest compressions and rescue breaths to circulate oxygenated blood to vital organs. The ratio of chest compressions to breaths is 30:2. Aim for approximately 100 compressions per minute.
- **D – Defibrillation:** If an automated external defibrillator (AED) is available, use it as soon as possible. AEDs are designed to analyse the person’s heart rhythm and deliver a shock if needed. Follow the AED voice prompts and guidelines for its proper use.

DRSABCD is a general guideline for initial assessment and assistance in a medical emergency. It is crucial to seek professional medical help as soon as possible and, if available, consult with trained individuals or emergency responders to provide appropriate care.

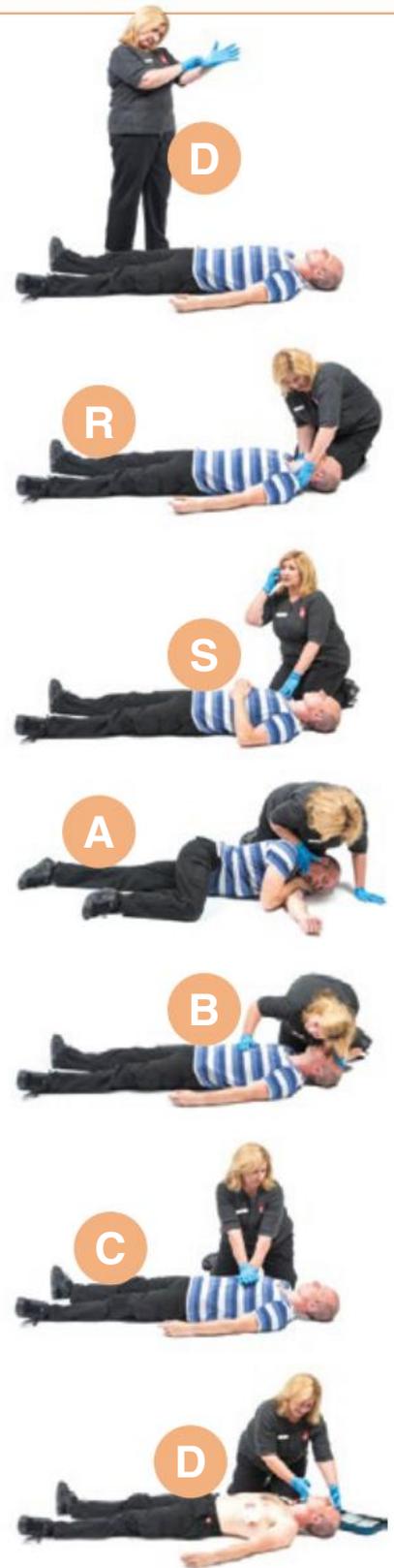


Figure 3.5:
DRSABCD action plan.
Image source: St John
Ambulance, WA.

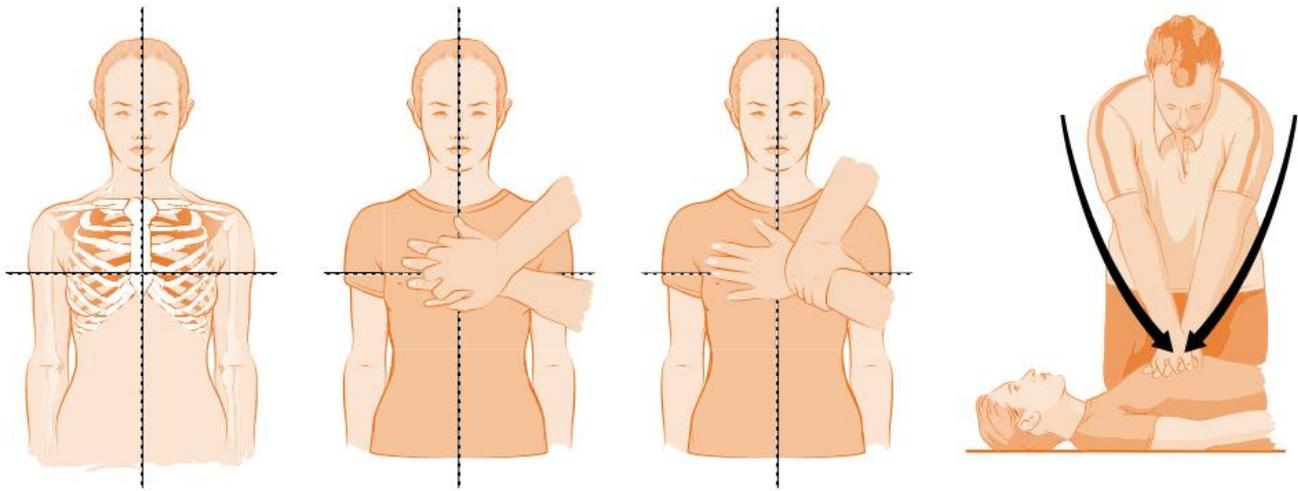


Figure 3.6:

CPR should be initiated promptly when an individual is unresponsive and not breathing, or not breathing normally.

CPR

Cardiopulmonary resuscitation (CPR) is a lifesaving technique used to maintain blood flow and oxygenation to vital organs in a person experiencing cardiac arrest or a complete cessation of breathing. CPR should be initiated promptly when an individual is unresponsive and not breathing, or not breathing normally. Commence CPR by:

- Gently place the person on their back on a firm, flat surface. If there is a possibility of a spinal injury, use appropriate precautions to minimise movement and maintain alignment of the head, neck, and spine.
- Tilt the person's head back by placing one hand on their forehead and gently lifting the chin with your other hand. This manoeuvre helps to clear any obstructions and open the airway. Place your mouth over the patient's mouth and give two full breaths. Look for the rise and fall of the chest.
- Position yourself kneeling beside the person's chest. Place the heel of one hand on the centre of the person's chest (between the nipples), and place your other hand on top, interlocking your fingers. Keep your arms straight and position your shoulders directly above your hands.
- Push hard and fast at a rate of about 100 compressions per minute. Depress the chest approximately five centimetres in adults. Allow the chest to fully recoil between compressions without lifting your hands off the chest.
- After every 30 compressions, open the person's airway again and give two rescue breaths. Pinch the person's nose shut, make a seal over their mouth with yours, and deliver a breath that makes their chest rise. Each breath should last about one second.
- Continue cycles of compressions and breaths. Repeat the cycle of 30 compressions followed by two rescue breaths. Aim for a compression-to-breath ratio of 30:2 in one-rescuer CPR for adults and children.
- If an AED is available, turn it on and follow the prompts. Apply the pads to the person's bare chest as instructed and allow the AED to analyse the person's heart rhythm. It will deliver an electrical current to the heart if required.

Perform CPR until the person shows signs of life, until medical professionals take over, or until you are physically unable to continue. If there are other trained responders available, you can take turns performing compressions to avoid fatigue.

To carry out chest compressions on a child (over one year of age):

- Place the heel of one hand on the lower half of breastbone, in the centre of the child's chest (the size of the child will determine if you do CPR with one hand or two hands).
- Follow the basic steps for performing CPR above.

To carry out chest compressions on a baby:

- With the baby lying on their back, locate the centre of the baby's chest, just below the nipple line. Use two fingers to provide chest compressions, pressing down about one-third the depth of the baby's chest.
- Perform gentle and quick compressions at a rate of about 100–120 compressions per minute. Allow the chest to fully recoil between compressions without lifting your fingers off the chest.
- After completing the 30 compressions, maintain the baby's head tilt, cover their mouth and nose with your mouth, and deliver two gentle puffs of air. Use just enough breath to make the baby's chest rise. Each breath should last about one second.
- Do not use an AED on a child under one year of age.

It is essential to receive proper CPR training from a certified provider to ensure the correct technique and to stay updated with any guideline changes.



Figure 3.7:

The size of the child determines whether CPR is performed with one or two hands.

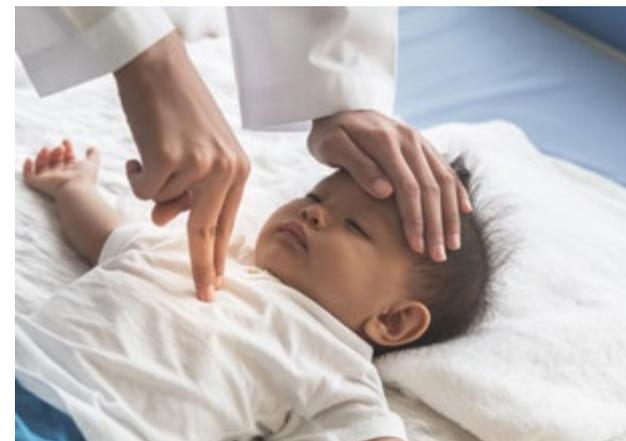


Figure 3.8:

CPR on babies uses two fingers to provide chest compressions.

Internet activity

Log on to TitanOnline and complete Activity 3.1 to learn more about administering CPR.

Practical activity

1. Practise the DRSABCD action plan on a manikin.
2. Practise CPR on a manikin, demonstrating the differences for an adult, child and infant.

Emergency services

Emergency services ensure public health and safety in emergency situations. They are on call 24 hours per day and respond to individual and group safety and health emergencies.

One of the main roles of emergency service organisations is providing community awareness, prevention and health promotion programs. The aim of raising awareness is to reduce the incidence of emergencies.

When contacting the emergency services, the first aider should make sure that they have all of the necessary information before speaking to the operator. They must keep the information brief and accurate. They must also ensure that the message is given clearly and calmly so that they are understood by the operator.

Triple zero (000) is the main number to be used in Australia for emergencies, but 112 can also be used on a mobile phone. There is a misconception that 112 calls access satellite phone technology, but this is not true. If in a remote area without reception, neither number will reach the emergency call centre. It is also not true that 112 calls receive priority over 000 calls. 112 calls can only be made on mobiles and do not require a pin number or a SIM card.

The emergency services that can be reached by calling 000 or 112 are:

- Ambulance
- Police
- Fire and rescue.



Figure 3.9:

The ambulance service is available 24 hours per day to respond to health emergencies.



Figure 3.10:

Triple zero (000) is the main Australian number to be used for emergencies, but 112 can also be used on mobiles.

Learning activity

1. Research the appropriate first aid treatment in the following scenarios:
 - a. A friend has an anaphylaxis allergic reaction to a biscuit they are eating that contains peanuts.
 - b. Your younger brother suffers a severe asthma attack.
 - c. You find your best friend lying semi-conscious outside their home.
2. Outline the information that emergency services will require in each first aid situation.

Managing conditions

When attempting to treat any injury, it is important to recognise the signs and understand the symptoms that might accompany that injury. A sign is something that can actually be seen as being hurt or injured, such as very pale skin or severe bleeding. A symptom is something that the sick or injured person describes to the first aider, such as blurred vision, nausea or an aching muscle.

Unconsciousness

When dealing with an unconscious person, it's crucial to act quickly and take the necessary steps to ensure their safety and wellbeing.

Signs and symptoms of an unconscious person:

- **Unresponsiveness:** the person does not respond to stimuli, such as touch or sound.
- **Loss of consciousness:** they are unable to stay awake or maintain awareness of their surroundings.
- **Absence of voluntary movements:** the person does not move purposefully or respond to commands.
- **Altered breathing:** breathing may be shallow, irregular, or absent.
- **Pale or bluish skin:** due to poor circulation or inadequate oxygenation.
- **Dilated or unequal pupils:** pupils may be larger than usual or vary in size.

Management techniques for an unconscious person:

- **Ensure safety:** assess the scene for any immediate dangers to yourself and the unconscious person. Move them away from hazards if possible.
- **Check responsiveness:** gently tap the person and ask loudly if they are okay. If there is no response, assume they are unconscious.
- **Call for help:** dial emergency services (000/112) immediately or instruct someone nearby to do so. Provide them with accurate information about the situation.
- **Open the airway:** roll their back and head gently. This helps to facilitate breathing.
- **Check breathing:** look, listen, and feel for any signs of breathing for up to 10 seconds. If the person is not breathing or only gasping, begin CPR (cardiopulmonary resuscitation) immediately.
- **Perform CPR:** administer chest compressions and rescue breaths at a ratio of 30:2.
- **Monitor vital signs:** if the person is breathing, turn them onto their side in the recovery position to maintain an open airway. Continuously monitor their breathing, pulse,

Figure 3.11:

An unconscious person may not respond to stimuli, such as touch or sound.



Shock

Shock is a serious medical condition that occurs when there is insufficient blood flow and oxygen delivery to the body's tissues and organs. It can have various causes, including severe injuries, blood loss, infections, allergic reactions, or other medical emergencies.

Signs and symptoms of shock:

- **Pale, cool, or clammy skin:** the skin may appear pale or have a bluish tinge. It may also feel cool or moist to the touch.
- **Rapid and weak pulse:** the heart rate may be fast and weak, indicating the body's attempt to compensate for decreased blood flow.
- **Rapid and shallow breathing:** the person may breathe rapidly or have difficulty taking deep breaths.
- **Low blood pressure:** blood pressure may drop, leading to dizziness, light headedness, or fainting.
- **Weakness and fatigue:** the person may feel weak, fatigued, or confused.
- **Thirst and dry mouth:** due to reduced blood flow, the body may signal dehydration and thirst.
- **Altered mental state:** the person may appear confused, disoriented, or agitated.

Management techniques for shock:

- **Call for emergency medical assistance:** call emergency services (000/112) immediately and provide them with accurate information about the person's condition.
- **Ensure safety:** assess the situation and remove any potential hazards to protect yourself and the person experiencing shock.
- **Help the person lie down:** lay the person flat on their back, with their legs slightly elevated (unless they have a head, neck, or back injury). This helps improve blood flow to vital organs.
- **Maintain body heat:** cover the person with a blanket or any available clothing to prevent further loss of body heat, as shock can lead to decreased body temperature.
- **Loosen restrictive clothing:** remove any tight clothing, belts, or accessories that could constrict blood flow.
- **Monitor vital signs:** continuously monitor the person's breathing, pulse, and level of consciousness. If they become unresponsive, be prepared to perform CPR.
- **Do not offer food or drink:** while it's important to keep the person comfortable, avoid giving them anything to eat or drink, as they may require medical treatment.

Remember, shock is a life-threatening condition, and it requires immediate medical attention. The management techniques provided are intended to stabilise the person's condition until professional medical help arrives.



Figure 3.12:

A person suffering from shock should be covered with a blanket, to prevent loss of body heat.

Bleeding

Bleeding can occur due to various causes, such as injuries, wounds, or underlying medical conditions. It is important to assess the severity of the bleeding and take appropriate actions to control it.

Signs and symptoms of bleeding:

- **Visible blood:** obvious signs of bleeding, such as blood flowing from a wound or pooling on the skin.
- **Blood-soaked clothing or bandages:** clothing or bandages that are saturated with blood.
- **Blood coughed up or vomited:** in cases of internal bleeding, blood may be present in the coughed-up mucus or vomit.
- **Rapid and weak pulse:** increased and weak heart rate, as the body attempts to compensate for blood loss.
- **Pale and cool skin:** decreased blood flow can cause the skin to appear pale or have a bluish tinge. The skin may also feel cool to the touch.
- **Dizziness or light headedness:** blood loss can lead to a drop in blood pressure, resulting in feelings of dizziness or faintness.
- **Weakness and fatigue:** excessive bleeding can cause weakness, fatigue and a general unwell feeling of being unwell.

Management techniques for bleeding:

- **Ensure safety:** before providing assistance, ensure your safety and, if necessary, wear gloves or use a barrier between yourself and the person's blood to prevent potential transmission of diseases.
- **Apply direct pressure:** if the bleeding is external, apply direct pressure to the wound using a clean cloth, sterile gauze, or your hand. Maintain pressure for several minutes until the bleeding stops or help arrives.
- **Elevate the injured area:** if possible, raise the injured body part above the level of the heart to reduce blood flow to the area. This can help slow down bleeding.
- **Maintain pressure:** if the bleeding persists, continue applying direct pressure while seeking medical assistance.
- **Do not remove objects:** if there is an embedded object in the wound, such as a knife or a piece of glass, do not attempt to remove it. Applying pressure around the object can help control bleeding until medical professionals can safely remove it.
- **Use tourniquet as a last resort:** tourniquets should only be used as a last resort for life-threatening bleeding. They should be applied above the bleeding site and tightened until the bleeding stops. Note the time of application and inform medical professionals.
- **Seek medical attention:** regardless of the severity of the bleeding, it's important to seek medical attention to assess the extent of the injury and receive appropriate care.



Figure 3.13:
Pressure should be applied to a bleeding wound using a clean cloth.

Neck and spinal injuries

Neck and spinal injuries can have severe consequences and require immediate attention. It is important to approach these injuries with extreme care to prevent further damage.

Signs and symptoms of neck and spinal injuries:

- **Pain or tenderness:** the person may experience localised pain or tenderness in the neck or spine.
- **Limited mobility:** inability or difficulty moving the neck or spine.
- **Numbness or weakness:** loss of sensation, tingling, or weakness in the extremities (arms, legs).
- **Paralysis:** partial or complete loss of movement or sensation in the limbs.
- **Difficulty breathing:** impaired or laboured breathing may occur due to damage to the spinal cord or associated muscles.

Management techniques for neck and spinal injuries:

- **Call for emergency medical assistance:** call emergency services (000/112) immediately and provide accurate information about the person's condition, including the possibility of a neck or spinal injury.
- **Do not move the person's head or neck:** it is crucial to keep the person's head and neck immobilised to prevent further injury. Do not attempt to realign their head or neck.
- **Maintain the person's position:** if the person is conscious, instruct them to remain as still as possible. If they are unconscious, support their head and neck in the position you found them until professional help arrives.
- **Stabilise the head and neck:** if the person needs to be moved due to immediate danger, multiple trained individuals should carefully work together to stabilise the head and neck while transferring the person onto a rigid board or spine immobilisation device. This should be done in a coordinated manner to minimise movement.
- **Minimise movement during transport:** once the person is on a spine board or immobilisation device, secure them properly to prevent any unnecessary movement during transportation to the hospital. Avoid bending or twisting their spine.
- **Follow medical professionals' instructions:** allow trained medical professionals to evaluate and manage the injury. They may conduct imaging tests, such as X-rays or CT scans, to assess the extent of the damage and provide appropriate treatment.

It is crucial to remember that neck and spinal injuries require specialised medical attention. Handling these injuries improperly can lead to further harm or permanent damage. Focus on keeping the person as still and immobile as possible until professional medical help arrives.



Figure 3.14:

It's important to keep the head, neck and spine immobilised if spinal injury is suspected.

Internet activity

Log on to TitanOnline and complete Activity 3.2 to learn more about neck and spinal injuries.

Heart attack

A heart attack, also known as a myocardial infarction, occurs when the blood flow to the heart muscle is blocked, usually due to a blood clot. Recognising the signs and symptoms of a heart attack and taking immediate action is crucial for saving a person's life.

Signs and symptoms of a heart attack:

- **Chest discomfort:** the most common symptom is a feeling of pressure, tightness, or heaviness in the chest. It may last for a few minutes or come and go.
- **Pain in other areas:** the discomfort may extend beyond the chest to the arms (usually the left arm), back, neck, jaw, or stomach.
- **Shortness of breath:** the person may experience difficulty breathing or feel breathless even during rest or minimal exertion.
- **Cold sweats:** the skin may appear pale and clammy, and the person may break out in a cold sweat.
- **Nausea and vomiting:** some individuals may experience feelings of nausea, indigestion, or vomiting.
- **Light headedness or dizziness:** the person may feel lightheaded or dizzy, possibly leading to fainting.
- **Fatigue:** unexplained fatigue or extreme exhaustion, even without exertion, can be a symptom.

Management techniques for a heart attack:

- **Call for emergency medical assistance:** call emergency services (000/112) immediately and provide them with accurate information about the person's symptoms and condition.
- **Keep the person calm:** encourage the person to remain as calm as possible and avoid any unnecessary exertion.
- **Assist with medications:** if the person carries prescribed medication for a heart condition, help them take it as directed.
- **Help the person sit or rest comfortably:** if the person is conscious and able to sit, assist them in finding a comfortable position. Loosen any tight clothing to ease breathing.
- **Do not delay in seeking medical help:** it is essential to prioritise seeking immediate medical attention over attempting to manage the situation at home.
- **Perform CPR if necessary:** if the person becomes unresponsive, stops breathing, or their pulse is absent, it may be necessary to perform CPR until professional help arrives.

Recognising the signs and symptoms of a heart attack and seeking immediate medical help can significantly improve the chances of survival and minimise long-term damage. Time is critical during a heart attack, so do not hesitate to call emergency services even if you are unsure if it is a heart attack.



Figure 3.15:

It is essential to prioritise seeking immediate medical attention if a heart attack is suspected.

Internet activity

Log on to TitanOnline and complete Activity 3.3 to learn more about heart attack.

Asthma

Asthma is a chronic respiratory condition characterised by inflammation and narrowing of the airways, which leads to recurrent episodes of difficulty in breathing. It is a condition that affects the lungs and can cause a range of symptoms, including coughing, wheezing, shortness of breath and chest tightness.

Signs and symptoms of an asthma attack:

- **Shortness of breath:** the person may experience a sudden onset of breathlessness and have difficulty taking in enough air.
- **Wheezing:** a whistling or high-pitched sound may be heard when the person exhales due to narrowed airways.
- **Coughing:** the person may have a persistent, dry cough that worsens during an attack.
- **Chest tightness:** the individual may feel a sensation of tightness or pressure in the chest.
- **Rapid breathing:** breathing may become rapid and shallow in an attempt to compensate for the reduced airflow.
- **Anxiety or panic:** feelings of anxiety, fear, or panic may arise due to the difficulty in breathing.
- **Cyanosis:** the lips, fingers, or face may appear bluish due to inadequate oxygenation.

Management techniques for an asthma attack:

- **Assist with medication:** if the person has prescribed asthma medication, such as an inhaler, help them use it as directed. Usually, this involves taking multiple puffs of a short-acting bronchodilator inhaler.
- **Help the person sit upright:** encourage the person to sit in an upright position to facilitate breathing and reduce strain on the chest.
- **Stay calm and reassure the person:** provide reassurance and encourage them to remain as calm as possible. Anxiety can worsen symptoms.
- **Loosen tight clothing:** help loosen any clothing that is tight around the chest or neck, to allow for easier breathing.
- **Encourage slow, deep breaths:** instruct the person to take slow, deep breaths to help relax the airways.
- **Keep the person away from triggers:** if possible, move the person away from any known triggers, such as allergens, cigarette smoke, or pollution.
- **Do not delay in seeking medical help:** if the person's symptoms worsen, do not hesitate to seek emergency medical assistance. Asthma attacks can escalate rapidly,

Practical activity

Demonstrate the management technique for a person who is:

- unconscious
- shock
- bleeding
- neck and spinal injury
- heart attack
- asthma.

Figure 3.16:

Asthmatics should use their medication during an asthma attack.



Epilepsy

Epilepsy is a neurological disorder characterised by recurrent seizures. Seizures occur due to abnormal electrical activity in the brain.

The signs and symptoms of epilepsy can vary, depending on the type of epileptic seizure:

- **Loss of consciousness:** the person may become unresponsive, unaware of their surroundings, and appear to be 'zoned out or staring into space.
- **Uncontrolled movements:** the person may experience jerking, twitching, convulsions, or repetitive motions of the limbs or other parts of the body.
- **Tonic phase:** the muscles may stiffen, leading to rigidity and muscle contraction.
- **Clonic phase:** the muscles may alternate between relaxation and contraction, resulting in rhythmic jerking movements.
- **Absence seizures:** the person may exhibit a brief loss of awareness, staring spells, or subtle body movements like lip-smacking or repetitive hand movements.
- **Sensory symptoms:** some individuals may experience sensory symptoms such as tingling, strange tastes or smells or visual disturbances.

Management techniques for an epileptic seizure:

- **Stay calm and maintain safety:** it is important to stay calm and reassure others present. Ensure the person's safety by removing any nearby objects that may cause harm.
- **Protect the person's head:** if possible, cushion the person's head with a soft object, such as a pillow or folded clothing, to prevent injury.
- **Do not restrain or restrict movements:** allow the seizure to run its course without attempting to hold the person down or restrict their movements. Restraining someone during a seizure can cause injury or increase distress.
- **Time the duration of the seizure:** note the start time of the seizure and observe the duration, to help assess whether emergency medical assistance is needed.
- **Do not put anything in the person's mouth:** it is not necessary to insert anything into the person's mouth during a seizure – doing so can cause harm or injury.
- **Monitor breathing:** keep an eye on the person's breathing. If breathing difficulties occur, gently roll the person onto their side (recovery position) after the convulsive movements have subsided. This can help maintain an open airway and prevent choking.
- **Stay with the person:** once the seizure ends, stay with the person and provide support. Offer reassurance and comfort as they regain consciousness.
- **Seek medical attention if necessary:** if it is the person's first seizure, the seizure lasts longer than usual, or if the person is injured or experiencing breathing difficulties, it is important to call for emergency medical assistance.



Figure 3.17:

The recovery position can help prevent choking after a seizure has subsided.

Internet activity

Log on to TitanOnline and complete Activity 3.4 to learn more about epilepsy.

Diabetes

Diabetes is a chronic medical condition that affects how your body regulates blood sugar (glucose) levels. Glucose is a vital source of energy for the body's cells, and its levels need to be carefully controlled for optimal functioning. Diabetes occurs when there is a problem with insulin, a hormone produced by the pancreas that helps regulate glucose levels.

There are three main types of diabetes:

- **Type 1 diabetes:** in this autoimmune condition, the body's immune system mistakenly attacks and destroys the insulin-producing cells in the pancreas. As a result, the pancreas produces little to no insulin. Type 1 diabetes typically develops early in life, often in childhood or adolescence. People with type 1 diabetes require life
- **Type 2 diabetes:** this is the most common. Type 2 diabetes occurs when the body cannot produce enough insulin to meet the body's needs. It is caused by sedentary behaviour, poor diet and genetics. It is managed with lifestyle modifications such as exercise and diet. In some cases, oral medications or insulin are used.
- **Gestational diabetes:** this type of diabetes occurs during pregnancy and usually resolves after childbirth. It is caused by hormones that interfere with insulin. People who have high blood sugar levels due to gestational diabetes require careful monitoring to ensure the health of both the mother and the baby. Some people who develop gestational diabetes have an increased risk of developing type 2 diabetes later in life.

A diabetic emergency can occur when blood sugar levels become too high (hyperglycaemia) or too low (hypoglycaemia). The signs and symptoms and management differ depending on whether it is a hyperglycaemic or hypoglycaemic episode.

Signs and symptoms of hyperglycaemia (high blood sugar) include:

- excessive thirst and dry mouth
- frequent urination
- fatigue and weakness
- blurred vision
- headache
- increased hunger
- slow-healing sores
- dry, flushed skin
- fruity breath odour (in more severe cases)



Figure 3.18:

A diabetic emergency can occur when blood sugar becomes too high or too low.

Management techniques for hyperglycaemia:

- **Check blood sugar levels:** use a glucose meter to measure blood sugar levels and confirm hyperglycaemia.
- **Drink water:** hydrate by drinking water or other sugar-free fluids, to help dilute the excess sugar in the blood and prevent dehydration.
- **Administer insulin:** if the person is on insulin therapy, they may need to administer additional insulin to bring down blood sugar levels.
- **Seek medical advice:** if blood sugar levels remain high or if symptoms worsen or persist, it is essential to seek medical advice.

Signs and symptoms of hypoglycaemia (low blood sugar) include:

- sweating and clammy skin
- shakiness or tremors
- rapid heartbeat
- hunger and nausea
- dizziness or light headedness
- confusion or difficulty concentrating
- irritability or mood changes
- weakness or fatigue
- blurred vision
- headache
- seizures or unconsciousness (in severe cases).

Management techniques for hypoglycaemia:

- **Check blood sugar levels:** use a glucose meter to measure blood sugar levels and confirm hypoglycaemia.
- **Consume fast-acting carbohydrates:** provide the person with a quick source of glucose to raise blood sugar levels rapidly. This can include glucose tablets or gel, fruit juice, regular soda, honey or lollies.
- **Recheck blood sugar:** wait 15 minutes and then recheck blood sugar levels. If it is still below the target range, repeat the administration of fast-acting carbohydrates.
- **Provide a balanced snack:** once blood sugar levels have stabilised, offer a snack that includes a combination of carbohydrates and protein to sustain blood sugar levels.
- **Seek medical attention if necessary:** if the person is unconscious, having seizures, unable to swallow, or if symptoms do not improve despite appropriate treatment, call for emergency medical assistance.



Figure 3.19:
Diabetics can use a glucose meter to check their blood sugar levels.



Figure 3.20:
Women who develop gestational diabetes have an increased risk of developing type 2 diabetes later in life.

Did you know?

It is estimated that 3.3 million Australians will have type 2 diabetes by 2031.

Poisons

Signs and symptoms of poisoning can vary depending on the substance ingested, inhaled, or absorbed. However, there are some general signs to be aware of. It is important to note that in case of suspected poisoning, immediate medical assistance should be sought by calling emergency services or the Poisons Information Centre (131 126).

Signs and symptoms of poisoning include:

- nausea and vomiting
- abdominal pain or cramping
- diarrhoea
- difficulty breathing or shortness of breath
- chest pain or palpitations
- dizziness or light headedness
- headache
- confusion or disorientation
- seizures or convulsions
- burns or redness around the mouth or on the skin
- unconsciousness or coma.

Management techniques for poisoning:

- **Ensure safety:** if you suspect poisoning, ensure your own safety first. If the person is in a dangerous environment or still exposed to the toxic substance, move them to a safe area away from the source of poisoning.
- **Call for help:** contact emergency services (000/112) or the Poisons Information Centre (131 126) immediately. Provide them with as much information as possible about the substance involved, the symptoms observed and the person's condition.
- **Follow instructions:** follow the instructions given by the emergency operator or the Poisons Information Centre. They will provide specific guidance based on the type of poisoning and substance involved.
- **Do not induce vomiting:** in some cases of poisoning, inducing vomiting may worsen the situation or cause further harm. It is best to wait for guidance from medical professionals before attempting any interventions.
- **Remove contaminated clothing:** if the person's clothing is contaminated with the toxic substance, carefully remove it to prevent further exposure. Use gloves or other protective measures to avoid direct contact.
- **Rinse affected areas:** if the poison is on the skin or in the eyes, gently rinse the affected area with lukewarm water for at least 15 minutes. This helps remove the toxin and minimise its effects.
- **Provide comfort and reassurance:** stay with the person and provide comfort and reassurance while waiting for medical help. Keep them calm and monitor their vital signs and pulse.
- **Preserve evidence:** if possible, gather any containers, bottles, or materials related to the poisoning. This information can be helpful for medical professionals in identifying the substance and determining appropriate treatment.

Figure 3.21:

Nausea and vomiting are signs of possible poisoning.



Bites and stings

Australia is known for its unique wildlife, including several animals that can deliver bites or stings that may cause harm to humans. It's important to note that some animals are venomous and can pose serious health risks. If someone has been bitten or stung, it is crucial to seek immediate medical assistance.

Snake bites

Signs and symptoms of snake bites:

- Immediate pain at the bite site, swelling, redness and bruising.
- Depending on the snake species, additional symptoms may include dizziness, nausea, vomiting, sweating, muscle weakness, difficulty breathing, and changes in heart rate.

Management technique for snake bites:

- Keep the person calm and still to slow down the spread of venom.
- Immediately call emergency services (000/112) for help.
- Apply a pressure immobilisation bandage over the bite site, starting from the extremity and wrapping upward.
- Splint the bitten limb to minimise movement.
- Do not wash the wound or attempt to suck out venom.

Spider bites

Signs and symptoms of spider bites:

- Immediate pain at the bite site, swelling, redness and itching.
- Some spiders can cause more severe symptoms, including muscle pain, abdominal pain, sweating, nausea, vomiting, headache, and in rare cases, difficulty breathing or anaphylaxis.

Management technique for spider bites:

- Keep the person calm and still.
- Immediately call emergency services (000/112).
- Apply a cold compress or ice pack to the bite site to reduce pain and swelling.
- Capture or identify the spider if possible (without putting yourself at risk) for identification by medical professionals.



Figure 3.22:

A pressure immobilisation bandage should be applied over a snake bite site.



Figure 3.23:

A cold compress or ice pack applied to a spider bite can reduce pain and swelling.

Did you know?

Funnel web spiders have been known to survive 24–30 hours under water.

Internet activity

Log on to TitanOnline and complete Activity 3.5 to learn more about bites and stings.

Jellyfish stings

Signs and symptoms of jellyfish stings:

- Intense pain, redness, swelling and welts at the sting site.
- In some cases, venomous jellyfish (box jellyfish) stings can cause symptoms such as muscle pain, difficulty breathing, chest tightness, and in rare cases, cardiac arrest.

Management technique for jellyfish stings:

- Remove the person from the water to avoid further stings.
- Rinse the affected area with vinegar for at least 30 seconds to neutralise any remaining stinging cells. Do not use freshwater, alcohol, or urine to rinse the sting.
- Use hot water or a hot pack for 20 minutes to help alleviate pain.
- Seek medical attention promptly. For box jellyfish stings, call emergency services (000/112) immediately.

Bee and wasp stings

Signs and symptoms of bee and wasp stings:

- Immediate pain, redness, swelling and welts at the sting site, itching, localised heat, mild allergic reaction.
- In rare cases, individuals may experience anaphylaxis, with symptoms such as difficulty breathing, swelling of the face or lips, dizziness, rapid heartbeat and a drop in blood pressure. This requires immediate medical attention.

Management technique for bee and wasp stings:

- Scrape the area gently with a flat-edged object (such as a credit card) to remove the stinger. Do not use tweezers or pinch the stinger, as this can inject more venom.
- Clean the sting site with mild soap and water to help prevent infection.
- Place a cold compress or ice pack wrapped in a cloth on the sting site to reduce pain, swelling, and inflammation. If necessary, over-the-counter pain relievers can be taken.
- Resist the urge to scratch the sting site, as this can worsen symptoms and increase the risk of infection.
- Monitor the person for allergic reactions. If signs of anaphylaxis or a severe allergic reaction occur, call emergency services (000/112) immediately.



Figure 3.24:

Jellyfish stings can produce intense pain and welts at the sting site.



Figure 3.25:

Bee and wasp stings can result in swelling, itching, and localised heat.

Practical activity

Demonstrate the management technique for a person suffering:

- | | | |
|------------|------------------------|----------------------|
| ▪ epilepsy | ▪ poisoning | ▪ jellyfish sting |
| ▪ diabetes | ▪ snake or spider bite | ▪ bee or wasp sting. |



Figure 3.26:

The most common cause of limb fractures is a traumatic event, such as a fall or sports injury.

Managing injuries

The management of an injury is usually dependent upon the type of injury that has been sustained. Due to the environment that people work and/or play in, a variety of injuries may occur in different situations. It is important that the first aider knows how to identify the symptoms of a variety of injuries and the correct management techniques. Prior to assisting injured people, remember to make sure the environment is safe. Ask bystanders and/or the injured person about what actually happened. Call for assistance, stay calm, reassure the casualty and be positive.

Fractures of the limbs

A fracture refers to a broken bone. Fractures of the limbs specifically involve breaks or cracks in the bones of the arms or legs. Fractures of the limbs can occur due to various reasons. The most common cause of limb fractures is a traumatic event, such as a fall, sports injury, motor vehicle accident, or direct blow to the limb. These high-impact forces can cause the bone to break.

Repetitive stress or excessive pressure on a bone over time can lead to stress fractures. This commonly occurs in athletes or individuals engaged in activities that involve repetitive motion or excessive strain on the limbs.

Weakened bones due to osteoporosis, a condition characterised by low bone density, can make bones more prone to fractures. In individuals with osteoporosis, even a minor fall or minimal force can result in a fracture. Fractures can occur in bones that are weakened or damaged by an underlying condition, such as bone cancer, infection, or metabolic disorders. These fractures are called pathological fractures. Older adults may be more susceptible to fractures due to age-related changes in bone density and strength. Falls, even from a standing height, can lead to fractures in this group.

It's important to note that the severity and specific type of fracture can vary depending on the force of impact, location of the fracture and the individual's overall bone health.

There are different types of fractures, including:

- **Closed fracture:** the bone breaks but does not puncture through the skin.
- **Open fracture:** the broken bone pierces through the skin, leading to an external wound. This type of fracture is also referred to as a compound fracture and carries a higher risk of infection.
- **Transverse fracture:** a transverse fracture occurs when the break is straight across the bone, creating two bone fragments. It is typically caused by a direct blow or high-impact force applied perpendicular to the bone's axis.
- **Oblique fracture:** an oblique fracture is characterised by an angled or sloping break across the bone. It occurs when a force is applied at an angle to the bone's long axis.
- **Spiral fracture:** a spiral fracture is a result of a twisting or rotational force applied to the bone. The fracture line spirals around the bone shaft, resembling a corkscrew or spiral staircase. This type of fracture is commonly seen in sports injuries or falls.
- **Comminuted fracture:** in a comminuted fracture, the bone breaks into multiple fragments, usually three or more. It can occur due to high-energy trauma, such as a car accident or a fall from a significant height.
- **Greenstick fracture:** are incomplete fractures commonly seen in children whose bones are more flexible. In this type of fracture, the bone bends and cracks, but does not break completely. It is similar to a green branch bending without snapping.
- **Compression fracture:** a compression fracture typically occurs in the vertebral bones of the spine. It is characterised by a collapse or compression of the bone, often seen in conditions like osteoporosis or high-energy trauma.
- **Avulsion fracture:** an avulsion fracture happens when a tendon or ligament pulls away a small fragment of bone. It occurs due to sudden and forceful muscle contractions or when the muscle is stretched beyond its limits.
- **Stress fracture:** are hairline cracks in the bone that develop over time due to repetitive stress or overuse. They are common in athletes or individuals engaged in activities that involve repetitive impact, such as running or jumping.



Figure 3.27:

Immobilisation devices can be prescribed to help fractured bones to heal correctly.



Figure 3.28:

Greenstick fractures commonly affect children, whose bones are more flexible.

Internet activity

Log on to TitanOnline and complete Activity 3.6 to learn more about fractures.

Signs and symptoms of a limb fracture can vary depending on the location and severity of the fracture:

- **Pain:** intense and localised pain at the site of the fracture.
- **Swelling:** swelling and tenderness around the injured area.
- **Deformity:** visible deformity or misalignment of the limb.
- **Bruising:** discoloration or bruising around the fracture site.
- **Inability to bear weight:** difficulty or inability to put weight on the affected limb.
- **Limited range of motion:** restricted movement or difficulty moving the limb.
- **Abnormal mobility:** unnatural movement or instability of the limb.
- **Crepitus:** a grating or grinding sensation or sound when the broken ends of the bone rub against each other.

Management techniques for a limb fracture:

- **Immobilise the limb:** help the person stay as still as possible to prevent further injury. If a splint or other immobilisation device is available, use it to stabilise the limb. Avoid moving or manipulating the fractured limb unless absolutely necessary.
- **Call for medical assistance:** contact emergency services or seek medical attention immediately. A healthcare professional will be able to assess the injury, provide appropriate treatment and determine the need for further imaging or intervention.
- **Control bleeding:** if there is an open wound associated with the fracture and bleeding is present, apply gentle pressure with a sterile dressing or clean cloth to help control bleeding. Avoid putting pressure directly on the fractured bone.
- **Elevate the limb:** if possible, elevate the injured limb to help reduce swelling. The limb should be raised above the level of the heart.
- **Apply ice or cold pack:** apply a cold pack or ice wrap for about 15–20 minutes to help reduce pain and swelling. Do not place ice directly on the skin.

Support and reassure the person and offer support while waiting for medical assistance. Encourage the person to remain as calm as possible and avoid any movement of the injured limb.



Figure 3.29:

A doctor may determine if surgery is needed to help a fracture heal.



Figure 3.30:

Dislocations are typically caused by sudden and forceful movements that exceed a joint's normal range of motion.

Dislocations

A dislocation refers to the displacement or separation of the bones at a joint, resulting in the loss of their normal alignment. In a dislocation, the bone ends that form the joint are forced out of their usual position. Dislocations can occur in various joints of the body, such as the shoulder, elbow, hip, knee, or finger. Dislocations are typically caused by sudden and forceful impacts or movements that exceed the normal range of motion of a joint. Dislocations often occur as a result of traumatic events such as falls, sports injuries, motor vehicle accidents, or direct blows to a joint.

Signs and symptoms of dislocations:

- **Pain and swelling:** dislocations often cause immediate and severe pain in the affected joint. Swelling and bruising may also be present.
- **Deformity:** dislocations can lead to visible deformity or an abnormal appearance of the joint. The affected joint may look misaligned, out of place, or disfigured.
- **Limited range of motion:** dislocated joints usually have restricted movement or complete loss of movement. The person may be unable to move the joint or experience severe pain when attempting to do so.
- **Numbness or tingling:** in some cases, nerve damage or compression may occur during a dislocation, resulting in numbness, tingling, or weakness in the affected area.
- **Instability:** dislocations can cause a feeling of joint instability or a sense that the joint is 'giving way'.

Management techniques for a dislocation:

- **Stay calm and reassure the person:** help the person remain calm and provide reassurance while you assist them. Dislocations can be painful and distressing, so maintaining a calm and supportive environment is important.
- **Don't attempt to relocate the joint:** it is crucial not to try to relocate or manipulate the joint back into place unless you are a trained healthcare professional. Improper attempts at reduction can lead to further injury or complications. The joint should be stabilised in its current position until medical help arrives.
- **Immobilise the joint:** support and immobilise the affected joint using a splint, sling, or improvised immobilisation materials. This helps to prevent movement and further injury to the dislocated joint. If possible, keep the joint in the position it was found, as any attempt to move it may increase pain or cause additional damage.
- **Apply ice or cold pack:** applying a cold pack or ice wrapped in a cloth to the injured area can help reduce pain, swelling and inflammation. Apply it for about 15–20 minutes at a time, with breaks in between, for the first 24–48 hours following the injury.
- **Elevate the injured limb:** if applicable, elevate the injured limb slightly above the level of the heart. This can help reduce swelling and minimise pain.
- **Seek medical attention:** contact emergency services or seek immediate medical attention. Dislocations require proper evaluation and treatment by a healthcare professional. They will be able to perform the necessary procedures to reduce or realign the joint safely.
- **Follow medical guidance:** once medical help arrives, follow the instructions and recommendations provided by the healthcare professional. They may conduct diagnostic tests, administer pain medications, and perform the appropriate reduction techniques to restore the joint to its normal position.
- **Rehabilitation:** once the joint is stable, a physiotherapist can provide physiotherapy and rehabilitation to help the person return to their normal activities.

Practical

Demonstrate

- fracture
- dislocation



Figure 3.31: Dislocations can be painful and distressing.

Concussion

A concussion occurs when the brain experiences a sudden jolt or impact. Concussions can result in temporary dysfunction of brain function and can range from mild to severe. The most common cause of a concussion is a direct blow to the head. This can occur during contact sports such as football, soccer, or boxing, where athletes may collide with each other or with objects like balls or equipment. Falls, motor vehicle accidents, physical assaults, or accidents in the workplace can also lead to a direct impact on the head.

Concussions can also be caused by rapid and forceful movement of the head and upper body, even without a direct impact. This can happen in situations such as car accidents where sudden deceleration or acceleration forces cause the head to jerk back and forth, or in cases of physical abuse where shaking or jerking the head violently can lead to a concussion.

The signs and symptoms of a concussion can vary depending on the individual and the severity of the injury. They may not always be immediately apparent and can develop over time. Common signs and symptoms include:

- headache or pressure in the head
- dizziness or balance problems
- confusion or disorientation
- memory loss or difficulty concentrating
- nausea or vomiting
- sensitivity to light or noise
- fatigue or drowsiness
- blurred vision or ringing in the ears
- changes in mood or behaviour, such as irritability, anxiety, or depression
- sleep disturbances, such as insomnia or excessive sleepiness.

It's important to note that some symptoms may not manifest immediately after the injury and can appear hours or even days later.



Figure 3.32:

The most common cause of a concussion is a direct blow to the head.



Figure 3.33:

Signs and symptoms of concussion may not always be immediately apparent and can develop over time.

Did you know?

82 per cent of rugby league and rugby union players have been hospitalised for a concussion.

Management techniques of a concussion:

- **Seek medical attention:** if a concussion is suspected, it is important to seek medical evaluation and diagnosis. A healthcare professional will assess the severity of the concussion, provide appropriate guidance, and rule out any other potential injuries or complications.
- **Physical and cognitive rest:** in the immediate aftermath of a concussion, it is crucial to allow the brain to rest and recover. Physical and cognitive rest involves limiting activities that can worsen symptoms, such as avoiding physical exertion, sports, screen time, reading, and mentally demanding tasks. Resting the brain helps to reduce the workload and allows the brain to heal.
- **Gradual return to activities:** as symptoms improve, a gradual return to activities can be initiated under the guidance of a healthcare professional. This may involve a stepwise progression, starting with light activities and gradually increasing the intensity and duration as tolerated. The progression should be individualised and closely monitored to ensure that symptoms do not worsen.
- **Symptom management:** over-the-counter pain relievers can be used to manage headaches or mild pain associated with the concussion. However, it is important to consult a healthcare professional before taking any medication.
- **Avoiding re-injury:** to prevent further injury and ensure a proper healing process, it is important to avoid activities and situations that may increase the risk of another concussion. This includes refraining from contact sports, high-risk activities, or situations where there is a risk of falls or head trauma until fully cleared by a healthcare professional.

Burns

Burns are injuries to the skin and underlying tissues caused by exposure to heat, chemicals, electricity, radiation, or friction. They can range in severity from minor superficial burns to life-threatening ones. Burns are classified based on the depth and severity of tissue damage:

- **Superficial burn:** affects the outermost layer of the skin (epidermis) and causes redness, pain and mild swelling. Sunburn is a common example of a superficial burn.
- **Superficial partial-thickness burn:** involves damage and extends into the upper layers of the dermis. It causes swelling, and the formation of blisters, which may occur without scarring.
- **Deep partial-thickness burn:** affects the epidermis deeper into the dermis. The burn site may appear pale and may involve blistering, but the blisters are often filled with clear fluid. Healing is slower, and scarring is more likely.
- **Full-thickness burn:** affects the entire thickness of the skin, including the epidermis, dermis, and potentially deeper tissues. The burned area may appear white, brown, black, or charred. There may be no pain due to nerve damage. Full-thickness burns often require surgical interventions, such as skin grafts.

Figure 3.34:

Sunburn is a common example of a superficial burn.



The signs and symptoms of burns can vary depending on the severity and depth of the burn:

- **Redness:** the burned area may appear red or pink.
- **Pain:** burns can cause varying degrees of pain, which can range from mild discomfort to intense, severe pain.
- **Swelling:** the burned area may become swollen due to inflammation.
- **Blisters:** blister formation is common in superficial partial-thickness burns and can be present in deep partial-thickness burns. Blisters may be filled with clear fluid or blood.
- **Peeling or shedding of skin:** in deep partial-thickness burns or full-thickness burns, the skin may peel away.
- **White or charred appearance:** full-thickness burns can cause the burned area to appear white, brown, black, or charred.
- **Numbness or decreased sensation:** severe burns can damage nerves, leading to a loss of sensation in the affected area.
- **Difficulty breathing or coughing:** inhalation of hot air, smoke, or toxic fumes can cause respiratory symptoms, including difficulty breathing, coughing, or wheezing. This is particularly relevant if the burn involves the face, neck, or airways.
- **Sooty or blackened skin:** burns from fires may cause the skin to appear darkened or sooty.
- **Shock symptoms:** severe burns can lead to shock, characterised by pale skin, rapid heartbeat, low blood pressure, dizziness and weakness.

It's important to note that these signs and symptoms may not be present in all burns, and their severity can vary depending on the individual and the extent of the injury. Seeking medical attention is crucial for accurate diagnosis, proper treatment and prevention of complications.

The management of burns depends on the severity and extent of the injury:

- **First aid:** Remove the source of the burn if it is safe to do so. Cool the burn with cool (not cold) running water for about 10–20 minutes to reduce the heat and minimise tissue damage. Avoid using ice or very cold water. Cover the burn with a clean, non-stick dressing or a sterile cloth to protect it from infection. Do not apply any ointments, creams, or home remedies to the burn without medical advice.
- **Seek medical attention:** Assess the severity of the burn and determine whether medical attention is necessary. For minor burns (superficial burns), you can often manage them at home with first aid. However, if the burn is larger, involves the face, hands, feet, genitals, or major joints, or if it is a chemical or electrical burn, seek medical attention promptly.
- **Wound care:** For more severe burns, healthcare professionals will clean the wound thoroughly, remove any dead tissue or debris, and apply appropriate dressings to promote healing and prevent infection. Surgical interventions like skin grafts may be required.



Figure 3.35: Cool running water can be used on burns to reduce the heat and minimise tissue damage.

Cramps

Muscle cramps are sudden, involuntary contractions or spasms that occur in one or more muscles. They can be very painful and may last for a few seconds to several minutes. Muscle cramps commonly affect the legs (particularly the calf muscles), but they can also occur in other parts of the body, such as the arms, hands, abdomen, or feet.

The signs and symptoms of muscle cramps include:

- **Sudden and intense pain:** cramps typically cause a sharp, stabbing pain in the affected muscle or muscle group.
- **Visible or palpable muscle tightness:** you may notice a hard lump or knot in the muscle during a cramp.
- **Involuntary muscle contractions:** the muscle may visibly twitch or spasm during a cramp.
- **Limited range of motion:** cramps can temporarily restrict movement in the affected muscle or joint.

To manage and relieve muscle cramps, the following techniques are recommended:

- **Stretch and massage:** gently stretching the affected muscle and massaging it can help relax the muscle and relieve the cramp. Try techniques like pulling the toes upward to stretch a calf muscle cramp.
- **Apply heat or cold:** applying a warm compress or taking a warm bath may help relax the muscle and alleviate cramping. Alternatively, applying a cold pack or ice wrapped in a towel can numb the area and reduce pain.
- **Hydrate:** make sure you're properly hydrated, especially during physical activity. Drink plenty of fluids throughout the day, especially water and electrolyte-rich beverages.
- **Gentle exercise:** regular stretching and strengthening exercises can help prevent muscle cramps in the long term.
- **Address underlying conditions:** if cramps are persistent, severe, or accompanied by other concerning symptoms, it's important to consult a healthcare professional for a proper evaluation. They can help identify and treat any underlying medical conditions contributing to the cramps.

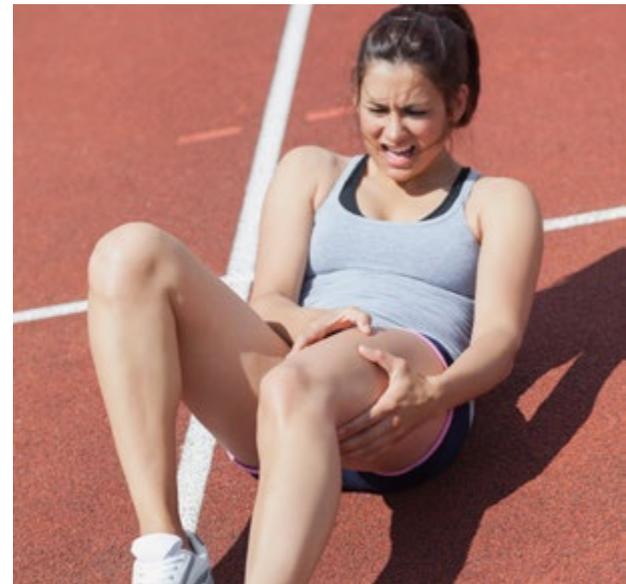


Figure 3.36: Muscle cramps commonly affect the legs.

Practical activity

Demonstrate the management technique for a person suffering:

- concussion
- burns
- cramps.

Principles of sports injury management

While there are many benefits of playing sport and being physically active, there are also inherent risks associated with injury to the body. Soft-tissue injuries are a common occurrence when playing sport. Soft-tissue injuries include injuries to muscle, ligaments, tendons and blood vessels. Soft-tissue injuries are often painful and can result in weeks or even months of rehabilitation before the athlete is ready to resume competition.

To reduce the incidence of sports injuries, participants should ensure a range of preventative measures are followed. If injury does occur, the immediate management of the injury and rehabilitation are essential.

Prevention

To reduce the risk of injury, participants should:

- warm-up, stretch and cool-down
- participate in training sessions
- participate in activities involving speed and acceleration
- include appropriate stretching and strengthening exercises in training programs
- gradually increase the intensity of training sessions
- maintain high levels of cardiorespiratory and muscle endurance to prevent fatigue
- allow adequate recovery time between training sessions and games
- wear appropriate footwear and protective equipment that is recommended by sporting organisations
- ensure the playing surface is safe and remove any potentially dangerous objects
- remain hydrated – drink water before, during and after activity
- avoid extreme risk activities wherever possible.

Practical activity

Plan and conduct warm-up sessions consisting of low intensity activities, stretching and sports-specific activities.



Figure 3.37:

To reduce the risk of injury, participants should warm-up, stretch and cool-down.

Did you know?

One million sports injuries occur each year in Australia.

Internet activity

Log on to TitanOnline and complete Activity 3.7 to learn more about preventing sports injuries.

Incident

Assessing the nature of a sports injury and prioritising action involves a systematic approach to gather information about the injury, evaluate its severity and determine the appropriate course of action. Sports injuries are classified as acute or chronic.

Acute sports injuries refer to injuries that occur suddenly and result from a specific traumatic event or incident during sport or physical activity. These injuries typically have a rapid onset and can cause immediate pain, swelling and dysfunction. Examples of acute sports injuries include sprains, strains, fractures, dislocations, contusions and concussions. These injuries often result from direct impact, falls, collisions, twisting, or overexertion. Acute sports injuries require immediate attention and may require medical evaluation, first aid, and appropriate management to promote healing and recovery.

Chronic sports injuries, on the other hand, develop gradually over time and are often the result of repetitive stress or overuse on a specific body part or joint. These injuries typically occur due to the repetitive nature of certain sports activities or improper training techniques. Chronic sports injuries can involve tendons, muscles, bones, or joints and may include conditions such as tendonitis, stress fractures, bursitis, and overuse syndromes like tennis elbow or runner's knee. Unlike acute injuries, chronic sports injuries tend to have a longer duration and can cause persistent or recurring pain, inflammation and functional limitations. Proper management of chronic sports injuries usually involves a combination of rest, physical therapy, modifications in training or technique, and addressing underlying factors contributing to the injury.

Once the injury is classified and its severity is determined, prioritise the appropriate action plan. This may involve immediate first aid measures, referral to a healthcare professional, or immediate cessation of activity to prevent further harm. Consider the urgency of treatment, the person's pain levels, the potential for complications, and their ability to continue participating in their sport.



Figure 3.38: Acute sports injuries typically have a rapid onset and can cause immediate pain, swelling and dysfunction.

Learning activity

1. Create a list of all the stretches you know that focus on the legs.
2. Compare your list with others in the class and add more stretches to your list.
3. Research additional stretches for any part of the legs that do not have at least three stretches on your list. Don't forget areas such as hip flexors.
4. Describe the different options available for icing a sprained ankle.

Acute phase

The body responds to a soft tissue injury by a self-healing process called the inflammatory response, which is the acute phase of sports injuries. The signs and symptoms include swelling, pain, limited movement, redness and warmth. Pain and swelling results in restricted movement. Redness and warmth is a result of increased blood supply. Extra blood cells sent to the area give oxygen to the damaged tissues, extra white cells fight infection, break down damaged tissue and start scar formation.

When assessing sports-related injuries, the STOP and TOTAPS acronyms are recommended. The STOP procedure, as outlined in Table 3.1, is used to conduct an initial assessment of the injury.

Table 3.1: STOP procedure.

S	Stop	<ul style="list-style-type: none"> ▪ Stop the athlete from participating. ▪ Stop the game if necessary. ▪ Stay calm and don't panic.
T	Talk	<ul style="list-style-type: none"> ▪ Talk to the injured athlete and ask them questions such as: <ul style="list-style-type: none"> – How did it happen? – What did you feel? – Where does it hurt? – Did you hear any sounds? ▪ Provide comforting feedback.
O	Observe	<ul style="list-style-type: none"> ▪ Observe the athlete and the injured area while talking to the athlete: <ul style="list-style-type: none"> – How is the injured athlete reacting? – Is the injured site showing any deformity, bruising or swelling? – Can the athlete move the injured area themselves?
P	Prevent	<ul style="list-style-type: none"> ▪ Prevent further injury from occurring. If the injury is severe, seek professional help immediately. ▪ A less severe injury will require RICER (rest, ice, compression, elevation and referral). ▪ An athlete with a minor injury may be able to play on with proper monitoring.



Figure 3.39: Injured athletes should stop participating while their condition is assessed.

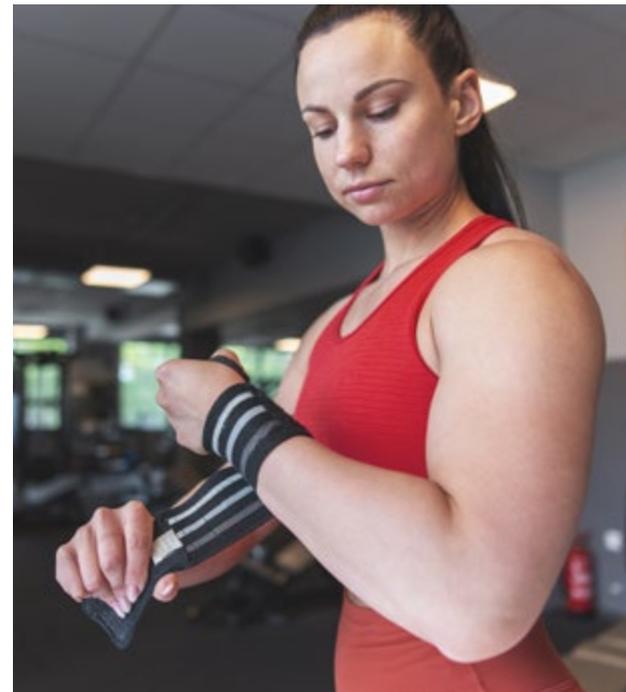


Figure 3.40: An athlete with a minor injury may be able to play on with proper monitoring.

The TOTAPS procedure, as outlined in Table 3.2, allows a full assessment of the injury and will enable a sports trainer to answer questions such as:

- Is there an injury and if so, is it a major or minor injury?
- Is it a hard or soft tissue injury?
- What immediate treatment is necessary?
- Does the athlete require medical treatment and when should this occur?
- Can the athlete safely resume play?

Table 3.2: TOTAPS procedure.

T	Talk	<ul style="list-style-type: none"> ▪ Ask the athlete exactly what happened: <ul style="list-style-type: none"> – What did they feel when the injury occurred? – Where does it actually hurt? – Has this injury happened before?
O	Observe	<ul style="list-style-type: none"> ▪ Observe the athlete's behaviour and the injury: <ul style="list-style-type: none"> – Is there deformity, swelling or severe pain? – If a break, fracture or dislocation is evident, assessment should stop and seek medical assistance.
T	Touch	<ul style="list-style-type: none"> ▪ Is the injury tender to touch? ▪ Is the injured area warmer than the uninjured site? ▪ If it is a possible break, fracture or dislocation, immediate hard tissue management should take place
A	Active movement	<ul style="list-style-type: none"> ▪ Ask the athlete to attempt to move the injured part slowly, not forcing any movement or extreme pain. ▪ Ask the injured athlete what they are feeling and where.
P	Passive movement	<ul style="list-style-type: none"> ▪ A trained sports first aider will move the injured body part through its range of movement until the athlete begins to feel pain. ▪ If the athlete feels tremendous pain or the range of movement is hindered, take the correct immediate steps to manage it.
S	Skills test	<ul style="list-style-type: none"> ▪ Ask the athlete to perform some of the basic movements and skills required in the sport that they are participating in. This will enable the trainer to make a professional judgement on whether they should or should not return to play.

Internet activity

Log on to TitanOnline and complete Activity 3.8 to learn more about TOTAPS.

Practical activity

1. Conduct an initial assessment on a partner with a suspected knee injury using STOP.
2. Conduct a full assessment of the injury, to determine if the injured athlete can resume play using TOTAPS.

Referral

Medical assessments should be sought as soon as possible, to ascertain the full extent of any injury, and to commence rehabilitation. There are certain actions that need to be avoided in the first 48–72 hours after an injury, as they will increase blood flow and therefore promote swelling at the injured site. These include:

- the application of heat (spas, saunas and hot liniments)
- drinking alcohol
- physical activity
- massage.

Examples of where to get help for sports injuries include:

- doctor or GP
- sports medicine clinic
- physiotherapist
- hospital emergency department
- in an emergency, always call 000 (or 112 on a mobile phone) for an ambulance.

If the injury is severe, referral may be made to a specialist surgeon.



Figure 3.41: Medical assessments should be sought as soon as possible after an injury has occurred.

Learning activity

1. Make a list of questions that you could ask an injured athlete that would provide valuable information for emergency services.
2. Research what is meant by the term 'duty of care' and outline what it means in the context of first aid.
3. Explain why professional sporting teams often have post game recovery sessions at the beach, standing in cold ocean waters.

Rehabilitation

Rehabilitation after an injury can take some time depending on the type and severity of the injury, as well as the degree of fitness and activity level of the athlete. Usually, the fitter and more active the person, the quicker they will recover. A qualified sports physician or physiotherapist should supervise the process in consultation with the injured athlete's coach.

The aim of a rehabilitation program is to:

- minimise and reduce swelling
- hasten healing
- restore optimal function of the injured area
- restore flexibility
- return the athlete to competition quickly and safely
- prevent recurrence.

Returning the athlete to their pre-injury level of fitness, depending on the type and severity of the injury, is achieved through all or a combination of the following factors:

- progressive mobilisation
- stretching
- conditioning
- total body fitness
- training
- use of heat and cold.



Figure 3.42:

The fitter and more active the person, the quicker they will recover.

Did you know?

The cost of treating hospitalised sports injuries in Australia is over \$765 million.

Internet activity

Log on to TitanOnline and complete Activity 3.9 to learn more about rehabilitating sports injuries.

Learning activity

1. Design a rehabilitation program for one of the following injuries: a hamstring tear, shoulder dislocation, or an ankle sprain. The rehabilitation program should include:
 - an explanation of the process and benefits of progressive mobilisation, including specific exercises and advice
 - different types of stretches, outlining the benefits
 - conditioning exercises for the injured area, with reasons why conditioning is so important
 - an exercise program for total body fitness.
2. Identify rehabilitation health professionals (including contact details and the service they provide) in your local area.
3. Describe the importance of a full rehabilitation to the prevention of further injury.

Case study

Georgia is a fit and athletic girl who loves playing sport. She goes for a short run every morning before school, plays basketball during lunchtime, and competes in netball and soccer tournaments on the weekend. She is always keen for weekend sport with her friends and would rarely miss a game.

On Sunday in her weekly soccer game, she was playing the team that was coming second in the competition. Her coach was away for the week so Joel, a teammate's dad, stepped in to coach the team for the day. He knew that it was going to be a hard game so he told the girls to give it all they've got. During the second half of the game it was 0-0. Georgia saw a great opportunity so she ran up to kick the ball to Carla who was standing in a perfect position to take a shot for goal. While she was running to the ball, her foot landed in a divot in the grass where she heard her ankle crack before she collapsed onto the ground. She was screaming and holding her ankle as she rolled around on the ground.

Joel, the fill-in coach ran over, picked her up and carried her off the field. The ankle had rapidly swollen up and was starting to turn a blue/purple colour. There was no first aid services available and, while her regular coach had great first aid training, Joel only had basic knowledge of what to do. There was nothing readily available to treat the injury, as the team first aid kit was with their regular coach. Joel made use of what they had, laying Georgia down on the ground and putting a cold water bottle to the ankle, while her mum grabbed her soccer bag to rest her leg on.

After ten minutes, Georgia was still crying and groaning in agony. Her mum thought that something must be wrong, as she is usually very tough when she gets an injury and doesn't usually complain when she has hurt herself. Her mum helped her hop to the car and drove her to the local medical centre. When she got into the GP's office, the doctor assessed her ankle and said that she has badly sprained her ankle and had torn tendons and ligaments in the area. She strapped her ankle, teaching Georgia how to properly tape it and gave her a set of crutches to use. The doctor also advised her to rest and stay off the ankle for at least five weeks.



Figure 3.43:
It is important to follow all medical advice when recovering from sports injuries.

Case study*(continued)*

Georgia was devastated by the news, as that meant that she couldn't play any sport and her netball grand final was coming up in two weeks. Her mum sent Georgia off to school with her ankle strapped and her crutches, but Georgia was so self-conscious that she put the crutches in a locker and did her best to look normal for the rest of the day.

When she spoke to her friends, she told them that she was feeling great and there was nothing wrong with her ankle, but she had to keep it strapped up just in case anything happened. She hobbled around school and had to frequently sit down and rest her ankle, because it hurt to put pressure on it.

A week went by and her ankle was still tender, although she was now able to walk on it. She still could not go for her morning runs, as it hurt to put that kind of pressure on her ankle, so she started to do other exercises to try and keep her fitness levels up. She made herself busy during lunchtimes instead of playing basketball, so that her friends didn't realise that her ankle was still injured.

The day of the netball grand final came by, and Georgia was so eager to play because her ankle was feeling a bit better and she had been waiting for this game all season. She told her mum that she was feeling great and that her ankle had already made a full recovery, so they didn't bother to see the GP again or get a medical clearance to play sport. Her friends in her netball team had no idea of the extent of the injury and Georgia had not told her netball coach that she was previously injured.

She played the first quarter of the game and her ankle was feeling okay to start with, but as she kept dodging to get the ball, she could feel her ankle getting weaker. Georgia kept stopping to take rests and her team was started to get worried. At quarter time, she told them that she was just feeling really exhausted and that she wanted a quarter off to regain her breath.

She went back onto the court for the third quarter of the game and her team was down by five points. She was working really hard to help her team get in the lead. They were now on equal points and Georgia was really happy even though her ankle was throbbing. She was standing outside the circle and the goal shooter threw her the ball to try and get closer to the goal post. The ball was thrown a little bit off centre and Georgia reached over the catch the ball when her ankle rolled and gave way.

1. Outline why it is important to always have a person who is trained in first aid on hand, as well as a first aid kit.
2. Discuss the implications of not giving the injury proper time and resources to heal.
3. Identify the immediate first aid treatment that should be given to Georgia.
4. Discuss the complications from spraining her ankle a second time.
5. Describe how an athlete recovering from injury can confidently know that they are fit to resume play.
6. Describe the pressures that made Georgia understate her injuries and explain the resulting outcome for the team

Types of sports injuries

Injuries are unfortunately a common part of playing sport, with more than one million injuries occurring each year. Classifying injuries according to their type or cause can assist in determining the best method of treatment.

Hard tissue injuries

Hard tissue injuries occur to bones and teeth, although the treatment may vary slightly depending on the nature and position of the injury. All treatment will involve immobilisation and referral for medical treatment, as outlined in Table 3.3.

Table 3.3: Treatment of hard tissue injuries.

Type of injury	Treatment
Teeth injuries	<ul style="list-style-type: none"> For a loose tooth, hold it firmly in place until dental assistance is available. If the tooth is dislodged, replace it with correct orientation as quickly as possible. If the tooth is dislodged and cannot be replaced, place it in milk or clean with the person's saliva and seek dental assistance immediately.
Fractures	<ul style="list-style-type: none"> DRSABCD. Reassure the athlete. Control any bleeding. Remain on the lookout for signs of shock and treat if necessary. Immobilise using a splint and/or sling. Ice and elevate the site if possible. Seek immediate medical assistance.
Dislocations	<ul style="list-style-type: none"> DRSABCD. Reassure the athlete. Immobilise using a splint and/or sling if possible. Ice and elevate if possible. Seek immediate medical assistance.



Figure 3.44: A mouthguard can help to prevent teeth injuries.



Figure 3.45: All hard tissue injury treatments will involve immobilisation.

Internet activity

Log on to TitanOnline and complete Activity 3.10 to learn more about hard tissue injuries.

Soft tissue injuries

In the context of managing sports injuries, soft tissue includes:

- skin (injuries such as abrasions, lacerations and blisters)
- tissues just under the skin
- blood vessels
- nerves
- muscles (injuries such as tears and contusions)
- tendons (injuries such as tears or strains of tendon fibres)
- ligaments (injuries such as sprains and tears of ligament fibres).

Tears in a muscle are classified as:

- **Strains:** when some of the muscle fibres are overstretched.
- **Partial tear:** can disrupt enough of the muscle to interfere with normal function.
- **Complete tear:** involve a total loss of muscle function.

A sprain can occur when a joint is forced past its normal range of movement and the fibres of a ligament are torn.

Contusions and bruises are caused when direct force is applied and bleeding occurs into the soft tissue.

Skin is the major proactive covering of the body. Injury can allow infection to enter the body or blood, and tissue to escape. When large layers of skin are destroyed or a loss of body fluids occurs, shock may result. Common skin injuries include:

- **Abrasion:** an open wound, usually caused by skin scraping across a hard surface. To treat an abrasion, clean the wound and apply a non-stick dressing.
- **Laceration:** also an open wound, that is more likely to be caused by a sharp object. Skin and underlying tissue are likely to be damaged. To treat a laceration, control any bleeding, clean the wound with sterile solution then cover with a non-stick dressing.
- **Blisters:** fluid-filled pockets that pain and inflammation. Blisters can occur in any area where friction or rubbing occurs.
- **Calluses:** protective layers of compacted dead skin cells. They are caused by repeated friction and pressure to a particular area. Calluses often occur on the hands (particularly in racquet sports) or the heels, toes or balls of the feet (from repeated friction or rubbing from poorly-fitting shoes).



Figure 3.46: Strains occur when some of the muscle fibres are overstretched.



Figure 3.47: Abrasions are usually caused by skin scraping across a hard surface.

Did you know?

A bruise changing colour over time is the body repairing the injury by breaking down and reabsorbing the blood.

Overuse

Overuse injuries are commonly caused by excessive training, repetitive movements or incorrect training techniques over a period of time. Overuse injuries are caused by wear and tear on the muscles, ligaments, tendons and bones. These injuries lead to pain, inflammation and loss of functionality. Rest is often recommended for overuse injuries.

Common examples of overuse injuries include:

- **Patella tendonitis (jumper's knee):** overuse of the leg, particularly jumping activities can lead to tenderness and inflammation of the area around the patella (knee cap) and surrounding tendon.
- **Achilles tendonitis:** overuse of the leg, in particular movements that engage the achilles. This injury is usually slow to heal as the achilles does not have a good blood supply. It may lead to rupture of the tendon if left untreated. Prevention includes stretching, adequate rest, proper footwear and development of correct technique.
- **Rotator cuff injury:** the muscles from the scapula to the head of the humerus form a cuff. The associated tendons of these muscles can become torn or impinged as a result of a trauma or through excessive use. Sports that involve throwing are the greatest risks for this injury.
- **Tennis elbow:** the outer part of the elbow becomes painful. Can be caused by repetitive grasping, bending of the elbow or wrist. It is not restricted to racquet sports such as tennis, although it is common in these sports.
- **Shin splints:** refers to a condition characterised by pain in the shin region. It is caused by excessive running or jumping, incorrect footwear or unsuitable running surfaces. It is an overuse injury that often is chronic and slow to heal.
- **Stress fractures in the feet:** fractures to the bones of the feet as a result of excessive weight bearing exercise, especially common in children and athletes involved in running on hard surfaces.



Figure 3.48:

Shin splints can be caused by excessive running, incorrect footwear or unsuitable running surfaces.



Figure 3.49:

Tennis elbow can be caused by repetitive grasping, bending of the elbow or wrist.

Did you know?

Although 60 per cent of organised sports injuries occur during training, most athletes do not take the same safety precautions at training that they would during competition.

Internet activity

Log on to TitanOnline and complete Activity 3.11 to learn more about overuse injuries.

Heat injuries

Heat-related injuries occur when the body is exposed to heat and is unable to cool itself. In extreme cases, heat injuries can lead to loss of life.

To reduce the chance of heat injury, athletes need to stay well hydrated. Exercising in extreme conditions (very hot, humid weather) can lead to heat-related injuries. Where this type of activity is unavoidable, an individual needs to ensure they monitor their body's response to these conditions.

Sweat is the body's main system for dealing with extra heat. When a person sweats, water and heat evaporates from the skin. If a person becomes dehydrated, the body's ability to sweat will be impaired and body heat management is affected.

It's also important to make sensible choices about the amount of exertion in hot weather. The hotter and more humid it is, the harder it will be to get rid of excess heat. Clothing is also a factor – clothing that is light and made from breathable fabric will assist heat regulation.

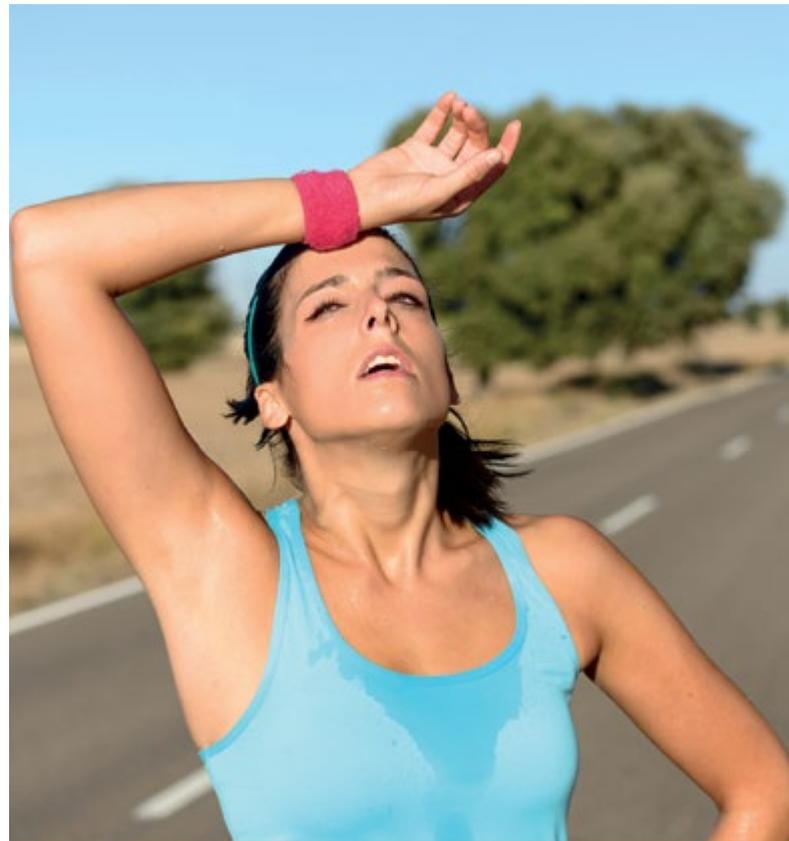


Figure 3.50: Exercising in extreme conditions can lead to heat-related injuries.

Learning activity

1. Distinguish between hard tissue injuries and soft tissue injuries.
2. Explain the nature of overuse injuries.
3. Research five sports and list the common injuries for each sport. Identify the risk factors for each injury and strategies to reduce the incidence of these injuries occurring.
4. Explain how an athlete can avoid heat injury when exercising in summer.



Figure 3.51:

By applying tape in specific patterns, it can restrict excessive movement and help prevent injury or re-injury.

Managing sports injuries

The management of sports injuries is dependent on the type and severity of the injury. A doctor should be consulted if pain persists for more than two or three days. Injuries may be worse than first assessed and delays in proper treatment can affect recovery.

The rehabilitation process is often aided through the use of sports medicine professionals such as physiotherapists. Physiotherapists rehabilitate injuries by stimulating gains in strength and flexibility. A doctor or physiotherapist should be consulted before returning to training or competition. This will help prevent reinjury.

Slings, bandaging and taping

Slings, bandaging and taping are commonly used in the treatment of sports injuries for various reasons, including providing support, immobilisation, compression and stability to the injured area. While slings, bandaging and taping can be beneficial in the initial management of sports injuries, they are often used as part of a comprehensive treatment plan that includes other interventions such as rest, ice, compression, elevation, referral (RICER), physiotherapy and medical evaluation.

Slings

Slings are commonly used for certain types of sports injuries, particularly those involving the upper extremities such as the shoulder, arm, or wrist. Slings provide immobilisation and support to the injured area, reducing movement and preventing further damage. They can help alleviate pain by reducing the movement and weight-bearing on the injured limb. By limiting movement and providing compression, slings can assist in reducing swelling or oedema around the injured area.

Slings offer protection to the injured limb, shielding it from external forces, accidental bumps, or impacts that could worsen the injury. By keeping the injured limb in a supported and elevated position, slings can promote optimal blood flow and circulation to the injured area. This can aid in the healing process by supplying essential nutrients and oxygen to the tissues and facilitating the removal of waste products.

The three common types of slings are arm, elevation and collar and cuff.

Arm sling

Applying an arm sling can provide support and immobilisation for injuries such as fractures, sprains, or strains. To apply an arm sling, follow these steps:

- Gently position the injured arm in a comfortable position, typically at a 90-degree angle at the elbow. The hand should rest across the chest with the palm facing upward.
- Take a triangular bandage, a large piece of fabric, or a commercial arm sling. Fold it in half diagonally to create a triangle with the long edge at the top.
- Slide the folded sling under the injured arm, with the triangle pointing toward the elbow and the long edge past the fingertips.
- Hold the forearm with one hand and use the other hand to lift the apex of the sling to support the elbow.
- Bring the ends of the sling over the shoulder or uninjured side. Cross the ends behind the neck and tie them securely in a knot or use a safety pin to secure them together.
- Make sure the sling is snug but not too tight, allowing for proper circulation. The injured arm should be well-supported and immobile within the sling. Check that the fingers are visible and not turning blue or cold, indicating restricted blood flow.
- Ensure that the person wearing the sling feels comfortable and that there are no areas of excessive pressure or discomfort. Verify that the injured arm is adequately immobilised and that the person cannot move it freely.



Figure 3.52:

Slings are commonly used for injuries involving the shoulder and arm.

Elevation sling

An elevation sling is used to elevate an injured arm or hand to reduce swelling, promote fluid drainage, and enhance circulation. To apply an elevation sling:

- Have the person sit or lie down comfortably. Position the injured arm in a relaxed position, such as resting on a cushion or pillow.
- Take a long strip of fabric or a triangular bandage and fold it lengthwise to create a wide strip. The length of the fabric should be sufficient to reach from the wrist to the shoulder.
- Gently slide the fabric/bandage under the injured arm, ensuring it extends from the wrist to the shoulder. The arm should be centred over the fabric.
- Lift the fabric/bandage on the uninjured side to raise the injured arm. The arm should be raised to a level higher than the heart.
- Tie or fasten the ends of the fabric/bandage securely to maintain the elevation. Make sure the knot/fastening is comfortable and does not put excessive pressure on the arm or shoulder.
- Ensure that the person wearing the elevation sling is comfortable and that there are no areas of excessive pressure or discomfort. Verify that the fingers are visible and not turning blue or cold, indicating restricted blood flow.
- Regularly check the elevation of the arm to ensure it remains in an elevated position. If the person needs to move or adjust, they should do so gently to maintain the elevation.

Collar and cuff sling

A collar and cuff sling is commonly used to provide support and immobilisation to the shoulder and arm in cases of shoulder injuries, such as dislocations, fractures, or strains. To apply a collar and cuff sling:

- Gently position the injured arm against the chest with the elbow flexed at a 90-degree angle. The forearm should rest across the chest with the palm facing upward.
- Take a triangular bandage, a large piece of fabric, or a pre-made sling. Fold it in half diagonally to create a triangle, with the long edge at the top.
- Slide the folded sling under the injured arm, with the apex of the triangle pointing toward the elbow and the long edge extending past the fingertips.
- Hold the forearm with one hand and use the other hand to lift the apex of the sling to support the elbow. This will help take weight off the injured arm.
- Bring the ends of the sling up and cross them behind the neck, forming a figure-of-eight pattern. The ends of the sling should then loop around the opposite shoulder and return to the injured arm.
- Tie the ends of the sling together over the injured arm, just below the elbow, creating a secure and snug fit. Ensure that the knot is comfortable and doesn't put excessive pressure on the arm or shoulder.
- Make sure the sling is properly adjusted, providing support and immobilisation to the injured shoulder. The arm should be held against the chest, and the shoulder should be supported in a stable position.

Internet activity

Log on to TitanOnline and complete Activity 3.12 to learn more about slings.

Bandaging

Bandaging is commonly used to treat sports injuries for several reasons:

- Applying a bandage can provide compression to the injured area, which helps reduce swelling and inflammation. Compression helps limit the accumulation of fluid at the injury site and supports the injured tissues, promoting the healing process.
- Bandages can provide support and stability to the injured joint or body part. They help restrict excessive movement and provide a sense of security, reducing the risk of further injury or aggravation.
- Certain sports injuries, such as sprains or fractures, may require immobilisation to allow for proper healing. Bandages can be used to immobilise the injured area, preventing unnecessary movement that could delay healing or cause further damage.
- Bandaging can help alleviate pain associated with sports injuries. By providing support and reducing swelling, bandages can relieve pressure on sensitive nerves, reducing pain sensations.
- Bandages act as a protective barrier, shielding the injured area from external elements and potential trauma. They can help prevent dirt, debris, or accidental bumps from further irritating or damaging the injured tissues.

Roller bandage

Applying a roller bandage is a common technique used to secure a dressing or provide compression and support to a specific body part. To apply a roller bandage:

- Position the injured body part in a comfortable position, either elevated or in a neutral position, depending on the specific injury.
- Begin by anchoring the bandage. Hold the loose end of the bandage against the body part or adjacent unaffected area and make two or three circular turns to secure the bandage in place.
- As you wrap the bandage, apply gentle tension to create compression and support. The tension should be firm enough to provide support but not so tight as to cut off circulation or cause discomfort.
- Continue wrapping the bandage in a spiral manner, overlapping each previous layer by about two-thirds of the width of the bandage. Ensure that each turn of the bandage covers at least half of the previous layer to provide even compression.
- When you reach the desired length or the end of the bandage, secure it in place. You can use clips, tape, or tie a knot with the end of the bandage.
- Make sure the bandage is secure but not too tight. Check for signs of restricted blood flow, such as swelling, coldness, or bluish discolouration of the skin. Ask the person being bandaged about any discomfort or pain caused by the tightness.



Figure 3.53:

Bandages can provide support and stability to the injured joint or body part.

Internet activity

Log on to TitanOnline and complete Activity 3.13 to learn more about bandaging.

Taping

Taping is commonly used to treat and prevent sports injuries for several reasons:

- Taping can provide support and stability to joints, muscles and ligaments. By applying tape in specific patterns, it can restrict excessive movement and help prevent injury or re-injury. Taping is particularly beneficial for unstable joints or weak muscles, providing external support during sport.
- Taping techniques can help reduce the risk of certain sports injuries. By supporting vulnerable areas, such as ankles, knees, or wrists, taping can enhance proprioception (awareness of joint position) and help maintain proper alignment and mechanics. This can minimise the likelihood of injury by reducing excessive joint movements or abnormal stress on tissues.
- Taping can provide compression to injured areas, which helps reduce swelling and inflammation. The pressure applied by the tape helps restrict the accumulation of fluid and supports the injured tissues, promoting the healing process.
- Taping techniques can alleviate pain associated with sports injuries. By providing support and stability to injured tissues, taping can help reduce pain and discomfort. The tape's physical presence can also create a sense of support and reassurance, aiding in pain management.
- Taping can play a psychological role in injury management. It can provide athletes with a sense of security and confidence, knowing that their vulnerable areas are supported and protected. This psychological benefit can help athletes perform at their best and reduce fear of re-injury.

Taping an ankle

Taping an ankle is a common technique used to provide support and stability to the joint, prevent injury, or assist in the rehabilitation of ankle sprains. To tape an ankle:

- Ensure the ankle and foot are clean and dry before taping. If desired, apply pre-wrap or foam padding around the ankle to protect the skin and provide additional cushioning.
- Start by anchoring the tape. Begin by applying a strip of tape around the ball of the foot, just below the toes. Wrap the tape once around the foot, making sure it's snug but not overly tight.
- From the anchored tape, bring the tape up along the inside of the foot, behind the ankle, and across the front of the ankle bone. Then, cross diagonally under the foot, behind the heel, and up the outside of the foot.
- Continue the tape diagonally across the front of the ankle, crossing over the previous strip of tape. Then, wrap it under the foot, behind the heel, and back up the inside of the foot, crossing over the initial stirrup. Repeat this figure-eight pattern several times, ensuring the tape is snug and provides support.
- After completing the figure-eight pattern, finish with a final wrap around the ankle, just above the ankle bone. This helps secure the tape and prevent it from unravelling. Depending on the specific needs, you may add extra tape around the ankle or under the arch of the foot for further support.
- Ensure the taped ankle feels snug and supported but not excessively tight. The tape should not impede circulation or cause discomfort.

Internet activity

Log on to TitanOnline and complete Activity 3.14 to learn more about taping.

RICER

RICER is used to manage soft tissue injuries, to reduce scarring and pain, to enable faster recovery. Using RICER immediately can help to stop bleeding and swelling around the injured site.

Internet activity

Log on to TitanOnline and complete Activity 3.15 to learn more about RICER.

Table 3.4: RICER procedure.

R	Rest	Rest the injured site to prevent further swelling and bleeding. Get the athlete comfortable, possibly lying down, immobilise and support the injury. Rest works by reducing activity, which would promote bleeding and swelling by increasing blood flow to the injured area.
I	Ice	Ice should be applied to the injury for 15–20 minutes, every two hours, for the first 48–72 hours. Cold packs or cold water can also be used. Use a towel or barrier to avoid direct ice contact with the skin. Ice works by reducing swelling, pain and muscle spasm.
C	Compression	Apply pressure to the injured site with a firm bandage, to reduce inflammation. Compression works by providing support and reducing bleeding and swelling by restricting blood flow.
E	Elevation	Elevate the injury, if possible, to prevent fluid flowing to the injured site resulting in swelling. Elevation works by reducing bleeding, swelling and pain by using gravity to restrict blood flow.
R	Referral	The patient should be referred to a medical expert or hospital for further treatment and assessment. Early referral allows diagnosis, treatment and rehabilitation to commence sooner.

Learning activity

1. Explain the impact of the RICER procedure on injury recovery time.
2. Analyse the advantages and disadvantages of the following types of ice treatment:
 - a. Ice immersion (bucket filled with ice and water).
 - b. Ice in a plastic bag.
 - c. Ice in a wet towel.
 - d. Commercial cryogel cold packs.

Practical activity

1. Demonstrate the application of a sling for a shoulder injury.
2. Demonstrate the application of a roller bandage for a wrist injury.
3. Demonstrate the application of taping for an ankle injury.
4. Demonstrate the RICER procedure for the following injuries:
 - a carked calf muscle
 - a sprained ankle.
 - a sprained wrist

Thermoregulation

Thermoregulation is the process by which organisms maintain a relatively stable internal body temperature, regardless of changes in the external environment. It is a vital biological function that helps ensure optimal physiological and biochemical processes within an organism.

In most animals, including humans, the internal body temperature is typically higher than the surrounding environment. Thermoregulation involves monitoring and adjusting the body's temperature through various physiological mechanisms to maintain a state of homeostasis. This allows organisms to function efficiently and survive in a wide range of environmental conditions.

The organs and systems involved in thermoregulation include the hypothalamus (a region of the brain), the skin, blood vessels, sweat glands and skeletal muscles. These components work together to regulate heat production, heat loss, and heat conservation to maintain the body temperature within a narrow range.

When the body detects a change in temperature, the hypothalamus initiates appropriate responses to restore or maintain the desired body temperature. For example, when the body becomes too hot, the hypothalamus triggers mechanisms such as vasodilation (expansion of blood vessels near the skin) to increase heat loss through radiation and sweating. Conversely, when the body is too cold, the hypothalamus initiates vasoconstriction (narrowing of blood vessels) to conserve heat and triggers processes like shivering to generate heat through muscle contractions.

Thermoregulation is crucial for the survival and wellbeing of organisms, as extreme deviations from the optimal body temperature can lead to harmful effects, such as hyperthermia (heatstroke) or hypothermia.

Hypothermia

Hypothermia is a medical condition characterised by an abnormally low body temperature, typically below 35 degrees Celsius. It occurs when the body loses heat faster than it can produce it, resulting in a disruption of the body's thermoregulatory mechanisms. Hypothermia can be life-threatening if not promptly treated.

Signs and symptoms of hypothermia can vary depending on the severity of the condition, but they generally progress in stages as outlined in Table 3.5 on the following page.



Figure 3.54: Hyperthermia can be caused by external factors, such as hot weather.



Figure 3.55: Hypothermia occurs when the body loses heat faster than it can produce it.

Internet activity

Log on to TitanOnline and complete Activity 3.16 to learn more about hypothermia.

Table 3.5: Signs and symptoms of hypothermia.

Condition	Signs and symptoms	
Mild hypothermia	<ul style="list-style-type: none"> ▪ shivering ▪ cold and pale skin ▪ numbness or tingling in extremities 	<ul style="list-style-type: none"> ▪ fatigue and drowsiness ▪ mild confusion
Moderate hypothermia	<ul style="list-style-type: none"> ▪ intense shivering or shivering may stop ▪ difficulty speaking or slurred speech ▪ slow breathing and heart rate 	<ul style="list-style-type: none"> ▪ loss of coordination and impaired motor skills ▪ increased confusion and memory loss
Severe hypothermia	<ul style="list-style-type: none"> ▪ shivering may cease entirely ▪ weak pulse ▪ shallow or irregular breathing 	<ul style="list-style-type: none"> ▪ loss of consciousness ▪ dilated pupils ▪ very low blood pressure

Immediate management techniques for hypothermia include:

- **Move to a warm environment:** get the person out of the cold and into a warm, dry place as soon as possible.
- **Remove wet clothing:** replace wet clothing with dry clothes or wrap the individual in blankets or insulation to prevent further heat loss.
- **Warm the core:** apply gentle heat to the core of the body, such as the chest, neck, and head. Use warm blankets, hot packs, or heated water bottles (not too hot to avoid burns).
- **Insulate extremities:** keep the hands and feet warm by covering them with dry blankets or using warm packs.
- **Offer warm liquids:** if conscious and able to swallow, provide warm, non-alcoholic beverages. Avoid caffeine or alcohol, as they can hinder the body's ability to gain heat.
- **Seek medical assistance:** hypothermia can be a medic or transport the person to a medical facility for profession

Hyperthermia

Hyperthermia is a medical condition characterised by an abnormally high body temperature, typically above 37.5 degrees Celsius. It occurs when the body's heat-regulating mechanisms are overwhelmed, leading to an increase in body temperature. Hyperthermia can be caused by external factors, such as hot weather or prolonged exposure to high temperatures, or internal factors, such as certain medical conditions.

Signs and symptoms of hyperthermia can vary depending on the severity of the condition, as outlined in Table 3.6 on the following page.

**Figure 3.56:**

It's important to be proactive in preventing hyperthermia by staying hydrated.

Table 3.6: Signs and symptoms of hyperthermia.

Condition	Signs and symptoms	
Heat cramps	<ul style="list-style-type: none"> ▪ muscle cramps and spasms, usually in the legs or abdomen 	<ul style="list-style-type: none"> ▪ excessive sweating ▪ fatigue and weakness
Heat exhaustion	<ul style="list-style-type: none"> ▪ profuse sweating ▪ pale, cool, and moist skin ▪ headache and dizziness ▪ nausea or vomiting 	<ul style="list-style-type: none"> ▪ rapid heartbeat ▪ muscle weakness or cramps ▪ fatigue and weakness
Heat stroke – severe hyperthermia	<ul style="list-style-type: none"> ▪ high body temperature (above 40 °C) ▪ altered mental state, confusion, or delirium ▪ dry, hot, and flushed skin ▪ rapid breathing and heartbeat 	<ul style="list-style-type: none"> ▪ headache, dizziness, or fainting ▪ nausea or vomiting ▪ seizures or convulsions ▪ loss of consciousness

Immediate management techniques for hyperthermia include:

- **Move to a cooler environment:** get the person out of the heat and into a cool, shaded area or an air-conditioned space.
- **Remove excess clothing:** help the person remove unnecessary clothing to allow better heat dissipation.
- **Cool the body:** apply cooling measures to lower body temperature rapidly. Some effective techniques include:
 - Wetting the skin with cool water and using fans to enhance evaporation.
 - Placing ice packs or cold compresses on the neck, armpits, and groin areas.
 - Immersing the person in a cool bath or using cool towels or sheets to wrap around the body.
- **Hydration:** encourage the person to drink cool water or other non-alcoholic, non-caffeinated beverages to rehydrate.
- **Seek medical assistance:** if the person’s condition worsens, or if they are experiencing symptoms of heat stroke, call emergency services (000/112) immediately. Heat stroke can be life-threatening and requires immediate medical attention.

It’s important to be proactive in preventing hyperthermia by staying hydrated, wearing appropriate clothing for the weather, and avoiding prolonged exposure to hot environments, especially during peak heat hours. If engaging in outdoor activities, take regular breaks in shaded or cool areas and listen to your body’s signals for rest and hydration.

Learning activity

1. Create a list of strategies to avoid hypothermia for a school hiking excursion to the Snowy Mountains in autumn.
2. Create a list of strategies to avoid hyperthermia for a school cross-country carnival to be held in summer.

Revision questions

1. Describe each step in DRSABCD.
2. Describe the differences in administering CPR for an adult, child and infant.
3. Outline the signs, symptoms and management procedures for the following medical conditions:
 - a. shock
 - b. heart attack
 - c. asthma
 - d. epilepsy
 - e. diabetes.
4. Outline the signs, symptoms and management procedures for the following injuries:
 - a. fractures
 - b. dislocations
 - c. concussion
 - d. burns.
5. Describe how warming-up helps prevent injury.
6. Identify the STOP injury assessment and outline why it is used.
7. Outline the TOTAPS injury assessment.
8. Explain the importance of a full rehabilitation to prevent further injury.
9. Distinguish between hard and soft tissue injuries, providing examples.
10. Describe one overuse injury, outlining its cause and treatment.
11. Explain the importance of taping to prevent injury.
12. Outline the steps of RICER for treating soft tissue injuries and explain how it minimises damage to the body.
13. Describe the three stages of hypothermia.
14. Explain the signs and symptoms and treatment for heat exhaustion.



CHAPTER 4

Fitness

Throughout this unit, students explore the concept of fitness and how it can be achieved. Students develop an understanding of the relationship between fitness, health-related and skill-related fitness, and practise both. They explore the differences between fitness and physical activity, through an analysis of the guidelines of physical activity. Students discuss the FITT Principle and apply it to their own fitness program. In doing so, they will explore specific considerations that may need to be made in order for a training program to be individual. Students also compare and contrast various ways of training. They evaluate various ways of training, including using different types of aerobic and anaerobic training and training

Syllabus outcomes

A student:

- explains the relationship between fitness and healthy lifestyle
- demonstrates ways to enhance physical activity (1.3)
- analyses the fitness requirements (2.2)
- designs programs that respond to performance needs (3.2)
- measures and evaluates performance capacity (3.3)
- plans strategies to achieve

Focus areas

- Nature of fitness
- Fitness programming
- Improving fitness



Figure 4.1: Flexibility helps with the prevention of injury.



Figure 4.2:

One of the most effective ways to develop and build strength is to work against a resistance.

Nature of fitness

Physical fitness relates to specific qualities that an individual has in order to successfully perform in physical activity. Maintaining physical fitness is a significant influence to an individual's quality of life. The level of fitness that a person has is relative to many factors. Fitness requirements of an individual vary through different physical activities. For example, a person may be fit enough to join the school cricket team but may not be fit enough to represent the school in cross country running. What is considered an adequate level of fitness can be different for each individual and depends on their lifestyle, values and physical activity choices.

Health-related

Health-related fitness refers to the aspects of physical fitness that are related directly to the health of the individual as opposed to fitness aspects that are related to sporting performance. The main fitness components that a person would focus on if they were looking for health outcomes only are flexibility, cardiorespiratory endurance, muscular endurance, muscular strength and body composition.

Cardiorespiratory endurance

Cardiorespiratory endurance, or aerobic fitness, relates to the ability and ease in which the heart and lungs can absorb and transport oxygen in order to supply the body with adequate fuel during physical activity. The cardiorespiratory system is also responsible for the elimination of waste products caused by repeated muscular contractions.

There are two components of cardiorespiratory endurance that relate to an individual's level of fitness. The first is the efficiency in which the heart and lungs can transport the oxygen and the second is the efficiency in which the body can utilise this oxygen. For example, a person with poor cardiorespiratory fitness will get 'puffed' and exhausted easier than someone with a higher level of cardiorespiratory fitness who could perform at a higher intensity for longer.

There are physical tests such as monitoring heart rate levels and maximum volume of oxygen consumption tests (VO_2 max), which measure a person's level of cardiorespiratory fitness. Testing a person's VO_2 max involves exercise, usually on a bike or treadmill and the analysis of the concentration of oxygen and carbon dioxide in the inhaled and exhaled air as the workload is increased. The point where the individual cannot increase their intake of oxygen, despite an increase in exercise load, is the point which indicates the VO_2 max.

In a school environment, a common test of cardiorespiratory endurance is the 20-metre multi-stage fitness test (beep test). The beep test involves running between two lines that are 20 metres apart. The participants begin running when instructed. The test starts off quite slowly and gradually decreases the time between 'beeps'. Participants are eliminated when they can no longer keep up with the 'beeps', i.e. they fail to reach the line in time (on two consecutive shuttles).

Muscular strength

Muscular strength is defined as the ability of muscle/s to exert force. If a muscle is not used regularly, atrophy will occur and become smaller. The amount of force applied during a single contraction is an indicator of an individual's muscular strength. Improvements in strength also improve posture, energy levels and the overall health of an individual.

One of the most effective ways to develop and build strength is to work against a resistance. Resistance training can use weights, machines or a person's own body weight to provide the workloads.

Muscular strength can be measured using a range of isokinetic and isometric tests, but handgrip dynamometer and abdominal strength tests are the safest and most popular. The handgrip dynamometer is a device that measures strength or force in a singular movement. To do the test, a student will grip the handle of the dynamometer and squeeze as hard as they can and record the reading.

Figure 4.4: Muscular strength can be measured using a handgrip dynamometer.



Figure 4.3: Cardiorespiratory endurance can be measured with the beep test.

Internet activity

Log on to TitanOnline to complete Activity 4.1 by reviewing the video on testing cardiovascular endurance and VO_2 max.

Did you know?

Paul Anderson was an American Olympic weightlifter who still holds the Guinness World Record for the heaviest weight ever lifted – 2844kg!

Muscular endurance

Muscular endurance involves the muscles' ability to repeatedly contract for extended periods without tiring. For example, a runner practising for a marathon will be using muscular endurance as they continually repeat the same movement sequence.

Individuals can use a variety of different tests to measure their muscular endurance, depending on what muscle group they wish to measure. Generally, any muscular endurance test involves repeating an action that requires a certain muscle group to work (contract) until fatigued. Students can measure muscular endurance in many ways such as repeating sit-ups, push-ups, squats, lunges and bridge/plank exercises.

Flexibility

Flexibility relates to the range of motion of the joints and muscles in the body. Flexibility is particularly important in activities such as dance and gymnastics, where certain actions require strong, supple limbs moving through a full range of motion.

Flexibility helps with the prevention of injury. If an individual develops good flexibility early in life and continues to maintain their flexibility, it may help in preventing muscular diseases later in life, as well as helping in improving posture. It is important to ensure the body is adequately warmed up before an individual starts working on flexibility. Activities to build flexibility include stretching, yoga and dancing.

A commonly used test to measure flexibility is the sit and reach test. This requires a student to sit on the ground with their legs out straight against a sit and reach box. Their feet must be flat against the inside wall of the box. When they are ready, they reach forward, placing their fingertips on the measuring line and stretch forward as far as they can. They must hold the stretch for at least three seconds for the measurement to count.

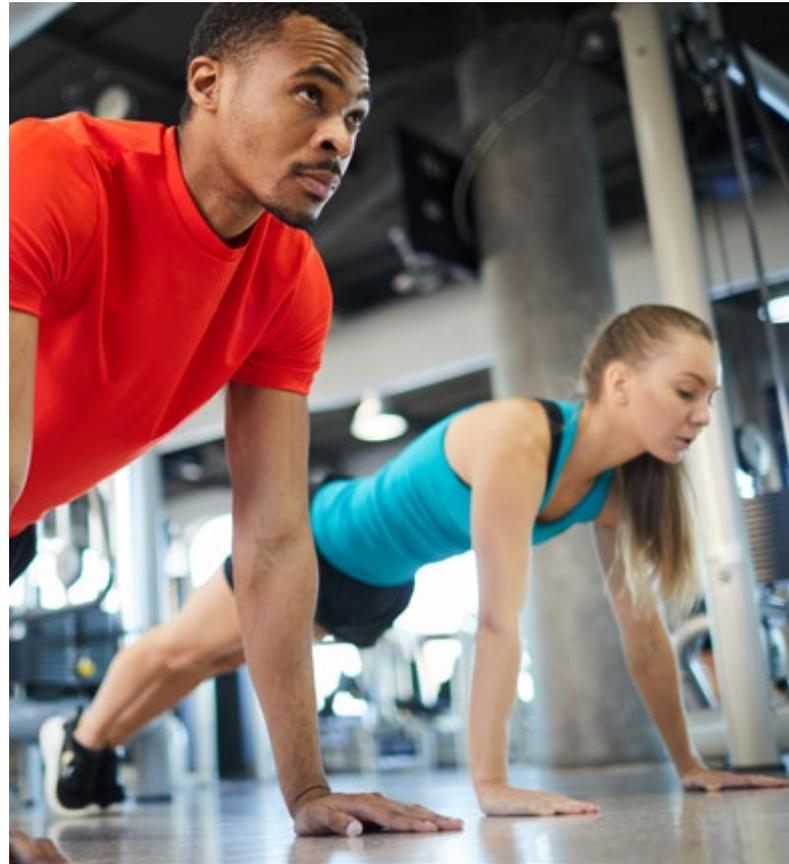


Figure 4.5: Muscular endurance can be measured by repeating push-ups until fatigued.



Figure 4.6: The sit and reach test is commonly used to measure flexibility.

Body composition

Body composition relates to an individual's total body fat in relation to their lean body mass (muscles, bones, tendons, etc.). It is important to have some body fat because it acts as a protective barrier for the organs, particularly the layers of fat directly under the skin.

On average, boys should have 15–20 per cent of body fat, and girls 20–25 per cent. Being outside of this range, whether it is below or above, puts an individual's health at risk. If the body has too little fat, it can cause nutrient deficiencies and increased risk of dehydration and starvation. It can also lead to loss of muscle tissue, heart damage and shrinkage of internal organs. Alternatively, too much body fat also has detrimental effects on the body. Not only does it force the cardiovascular system to deliver oxygen to these fat stores, forcing the heart to do extra work, it also exposes the individual to health issues such as diabetes, cardiovascular disease and sleep apnoea.

Activities that are ideal for improving body composition are those that burn kilojoules, particularly activities that work on cardiovascular fitness. It is important to remember that weight is not an effective indicator of body composition. During training, if an individual is losing body fat and gaining lean muscle, there may not be any changes in the individual's total body weight.

There are numerous tests that measure body composition, however many are expensive and impractical to complete in most school settings such as hydrostatic weighing and DEXA scans. One of the easiest tests to do in a school setting is with skinfold calipers, although this test is not always reliable. The test works by clamping layers of skin and measuring fat at various locations around the body. The measurements are added up to make a skinfold total.



Figure 4.7: Testing body composition with skinfold calipers is not always reliable.

Internet activity

Log on to TitanOnline to complete Activity 4.2 by researching a variety of tests that can be used to assess body composition.

Practical activity

1. Conduct a cardiorespiratory fitness test using the 20-metre multi-stage fitness test (beep test).
2. Conduct a muscular strength test using a dynamometer.
3. Conduct a muscular endurance test using push-ups.
4. Conduct a flexibility test using the sit and reach test.
5. Conduct a body composition test using skin calipers.
6. Analyse and interpret these results in order to understand your level of fitness in these health-related components.

Skill-related

Skill-related components of fitness can be developed through participation in physical fitness, so that the body can better perform certain tasks. The skill-related components of fitness are agility, speed, coordination, balance, power and reaction time.

Power

Power relates to both speed and strength. It is the ability of the body to perform a movement quickly and with a great deal of force. Power allows an individual to throw, run and jump further. In order to improve power, both strength and speed training must be included in a fitness regime. Examples of activities requiring power include:

- a volleyball serve
- hitting the ball in cricket
- athletics events, such as javelin and shot put.

An ideal school-based test for measuring power is the vertical jump. To complete this test, students will need a tape measure, a piece of chalk and a brick wall with a flat surface. The student stands beside the brick wall with a piece of chalk in their hand. They jump as high as they can from a stationary position. They can squat down and jump up for extra momentum from leg strength but they must not take a run up. While in the air, students mark the brick wall with chalk. The person being tested also reaches as high as they can while stationary and makes a mark with the chalk. The score is the distance between the two chalk marks.

Agility

Agility refers to the ability to change direction and speed mid-motion in an efficient manner. Agility can also involve starting and stopping, speed, reaction time, balance and strength. Examples of agility are often present in team sports such as rugby league, football (soccer), basketball and netball, where players often use actions like dodging to avoid or 'lose' their opponent.

One of the most commonly used tests in schools to measure agility is the Illinois Agility Test. This involves students running through an obstacle course of cones or markers that tests how quickly they can change direction in a short space. A stopwatch is used to record how long it takes for them to complete the test.



Figure 4.8: Power allows an individual to throw, run and jump further.



Figure 4.9: Basketball players often use actions like dodging to avoid or 'lose' their opponent.

Coordination

Coordination relates to the ability of the body to efficiently use different muscle groups together to perform larger movement patterns. Good coordination involves using various body parts and the senses such as sight, sound and touch to perform a skill well. Spatial awareness, body awareness and muscle memory are all important factors in developing coordination. Fundamental skills in many sports such as kicking, catching and throwing are reliant on coordination to be successfully completed.

One of the easiest ways to test coordination while in school is the 'wall-toss-test'.

To complete this test a student will need to stand a set distance (usually between one and two metres) away from a solid, straight wall such as a brick wall. The student throws a ball (under-arm) at the wall, and when the ball bounces off the wall they must catch it with the opposite hand to the one they threw it with. They continue this process, alternating throwing and catching hands, adding up how many catches they get before dropping the ball.

Speed

Speed is the ability for the whole body or part of the body to get from one point to another quickly. It is essential in many sports. Some individuals will genetically be faster than others. An underlying determinant of an individual's speed is the ratio of slow- to fast-twitch muscle fibres. Slow-twitch muscle fibres contract slowly, but are able to work for extended periods of time. Fast-twitch muscle fibres contract quickly, but tire faster.

Examples of speed include sprinting from one end of a field to the other or swinging a bat in baseball with sufficient speed to hit the ball.

Speed is one of the easier components to measure. The simplest test involves marking out a distance of 50 or 100 metres. One student will run the distance as fast as possible, with another student recording the time it takes for the running student to cover the distance.



Figure 4.10: Fundamental skills in many sports such as kicking, catching and throwing are reliant on coordination.



Figure 4.11: A baseball bat needs to be swung with sufficient speed to hit the ball.

Balance

Balance relates to the ability of an individual to remain steady and centred. It relates to equilibrium, the manner in which an individual's weight is distributed in regards to their base of support and the position of their centre of gravity. Base of support refers to the area at which a person has contact with the ground. For example, if someone has one foot on the ground, their base of support is the outline of their foot. If they have two feet on the ground, their base of support is the outline of their two feet and the space between on the ground. Centre of gravity is the point within an object where most of the weight is concentrated. For humans, when standing, the centre of gravity is generally just about the waist.

Types of balance include static (when stationary) and dynamic (while moving). Balance is an essential component of all performance, but may be particularly important in activities such as the beam in gymnastics, holding yoga positions or performing dance routines.

A very easy and reliable way to test balance is the standing stork test. This test involves the individual being tested standing on one leg, for example their left leg. They place their right foot on the side of their left kneecap. A second person is timing and when they give appropriate instructions, the first individual goes up on their toes on their left foot. The person timing continues timing until the first individual comes down from their toes or their right foot slips away from their left kneecap. The result should be recorded.

Reaction time

Reaction time relates to how efficiently (quickly) the brain can respond to stimuli and react accordingly. Reaction time involves the body sending messages to all parts of the body.

People will have varying reaction times. Situations where a quick reaction time is desirable include centre passes in netball, the gun at the start of a running race and diving into the pool as the second swimmer in a relay.

One of the easier reaction time tests to administer is the ruler test. An individual holds their hand out in front of them with a gap between the thumb and the fingers. Another individual holds a ruler vertically above the first individual's cupped hand. Without warning, the ruler is released and the other person reacts and grabs the ruler by closing the hand, but not moving it vertically. Record the measurement indicating how much of the ruler passed by the thumb.



Figure 4.12:
Balance is particularly important for performing dance routines.



Figure 4.13:
A quick reaction time is needed for swimming in a relay race.

Did you know?

When you are standing still, the body is using 300 muscles to balance.

Internet activity

Log on to TitanOnline to complete Activity 4.3 by participating in the online reaction time test.

Practical activity

1. Conduct a power test, using the vertical jump test.
2. Conduct an agility test using the Illinois Agility Test.
3. Conduct a coordination test using the wall-toss test.
4. Conduct a speed test using the 50-metre sprint test.
5. Conduct a balance test using the standing stork test.
6. Conduct a reaction time test using the ruler test.
7. Analyse and interpret these results in order to understand your level of fitness in these skill-related components.

Case studies

You are a celebrity personal trainer and are currently working on a program where viewers of your show can write in and ask for your advice and a chance to feature on the show. Read the following viewer emails and answer the related questions.

I'm tired and unmotivated



Bree Hamilton

To: trainer@titantv.au

I have always been really skinny, which absolutely frustrates my friends who have a constant battle with their weight. I eat big meals, but don't seem to ever put weight on – even when I eat more junk food than I know I should. I hardly ever exercise, unless it's running around with my girlfriends, but nothing really organised. I had a gym membership to try and work on building lean muscle, but I found it way too boring and cancelled the membership. Since starting Year 12, I've found that I'm quickly becoming fatigued at school and I'm always sleeping. I'm worried because my grades are starting to drop. I'm finding it really hard to get motivated but I know I need to start incorporating physical activity into my routine. Please help!

1. Suggest reasons why Bree is becoming fatigued easily.
2. Propose a new diet plan for Bree, to make sure she is eating foods that are high in nutrition.
3. Suggest an exercise program that would suit Bree, taking into account that she disliked the gym.

Case studies*(continued)*

I'm worried about my grandma

**Ashley Brennan**

To: trainer@titantv.au

My grandpa used to be the coach of my soccer team up until last season when he suddenly passed away. Of course this was a difficult time for my family, especially for me as we were really close and we always used to try new activities together. My grandma, however, is the opposite. She is overweight, she can't walk around for long without tiring and she doesn't eat the healthiest. I can tell she really misses my grandpa and I want to spend more time with her. I really think she would get a lot out of doing different activities with me each week. However, she always laughs it off and calls me silly. If I push the fact that she should be doing more exercise and this is a great way to do it, she breaks down and gets really emotional.

1. Discuss some of the health risks that Ashley's grandma may be facing, particularly if she continues her current lifestyle choices.
2. Write a letter on Ashley's behalf to her grandmother encouraging her to try new activities with Ashley.

I can't keep up with my competitors

**Liam Vogel**

To: trainer@titantv.au

I am an aspiring Greco-Roman wrestler. I am athletic and I eat healthy. I train every day and compete regularly. But I have a couple of problems – a) I never usually place well when competing and b) after returning back to training after an injury, I am struggling to get back to the fitness level I was at. My coach recommends that I move into a higher weight division, but of course this requires a lot more training. There is a lot of pressure to keep up with those at the top of the sport in wrestling and many athletes turn to banned substances in order to achieve this. I have always been opposed to using performance- and image-enhancing drugs, but I really don't know how to stay clean and still keep up with my competitors.

1. Explain the pressures athletes may feel to use performance- and image-enhancing drugs.
2. Propose strategies Liam could use to gain weight and enter the next weight division.

Case studies*(continued)***I'm struggling to find time to exercise****Lauren Millen**

To: trainer@titantv.au

I am a 27-year-old hairdresser from Wollongong. I used to be really active when I was in high school, but since leaving school in Year 10, I've always had to work a lot in order to pay rent and bills. I do yoga once a week with my friends down at the beach and then we walk to the café and have brunch. I have a pretty active job and I'm on my feet all day. By the time I get home of an evening, I'm always so exhausted and I struggle to fit any physical activity in. Dinner is normally whatever I can grab on the go on the way home from work, or a frozen dinner. My husband and I are trying to have a baby, but I know I need to get a solid exercise program started and a healthy diet in order create the safest environment if we get pregnant.

1. Propose an exercise plan that would be suitable for Lauren.
2. Suggest a range of contra-indicated activities to avoid.

I've stopped seeing improvements**Simon Nassif**

To: trainer@titantv.au

I have been training for an hour every day for the last three months in order to drop weight after my doctor diagnosed me with type 2 diabetes. I lost 8kgs in my first two weeks of training and this has steadily decreased each week. However, over the past three weeks, I haven't lost any weight and I also don't feel as good as I have been. The last three months have been great – I've had more energy, better sleep and have been feeling less cranky and grouchy. But lately, I've felt none of these improvements and I don't know what to do. My training program consists of three sessions on repeat, with Sunday as a wild card where I do something different with friends each week. I have my swimming session, which is an hour of laps at the local rock pool. Then, there is the gym session where I move around the equipment and do three sets of 15 on each of the equipment pieces. And the third is a bike ride.

1. Analyse why Simon is seeing a plateau in his training.
2. Propose ways to improve Simon's program.

Fitness vs physical activity

It is not uncommon for the terms fitness and physical activity to be confused. While these two terms can be interrelated, the characteristics of each, the reasons for participation and the benefits of each differ.

Physical activity involves any type of movement that uses energy. Physical activity can be planned or unplanned, which is where the difference in physical activity and fitness becomes evident. Fitness is planned exercise that is used to develop some or all of the eleven components of fitness. Participating in fitness or physical activity is extremely important, irrespective of age.

Guidelines for physical activity

Physical activity is an essential component of a healthy lifestyle. For adults, at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity activity each week, ideally spread throughout the week, is recommended. Alternatively, a combination of both can also be effective.

Strength training exercises, involving all major muscle groups, should be conducted three times a week. Remember to start slow and gradually increase the intensity to prevent injuries.

For children and adolescents, at least 60 minutes of varied intensity physical activities daily, incorporating strength, endurance, and flexibility exercises, is advised. This age group should be encouraged to play and participate in sports or physical hobbies. The same guidelines apply for older adults or those with chronic health conditions, but it's important to understand personal limitations and consult a healthcare provider before starting an exercise program.

In general, any physical activity is better than none. Avoid long periods of inactivity and incorporate movement, such as walking or stretching, into daily routines. Remember, hydration and a balanced diet complement physical exercise for overall wellbeing.

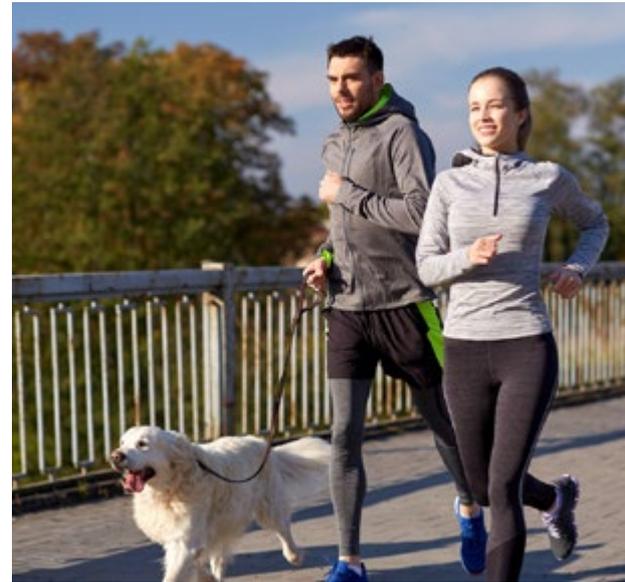


Figure 4.14: Physical activity involves any type of movement that uses energy.



Figure 4.15: Movement, such as walking or stretching, should be incorporated into daily routines.

Benefits of physical activity

There are a multitude of benefits to be gained from participating in physical activity. These can be broken up according to the various components of health: social, emotional, physical, spiritual and cognitive. The ways in which the benefits of physical activity can be felt among all components of health are outlined in Table 4.1.

Table 4.1: Benefits of physical activity.

Component	Benefits
Social	<ul style="list-style-type: none"> ▪ Socialising with team mates. ▪ Learning to work in a team and with a diverse group of people. ▪ Making new friends. ▪ Building confidence in social situations.
Emotional	<ul style="list-style-type: none"> ▪ Exercise releases endorphins – natural occurring chemicals that can cause feelings of euphoria. ▪ Exercising can relieve stress and be an emotional outlet. ▪ Exercise can be a way an individual can regain control over an excessively hectic lifestyle. ▪ Improves sleep, generally making people function better and be happier.
Physical	<ul style="list-style-type: none"> ▪ Reduces risk of having a heart attack. ▪ Assists with weight management. ▪ Lowers blood-cholesterol level. ▪ Lowers risk of developing type 2 diabetes and some cancers. ▪ Lowers blood pressure. ▪ Creates stronger bones, muscles and joints. ▪ Higher energy levels. ▪ Improvements in the health-related and skill-related components of fitness.
Spiritual	<ul style="list-style-type: none"> ▪ Specific activities can have a calming effect. ▪ Feeling of connectedness. ▪ Helps develop mindfulness. ▪ Activities such as running, surfing and bushwalking can be considered therapeutic.
Cognitive	<ul style="list-style-type: none"> ▪ Helps develop skills such as: <ul style="list-style-type: none"> – problem-solving – decision-making – timing – coordination – memory. ▪ Can prevent illness later in life such as Alzheimer’s disease and dementia. ▪ Physical activity promotes the flow of oxygen around the body, particularly the brain, promoting and increasing cognitive functioning.

Did you know?

Being active not only improves health, it makes you more likely to be motivated, focused and successful in school.

Internet activity

Log on to TitanOnline to complete Activity 4.4, which investigates how much sitting you do each day and the impact this has on your fitness.

Learning activity

1. Analyse your posture by looking at the front and side view of your body in the mirror. Does it appear symmetrical? Are your muscles the same size on both sides? Were strength test results for your left and right hands the same or different? Suggest reasons for any differences and outline how any imbalances could be addressed through training.
2. Research the sport specific fitness tests that would assess the components most relevant for the sport of soccer. Use these tests on some soccer and use the results to judge the effectiveness of the training.
3. Discuss the benefits of physical activity on the following:
 - social
 - emotional

Fitness programming

For most people, it is ideal to develop a physical fitness program that includes four to six days of exercise per week, with each session lasting between 20 and 60 minutes, and rest and recovery days in between. As a result of today's busy lifestyle, many people find it difficult to find the time to train. It is important to develop a routine where training is scheduled for a part of the day that best suits the individual and is least likely to be impacted by work and family commitments. When developing a fitness program, it is important to consider the FITT Principle, individual needs and relevant safety considerations.

Before beginning to design a fitness program, careful consideration of the following points:

- Why do you want to start a fitness program? Complete a pre-exercise questionnaire.
- The program must suit your needs and available time.
- Attainable, realistic goals must be set.
- Include variety in your program to keep you motivated.
- Start at a level of exercise that you can cope with.
- Progress gradually and set new benchmarks.
- Keep a diary.
- Select the appropriate time to train considering weather and other factors.
- Enjoy your exercise – if you become bored, motivation, you will lose.
- Wherever possible, exercise with friends or in a group.

Individuals should fill out a pre-training program questionnaire that addresses the goals of the person the questionnaire is for, as well as any important details such as pre-existing conditions.

Figure 4.16:

Attainable, realistic goals must be set in a fitness program.





Figure 4.17:

The FITT Principle can be used in aerobic, strength, flexibility, and anaerobic training.

FITT Principle

The FITT Principle is designed to help improve an individual's existing fitness levels. The four aspects of the FITT Principle are frequency, intensity, time and type. These aspects provide a framework that can be applied when creating an exercise program. The purpose of its design is to develop fitness programs for everybody from elite athletes to people who simply want to improve their fitness level. Although it is mainly aimed at development of aerobic fitness, it can also be used in strength, flexibility and anaerobic training.

Frequency

Frequency relates to the number of times a person exercises over a specific period of time. The recommendation is a minimum of three times a week for beginners, through to six times a week for more advanced individuals. 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 heal.

Intensity

Intensity relates to the level of effort a person uses while exercising. If the aim is to develop aerobic fitness, the person's heart rate is used to measure intensity. The recommended level for people to work at is between 65 and 80 per cent of their maximum heart rate (MHR). Beginners should work at about 60 per cent of their MHR, while advanced athletes can work at a level of up to 85 per cent of their MHR.

Time

Time relates to 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 40 minutes, often at a higher intensity. Table 4.2 outlines an example of the FITT Principle for a person who wants to improve cardiovascular endurance and strength.

Table 4.2: The FITT Principle.

FITT Principle	Cardiovascular endurance	Strength
Frequency	3–6 times a week	3–6 times a week
Intensity	Moderate to vigorous intensity at 65–80 % of MHR	Four exercises, three sets each, 8–12 repetitions each set
Time	20 to 60 minutes	30 to 60 minutes
Type	Cardio-endurance activities such as running, cycling and swimming	Resistance training, e.g. free weights



Figure 4.18: To develop aerobic fitness, the minimum time recommended for the heart rate to be elevated is 20 minutes.

Internet activity

Log on to TitanOnline to complete Activity 4.5 by applying the information gathered after reviewing the video on the FITT principle.

Type

Type relates to the form of activity a person does. If the aim is to develop aerobic fitness, the person engages in activities in which large muscle groups are used and where the heart rate is elevated. Three examples include running, cycling and swimming. The type of activity would be different if the aim is to develop strength, flexibility or anaerobic fitness. For example, a person who is aiming to develop strength would engage in resistance training, such as cross fit or weightlifting.

Practical activity

1. Talk to a partner about their fitness goals and needs.
2. Design an individual training plan for them based on the information you have gathered and your knowledge of the FITT Principle.
3. Share the program with your partner and receive feedback on whether they believe it would meet their needs and interests.
4. Refine the program if necessary and allow some time for your partner to train. Ask for feedback after four weeks regarding the design of the program and whether they found it appropriate to their needs.

Considerations for individual program design

There are a number of factors to consider when developing an individual program design. It is important to consider the needs of the individual, including their personal goals, somatotype, gender, age, hereditary factors, injury history, muscle fibre composition, general health and training background.

Individual needs/hereditary factors

There are a number of individual needs and hereditary factors to consider when developing an individual training program. The individual should complete appropriate pre-screening to discover any medical conditions, injuries and exercise history. A pre-exercise questionnaire should be completed so that the program writer is aware of the participant's reasons for wanting to exercise and their goals. A medical clearance may be required by those with a family history of diabetes, high blood pressure, heart disease and other serious illnesses. Rehabilitation programs for individuals recovering from serious injury should be designed in consultation with medical therapists.

Muscle fibre composition

It is necessary to consider the individual's muscle fibre composition when developing a fitness program. Muscles are made up from bundles of muscle cells known as muscle fibres. There are two distinct types of muscle fibre within the human skeletal muscle – fast-twitch fibres and slow-twitch fibres. Fast-twitch fibres are white in colour, are characterised by their quick response, and are used predominately in anaerobic type activities. Slow-twitch fibres are red in colour, have a slower contraction speed, and are predominant in endurance type activities.

Somatotype

Somatotype is the process of classifying people into groups according to their physique or body shape. There are three main groups – endomorphs, mesomorphs and ectomorphs. Endomorphs have a rounded body shape and tend to put on fat more easily than others. Mesomorphs have a muscular frame with minimal body fat and broad shoulders. Ectomorphs tend to be thin and slim with long limbs, narrow shoulders, and low muscle and body fat content.



Figure 4.19: Rehabilitation programs for individuals recovering from injury should be designed in consultation with medical therapists



Figure 4.20: Somatotype should be considered when designing a training program.

Did you know?

The thumb is controlled by nine individual muscles.

Internet activity

Log on to TitanOnline to complete Activity 4.6 and determine which body type you have by completing the online quiz.

Gender

Males and females often demonstrate variances in physical ability as a result of differences in body composition and hormones. Males are more likely to store any excess fat around the stomach area, whereas females are more likely to store excess fat around the leg/hip area. Males generally exhibit better cardiovascular endurance and more strength whereas females tend to be more flexible and are likely to carry a higher percentage of body fat. Gender may also impact an individual's choice of fitness activity and the type of goals they set.

Age

In general, children and adolescents should not train or compete for events that place extreme stress on their growing bodies. Activities such as ultra-marathon running or a high-load, low-repetition weight-training program can place too much stress on growth plates and affect bone growth. It may be more appropriate to use body weight in strength programs for younger athletes. Longer distance events and ultra-marathons are more appropriate for athletes who have finished their growth and have built up to the distances over time. Training programs for older athletes may need to factor in lower strength levels, diminishing flexibility, hormonal changes, medical status and history of injuries.

Training background

A person's training history will impact on how efficiently they respond to various types of training programs. An individual with little or no training background will need to start slowly and receive instruction and focus on correct technique. A beginner will tend to notice improvements in their fitness much quicker than a person who has been training for longer and may have plateaued. A more experienced individual may have already mastered most basic techniques and may benefit from variety and novelty being added to the program.

Learning activity

1. Outline some of the considerations for designing a training program for a middle aged male who is morbidly obese.
2. Explain the necessity of pre-screening procedures to a training program design.
3. Compare and contrast the different somatotypes and discuss how it would influence the design of a training program.



Figure 4.21:
Women tend to be more flexible than men.



Figure 4.22:
Training programs for older athletes may need to factor in lower strength levels.



Figure 4.23:

It is important to monitor and adapt training loads to ensure athletes are challenged in a safe way.

Safety considerations

It is extremely important to be mindful of safety considerations when designing an individual program for fitness. There is a fine line between pushing training limits to achieve a training effect and pushing the limit too far and causing injury. Warm-ups and cool-downs are essential, as is correct technique. Some muscle soreness is usually evident and should be expected when training, but should pass in a day or two. It is important to monitor and adapt training loads to ensure athletes are challenged, but not involved in unsafe or damaging activities.

Contra-indicated activities

A contra-indicated procedure, technique or exercise is one that is inadvisable as it impacts body alignment, or forces the joints beyond its normal limits. An exercise can also be contra-indicated for an individual because of a medical condition, e.g. strenuous exercise for someone who has a serious heart condition.

As a general rule, make sure to avoid:

- over stretching the upper back and neck
- hyper-extending the lower back
- hyper-extending the neck
- flexing the knee joint more than 90 degrees
- performing exercises that cause a muscle imbalance.

Contra-indicated activities are not suited in most training programs. Although many of these exercises may have traditionally been used in the past, the damage for joints is usually not immediate and even experienced trainers may be unaware of the long-term, accumulated damage. A knowledgeable trainer can achieve the same outcomes, substituting safer exercises for contra-indicated exercises. Table 4.4 on the following page highlights contra-indicated activities with possible modifications to make them safer.

Table 4.3: Contra-indicated activities.

Stretch	Image	Contra-indication	Alternative
Hurdler's stretch		Places undue rotational stress on the flexed knee and can potentially strain the ligaments and cartilage.	Bring the bent knee to front instead of the back, i.e. foot of the bent leg placed against inner thigh of other leg.
Seated hamstring stretch		Places unnecessary stress on the lower back which is often a source of weakness with many people.	Perform the alternative stretch outlined above.
Neck rolls		Rolling the head in a circle can cause unnecessary wear to the neck joint and pinch nerves.	Stretch neck by tilting the head slowly to the front, back and to both sides, returning back to the upright position each time. Avoid rolling.
Donkey kicks		Hyper-extension puts unnecessary stress on the lower back.	Assume a plank position on the elbows, avoid arching the back. Maintain spine alignment and keep the knee slightly bent.
Flutter kicks		High level of stress on the muscles in lower back and neck, resulting in hyper-extension.	Lay on back with legs in air bent at 90° angle. Contract abdominal muscles and raise shoulders, neck and head slightly.
The swan		Hyper-extension can lead to nerve impingement and disc damage.	Back extension, which involves moving the back from a bent over position to a straight, aligned position, with no arching.

Warm-up/warm-down

Whether an person is a beginner or elite, a warm-up and cool-down (also known as a warm-down) is necessary. An effective warm-up increases the temperature and flexibility of the muscles, and raises heart rate and respiration in preparation for vigorous activity. It should also warm the synovial fluid in joints and move limbs through a full range of motion. Warming up prepares the individual psychologically, so that they are ready to perform at their maximum potential.

A general warm-up begins with active movement of the large muscle groups and progressively increases in intensity followed by stretching and sport-specific skills. Stretching exercises should be move body parts through their full range of motion, extending to a point of strain, but never pain. Concentrate on the muscles and joints that will be used during the training session.

Training sessions also need a cool-down. The cool-down occurs at the end of a session, and gradually returns body systems to their pre-exercise state. Respiration slows and body temperature drops. The purpose of the cool-down is to prevent muscle stiffness and soreness, and help the heart return to its resting heart rate. The cool-down helps flush-out the waste products that build up during exercise.

Legal responsibilities

Legal responsibilities are an important factor to consider when developing individual programs. First and foremost, in order to be involved in any organisation or sporting group, or even part of supervising physical activity, a person should have undergone some training. Some junior sporting clubs may do this training within the structure of the club, but in most situations, it is desirable for individuals to be qualified and registered with the Australian Fitness Industry or the Australian Coaching Council's National Accreditation Scheme. 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 organisations make this a compulsory requirement.

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.

The following list outlines specific areas of concern that should be considered when maintaining the safety of participants:

- Provide a safe and supportive environment for all participants.
- Attainment of appropriate coaching, CPR and a working with children check.
- Activities should be challenging but not compromise participants.
- Location should allow participants to be in shade and drinking water.
- If injured, participants should seek medical clearance from a medical professional such as a doctor or a physiotherapist before returning to training.
- Training should be appropriate to the age and ability of participants and activities should be based on their age, ability and experience.
- Pre-screening for all participants.
- Treating injuries appropriately.

In relation to legal responsibilities, there are a number of terms that individuals should be familiar with, which are outlined on the following page.

Internet activity

Log on to TitanOnline to complete Activity 4.7 by reviewing the video and



Figure 4.24:

Injured participants should be cleared by a medical professional before returning to training.

Table 4.4: Important legal terms.

Term	Explanation
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 others, especially in the case of young athletes. Coaches must ensure that they plan activities with consideration for possible risks and address ways of minimising those risks. The concept relies on both proactive and reactive behaviours that can keep athletes out of harms way. Duty of care might address issues such as safe playing surfaces, safe transportation, appropriate conditioning, maintenance of equipment and monitoring behaviour of athletes.
Standard of care	When considering the standard of care, a person should ensure all exercises prescribed are clearly explained and correctly demonstrated so that all participants understand how to participate safely. The coach or leader should monitor the way participants are interacting with and using equipment to make sure they are using it properly.
Liability	Liability involves being responsible for an incident. An example of liability includes a coach allowing an athlete to return to play despite knowing that the athlete is still suffering concussion from a head clash. In this case, the coach would be liable or responsible if the player sustained further injury. In serious cases, such as one that results in permanent injury, illness or even death, being liable can result in serious consequences including dismissal from employment or legal prosecution.
Misleading conduct	Misleading conduct involves giving information, advice or a guarantee of a specific result, with the knowledge that this may not be true, correct or the end result. Examples of misleading conduct include providing guarantees about fitness improvements or making unsubstantiated health claims. Misleading conduct can lead to a loss of trust, loss of reputation, loss of business and possibly legal action.

Learning activity

1. Describe how athletes involved in contact sports, or sports with inherent risks, can minimise the chance of injury.
2. Research how sporting bodies have used somatotyping as a tool for talent identification. Name three sports which are best suited to your body type.
3. Research contra-indicated activities other than those listed in the text and propose safe alternatives for each.
4. Your friend is rather tall and lean and has always been a keen basketballer. They want to take on a new sport that would suit their body shape and has asked you for your opinion. What would you suggest?



Figure 4.25:

Fitness can improve when training is made specific to a sport, such as rowing.

Improving fitness

While a basic knowledge of exercise is enough to start a fitness program, better results will result when a person understands the process the body is going through, how it is adapting and why. This will best encourage and empower the individual and increase the likelihood of the results being long term. When improving performance, individuals should consider the following principles of training:

- **Progressive overload:** training should increase in terms of frequency, intensity and time. The overload should occur gradually and steadily, and athletes should avoid plateauing. When the body is progressively overloaded, and a safe amount of additional stress is placed on the body systems, adaptations begin to occur. For example, an athlete who regularly runs for 20 minutes at a certain pace, may overload by extending the run to 30 minutes at the same pace or keep the time to 20 minutes but quicken the pace.
- **Specificity:** how the training is made specific to the sport, or individual or the team, by considering factors such as unique game requirements, individual needs and hereditary factors, muscle fibre composition, somatotype, gender, age and training background.
- **Reversibility:** if an individual stops training, or training loads or intensity reduces, they will see their training adaptation begin to reverse and fitness levels will deteriorate.

- **Variety:** if a training program is boring or tedious, individuals can lose interest. While it is accepted that training must specifically target the particular sport or training goals, there is always more than one way outcomes can be achieved. Cross training in sports and activities with similar skill sets provide interesting alternatives for sports people. Fitness activities that target fitness components in new and novel ways, incorporating competition or fun can make training different and increase motivation.
- **Training thresholds:** involves training at a level that places the body under sufficient stress to result in a physiological change. It is the zone between being comfortable in one's training and being challenged. In anaerobic training, it is the training level where lactic acid begins to build up at a rate that is quicker than it can be dispersed.
- **Warm-up and cool-down:** as discussed in the fitness programming safety considerations, warm-up and cool-down are essential in preparing the body to safely participate in physical activity, as well as preventing side effects of training such as cramping, delayed onset of muscle soreness, and a build-up of lactic acid and other waste products.

When improving fitness, it is also necessary to consider the nature of aerobic and anaerobic fitness, training thresholds and types of training.



Figure 4.26: Cross training can provide interesting alternatives for sports people.

Internet activity

Log on to TitanOnline to complete Activity 4.8, which explores the different training principles.

Learning activity

1. Analyse how the principles of training can improve performance.
2. Explain, using examples, the following principles of training:
 - a. Progressive overload
 - b. Reversibility
 - c. Training thresholds
3. The principle of variety emphasises the need to mix activities up to challenge the athlete and make it interesting. Outline five variations of the game of soccer suitable for training sessions.

Nature of aerobic and anaerobic fitness

Training is often categorised as aerobic or anaerobic. Aerobic fitness is dependent upon the cardiovascular system supplying oxygen to the body's cells to produce energy. The more oxygen that is made available to the muscle, the more energy that can be produced with minimal fatigue on the body. Participating at approximately 70–80 per cent of an individual's maximum heart rate will predominantly use the aerobic system. Examples of aerobic type activities include marathons, triathlons and most team sports.

Anaerobic fitness is dependent upon the athlete's ability to draw energy stored in the muscles, without the use of oxygen. When exercise is short and intense, the athlete must rely on the immediate anaerobic energy available. This form of energy will not last long – possibly up to one minute, longer in a trained athlete. Examples of anaerobic type activities include sprinting, shot put and high jump.

In understanding aerobic and anaerobic fitness, it is important to understand how intensity, duration, recovery, energy source and psychological benefits all impact on training.

Intensity

Intensity relates to how hard a person trains, or the amount of effort put in. When focusing on intensity, it is not uncommon for a coach to instruct trainers to run at 60 per cent or 75 per cent. This relates to how much effort the coach wants the trainers to put in. If training at 60 per cent intensity, an athlete would be using a small amount of effort, and is probably comfortable at this level.

Duration

Duration refers to not only the length of the individual training session, but also the length of the training program. The duration of each session and the program in general should be arranged at the commencement of the program, so that the individual can set goals to work towards and achieve by the conclusion of the program. To improve one's endurance or aerobic fitness, they should train for at least 20 minutes each session, with a program that runs for at least 12 weeks. To see significant improvement in anaerobic fitness, the program should last at least eight weeks.



Figure 4.27:
Triathlon is a type of aerobic activity.

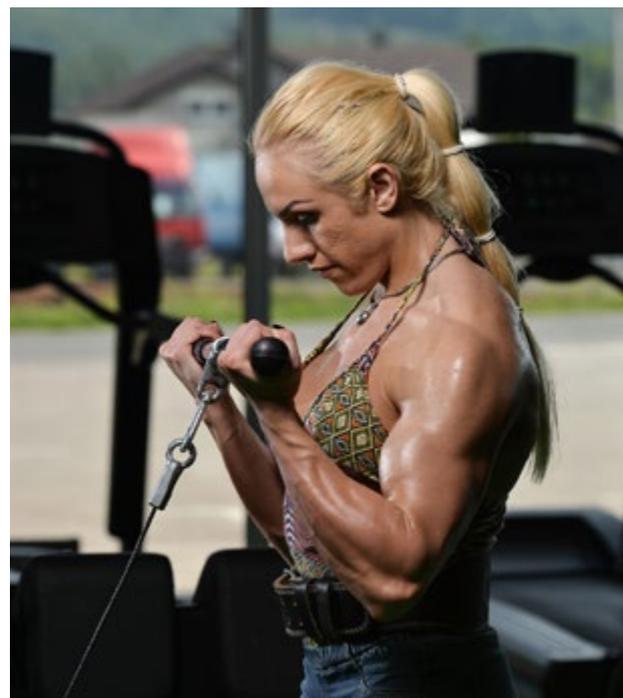


Figure 4.28:
Resistance training is a type of anaerobic activity.

Recovery

When the body stops exercising, it starts to return to its pre-exercise condition. This time is known as the recovery period. A recovery is used widely throughout many types of training programs and competitive sports. Recovery allows the athlete's body to rest and recover from training sessions. It is during this time the body adapts to the stresses placed upon it and improvements occur. Without adequate recovery, individuals may begin to tire and become exhausted. Lack of recovery time can also result in injury.

Energy source

Energy source relates to the system the body uses and the fuel source it needs in order to perform. There are three types of systems:

- **ATP-PC system:** In this system, a chemical that is stored in the muscles, phosphocreatine (PC), is used to re-build adenosine triphosphate (ATP). This system can be the source of maximum energy, but for only 10 seconds because the PC stores are rapidly depleted. ATP can only be resupplied to the working muscles in this energy system at rest.
- **Lactic acid system:** When the body needs fuel for longer than 10 seconds and the supplies of creatine phosphate are diminishing, the lactic acid system can begin supplying ATP for activities lasting to up to two to three minutes. This system functions by breaking down carbohydrates to form glucose. Excess glucose is stored as glycogen in the muscles and liver. Glycogen breaks down to produce two ATP molecules and pyruvic acid. Without oxygen, the pyruvic acid becomes lactic acid. When this lactic acid builds up in the body it causes fatigue in the muscles.
- **Aerobic system:** The slow production of energy is provided by the aerobic-energy system. In this system, oxygen along with stored carbohydrates and fats are used to re-build ATP. Carbohydrates and fats are broken down completely into carbon dioxide and water, which are removed through sweating and expiration. This system of energy production can go on for hours, as long as the activity level is low.

Table 4.5 on the following page summarises each of the three energy systems, with reference to the appropriate fuel source for each.

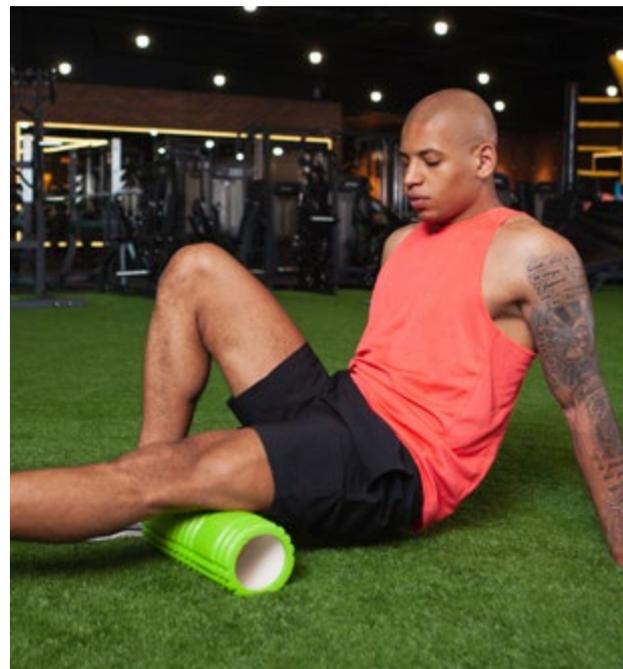


Figure 4.29:
A recovery is used widely throughout many types of training programs.



Figure 4.30:
Cycling uses the aerobic energy system.

Table 4.5: Summary of energy systems.

	ATP-PC system	Lactic acid system	Aerobic system
Fuel source	Creatine phosphate.	Carbohydrate is broken down into muscle glycogen.	Carbohydrates are the main fuel source. Fats, and to a limited extent, protein can also be used.
Amount of energy supplied	Very limited amount.	Limited.	Unlimited, as long as it is at a low intensity.
Duration	At 95–100 % of maximum effort, the system will last for between 10–12 seconds.	Depending on the level of intensity, 30 seconds to three minutes. At 90–95 % of maximum effort, duration would be approximately 30 seconds.	At a low intensity, system will last for virtually an unlimited amount of time.
Cause of fatigue	Creatine phosphate exhausted after about 10–12 seconds.	Lactic acid (a waste product) builds up in the muscles leading to fatigue and exhaustion.	Will continue until the body has used muscle glycogen or stored energy in the form of carbohydrate, fats and protein.
Waste products	N/A.	Lactic acid.	<ul style="list-style-type: none"> ▪ Carbon dioxide. ▪ Water (sweat).
Recovery time	Between 30 seconds and two minutes.	Between 20 minutes and two hours, depending on the intensity and duration of exercise.	Sufficient time (up to 24 hours) required to allow diminished fuel supplies to be replaced.
Examples	<ul style="list-style-type: none"> ▪ 100-metre sprint. ▪ Javelin. ▪ Long jump. ▪ Weightlifting. 	<ul style="list-style-type: none"> ▪ 100-metre swimming. ▪ 400-metre running. ▪ One-kilometre cycling time trial. 	<ul style="list-style-type: none"> ▪ Triathlon. ▪ Marathon running. ▪ 1500-metre swim. ▪ Cycling road race.

Psychological benefits

There are numerous psychological benefits to be experienced through being involved in a training program. There is such an emphasis on the importance of exercise not only because of the physical benefits, but also the psychological benefits. When a person starts exercising, the heart rate and respiration quicken, muscles fatigue and the mind recognises the stress the body is under. The body responds to this stress by releasing a protein called brain-derived neurotrophic factors, which has a neuroprotective and protective factor. The pituitary gland also releases chemicals called endorphins, the 'feel good' chemicals. Endorphins also decrease the feeling of pain and is sometimes referred to as the 'runners' high'.

The brain functioning created during exercise in the short and long term, create the following changes:

- increased motivation and in turn productivity at work, at school or in recreational pursuits
- decreased feelings of depression, anxiety and stress
- improved feelings of happiness
- improved memory
- better problem-solving
- boost in self-esteem and self-confidence
- improved sleep and patterns of sleep
- improved ability to work in a team.



Learning activity

1. Calculate your own aerobic and anaerobic thresholds.
2. Suggest activities that a person could undertake in order to enhance their:
 - a. aerobic capacity
 - b. anaerobic capacity.
3. Outline how the body utilises the different energy systems to supply energy for the following athletic events: marathon, 1500-metre run and the 100-metre sprint.

Training thresholds

Training thresholds relates to levels of exercise intensity that is sufficient to have a training effect and cause the body to adapt. There is an aerobic and anaerobic training threshold. Both are determined by a percentage of a person's maximum heart rate (MHR), which is calculated as $220 - \text{age}$.

Aerobic

The aerobic training threshold is the lowest intensity of exercise that produces an aerobic training effect for an individual. This occurs at approximately 60–70 per cent of the person's MHR. At this level a person will feel a level of exertion but can usually conduct a conversation.

Anaerobic

As exercise increases in intensity, the body will begin to recruit the anaerobic system to provide energy. This results in the by-product of lactic acid being produced. The point at which lactic acid begins to accumulate is known as the anaerobic training threshold. For many athletes, this occurs when training around 80–85 per cent MHR.

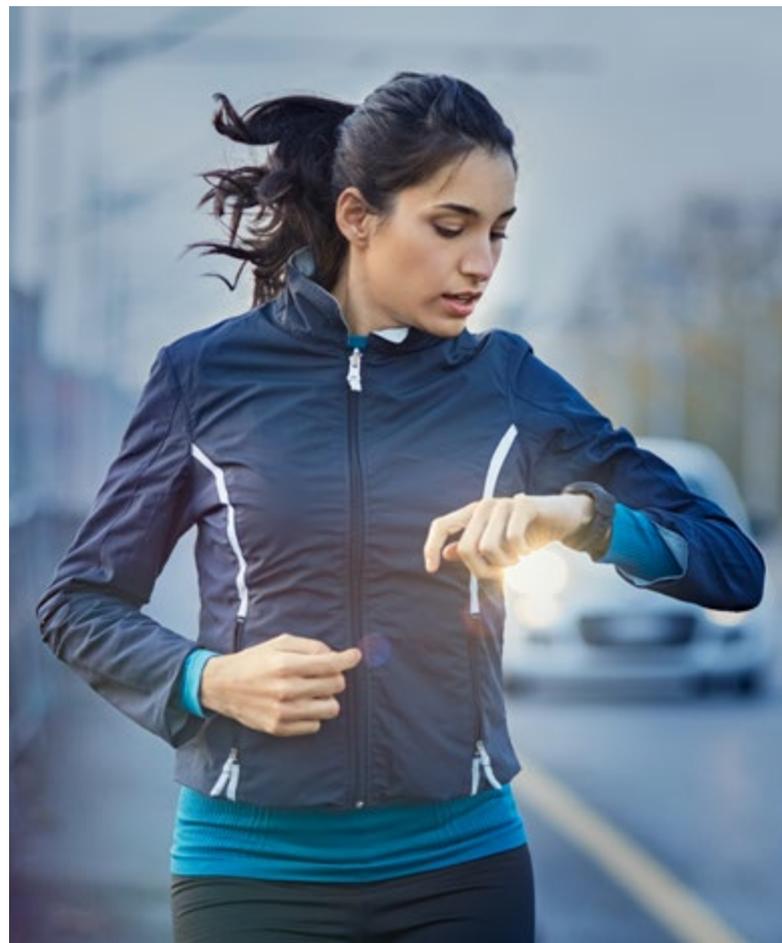


Figure 4.32:
An aerobic training effect occurs at approximately 60–70 per cent of a person's maximum heart rate.

Internet activity

Log on to TitanOnline to complete Activity 4.9 by summarising the information in the video about aerobic glycolysis.

Practical activity

1. Participate in an aerobic activity, and use the talk test as a gauge of how well your aerobic energy system is coping as you gradually increase the intensity.
2. Describe how effective the talk test is as an indicator of aerobic fitness.
3. Participate in an aerobic activity and use a heart rate monitor to record heart rates at regular intervals as you increase the intensity over a 20-minute period (depending on the type of heart rate monitor, you may need a partner to record). Graph your results and indicate your aerobic and anaerobic thresholds.

Types of training

Aerobic

Aerobic training relies on the availability of oxygen to be used as an energy source and pumped around the body. Aerobic training is most successful when completed at a low to moderate level of intensity. If completed at this level of intensity, aerobic training can generally be carried out indefinitely, or for extended periods of time. Aerobic training generally involves continuous type activities using the large muscle groups of the body. Examples of aerobic training include running, swimming, cycling and body attack classes at the gym.

Circuit

Circuit training involves performing a workout using various stations where different components of fitness are focused on. It is ideal to do circuit training at a gym where there is a variety of equipment to take advantage of. However, circuits can still be carried out without using any equipment and using activities such as sit-ups, push-ups, burpees and bridges or planks. Circuits can be fixed resistance or individual. A fixed resistance circuit involves stations that have predetermined guidelines, such as complete three sets of 15 at each station. Individual circuits involve individuals completing the circuit at their own pace or as fast as they can in a set time limit, for example, two minutes per station.

Fartlek

Fartlek is a Swedish word that translates as 'speed play'. Fartlek training involves using a mix of continuous and interval training. The intensity and speed of this training is continuously adapting and changing and therefore uses both the anaerobic and the aerobic energy systems. Like continuous training, fartlek training should last at least 20 minutes and should occur without any rests or breaks. However, fartlek training should involve changing the pace, the terrain or the incline. Fartlek training is ideal for participants of team sports, where the pace of the game is continuously changing, forcing the heart rate to rise and fall. It incorporates both high intensity and low intensity aspects. Examples of how fartlek training can be used include:

- running up and down hills
- run hard for 400 metres, jog for 400 metres and repeat a number of times
- running on a straight path, but varying between jogging, running and sprinting.



Figure 4.33: Resistance training may be incorporated into a training circuit.

Interval

Interval training involves a period of high intensity followed by a rest period. Interval training can be adapted for improvements to aerobic or anaerobic fitness.

For example running 800 metres in three minutes, followed by a rest period of 60 seconds, and then running 800 metres again. Training effects are achieved by increasing the number of intervals, reducing the amount of time to complete the interval or reducing the recovery time.

Continuous

The continuous type of training is the most common style of training and involves training without breaks for a period of at least 20 minutes. Continuous training needs to last at least 20 minutes because it is at this time frame that the body begins to burn fat stores. During this time, the heart rate should stay elevated, above 65 per cent of the maximum heart rate and below 85 per cent. This type of training provides many benefits, including cardiorespiratory (aerobic) endurance and muscular endurance. Examples of activities that can be classified as continuous training include running, swimming and cycling.



Figure 4.34: Interval training can be adapted for improvements to aerobic or anaerobic fitness.

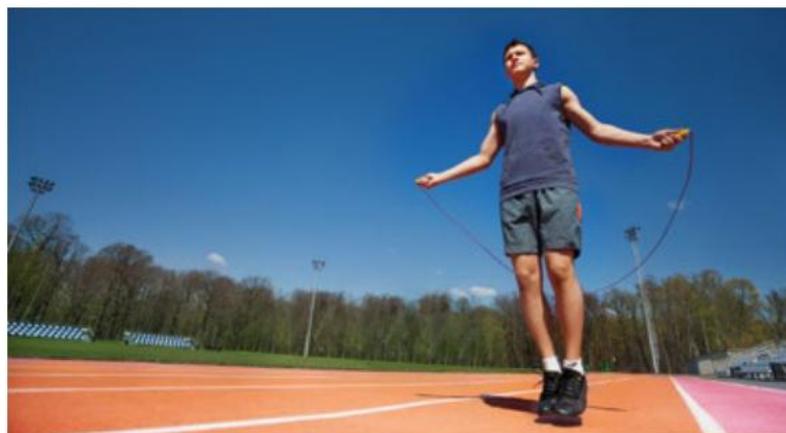


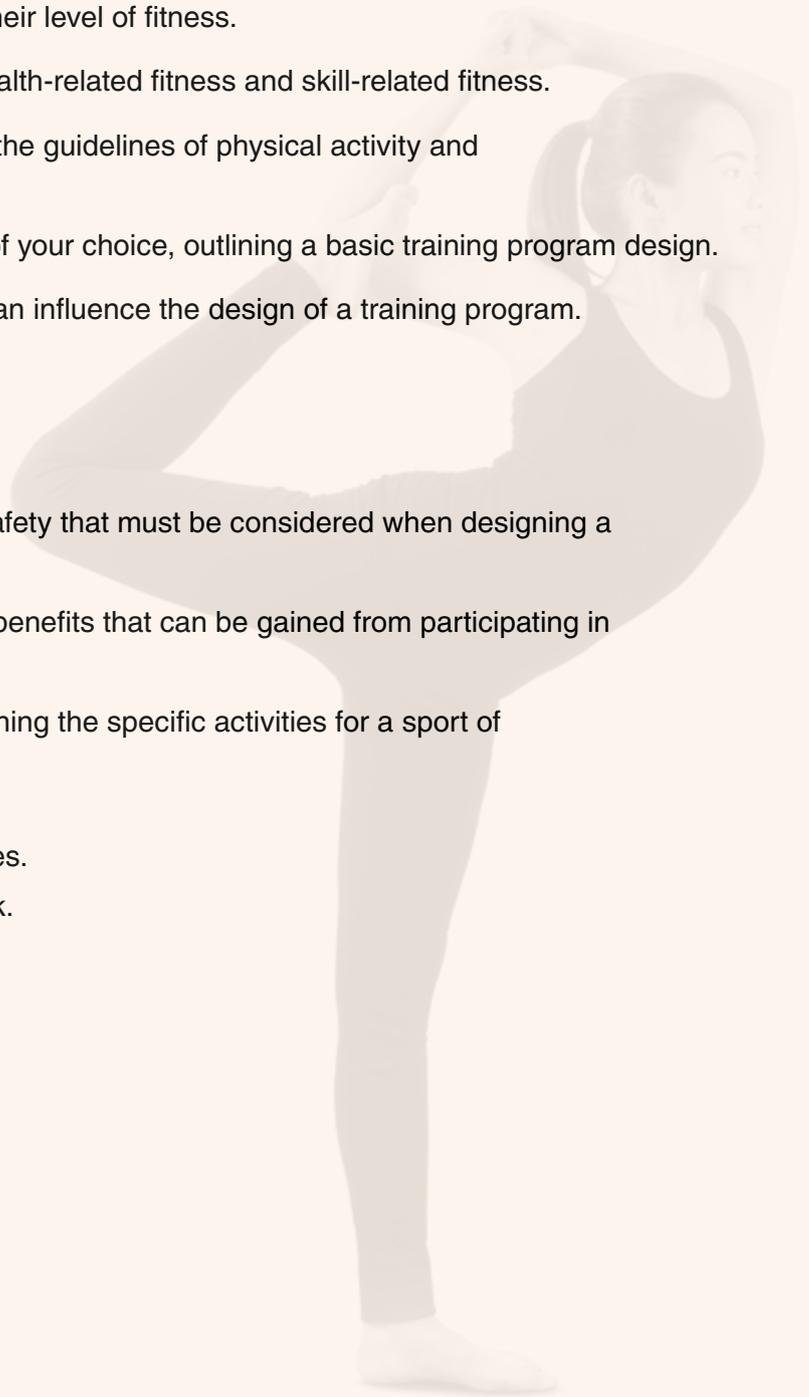
Figure 4.35: Continuous training of at least 20 minutes help improve cardiorespiratory endurance.

Learning activity

1. Identify and describe the physiological responses to aerobic and anaerobic activities.
2. Design a circuit with ten activity stations, using body weight exercises only, for a sport of your choice.
3. Design a fitness program in order to improve performance in aerobic and anaerobic activities. Swap with a partner and evaluate their fitness program.

Revision questions

1. Explain the nature of fitness, in your own words.
2. Identify how an individual can test their level of fitness.
3. Discuss the differences between health-related fitness and skill-related fitness.
4. Explain the importance of following the guidelines of physical activity and minimising sedentary behaviour.
5. Apply the FITT Principle to a sport of your choice, outlining a basic training program design.
6. Identify how the following aspects can influence the design of a training program.
 - a. Hereditary factors.
 - b. Muscle composition.
 - c. Gender.
7. Define and explain the aspects of safety that must be considered when designing a fitness program.
8. Describe the various psychological benefits that can be gained from participating in physical activity.
9. Design three training sessions, outlining the specific activities for a sport of your choice.
 - a. Session 1 will be a circuit.
 - b. Session 2 will use fartlek activities.
 - c. Session 3 will be all interval work.



CHAPTER 5

Games and sports application

Throughout this unit, students will develop skills and knowledge necessary to become active participants in a number of games and sports. They will explore various performance characteristics of different games, such as rules, equipment, playing formations and space requirements. They will understand the responsibilities of participants in these games, particularly in relation to safety, legal and ethical issues and etiquette. Students will analyse and practise defensive and offensive strategies and manipulate the ball in games or sports. Students finish the unit by understanding the aspects of team play.

Syllabus outcomes

A student:

- applies the rules and conventions of a range of physical activity (1.3)
- demonstrates ways to enhance participation in a range of physical activity (1.3)
- explains the principles of skill development and training (2.1)
- selects appropriate strategies and equipment for success in a range of movement contexts (2.4)
- designs programs that respond to individual needs (3.2)
- plans strategies to achieve performance goals (4.1)
- demonstrates competence and confidence in a range of movement contexts (4.4).

Focus areas

- Elements of specific games and sports activities
- Games and sports strategies and skills
- Aspects of team play



Figure 5.1: Participating in games and sports teaches individuals a wide range of skills.

Elements of specific games and sports activities

Games and sport activities are generally classified on their basic structure and the way they are played. The common categories of classifying games and sports include:

- net games
- bat and ball games
- kicking games
- throwing and catching games.
- court games
- invasion games
- striking games

In this chapter, there will be opportunities to engage in a range of these games and sports and investigate the elements that are unique to each.

Performance characteristics

Regardless of how a game or sport is classified, all have core elements that define the activity. These elements include:

- a set of rules governing how the game or sport is played
- equipment used
- space
- team members (unless it is an individual)
- opposition players
- movement patterns, both offensive and defensive
- specified performance outcomes.

By examining and developing the performance confidence and success in a range of games and sports.

Rules

Rules provide an agreement that enables participants to engage in a competition with the knowledge of what behaviours are allowed and those that are not. Rules usually address:

- the objective of the game and method of play
- infringements and the associated penalties
- approved playing equipment, protective equipment, clothing and field dimensions
- behaviours of players, coaches and officials
- safety of participants and aim to reduce the risk of injury.

Many codes also modify the traditional rules of the sport to cater for different age groups and different ability levels.



Figure 5.2: Rules usually address infringements and the associated penalties.

Equipment

Sports equipment is intrinsic to the uniqueness and safety of each game. Every sport has its distinct set of gear that facilitates gameplay and adds a defining character. For example, the equipment in hockey (stick, ball and net) dramatically shapes the game's dynamic, distinguishing it from other striking games such as cricket.

Equipment also provides safety and minimises injury risk. Protective gear such as helmets, padding, mouthguards, and shin guards shield athletes from potential harm in contact sports like rugby league or hockey. Furthermore, sport-specific shoes enhance performance and prevent accidents caused by slips or falls, while safety nets or padding around playing fields can protect spectators and athletes from stray balls or pucks.

Specialised equipment also assists athletes in refining their skills. For example, the design of training equipment in soccer allows players to simulate match conditions, without the need for an opponent. Similarly, the weight and size of a baseball bat can significantly influence a player's swing.

Space

Space is the surroundings in which movement takes place. An individual's and/or team's success in sports such as basketball, football (soccer) and volleyball is largely dependent on their ability to use the space available to them successfully.

Within the available space, individuals can move in many directions – forwards, backwards, diagonally, circular, left, right or zigzag. The direction in which an individual moves is dependent on factors such as the:

- individual's skills and objectives
- opposition's skills and objectives
- spatial confines
- sporting equipment or apparatus.

Another variable for the athlete moving through space is the level or height of the movement relative to the ground. 'Level' refers to movement through the vertical axis. The body can be moved through three basic levels: low, medium and high.



Figure 5.3: Equipment such as mouthguards and safety glasses reduces injury risk.



Figure 5.4: A team's success in sports such as volleyball depends on their ability to use the available space successfully.

‘Dimension’ is the size of the movement in relation to the amount of performance space. It takes into account the space the body occupies as well as equipment and competitors. Most sports have a set performance space, such as a tennis court or a football field. The performance space is clearly defined with set outcomes if the performer or object transcends these dimensions. The dimensions of the performance space can be manipulated in many team games by increasing or decreasing the number of players, increasing or decreasing the available time and changing or modifying the rules.

‘Patterns and formations’ are the paths the body takes when moving in general space. This may occur in the air, on the floor or on sporting apparatus. When moving in a game situation, directional changes occur when attacking or defending. The various patterns that are made when attacking or defending are known as formations.

Learning activity

1. Analyse the key rules in relation to a range of specific sports.
2. Analyse the equipment used in relation to a range of sports.
3. Analyse how space is used in relation to a range of sports.

Team members

The role of team members will vary depending on the game played. However, the best team is one in which all team members have a meaningful role and contribute to the success of that team. In any sports team, everyone:

- makes a commitment to work in the best interests of the team
- knows the rules of the game or sport
- performs to the best of their ability
- is a good team mate and team player.

Opposition players

Opposition players in sports play a critical role in creating a competitive environment that challenges skills, strategies, and resilience. As a measure of performance and skill development, providing valuable feedback that can drive personal and team improvement. By defending, blocking, or outperforming, they pose tactical challenges, encouraging creativity, adaptability, and strategic thinking. Their actions also instill a sense of sportsmanship and fair play. Beyond the gameplay, opposition players contribute to an engaging, exciting sporting spectacle, fostering team spirit and fan engagement. Ultimately, without worthy opposition, the essence and thrill of competitive sports would be lost.

Figure 5.5: Opposition players play a critical role in creating a competitive environment.



Offensive/defensive formations

Offensive (attacking) and defensive formations are designed to compete effectively with opponents. The term 'formations' refers to the positions players take up on the field and occupy during the game. Each sport will usually have a number of different formations that a team can choose to use, with the choice being based on factors such as:

- perceived strengths and weaknesses of the opposition
- different situations and opportunities that arise during a game
- the team's own perceived strengths and weaknesses
- player skills and shared knowledge of formations
- coaching experience and knowledge.

Specified performance outcomes

To maximise success, coaches and administrators specify performance outcomes for individuals and teams. These outcomes can be achieved by:

- setting aspirational and realistic individual and team goals
- team planning and management
- performance reporting and feedback
- utilising facilities and equipment
- developing skills and abilities
- knowledge of and playing by the rules of the game or sport.



Figure 5.6: Each sport will usually have a number of different formations that a team can use.

Internet activity

Log on to TitanOnline to complete Activity 5.1, which researches offensive and defensive formations in basketball and soccer.

Learning activity

1. Analyse the role of team members in relation to a range of specialised performance activities.
2. Analyse the role of opposition players in relation to a range of specialised performance activities.
3. Analyse specific performance outcomes in relation to a range of specialised performance activities.

Participant responsibilities in the chosen activity

Participating in games and sports teaches individuals a wide range of skills. However, with every game or sport there is the inherent risk of injury. Participants have a range of responsibilities they are expected to adhere to. These responsibilities reduce the chance of injury and increase the enjoyment gained by participating in games and sports.

Safety

By focusing on safety, players, coaches, officials and administrators can reduce the risk of injury and maximise enjoyment. To ensure the game or sport is as safe as possible:

- Make safety checks prior to the game commencing. This enables any hazards identified to be removed.
- Participants should know the rules of the game and wear appropriate protective equipment.
- All participants, especially young children, should be supervised when undertaking sporting activities.
- Ensure trained first aid personnel and equipment is available.
- Participants should have the required skill level and fitness to safely participate in the chosen game or sport.

Legal requirements

Common law provides consequences for individuals whose conduct or unreasonable actions results in injuries to others. The law extends to those organising and supporting sporting activities and includes a person's duty of care. The term 'duty of care', refers to a person's moral and legal obligation to take reasonable care to avoid others being harmed.

This means that officials, administrators and coaches have a responsibility to use their common sense, experience and knowledge to identify potential risks and take reasonable action to minimise or avoid the danger.



Figure 5.7: Young children should be supervised when undertaking sporting activities.



Figure 5.8: Officials and coaches must be properly accredited.

Internet activity

Log on to TitanOnline to complete Activity 5.2 by researching codes of behaviour.

The following actions represent what needs to be done to fulfil the duty of care:

- Officials and coaches must be properly accredited.
- Safety checks of sporting grounds and facilities should occur prior to commencement of any activity.
- Children should be supervised at all times when they participate in sporting activities.
- All equipment should be in good working order.
- Participants should have knowledge of the rules, wear appropriate safety equipment and be properly prepared for the activities. This includes fitness and skills training.
- Injuries are properly assessed and treated.
- Inappropriate behaviour is discouraged. This encourages playing by the rules of the sport or activity.

Ethical issues

Ethics in sport involves fairness, integrity, responsibility, and respect.

Fairness

- All athletes and coaches must follow the rules of the sport. Any infringement of these rules will result in some form of penalty.
- Teams or individuals that seek an unfair competitive advantage over their opponent will not be tolerated.
- Discrimination has no place in sport. This includes being discriminated against or excluded from participating in a sport based on their race, gender, or sexual orientation.
- Referees apply the rules equally to both teams and should be shown respect at all times.

Integrity

- Similar to fair play, integrity must be upheld by all athletes who participate in sport. For example, a player should not feign an injury to gain an unfair advantage.

Responsibility

- Players and coaches are responsible for their actions on and off the field.
- Most sports require a high level of effort and commitment from players and coaches. Players and coaches should be held accountable for their performance when they are on the field.
- All players and coaches should follow the rules and regulations of the sport.
- Players and coaches should be held accountable for their actions on and off the field.



Figure 5.9: Participants should wear appropriate safety equipment.

Respect

- All participants should show respect to everyone involved in the game. This includes teammates, opponents, coaches, and officials.
- All coaches should show respect to everyone involved in the game. This includes all team members, opponents, coaches, and officials.
- All parents should show respect to everyone involved in the game. This includes opposition parents and players, coaches, and officials.

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 refers to a code of behaviour that the athletes, officials and spectators are expected to adhere to. Etiquette compliments the rules of the game and ensures that games are played in a respectable and fair manner.

Cricket is a sport well known for its etiquette, with examples such as:

- **Respecting umpire's decision:** Players are expected to respect the decisions made by the umpires, even if they disagree with them. Arguing or showing dissent towards umpires' decisions is generally considered disrespectful and can result in penalties.
- **Walking:** 'Walking' refers to a batsman voluntarily leaving the crease if they know they are out, even if the umpire hasn't given them out. While this is not always followed by all players, it is considered a display of honesty and sportsmanship.
- **Applauding good performances:** Players from both teams often applaud and acknowledge moments of exceptional performance, such as a century (scoring 100 runs) or a five-wicket haul (taking five wickets in an innings) achieved by an opponent.
- **Shaking hands:** At the end of a match, it is customary for players from both teams to shake hands as a sign of respect and sportsmanship, regardless of the outcome of the game.
- **Respecting the pitch:** Players should avoid damaging the pitch, which is the playing surface. Fielders should refrain from digging their spikes into the pitch. Bowlers should avoid running down the middle of the pitch on their follow through.

Learning activity

1. Choose a contact sport and describe the behaviours that jeopardise the safety of players. Outline the responsibilities of players and officials to ensure the safety of all concerned.
2. Outline scenarios in sport where legal issues could potentially impact players or officials.
3. Identify a range of ethical issues in relation to several games of your choice.
4. Outline accepted etiquette in relation to several games of your choice.

Practical activity

The class researches a number of games that they have not played in school before and outline the rules and etiquette to the class. They participate safely in each of the games researched.

Ways to participate

Participation in sporting events is versatile and can be tailored to individual preferences, abilities, and interests. Here are several ways people choose to participate:

- **As athletes:** Participating directly, either individually or as part of a team, testing skills and performance.
- **As coaches or trainers:** Guiding athletes, developing skills, strategies, and fostering sportsmanship and team spirit.
- **As officials:** Ensuring games are played fairly, enforcing rules, and adjudicating results.
- **As volunteers:** Helping with event logistics, registration, or aid stations, a rewarding way to contribute to the sporting community.
- **As sponsors or event organisers:** Providing financial support or coordinating the event's practical aspects.
- **As sports journalists or photographers:** Capturing and conveying the event's story through various media.
- **As spectators:** Enjoying the thrill and camaraderie of supporting a favourite team or player – often a communal, emotionally-engaging experience.

Each role offers unique perspectives and experiences, contributing to the overall richness and diversity of sporting events.

Social activity

For many individuals, sports represent much more than just a physical endeavour – they are a vibrant social avenue, teeming with opportunities for interaction, connection, and shared experiences. Participation in sports, whether through a local soccer league, a weekly game of touch football, or a casual game of basketball, brings people together, forging bonds over shared interests and common goals. These moments of camaraderie and teamwork extend beyond the field or court, spilling over into celebrations, commiserations, and shared memories. The communal spirit of sports creates a sense of belonging and mutual support, with team successes celebrated together and setbacks shouldered as a unit. Moreover, the informal, relaxed setting encourages open communication and friendships, often transcending the sporting context. The social aspect of sports can enrich lives, fostering a sense of community and mutual respect, creating lasting connections, and promoting overall wellbeing through the joy of shared physical activity.



Figure 5.10: Spectators can enjoy the thrill and camaraderie of supporting a favourite team or player.



Figure 5.11: For many people, sports represent much more than just a physical endeavour.

Competitions

Competitive games and sports are generally organised through sporting clubs. There are many influences, benefits and skills developed through participation in competitive games and sports. Lessons learned playing competitive sport can be helpful later in life. These lessons transcend sport and are applicable in all walks of life.

Skill improvement, teamwork, work ethic and goal setting all are aspects that individuals gain from a healthy experience in competitive games and sports. Participants also develop a sense of commitment to accomplish team goals. Determination, perseverance and sacrifice are all required to achieve these goals.

Competitive games and sports help to develop the following life skills:

- **Leadership:** sport provides many opportunities to develop leadership skills in a variety of roles.
- **Dealing with authority:** learning to work well with authority and accepting the umpire's decision contributes to an individual fulfilling their potential.
- **Communication:** effective communication is essential for sporting success and an essential life skill. Sport requires the development of verbal and non-verbal communication in a variety of settings. Communication can range from making public speeches, to motivational speeches at half time, right through to non-verbal signals to team mates regarding tactical manoeuvres.
- **Time management:** success in competitive sport requires a commitment of energy and time and developing the skills to adequately manage personal time.
- **Risk taking:** competitive sport provides a framework for people to test themselves against others and take calculated risks in order to succeed.
- **Decision-making:** competitive sport requires individuals to make decisions under stress and accept responsibility for those choices. It also provides opportunities to develop consensual decision-making skills as part of a team.

Learning activity

1. Outline the advantages and disadvantages associated with social participation in a range of games and sports.
2. Outline the advantages and disadvantages associated with competitive participation in a range of games and sports.



Figure 5.12:

Lessons learned playing competitive sport can be helpful later in life.



Figure 5.13:

Sport provides many opportunities to develop leadership skills.

Did you know?

Football (soccer) is the most watched sport in the world.



Figure 5.14:

Coaches make strategic decisions prior to a game, based on the strengths and weaknesses of their team.

Games and sports strategies and skills

‘Strategy’ can be defined as the decisions made prior to a game commencing that are based on the strengths and weaknesses of the participant’s team and opposition. Strategic planning, ranging from yearly plans right through to specific game plans, has improved over the years as a result of greater financial resources, improved coaching accreditation and technological improvements. Skill testing, fitness testing and video analysis assist coaches to develop strategies to improve performance, choose player rosters, make positional decisions and establish game strategies.

Defensive strategies

Defensive strategies are designed to counteract the offence and prevent them from scoring, regaining or retaining possession. They vary from sport to sport, but the underlying principles remain the same. Defensive strategies aim to limit the space available and reduce the time available to make decisions.

Internet activity

Log on to TitanOnline to complete Activity 5.3 by researching the strategies that teams can use to be successful in sport.

Positional play (defensive positions and formations)

When competing, teams use positional play to defend against their opposition. Each member of a team has a specific position or area of the playing space they should concentrate on and be responsible for. An example of defensive formations occurs in basketball, where two common formations are the zone defence and man-to-man defence.

With a zone defence each defender is required to defend an area of the court, or 'zone'. Any offensive player that comes into that area or zone then becomes the person they are defending against. With a zone defence, players adjust their position on the court depending on where the ball is on the court.

With man-to-man defence, each defender is allocated a certain offensive player to defend, and it is their responsibility to position themselves accordingly.

Patterns of movement (reducing space and manipulating tempo)

Space is the surroundings in which movement takes place. An individual's and/or team's success in games and sports is largely dependent on their ability to use the space available to them successfully. Defences that can reduce the space available to the attacking team have an increased likelihood of success.

Tempo is the rate or speed of motion of the game or sport. Defensive strategies are designed to manipulate the tempo of the game to suit the defence. For example, rugby league players will hold a tackled player for as long as they can without being penalised, to manipulate the tempo and provide extra time for their team mates to prepare defensive lines.



Figure 5.15:

With man-to-man defence, each defender is allocated a certain offensive player to defend against.



Figure 5.16:

To manipulate the tempo, rugby league players will hold a tackled player for as long as they can without being penalised.

Learning activity

1. Identify the specific requirements of various defensive positions and formations in basketball, netball and volleyball.
2. Design your own original defensive strategy in a sport of your choice and practise it in a game setting.
3. Outline how space and tempo can be manipulated in a range of games to gain a competitive advantage.

Offensive strategies

Offensive strategies are designed to counteract the defence and achieve their aim of scoring or regaining possession. Offensive strategies vary from sport to sport, but the underlying principles remain the same. Offensive strategies aim to increase the space available and increase the time available to make decisions.

Positional play (offensive positions and formations)

When competing, teams use positional play to attack their opposition. Each member of a team has a specific position or area of the playing space they should concentrate on. Each player is responsible for fulfilling the duties associated with their position. These patterns are called formations. An offensive formation is how the offence aligns their players prior to using a particular play.

The most common soccer formation is the 4–4–2, in which four players line up as defenders, four as midfielders, and two as forwards. This formation gives players and coaches the flexibility to press forward into the offensive zone or sag defensively to provide support.

Patterns of movement (creating space and set plays)

As previously mentioned, space is the surroundings in which movement takes place. An individual's and/or team's success in games and sports is largely dependent on their ability to use the space available to them successfully. Offences that can create space have an increased likelihood of success.

Set plays are a plan of action employed in particular predetermined situations. They are designed to create diversions, confuse the opposition and often contain an element of surprise. The advantages of set plays are they can be thoroughly rehearsed so that all players have a clear understanding of their role and errors in execution can be minimised. In soccer, for example, set plays are generally used when an attacking team receives a free kick or corner and there is time to position players and attack as rehearsed at training.



Figure 5.17:
When competing, teams use positional play to attack their opposition.



Figure 5.18:
A team's success in games and sports is largely dependent on their ability to use the space available to them successfully.

Learning activity

1. Describe strategies that would help a defender who lacks the speed of the player they are marking. Compare your strategies with others in the class.
2. Outline how a coach can develop a player's positional awareness.
3. Outline how offensive players 'create space' in a game of your choice.
4. Watch a professional game of football and outline one effective offensive set play and explain why it was effective.
5. Design an original offensive set play for a s

Manipulative skills

Manipulative skills involve holding, controlling, hit throwing an object and generally require a person hand–eye coordination. Manipulative movement controlling an object, usually by using the hands other parts of the body. They are sometimes refere skills, such as striking, throwing and kicking, and such as catching and trapping. Hockey is an exam of one sport in which the players use a range of manipulative skills to receive, control, dribble, pass and shoot the ball.

Techniques

Training the body to perform manipulative skills v is a major determinant of success in many game: The ability to competently manipulate an object in combination of correct technique, fine and gross practice. Techniques vary from sport to sport and instruction and practice. For example, the technic football varies significantly in the sports of Austr rugby league, despite the similarities in the ball s



Figure 5.19:

Manipulative skills generally require a person to have good

Practice methods

There are four types of practice methods that are useful in developing manipulative skills. These include:

- **Massed practice:** is a continuous type of skill practice where the rest periods are shorter than the practice periods. An example of this is a goal kicker in rugby union who practises his kicks at goal for 20 minutes with no break. Massed practice is best for highly skilled or motivated athletes.
- **Distributed practice:** is where the practice periods are broken with periods of rest or practising other skills. An example of this is a goal kicker in rugby union who practises his kicks at goal for 10 minutes, then either has a rest or practises another skill of the game for 10 minutes, before returning to goal kicking for another 10 minutes. Distributed practice is best for beginners when motivation is low or the skill is difficult or boring.
- **Whole practice:** is where the skill is practised as a whole. An example of this is the basketball free throw. If the coach was using whole practice, the skill would be demonstrated and then practised in its entirety.
- **Part practice:** this is where the skill is broken down into parts or sub routines. An example of this is the basketball lay-up. If the coach was using part practice, the lay-up would be broken down and practised in parts, i.e. approach angle, ball-handling, jumping technique and the release of the shot. The part method is best for beginners or when learning complex skills. Many coaches use a combination of whole and part practice.



Figure 5.20:

A professional rugby union player is likely to use a massed practice method when practising goal kicking.



Figure 5.21:

Netball players would use the whole practice method while practising throwing and catching on the run.

Practical activity

Practise your manipulative skills in the following activities:

- juggling two balls in your dominant hand
- juggling two balls in your non-dominant hand
- juggling two balls in two hands
- juggling two balls in two hands with eyes closed
- juggling three balls in two hands.

Compare your performance in each type of juggling with a partner. Suggest reasons for differences in performance. Consider other activities that you may have practised that enabled you to transfer skills to the activity of juggling.



Figure 5.22:

A good team member involves all teammates in the decision-making process.

Aspects of team play

What aspect of teamwork makes some teams successful and others not? Why doesn't the team that contains the most talented individuals always win? The answer is simple. A well organised, committed team has the capacity to create a greater competitive effect than the combined effort of players acting as individuals. It is not however, a simple matter to create the culture where individuals embrace a common vision and work together to succeed.

Individual vs team responsibilities

Individuals have responsibilities to perform to the best of their ability and use their skill, fitness and experience to compete effectively. In addition to the roles and responsibilities they have as a player, they also need to be contributing as part of the team. A good team member:

- works towards team goals
- is open and authentic with teammates regarding all aspects of the team
- involves all teammates in the decision-making process
- trusts and supports all team members
- doesn't blame others for their mistakes
- listens to all team members and considers both sides of a disagreement
- encourages the professional development of everyone involved with the team
- demonstrates respect and tolerance
- openly works through any conflict that may arise
- is open to constructive criticism
- encourages feedback on their ability
- understands and is committed to team goals
- participates actively and positively in all games and training sessions
- considers all solutions to any problems
- takes initiative to get jobs done
- trusts their teammates
- is willing to take risks for the good of the team.

Leadership

Leadership is the ability to influence, inspire and direct other people towards achieving set goals. In games and sports, 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, democratic and laissez-faire:

- **Autocratic leadership:** also known as authoritarian leadership. In this style of leadership, the coach focuses on being in control. They are commonly strict and disciplined and has a 'do as I say!' mentality. They are responsible for all decision making and solicits little communication from athletes. The focus of authoritarian coaching is on winning, and the coach allows for little flexibility in their coaching operations. This style of coaching is common in team games. Authoritarian coaching is questioned in relation to whether it leads to motivation among the athletes or teams.
- **Democratic leadership:** also known as participative leadership. In this style of leadership, the focus is on communication and cooperation between coaches and athletes. It is an athlete-centred style in which decision making is shared and interaction is high. The coach can form a positive relationship with the players, and their motivation is arguably high when their coach uses this style of leadership. However, coaches using this style have to be wary of their status as a coach, because if they become too friendly with their athletes, they (the coaches) risk losing their authority.
- **Laissez-faire leadership:** also known as delegative leadership. This style of leadership is casual or easy going, and is characterised by less dedication to the task of leadership and more focus on enjoyment and participation in the organised sport in question. In this style, the decision-making power lies with the athletes. However, the athletes can feel frustrated because of the lack of organisation and commitment in their coaching. Also, athletes' potential might not be realised due to the coach's informal and relaxed approach.



Figure 5.23: Autocratic leaders are commonly strict, with a 'do as I say!' mentality.

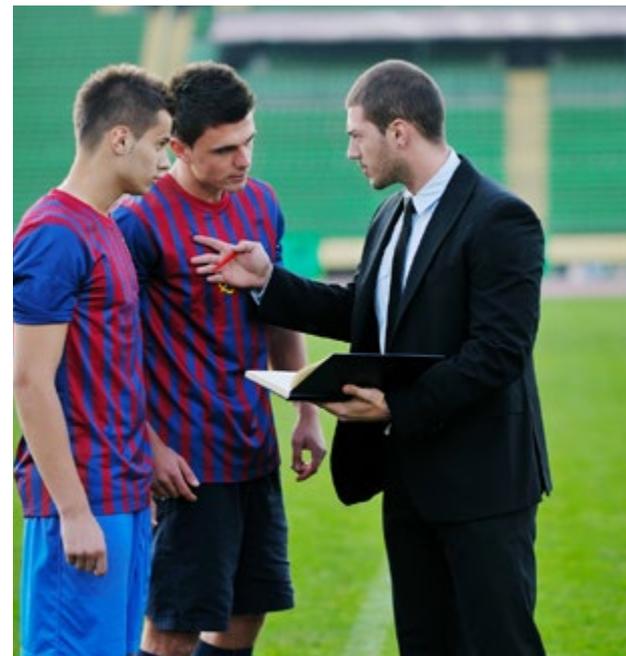


Figure 5.24: Democratic coaches focus on cooperation and communication with their athletes.

An effective leader has to have a multitude of skills, many of which are dependent on the participants' age and level of ability.

Effective leaders:

- listen carefully to all the group members and treat them as equals
- create options and opportunities
- solve problems
- communicate effectively
- are well organised
- provide constructive feedback
- are flexible
- share accolades and successes
- empower other people to take on a leadership role
- learn from experience, and self-monitor the knowledge and skills they are helping develop
- are role models and inspire other people
- understand the group members' physical, social, emotional and cognitive needs
- prepare both players and teams so they can achieve their maximum potential
- provide training sessions from which the outcome is improved performance.



Figure 5.25:
Effective leaders share accolades and successes.

Positional responsibilities

In a team sport, each player's positional responsibility is crucial for overall performance. Specific roles are assigned based on skills, strengths, and game strategy. In soccer, for example, forwards focus on scoring goals, midfielders control game flow and link defence with offence, while defenders and the goalkeeper prevent opponents from scoring. Similarly, in basketball, positions like guards, forwards, and centre each have unique duties, from orchestrating plays to scoring and defending. Adherence to these positions and executing their responsibilities effectively allows for a well-coordinated, balanced team, crucial for game success and competitive advantage.

Practical activity

The class will be split into small teams of five or six students and will compete in a sport chosen by the class. Identify leadership roles for each team, including captains, defensive coach and offensive coach. Discuss what these roles will mean for your team and allow the leaders the time to instruct the team prior, during and after the game. Debrief after the game and discuss how effective different individuals were in their role and what different types of leadership styles were used.



Figure 5.26:

Generally, the coach will decide on the defensive and offensive strategies a team will employ.

Application of defensive and offensive strategies in performance environments

Offensive and defensive strategy in games and sports involves manipulating tactics, positional play and patterns of movement for the desired outcome. Varying formations are achieved through varying strategies and tactics developed by a team for the opposition they are due to meet.

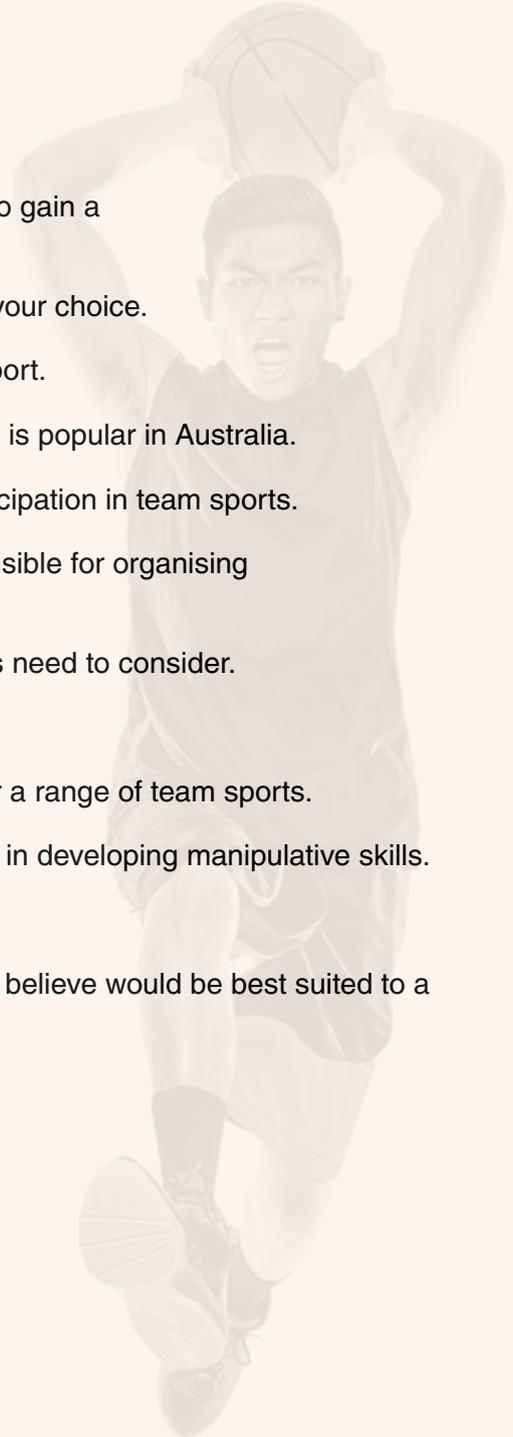
Many games and sports involve an intricate system of defensive and offensive strategies. Generally, the coach will decide on the defensive and offensive strategies a team will employ for their upcoming game based on their own strengths and weaknesses and their opponent's strengths and weaknesses. Factors such as playing conditions, climate, time of day and team injuries will all be taken into account when applying defensive and offensive strategies.

Learning activity

1. Design four practice sessions based on each of the different practice methods for a range of manipulative skills in a sport of your choice.
2. Outline the leadership skills required for a senior, amateur netball team.
3. Identify the positional responsibilities for a sport of your choice.
4. Design appropriate offensive and defensive strategies in a range of competitive situations in a sport of your choice.

Revision questions

1. Research the 'slide defence' and the 'umbrella defence' in rugby league and describe the tactics and the intended outcomes.
2. Outline the key rules for a sport of your choice.
3. Describe the equipment used in a sport of your choice.
4. Describe how space is manipulated in this sport in order to gain a competitive advantage.
5. Identify the role of individual team members in a sport of your choice.
6. Outline a defensive tactic that is commonly used in this sport.
7. Design your own unique offensive strategy for a sport that is popular in Australia.
8. Identify the social benefits a person can expect from participation in team sports.
9. Outline the legal requirements for officials who are responsible for organising sporting competitions.
10. Identify a range of ethical issues that professional athletes need to consider.
11. Outline accepted etiquette for a sport of your choice.
12. Describe how space and set plays can be manipulated for a range of team sports.
13. Describe the four types of practice methods that are used in developing manipulative skills.
14. Identify the characteristics a good team member displays.
15. Analyse the three leadership styles and outline which you believe would be best suited to a school-aged team.



CHAPTER 6

Healthy

Throughout this unit, students relate to achieving a healthy lifestyle by implementing strategies into their health and wellbeing. Students explore various lifestyle components and factors that influence a healthy lifestyle. They evaluate the impact of physical activity as well as their activity choice. Students study the interrelationship between health and lifestyle. They will explain the long-term and short-term nutritional needs. Students explore various types of reasons for using these drugs and the effects of these drugs. They will conclude on selected health issues of young people such as trauma, obesity, eating disorders, sexually transmitted infections, viruses, asthma and drug use.

Syllabus outcomes

A student:

- critically analyses the factors that influence health and their impact on health
- selects and participates in physical activity based on individual needs, interests and abilities
- analyses personal health and lifestyle
- makes strategic plans to improve personal and community health (4.3)

Focus areas

- Nature of lifestyle
- Physical activity
- Nutrition
- Drug use
- Selected health issues of young people



Figure 6.1:

It is important to eat nutritiously and to exercise to maintain health.

Nature of lifestyle

Lifestyle is a term used to describe all the aspects in a person's day to day experiences that make up their sense of self and identity. There are many different components that make up an individual's lifestyle, as well as many factors that influence lifestyle.

Lifestyle components

There are many lifestyle components that impact on and influence an individual's daily experiences. These components include recreation, exercise, work, relaxation and sleep. A key element in achieving a fulfilling, enjoyable and healthy life is an individual's ability to create and maintain a balance between these components.

Recreation

Recreation entails activities individuals participate in for a sense of enjoyment, relaxation, rejuvenation or fun. Recreational pursuits vary significantly between different individuals depending on their likes and dislikes. For recreation, some people may enjoy reading whereas other may prefer to play video and computer games.

Exercise

Exercise is a very important lifestyle component. Participating in regular physical activity has a multitude of benefits, not only for physical health but also for social, emotional, mental and spiritual health. Exercise incorporates activities that involve elevating the heart rate and expending energy. The term incidental exercise involves activities that expend energy but are not necessary planned fitness activities, but rather just the activities of everyday life. Examples of incidental exercise include pulling weeds from the garden, cleaning the house, walking to school, washing the dog, hanging clothes on the line and mowing the lawns. A healthy lifestyle contains a balance between planned exercise and incidental exercise.



Figure 6.2: People participate in recreational activities for a sense of fun and enjoyment.

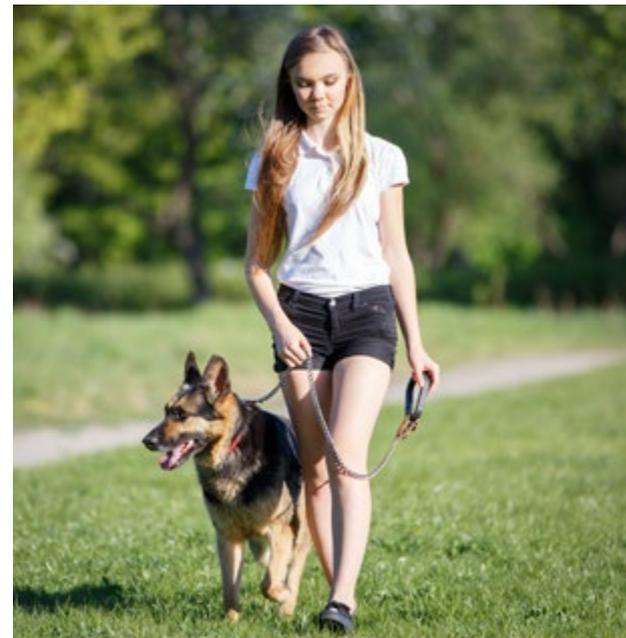


Figure 6.3: Walking the dog is an example of incidental exercise.

Work

Work is defined as any activity that involves physical or mental effort in order to achieve a desired result. Work can be on a volunteer basis, but in most cases, work refers to a person's career or job. There is a significant benefit to being able to secure a job that is challenging, rewarding and enjoyable, as it contributes to a person's quality of life. Most full-time positions require a person to work approximately 40 hours a week, and if a person has to settle for a job that they do not enjoy, it can result in significant mental and physical stress over an extended period of time.

In addition to finding a rewarding, enjoyable career, it is important individuals balance the work component of their life with the other components. Working too much can lead to stress, breakdowns in family relationships, missing out on social events, letting friends and family down. Alternatively, working too little can lead to financial instability, which in turn can affect relationships and mental health.

Relaxation

Relaxation relates to activities individuals do in order to unwind and de-stress. Relaxation and ways of relaxing have become more and more commercial due to higher levels of stress developing over the past decade. People may choose to relax by meditating, getting a massage, taking a hot bath, going for a walk and so on.

Sleep

Sleeping is a very important part of life. Adequate sleep is essential for brain functioning, alertness, memory function, weight management and much more. During sleep, the muscles are relaxed and body systems slow, allowing them to repair. Typically, eight hours sleep a night is ideal but this will vary from person to person. People who get inadequate sleep or suffer poor sleep quality, are more accident prone and less able to perform daily tasks efficiently.



Figure 6.4: Jobs that are rewarding and enjoyable contribute to a person's quality of life.

Learning activity

1. Review your own lifestyle and create a graph illustrating how much time you spend on each lifestyle component over a one-week period.
2. Describe what would be your 'ideal' lifestyle and develop a plan that would enable you to achieve it.
3. Assess the degree to which lifestyle promotes optimal health.
4. Discuss the importance of sleep and outline strategies that encourage quality sleep.
5. What do you value more in regards to lifestyle – job satisfaction or job remuneration? Why?

Factors influencing lifestyle

There are many different factors that can have an influence on lifestyle. These factors can have a positive, negative or neutral impact on a person's life. The factors include:

- relationships
- personal skills
- socioeconomic status
- geographical location
- sociocultural factors
- the media
- education.

Relationships

Relationships are the bonds and connections individuals share with those around them. There are many different types of relationships individuals will be involved in, and over time, relationships will develop and change. Relationships are one of the strongest influences on a person's lifestyle. The lifestyle of infants and children are framed by their parents and the lifestyle of the family. The lifestyle that children become accustomed to as they are raised often forms the basis of their values and habits later in life. During adolescence, friendships and peer groups become very influential and individuals begin to make their own lifestyle decisions. As people age, they may change their lifestyle once again as they are influenced by work environments, partners and the demands of raising a family. Some relationships experienced throughout a lifetime that will impact an individual's lifestyle include:

- **Friendship relationships:** relationships shared with friends and peers. Friendships usually develop because of sharing something in common, such as age, school, sport, taste in music, sense of humour, and personality.
- **Family relationships:** these are built with parents, siblings, grandparents, aunts, uncles. As individuals get older, if they choose to get married and/or have children, these people become family.
- **Work relationships:** these are developed with people at work and tend to be more professional relationships. It is important to develop good relationships in the workplace, as this is key to success for both the individual and the organisation.
- **Intimate relationships:** these are developed with people one is attracted to and have a special connection with. It is very important to understand rights and responsibilities while in intimate relationships and that mutual respect is developed.

Did you know?

Studies show that people who are married have greater life expectancy and health status



Figure 6.5:

Relationships are one of the strongest influences on a person's lifestyle.



Figure 6.6:

The location where people live can determine what they have access to and what activities they do on a daily basis.

Personal skills

Personal skills are specific skills that help create a well-rounded, balanced, resilient individual. Personal skills involve things like confidence, communication, patience, punctuality and being organised. These skills play an important role in developing healthy relationships and securing rewarding work.

Socioeconomic status

Socioeconomic status greatly impacts on an individual's lifestyle. The term socioeconomic status refers to a person's financial status and the community with which they identify. There is a strong link between socioeconomic status and a healthy lifestyle, as the more money an individual has, the more opportunities available to them. Having access to health care, nutritious food, adequate shelter, clothing, social events, physical activity opportunities and good education increases the likelihood of a healthy lifestyle.

Geographic factors

The location where an individual lives can determine what they are interested in, how they live their life, what they have access to and what activities they do on a daily basis. The lifestyle choices an individual will make can be significantly influenced by issues such as:

- Do they live in a warmer or colder climate?
- Are they located near the coast or are they living inland?
- Is it a remote community or urbanised area?
- Is the area relatively safe, free from violence and crime?
- Are there adequate health facilities in the local area?
- Is there a variety of physical activity and recreational opportunities in the local area?
- What are the educational and employment opportunities in the community?

Sociocultural influences

Sociocultural factors are those attitudes that are perpetuated throughout a specific community based on values, social structure, religion and cultural and social identities. These factors will influence an individual's feelings, thoughts and lifestyle choices. Behavioural expectations and what is considered to be healthy may differ considerably from culture to culture.

Media

Media has continued to have a growing impact on lifestyle, especially over the past thirty years with the increase of technology. Conventional media such as television, radio, magazines and newspapers have all developed in the way they deliver content to users. Social media has expanded upon this already powerful base, reinforcing stereotypes with images of how people should look and how they should act.

Education

Education plays a large role in any individual's life and having a good base of health knowledge provides the individual with the opportunity to make informed choices. Learning is a lifelong skill and if a person aspires to leading a healthy lifestyle, they need to continue learning about new advancements in health treatments, new food options and new ways of training and exercising. Education also provides tools and resources to understand the complexity of issues such as illicit drug use, dealing with abuse, and how to manage money.



Figure 6.7: Education and the media both impact on a person's lifestyle.

Learning activity

1. Analyse your own lifestyle decisions and rank those factors that impacted your decisions the most.
2. Discuss some personal skills that enhance health.
3. Compare the terms socioeconomic status and sociocultural factors.
4. Analyse the barriers impacting your lifestyle and propose strategies to overcome them.
5. Propose reasons why relationship status influences a person's lifestyle and health status.
6. Compare the educational opportunities in Australia to a third world country and suggest the impact the differences would have on the lifestyle choices made.

Physical activity

Physical activity includes any activity that gets the body moving and uses energy. Everyone has the ability, despite mobility, age, health status or intellectual ability, to participate in some sort of physical activity. People should aim to make physical activity a part of their everyday life and incorporate a mixture of moderate and vigorous activity. For those individuals that are used to a sedentary lifestyle, it is important to start at a comfortable base and build slowly, to avoid injury and becoming disheartened.

Benefits of participation

There are multiple benefits to be gained from participating in physical activity. These benefits are broad, but can be categorised into physical, social, mental and spiritual benefits.

Physical benefits are those that help improve the various body systems. The benefits an individual can expect to experience from participating in physical activity will depend on the nature of the physical activity. The benefits that flow from physical activity depend on factors such as the:

- intensity of activity
- duration of the activity
- type of physical activity
- existence of injury or health condition
- regularity of exercise

Taking into consideration the above factors, some of the physical benefits of physical activity can include improved:

- cardiovascular endurance
- muscular strength
- muscular endurance
- balance
- flexibility
- coordination
- blood pressure
- physical appearance

There are also many social benefits flowing from participation in physical activity. Physical activity provides a framework to make new friends and strengthen existing friendships. It develops confidence, a sense of achievement and skills associated with teamwork. For children, it provides opportunities to expend energy and avoid boredom. Mental health and spiritual health are promoted through relaxation, stress release, absence of disease and improved self esteem.

Did you know?

Physical activity releases endorphins, a group of hormones that induce feelings of well-being.



Figure 6.8:

There are multiple benefits to be gained from participating in physical activity.

Factors influencing activity choice

There are many different factors that will influence an individual's choice of activity. These factors can be categorised as social, environmental and personal.

Social factors

Social factors incorporate an individual's relationships, their socioeconomic status, sociocultural factors and the media.

The relationships an individual has over a lifetime has a significant impact of the choices they make. Parents may or may not encourage play and sport and as a role model, they influence the values and thoughts a young person has about physical activity. Friends encourage their peer group to join in activities both competitively and socially. Teachers in primary and high school can impact young people, influencing them to value and enjoy physical activity by including it in weekly curriculum and introducing students to new skills and activities.

Socioeconomic status can prove to be a significant influence on physical activity. Individuals with low socioeconomic status may not be able to afford to do many activities, such as going to a gym, playing organised sport, or sports that require expensive equipment, such as surfing. Individuals with lower socioeconomic status may also use this factor to help incorporate activity into their daily life. For example, instead of driving, they may bike ride, walk, or skate. Individuals with a high socioeconomic status may be able to afford more activities, such as gym memberships.

Sociocultural factors are often engrained into an individual's day-to-day life – they determine what is and what isn't natural or acceptable. Religion and culture play a large role in activities individuals involve themselves in. Another large sociocultural influencer on activity choices is subcultures. Subcultures are groups among who associate together because they have common interests, fashion, or taste in music. Groups such as skaters and surfers will choose physical activity based on their subculture.

The media can greatly influence physical activity. Firstly, the media perpetuates ideas and norms as to how a person should behave, dress and act. Successful male actors, for example are often buff and muscled, and successful female actors are often lean and toned. This can influence women to steer clear of activities that promote bodybuilding effects. Men may steer clear of activities that seem too feminine, because it does not fit with the stereotypical macho image that is portrayed in the media. The media can also have a positive effect by educating people on healthy dietary and activity choices.

Did you know?

Adolescents should be participating in an hour of



Figure 6.9: Groups such as skaters will choose physical activity based on their subculture.

Environmental factors

Environmental factors relate to an individual's geographical location and the resources available to them. Geographical location will play a role in the activity choices of individuals, because it can dictate what is and isn't available. People who live in remote areas won't necessarily have access to activities available at the beach such as surfing, snorkelling and surf lifesaving. People who live in dense city areas may not have access to spacious, naturally landscapes and thus will have to choose their activities accordingly.

Education can be considered another environmental factor that will influence activity choice and participation. If a person is not educated on what's available to them, they won't be able to participate in a wide range of activities. Understanding the benefits of doing specific activities can influence an individual's choice of activity as well.

Personal factors

Personal factors involve personal skills or habits that impact on an individual's level of activity. Examples of these personal factors include self-esteem and time management.

High self-esteem can make an individual more open to try new activities, to play team sports, and to exercise in places such as public gyms and fields. Low self-esteem can prevent an individual from wanting to participate in physical activities out in public, or in team sports.

Time management is being able to manage time effectively and can influence whether a person has time for physical activity at all, as well as what activities they choose. Individuals working in a busy office for example, might go for a walk or run during their lunch break.

Other personal factors such as disability, education levels and mental health status impact on the physical activity choices an individual will make.



Figure 6.10: Geographical location plays a role in the activity choices of individuals.



Figure 6.11: Disability can impact on a person's physical activity choices.

Learning activity

1. Describe the physical benefits of physical activity.
2. Describe the social benefits of physical activity.
3. Analyse how physical and social benefits of physical activity can be interrelated.
4. Create a physical activity plan for an older person with chronic knee problems.

Types of activity

There are many types of activity and they can be categorised as recreational, organised, competitive or non-competitive.

Recreational

Recreational activities are activities that people do for fun. These activities are often cheap or free. If an activity is done recreationally, it is not done competitively, for money, or with a referee or umpire. Examples of activities that can be done recreationally include snow skiing, fishing, skateboarding, snorkelling and sailing.

Organised activity

Organised activities are those incorporate planning, rules, playing times and a playing space. Organised activity involves performing on game or competition day and in some cases it also includes training and practice. Examples of organised activity include all competitive sporting events and planned recreational activities such as fun runs and guided bush walks.

Competitive

Competitive activity is any activity that is completed with the intent of winning or coming first. Competitive activities provide people with an opportunity to learn important life lessons and an awareness about themselves. Competition exposes people to the concepts of winning and losing, determination, focus, teamwork, and goal setting. Competitive sports are not for everyone and special consideration needs to be given to young athletes who may lack the necessary maturity and self confidence to compete. Examples of competitive activity include dance eisteddfods, athletic carnivals, knock-out competitions and sporting competitions.

Non-competitive

Non-competitive activities are exactly that, there is no competition as to who will win or be the best, but rather play simply for the social and physical benefits. Participants may just enjoy the activity, or may use it for relaxation or socialising. Examples of non-competitive activities include aqua aerobics, Zumba and bike riding.

Learning activity

1. Explain how social, environmental and personal factors influence your participation levels.
2. Reflect on your current lifestyle. How could you increase your level of physical activity? Discuss what types of activity would be suited to you, based on your individual needs, interests and lifestyle.
3. As a class, participate in a range of physical activities. Reflect on how you felt during and after your participation.
4. Provide a definition for each of the types of physical activity.

Nutrition

Nutrition is the process where organisms intake and utilise food substances, essential for growth, maintenance, and repair of body tissues, and overall health and wellbeing. Nutrition also incorporates diet and how much food is appropriate for a specific individual, depending on their dietary requirements and daily energy expenditure. When studying nutrition, it is important to consider the dietary guidelines, and nutrition in relation to exercise and health. The nutritional value of a product should include information concerning carbohydrates, proteins, fats, minerals, vitamins and fibre. Table 6.1 explains each of these components, with examples of foods high in each specific nutrient.



Figure 6.12: Complex carbohydrates help you feel fuller for longer.

Table 6.1: Nutrition explained.

Nutrient	Explanation	Examples
Carbohydrate	Carbohydrates provide energy so that it is possible for the body to work. It is the energy source that the body uses first, before fats and proteins. There are two types: simple and complex carbohydrates. Simple carbohydrates contain only one or two sugar molecules and are digested quickly. Complex carbohydrates contain many more sugar molecules, are often higher in fibre and take longer to digest.	Simple carbohydrates: <ul style="list-style-type: none"> ▪ Table sugar ▪ Soft drinks ▪ Jams Complex carbohydrates: <ul style="list-style-type: none"> ▪ Starchy vegetables ▪ Wholegrain bread
Protein	Protein is important for building and repairing tissue and essential in muscle recovery and development. The body does not store protein and regular intake is necessary. Protein requirements are not excessive however, and most Australians include more than enough protein in their diets.	<ul style="list-style-type: none"> ▪ Salmon ▪ Lentils ▪ Spirulina ▪ Tofu ▪ Eggs ▪ Nuts and legumes ▪ Avocado ▪ Chicken

Table 6.1: Nutrition explained.

(continued)

Nutrient	Explanation	Examples
Fat	Fats are important for many functions, in particular maintaining healthy skin and health, maintaining body temperature and providing protection for the bones. Fats have attracted a bad reputation and are often associated with cardiovascular disease and obesity. There are good fats (monounsaturated and polyunsaturated fats), and bad fats (saturated and trans fats).	<ul style="list-style-type: none"> ▪ Monounsaturated – avocado, almonds, seeds, soybean ▪ Polyunsaturated – fish, walnuts, Brazil nuts ▪ Saturated – meat fat, palm oil, dairy products ▪ Trans – takeaway foods, frozen dinners, doughnuts
Minerals	Minerals are important for absorbing vitamins and keeping parts of the body strong, such as teeth and bones. There are two types of minerals: macrominerals and trace minerals. The body needs more macrominerals than trace minerals, although both are important.	<ul style="list-style-type: none"> ▪ Macrominerals – sodium, phosphorus, potassium, calcium, magnesium, sulphur, chloride ▪ Trace minerals – manganese, iron, zinc, iodine, copper
Vitamins	Vitamins are very important in daily functioning. They are organic compounds that are important for growth and development. Vitamins will be either fat soluble or water soluble.	<ul style="list-style-type: none"> ▪ Vitamin B1 and B2 ▪ Vitamin C ▪ Vitamin K ▪ Vitamin A ▪ Vitamin D ▪ Folic acid
Fibre	Fibre is indigestible and moves through the body, large intestine and into the colon largely unchanged. A high-fibre diet will help in preventing constipation and helps the digestive system.	<ul style="list-style-type: none"> ▪ Broccoli ▪ Beans ▪ Spinach ▪ Grains

Learning activity

1. Explain why complex carbohydrates are a better dietary choice than simple carbohydrates.
2. Discuss the importance of including fats in the diet.
3. Select two macrominerals and discuss their role in the body.
4. For each of the examples of vitamins listed in the table, provide a definition of their role.
5. Find a television advertisement promoting products high in fibre. Research the product further and assess the accuracy of the advertisement.
6. Keep a food diary, recording the food and fluid consumed over a four-day period. Compare your intake to the Dietary Guidelines for Australians and suggest improvements that you could include in your diet.

Dietary guidelines

The Australian Dietary Guidelines have information about the types and amounts of foods, food groups and dietary patterns that aim to:

- promote health and wellbeing
- reduce the risk of diet-related conditions, such as high cholesterol, high blood pressure and obesity
- reduce the risk of chronic diseases such as type 2 diabetes, cardiovascular disease and some cancers.

The Australian Dietary Guidelines were developed in order to provide Australians with an accurate guide of what foods are appropriate to eat in what quantities, and how food should be incorporated into daily life.



Figure 6.13: New mothers should be encouraged and supported to breastfeed.

Table 6.2: The Australian Dietary Guidelines.

Guideline 1	To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet energy needs.
Guideline 2	Enjoy a wide variety of nutritious foods from these five groups every day: <ul style="list-style-type: none"> ▪ Vegetables ▪ Fruit ▪ Grain ▪ Lean meats and poultry, tofu, nuts and seeds, legumes/beans ▪ Milk, yoghurt, cheese or their alternatives.
Guideline 3	Limit intake of foods containing saturated fat, added salt, added sugars and alcohol.
Guideline 4	Encourage, support and promote breastfeeding.
Guideline 5	Care for your food; prepare and store it safely.

Source: National Health and Medical Research Council.

In the past, the Healthy Eating Pyramid was used to highlight which groups of foods should be eaten in what quantities. The bottom of the pyramid had foods people should consume most: fruit, vegetables and breads/cereals. In the middle were foods that should be eaten moderately: eggs, lean meats, fish and nuts. The top of the pyramid were foods to consume in small amounts: sugary and fatty foods. The pyramid was adapted and changed into what it is now – the Australian Guide to Healthy Eating, as seen in Figure 6.14 on the following page.

Learning activity

1. Explain the reasons underpinning each of the five Australian Dietary Guidelines.
2. Evaluate the food and drink served in your school canteen and analyse the extent to which the choices support the current Australian Dietary Guidelines.
3. Create a personal set of dietary guidelines based upon an analysis of your diet.
4. Critically examine the factors that influence dietary choice.



Figure 6.14: The Australian Guide to Healthy Eating. Source: National Health and Medical Research Council.

Nutrition, exercise and health

It is important to eat nutritiously and to exercise to maintain health, but it is important to do this safely. The foods individuals consume provide them with energy. Exercise uses energy. Therefore, consuming more energy than used each day will result in weight gain. Consuming less energy than used will result in weight loss. Consuming the same amount as used each day will lead to stable body weight.

To be able to exercise efficiently, the body needs to be filled with the right fuel, just like driving a car. The right fuel will depend on what sort of exercise an individual is doing. In most instances, carbohydrates are the preferred fuel source because the body stores carbohydrates as glycogen and the muscles use glycogen when they need energy.

To perform at an optimal level, it is important to also consider meal times. It is necessary to eat before exercise, in order to be well energised. If a heavy meal is consumed too close to exercising, this will negatively impact performance. The digestive system uses energy to digest the food, and if a person eats too close to exercise, energy will be divided between the muscles and the digestive system. If a person doesn't eat at all before exercise, they can quickly become fatigued and begin to feel faint and lose concentration. Ideally, eating should occur two or three hours before exercise and if still hungry, a light snack can be consumed.

It is important to keep hydrated at all times, but particularly before, during and after exercise. During exercise, water in the body is used up quickly, because temperature rises and the body sweats to keep cool. Effects of dehydration include:

- faintness
- light headedness
- dizziness
- thirstiness
- confusion
- heart palpitations.

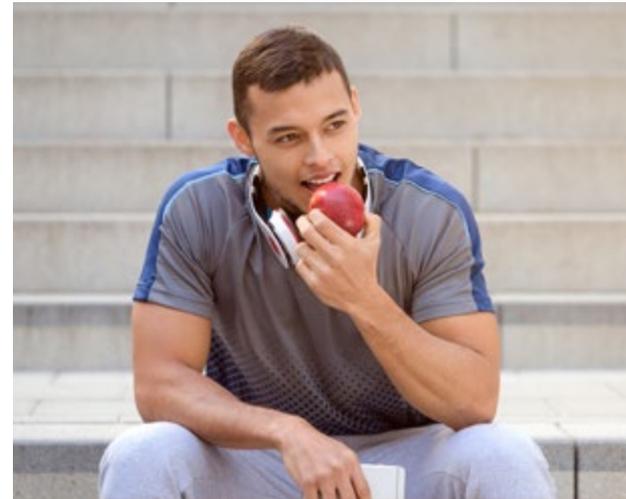


Figure 6.15:
The joints of the skull fuse to protect the brain (just like a bike helmet).



Figure 6.16:
It is important to keep hydrated before, during and after exercise.

Learning activity

1. Research a diet that is currently popular and compare it to the Australian Dietary Guidelines. Report your findings to the class, outlining any areas you believe the diet is deficient.
2. Outline the nutritional advice you would give to a athlete competing in an endurance event.
3. Analyse the relationship between nutrition and exercise.
4. Evaluate how nutrition and exercise impact on energy balance.
5. Analyse the claims of a popular breakfast cereals and evaluate its appropriateness for young children.



Figure 6.17: Nutritional imbalance can have a negative impact on the body and cause symptoms such as fatigue.

Consequences of nutritional imbalance

Nutritional imbalance occurs when an individual is not consuming enough of specific nutrients. This can have a negative impact on the body and cause many unwanted symptoms such as fatigue, anaemia, and dehydration. Individuals with certain specific dietary requirements, such as vegans, diabetics and people with lactose or gluten intolerance, need to take extra care to ensure they have a balanced and healthy diet. Table 6.3 highlights some of the necessary nutrients and what consequences an individual can expect if they consume too little or too much of that nutrient.

Table 6.3: Possible consequences of nutritional imbalance.

Nutrient	Too much	Too little
Carbohydrate	<ul style="list-style-type: none"> ▪ If not used, the body stores it as fat, resulting in weight gain ▪ Increased blood sugar levels ▪ Bloating ▪ Gastrointestinal stress 	<ul style="list-style-type: none"> ▪ Ketosis ▪ Weight loss ▪ Tiredness and fatigue
Protein	<ul style="list-style-type: none"> ▪ If not used, the body stores it as fat, resulting in weight gain ▪ Adds stress on the kidney and liver ▪ Dehydration 	<ul style="list-style-type: none"> ▪ Not enough essential amino acids – body will start breaking down muscles to access these acids ▪ Weakened immune system ▪ Tiredness and fatigue ▪ Weight loss ▪ Anaemia ▪ Slow growth in children

Table 6.3: Possible consequences of nutritional imbalance.*(continued)*

Nutrient	Too much	Too little
Fat	<ul style="list-style-type: none"> ▪ If not used, the body stores it as fat, resulting in weight gain ▪ Risk of developing the following: <ul style="list-style-type: none"> – high blood pressure – coronary heart disease – type 2 diabetes 	<ul style="list-style-type: none"> ▪ Weight loss ▪ Depression ▪ Overeating (other groups of nutrients) ▪ Problems with skin and hair disorders
Minerals	<ul style="list-style-type: none"> ▪ High blood pressure ▪ Problems with digestive system ▪ Headaches and nausea 	<ul style="list-style-type: none"> ▪ Weak/brittle bones ▪ Tiredness and fatigue ▪ Infertility ▪ Weakened immune system ▪ Anaemia
Vitamins	<ul style="list-style-type: none"> ▪ Nerve problems ▪ Kidney stones ▪ Bloating ▪ Headaches ▪ Diarrhoea 	<ul style="list-style-type: none"> ▪ Weakened immune system ▪ Weak/brittle bones ▪ Memory failure ▪ Weight loss
Fibre	<ul style="list-style-type: none"> ▪ Weight gain ▪ Gas ▪ Bloating 	<ul style="list-style-type: none"> ▪ Constipation ▪ Obesity ▪ Pains and cramps in the stomach

Learning activity

1. Research the situations where dietary supplements such as vitamin pills would be advised.
2. Describe the short- and long-term consequences of a diet too high in certain nutrients.
3. Research what is involved in following a vegan diet and the outline how they can source sufficient protein without the intake of animal products.
4. Create a new product ideal for consumption by marathon runners during the race. Provide reasons behind your choice.

Drug use

Individuals use drugs for many reasons. For some people it is the stimulant effect of their morning coffee, others may be habitually addicted to cigarettes and others may use illegal drugs to withdraw from the pressures of everyday life. The pattern of use might vary considerably as well. Some users might be experimenting with a drug for the first time, while a risky drinker uses alcohol irregularly but excessively, and others may be that so dependent on drugs that their use consumes every hour of the day.

Types of drugs

Drugs are substances and chemicals that alter body and mental functioning in some way. Drugs can be used to cure illness and disease, and they can also be abused. People use legal drugs such as medications, tobacco, alcohol and illegal drugs such as opiates, designer drugs and cannabis in a variety of ways. These drugs can be categorised into three groups, according to the effect they have on the human body:

- **Depressant:** slows the muscular and nervous system down. Slows reaction time and reduces coordination and concentration.
- **Stimulants:** increase activity in the nervous system and create higher alertness, heart rate and energy levels.
- **Hallucinogens:** alter an individual's perception of reality. May cause an individual to see, hear, feel and think things that are not real.

Medications

Medication is used to cure or treat certain illnesses and diseases. Medication can be over-the-counter or prescription:

- **Over-the-counter:** an individual can visit any chemist or pharmacy (and even some supermarkets) and buy the medication without any script or permission needed.
- **Prescription:** to buy the medication, an individual must have a script written out by a doctor detailing what medication the individual needs.



Figure 6.18:
Drug and alcohol abuse can have long-lasting effects on a brain.



Figure 6.19:
Over-the-counter medications are easy to access through pharmacies.

Did you know?

Studies show that mixing energy drinks (stimulant) with alcohol (depressant) sends mixed messages to the brain and dramatically increases the risk of overconsumption.

Proportion of current daily smokers, 2011–12 and 2021–22

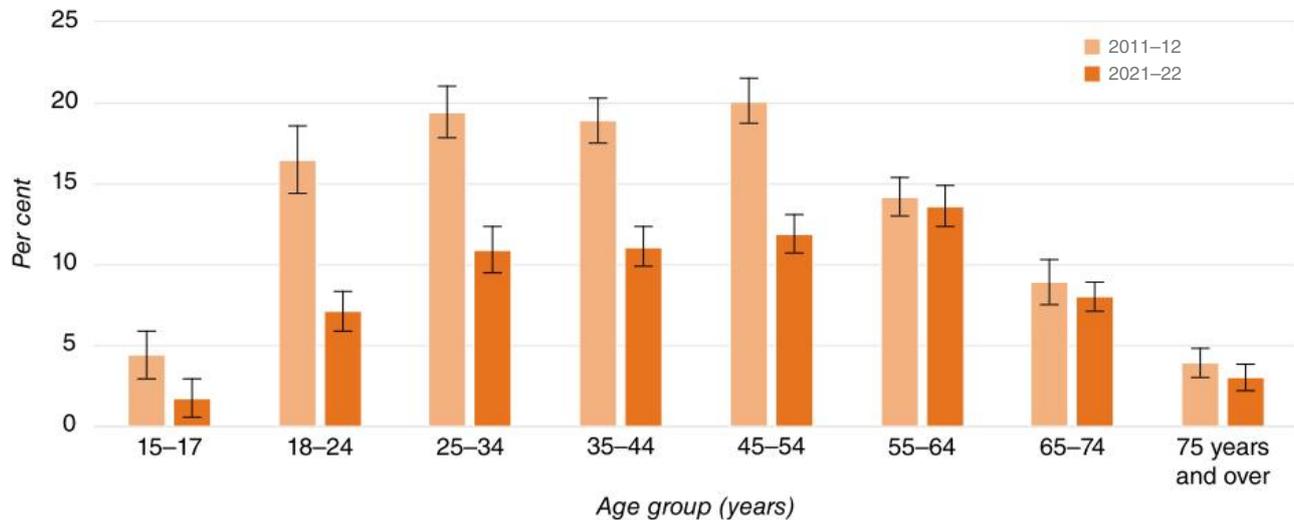


Figure 6.20:
Each of the body's complex structures has a specific role.

Smoking

Smoking is a hazardous habit involving the inhalation of tobacco smoke through burning cigarettes, cigars, or pipes. It entails the consumption of nicotine and other harmful chemicals that are detrimental to human health. This addictive behaviour significantly increases the risk of various life-threatening conditions, including lung cancer, heart disease, respiratory disorders, and stroke. Smoking not only affects the individual indulging in it but also poses a danger to those exposed to second hand smoke. Quitting smoking is highly recommended to improve overall wellbeing and reduce the likelihood of serious health complications. Governments have implemented several laws and strategies to control or ban smoking in certain settings to address the dangers of passive smoking.

Since 2011–12, the proportion of current daily smokers has decreased in all age groups – except for those aged 55–64 years and 65 years and over. Over this same period, the proportion of young people aged 18–24 years who were current daily smokers has halved (16.5 per cent in 2011–12 to 7.1 per cent in 2021–22). The majority (96.8 per cent) of people aged 15–17 years were current non-smokers in 2021–22 – this has increased from 94.2 per cent in 2011–12.

Source: Australian Bureau of Statistics – Insights into Australian smokers, 2021–22

Internet activity

Log on to TitanOnline to complete Activity 6.1 by researching the changes to smoking laws over time in Australia.

Alcohol

Alcohol occupies a significant place in Australian culture and is consumed in a wide range of social circumstances. In general, alcohol is consumed at levels of low immediate risk. However, some people may drink at levels that increase their risk of developing health problems over the course of their life, as well as increasing their risk of alcohol related injury.

The National Health and Medical Research Council's Australian guidelines to reduce health risks from drinking alcohol recommend that, to reduce the risk of harm from alcohol-related disease or injury, healthy individuals should drink no more than 10 standard drinks a week and no more than four standard drinks on any one day. The guidelines recommend that people under 18 do not drink alcohol.

Characteristics of people who exceeded the guideline:

- People aged 18 years and over born in Australia were almost twice as likely as those born overseas to exceed the guideline (30 per cent compared to 17.3 per cent).
- Those living in inner regional (29.2 per cent), and outer regional and remote (30.3 per cent) areas were more likely to exceed the guideline than those living in major cities (24.5 per cent).
- People employed full time were twice as likely as those who were unemployed to have exceeded the guideline (32.0 per cent compared to 16.8 per cent).
- People living in areas of least disadvantage were more likely than those living in areas of most disadvantage to exceed the guideline (30.7 per cent compared to 18.5 per cent).
- Nearly two-fifths (38.1 per cent) of those living in group households exceeded the guideline. This was higher than any other family household composition.

Source: Australian Bureau of Statistics – Alcohol consumption, 2020–21



Figure 6.21:

Australia's alcohol guidelines recommend that people should drink no more than four standard alcoholic drinks in one day.

Internet activity

Log on to TitanOnline to complete Activity 6.2 by investigating health promotions targeting alcohol consumption.

Cannabis

Cannabis, also known as marijuana, is a psychoactive drug sourced from the cannabis plant. Its two major active compounds are tetrahydrocannabinol (THC) and cannabidiol (CBD). THC is primarily responsible for the drug's mind-altering, euphoric effects, while CBD is noted for its therapeutic properties without the 'high'. These compounds can be consumed in a variety of ways, including smoking, vaporisation, ingesting through edibles, or applying as oils. Medicinally, cannabis is used to alleviate symptoms of numerous conditions, such as chronic pain, anxiety, epilepsy, and multiple sclerosis. Recreationally, it's consumed for its psychoactive effects. However, potential risks include dependency and mental health issues. The legality of cannabis varies globally, with some jurisdictions allowing medicinal and/or recreational use.

Data gathered about young people and the use of cannabis indicates that the proportion of students using cannabis increased with age and remains the most commonly used illicit substance.

Other illegal drugs

Other illegal drugs include and are not limited to:

- methamphetamine (speed)
- crystal methamphetamine (ice)
- acid (LSD)
- ecstasy
- cocaine
- magic mushrooms
- heroin
- steroids.

According to the 2019 National Drug Strategy Household Survey (NDSHS), an estimated 9.0 million (43 per cent) people aged 14 and over in Australia had illicitly used a drug at some point in their lifetime (including the non-medical use of pharmaceuticals), and an estimated 3.4 million (16.4 per cent) had used an illicit drug in the previous 12 months. This was similar to proportions in 2016 (43 per cent and 15.6 per cent, respectively), but has increased since 2007 (38 per cent and 13.4 per cent, respectively).

In 2019, the most common illicit drug use was cannabis (11.6 per cent), followed by ecstasy (3.0 per cent). A number of factors have influenced the recent use of illicit drugs between 2007 and 2019, including increases in the use of:

- cannabis (from 10.4 per cent to 11.6 per cent)
- cocaine (from 2.5 per cent to 4.2 per cent)
- ecstasy (from 2.2 per cent to 3.0 per cent)
- hallucinogens (from 1.0 per cent to 1.6 per cent)
- inhalants (from 1.0 per cent to 1.4 per cent)
- ketamine (from 0.4 per cent to 0.9 per cent)

Source: Australian Institute of Health and Welfare

Internet activity

Log on to TitanOnline to complete Activity 6.3 by researching laws of various countries in relation to cannabis use.



Figure 6.22:

Cannabis is the most commonly used illicit substance.

Learning activity

1. Research the current statistics and trends surrounding young people in Australia and their use of each type of drug.
2. Discuss short- and long-term effects of using the various types of drugs.
3. Research different organisations available to young people who have a drug addiction.
4. Define the term polydrug use and record current statistics.
5. Define the term 'synthetic drugs'. Find a case study of a young Australian who has died from synthetic drug use and discuss.

Reasons for drug use

There are a variety of reasons as to why individuals use drugs, but the common factor is the need to change some aspect of their lives. Some of these reasons may include taking drugs to:

- cure or manage an illness or disease
- fit in and to have a sense of belonging
- cope with peer pressure
- experiment with new life experiences that seem to promise happiness
- escape from stress, worry or conflict
- enjoy the effects or to have fun
- satisfy an addiction
- lose or gain weight
- appear grown up or gain respect from others
- relieve pain
- sleep better
- rebel against authority.

Consequences of drug use

Drug use can have a wide range of consequences and affect various aspects of an individual's life, including their physical health, mental wellbeing, relationships, and overall quality of life. Consequences of drug use can vary based on factors such as the type of drug, the frequency and duration of use, individual differences, and the presence of any underlying health conditions.

Seeking help and support for substance abuse and addiction is crucial to minimise these negative consequences and improve overall health and quality of life. Treatment options, including therapy, counselling, support groups, and medical interventions, can help individuals overcome the challenges associated with drug use.



Figure 6.23:

There is insufficient evidence to promote the use of e-cigarettes to quit smoking.

Did you know?

Cigarettes contain hydrogen cyanide, which was used to kill people in gas chambers during World War II.

Internet activity

Log on to TitanOnline to complete Activity 6.4 researching the argument for medicinal cannabis.

Short-term and long-term

The effects of drug use can vary widely depending on the type of drug, the dosage, frequency of use, individual factors (such as genetics and overall health), and whether the use is recreational or due to addiction. Drugs can be broadly categorised into legal drugs (like alcohol and prescription medications) and illegal drugs (such as cocaine, ecstasy and methamphetamine).

Table 6.4: Short- and long-term effects of legal and illegal drugs.

Drug	Short-term effects	Long-term effects
Alcohol	Lowered inhibitions, slowed reflexes and motor function, impaired decision making, potential for alcohol poisoning.	Liver disease, brain damage, increased risk of cancers, addiction, mental health disorders.
Anabolic steroids	Increased muscle mass, acne, mood swings, aggressive behaviour, liver damage.	Heart disease, liver cancer, mental health issues, infertility, physical changes (men can develop breasts, women can develop more masculine features).
Amphetamines (speed, adderall)	Increased heart rate, insomnia, reduced appetite, heightened focus, euphoria, agitation, paranoia.	Malnutrition, heart disease, mental health issues like anxiety and depression, risk of dependence and withdrawal syndrome.
Cocaine	Intense euphoria, heightened energy, increased heart rate, reduced appetite, insomnia, restlessness, paranoia.	Risk of heart attack or stroke, malnutrition, cognitive deficits, addiction, damage to nasal cavities (if snorted).
Cannabis (marijuana)	Altered senses, changes in mood, impaired memory, hallucinations, delusions, psychosis when taken in high doses.	Potential for addiction, cognitive impairment (particularly in adolescents), potential for lung disease if smoked, possible mental health issues.
Ecstasy (MDMA)	Heightened senses, empathy, euphoria, increased energy, dehydration, overheating, grinding teeth.	Cognitive impairments (especially memory), potential for addiction, damage to serotonin-producing neurons, mental health issues.
Tobacco smoking	Increased heart rate, heightened alertness, reduced appetite, potential for nicotine poisoning.	Lung cancer and other cancers, chronic obstructive pulmonary disease (COPD), stroke, heart disease, addiction.

Personal and community

There are a number of personal and community consequences of drug use. For those who regularly use illicit drugs or abuse medications, there are many detrimental impacts on all components of their health. Drug users can end up with serious debt and financial issues. This could cause homelessness due to inability to pay bills and rent/mortgage. Drug use also has an impact on the user's friends and family. Certain drugs can cause irritability and aggression, which can result in domestic violence. This will emotionally and socially impair both the user and the victim in different ways.

Drug use can interfere with education and employment, which will affect not only the user but coworkers and peers as well. Drug users are more likely to have admissions into the emergency departments of hospitals, causing resources to be shared between drug users and other ill or injured patients.

Specific communities may have a high rate of drug use, which can perpetuate and increase the likelihood of children in these communities developing drug dependence as they grow up.



Figure 6.24: Drug users are more likely to have admissions into the emergency departments of hospitals.



Figure 6.25: Drug users can end up with serious debt and financial issues, which can lead to homelessness.

Internet activity

Log on to TitanOnline to complete Activity 6.5 by reviewing the video on domestic violence and alcohol abuse.

Learning activity

1. Explain how social, environmental and personal factors influence drug use in young people.
2. Describe the short- and long-term health consequences of drug use.
3. Examine the social and economic costs associated with drug misuse.
4. Propose strategies for minimising harm associated with drug use.

Selected health issues of young people

Young people face a number of health issues. Adolescents are undergoing physical, social and emotional changes and are particularly vulnerable at this stage of life. Some health issues that impact on young people include road trauma, obesity, eating disorders, mental health, skin cancer, sexually transmitted infections (STIs) and blood-borne viruses, asthma and drug abuse.

Road trauma

Road trauma is a term describing any sort of accident involving the road, such as car accidents or pedestrian and cyclist accidents. Young people are more likely than any other age group to be involved in road trauma accidents. This is because of their lack of experience, and susceptibility to unsafe driving behaviours, such as being distracted by their mobile phones and speeding or driving recklessly because of peer pressure.

The following statistics surrounding young drivers illustrates the dangers:

- The biggest killer of young people aged 16–25 is road crashes.
- Most crashes involving young drivers occur over the weekend, in the late afternoon and night.
- Young drivers aged 25 and under account for 15 per cent of all drivers, but are involved in 36 per cent of road fatalities.
- Males make up 79 per cent of fatal crashes for young drivers.

Internet activity

Log on to TitanOnline to complete Activity 6.6, reviewing the safe driving ads that shock.



Figure 6.26: Most crashes involving young drivers occur over the weekend.



Figure 6.27: Young people are more likely to be involved in road trauma accidents.

Did you know?

Using a mobile phone while driving increases the chances of a serious crash by four times.

Obesity

Obesity is a medical condition characterised by an excess amount of body fat, usually measured through the body mass index (BMI). A person with a BMI of 30 or more is generally considered obese. Obesity is not just about aesthetics – it is a serious health concern linked with numerous chronic diseases such as heart disease, type 2 diabetes, high blood pressure, certain cancers, and a shorter lifespan.

The latest statistics indicate that two in three adults and one in four children and adolescents are overweight or obese. The surge in obesity rates in Australia and other Western countries is attributable to multiple interconnected factors:

- The shift towards energy-dense, nutrient-poor foods that are high in fat, sugar and salt, along with a decrease in physical activity due to sedentary nature of many forms of work, technological advancement, and urbanisation, are primary contributors.
- The food environment in these countries also plays a significant role. The heavy marketing of unhealthy foods and beverages, their wide availability, and larger portion sizes promote overeating.
- Socioeconomic factors also come into play, with lower-income individuals often having limited access to healthy foods and opportunities for physical activity.

Public health policies, cultural norms, education, and food labelling also affect obesity rates. Addressing obesity, therefore, requires comprehensive strategies that target individual behaviour, societal norms, and the broader food and physical activity environments.



Figure 6.28: The food environment in developed countries plays a significant role in the rates of obesity.

Internet activity

Log on to TitanOnline to complete Activity 6.7 about calculating and understanding BMI.

Eating disorders

An eating disorder refers to a person having obsessive thoughts about their body weight and food. It leads to unhealthy changes in behaviour, affecting a person physically and psychologically. These changes can include dieting, limited eating (and not eating at all), avoiding going out with friends, changes in mood and depression. Eating disorders, particularly anorexia nervosa, bulimia nervosa and binge-eating disorder, are most commonly experienced by young women.

- **Binge eating:** Involves over eating without any control. During and after a binge eating episode, an individual may have strong negative feelings such as sadness, anger or guilt. Although they are feeling these emotions, they still lack the ability to control their binge. The binge is not brought on because the individual is hungry, and does not stop once an individual is full.
- **Anorexia nervosa:** Restricting anorexia involves severely limiting food intake. Purging anorexia also involves limiting intake but also involves practising behaviours to prevent weight gain, including: vomiting, using laxatives or diet pills, extended periods of exercise and so on. People with anorexia are often underweight, appear sunken eyes and have tooth decay.
- **Bulimia nervosa:** Similar to binge eating disorder, but after a bingeing episode the sufferer will purge or vomit in order to get rid of the food they have just consumed. The sufferer will feel guilt after bingeing, hence the purge. An individual who suffers from bulimia nervosa may have stomach and intestinal ulcers, persistent sore throat, abdominal pain, heartburn and grazed or bruised knuckles from purging.

It is important to understand that eating disorders are not a choice, but a disease that needs to be addressed as soon as possible. Eating disorders most commonly affect young people, in particular young women, and are often associated with low self-worth and poor body image.

The main elements of treatment for eating disorders include adequate nutrition, preventing purging behaviour and decreasing extreme exercise. Treatment plans are altered for individual needs, with psychotherapy (counselling) and medications as the most common forms of treatment. Treatment addresses the eating disorder symptoms, the health repercussions and the psychological, genetic and cultural factors that may cause an eating disorder. Treatment may also involve nutritional counselling to educate the patient on choosing the correct foods.



Figure 6.29:

Eating disorders are often associated with low self-worth and poor

Mental health

Mental health, as defined by the World Health Organization, is a state of wellbeing in which an individual realises their own potential, can cope with normal life stresses, can work productively and fruitfully, and is able to contribute to their community. It's more than just the absence of mental illnesses – it's a crucial aspect of overall health, encompassing emotional, psychological, and social wellbeing.

Signs and symptoms of deteriorating mental health can vary widely depending on the specific condition. However, general indicators may include:

- persistent feelings of sadness, fear, or worry
- extreme mood changes
- difficulties in concentrating or making decisions
- changes in sleeping and eating habits
- withdrawal from social activities and personal relationships
- unexplained physical ailments.

It's crucial to remember that these symptoms may also be caused by physical health issues or temporary life stressors, so a professional evaluation is essential for accurate diagnosis. Several factors can influence mental health. They include:

- **Biological factors:** these encompass genetics and brain chemistry. Family history of mental health conditions can increase susceptibility.
- **Life experiences:** traumatic events like violence or abuse, especially during childhood, can significantly impact mental health.
- **Psychological factors:** personality traits, such as chronic negative thinking or low self-esteem, can make individuals more vulnerable to mental health issues.
- **Social and economic factors:** poverty, social isolation, and lack of access to quality healthcare can negatively impact mental health.
- **Cultural factors:** cultural stigmas can prevent individuals from seeking help, and discrimination can contribute to mental health issue

Mental health, like physical health, can be improved and maintained through regular exercise, a balanced diet, sufficient sleep, social connections, and strategies for managing stress. Additionally, psychotherapy, medication, or a combination of both can be effective in treating mental health disorders. Early intervention significantly improves the effectiveness of treatment and recovery.



Figure 6.30:

Signs and symptoms of deteriorating mental health can vary widely depending on the specific condition.

Some of the major mental illnesses are detailed below:

- **Depression:** affects the way a person feels. Sufferers usually experience low moods for long periods of time and these periods of sadness are sometimes without any apparent reason. A person who has depression may experience feeling overly sad, loss of motivation, withdrawal from normal activities, feelings of worthlessness and impaired thinking and concentration.
- **Anxiety:** an illness causing persistent worry and stress. These feelings are ongoing and may continue without any particular cause, making them hard to control. Anxiety can interfere with daily life and make it hard for the person to cope.
- **Schizophrenia:** a mental disorder that affects the brain's normal functioning. Sufferers' ability to act, see, feel and think is disrupted and their perception of reality can be altered. They may develop psychosis and paranoia, seeing or hearing things that aren't actually there or feeling like they are being watched.
- **Bipolar disorder:** causes extreme mood swings from high and hyperactive, to low and depressed. There are two major forms of bipolar that are separately diagnosed and have different symptoms, known as bipolar I and II.
 - Bipolar I disorder involves a more severe mood episode, experiencing mania. A person with this form of bipolar will have a longer lasting 'high', abnormal behaviour and may have psychotic episodes.
 - Bipolar II disorder experiences milder symptoms, called hypomania. A person with this form of bipolar has a sustained mood that is high or low, but does not have any psychotic symptoms.
- **Stress:** a normal human response to events that make a person feel pressured, challenged or threatened. The pressure is not only the demand of the situation, but also the demand we place on ourselves. The level of stress can depend on the attitude that a person feel towards the situation.
- **ADHD:** stands for attention deficit hyperactivity disorder. It is a neurodevelopmental disorder that primarily affects children, though for many it will continue into adolescence and adulthood. ADHD is characterised by a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with daily functioning and development. The exact cause of ADHD is not fully understood, but a combination of genetic, neurological and environmental factors likely contributes to its development. ADHD is more common in boys than girls.

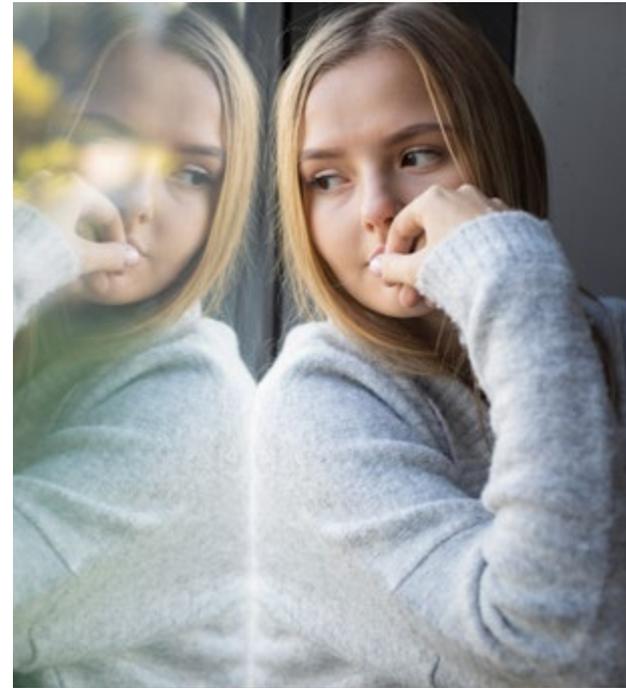


Figure 6.31:

A person who has depression may experience a loss of motivation and impaired thinking and concentration.



Figure 6.32:

Anxiety can interfere with daily life and make it hard for the person to cope.

Skin cancer

Australia has the highest rate of skin cancer in the world. Each year, over 1200 Australians die from what is an almost totally preventable disease. During summer, Australia is closer to the sun than most other countries, resulting in higher ultra violet (UV) intensity. The incidence rate for both men and women in relation to skin cancer is continuing to rise throughout Australia. This is largely due to the climate and the lack of protective behaviours.

In the past, the dangerous effects of the sun and extended sun exposure was not understood, and so people refrained from preventative measures such as wearing sunscreen, sitting in the shade or wearing protective clothing. Because of this, the incidence of skin cancer in later life is continuing to rise. Even small amounts of sunburn on separate occasions in an individual's youth can double the risk of developing skin cancer. There is no safe way of getting sun exposure without increasing the risk of skin cancer.

Skin cancer susceptibility can be strongly influenced by hereditary factors. Skin type is genetic. If a person's parents have fair skin, their offspring are likely to have fair skin also and hence a greater risk of skin damage due to sun exposure.



Figure 6.33: People with fair skin have a greater risk of skin damage due to sun exposure.



Figure 6.34: Even small amounts of sunburn in an individual's youth can double the risk of developing skin cancer.

Learning activity

- For each of the following health issues concerning young people, find a health promotion campaign targeting this issue and evaluate its effectiveness.

a. Road trauma	d. Mental health	g. Asthma
b. Obesity	e. Skin cancer	h. Drug abuse
c. Eating disorders	f. STIs	
- Work with a small group of classmates to create a short video highlighting the road trauma dangers affecting young Australians.

Case study – Sun safety

Nathan was a regular Australian guy. He loved his sport and loved getting out and about and being active. He would go to the beach with his mates just about every weekend, if it wasn't for a surf or body board, they would go for a swim in the water. After school, he would go to the fields with his friends and kick around a soccer ball or play some footy. Nathan also loved competitive sports and played soccer in winter and cricket in summer.

In the summer, he would put on a hat and sunglasses when he walked around and would put on some sunscreen before a surf. His friends never put much sunscreen on, as their skin would 'tan' rather than burn. During the winter months, he would get a season pass to the snow fields and spend a couple of weeks down there with friends and family in the school holidays. He would be mostly covered up from his goggles and helmet, and so didn't really wear sunscreen on the rest of his face.

When Nathan finished school, he took some time off to work and travel before he started his business degree at university. He worked part time at his local gym, where he would workout and get fit for his sports, and spent one month every year travelling up and down the coast with his friends. They visited beaches and went surfing and paddleboarding, as well as skateboarding and bike riding around the different towns along the way.

One day, he noticed a small lump on his shoulder near a mole. He thought it was just a sports injury from football and went home to put ice on it. A few weeks later the lump had still not gone down, so he went to the medical centre. The doctor referred Nathan to a surgeon who scheduled a biopsy.

A couple of days later, Nathan heard the horrific news – that he had been diagnosed with melanoma, a deadly form of cancer. Nathan and his family were extremely upset and terrified by the news. He has always seen ad campaigns about skin cancer and had learnt about it at school, but never thought it would happen to him.

Luckily for Nathan, he had caught the melanoma in its earlier stages and they were able to organise surgery to cut out the mole and the cancer would be removed. He went into surgery a couple of days later and came out feeling relieved. His family and friends were over the moon with the news and so happy that Nathan was okay again.



Figure 6.35:
There is no safe way of getting sun exposure without increasing the risk of skin cancer.

Case study – Sun safety*(continued)*

Nathan was always educated about skin cancer and melanoma. He knew the dangers that were involved with being outside in the sun and he would always try to cover himself up when he could, but he also thought that it was good for you to soak up some sun every now and then and get some vitamin D. There were times where he would forget to wear sunscreen, but he would never go out and intentionally tan, so this kind of news came as a big surprise to him.



Figure 6.36:
Melanoma can spread to the brain.

After the melanoma scare, he was very wary of his skin, especially out in the sun. He was wearing sunscreen every day, even when he wasn't planning on spending the day out in the sun, and would cover up his body by wearing long pants and something over his shoulders. Nathan also made sure that he was wearing a hat and sunglasses when he went out into the sun as well. He made sure that his family and friends were protecting themselves against the sun, and was trying to spread the word to people he would encounter that even though you think that it won't happen to you, it could.

A few years later, when Nathan was 23, he found a lump on his head and immediately scheduled a biopsy of the lump. It was found that even though he had the melanoma removed, it had already spread into his bloodstream and made its way to his brain.

This was some of the worst news that Nathan and his family could get. It was fatal news. The doctors informed Nathan that the tumour was lodged in a part of the brain where they were unable to operate. Chemotherapy and radiation would only prolong the inevitable. Nathan passed away later that year in hospital.

Since then, his family and friends have created a campaign to help promote his life and get his story known to young people around the country. The campaign aims to remind young people to be attentive when they are out in the sun and what they can do to protect themselves. It has been a major success and students around the country have been touched by the story of this regular Aussie guy.

1. Identify the lifestyle factors that could have caused Nathan to develop melanoma.
2. Outline some protective factors that young people can put in place in order to protect themselves against skin cancer.
3. Analyse what this case study portrays in terms of the social perception of the seriousness of skin cancer.
4. Discuss what the secondary cancer in Nathan's brain tells us about skin cancer.
5. Analyse your own behaviours in regards to sun safety and recommend sensible changes you could commit to in order to further protect yourself.

STIs and blood-borne viruses

Sexually transmitted infections (STIs) are infections that are passed on through skin to skin contact and the exchange of infected body fluids. They are commonly spread during sexual contact and intercourse. There are different types of STIs – bacterial, viral and parasitic. STIs can sometimes go unnoticed, as there may be no signs or symptoms of the infection. If left untreated, they can have serious effects on physical and sexual health and can cause infertility. Blood-borne viruses are those that are transmitted in the blood, from one person to another. The main types of STIs and blood-borne viruses are outlined in Table 6.5.

Table 6.5: STIs and blood-borne viruses.

Condition	Explanation
Chlamydia	<ul style="list-style-type: none"> ▪ One of the most common STIs in Australia. ▪ Symptoms are not noticeable, although women may experience a burning sensation while urinating, vaginal discharge and abdominal pain. ▪ Men may experience pain while urinating, white/yellow discharge and pain around opening of penis. ▪ Transferred through unprotected sexual intercourse.
Genital herpes	<ul style="list-style-type: none"> ▪ Development of blisters or sores around the genitals and anus. ▪ When infection begins, sores may not be present. They may appear months or even years after a person is infected. ▪ First reaction can cause a person to feel unwell with a fever, headache or aching muscles. ▪ Transferred through skin to skin contact with an infected person.
Gonorrhoea	<ul style="list-style-type: none"> ▪ Bacterial infection. ▪ Affects the genital area including the urethra, cervix and anus, and can also affect the throat or eyes. ▪ Infection can affect both men and women. ▪ Transmitted through unprotected sexual intercourse due to the transfer of infected body fluids.
Syphilis	<ul style="list-style-type: none"> ▪ Serious bacterial infection that can affect the brain and other major organs. ▪ Infection is rare in Australia and is about seven times more likely to occur in men rather than women. ▪ Three stages of syphilis: <ul style="list-style-type: none"> – Development of painless sores where the infection enters the body, between one and 12 weeks after infection is transmitted. – Red rashes forming on the body, fever, hair loss, ulcers on genitals and/or mouth, headaches, tiredness and muscular pain, 6–12 months after infection. – Infection can damage the brain and many other organs, can cause heart disease, paralysis, mental illness, blindness and deafness, two years after infection is transmitted.

Table 6.5: STIs and blood-borne viruses.*(continued)*

Virus	Explanation
Genital warts	<ul style="list-style-type: none"> ▪ Small lumps that form on the genitals caused by the human papillomavirus (HPV). ▪ Warts can be found on the vagina, vulva, penis, cervix or anus. ▪ Virus is highly contagious and is spread through skin to skin contact during sexual intercourse.
Hepatitis B	<ul style="list-style-type: none"> ▪ Inflammation of the liver and liver cells. ▪ Can lead to serious illness or death. ▪ Virus most present in the blood, but can be also found in genital fluids. ▪ Symptoms can include darkened urine, extreme fatigue, nausea, vomiting and yellowing of the skin and eyes. ▪ Can be transmitted by having unprotected sex, sharing needles or syringes, contact with infected blood and blood transfusions.
Pubic lice	<ul style="list-style-type: none"> ▪ Also known as crabs. ▪ Small parasites found in the pubic hair. ▪ Small, brown and flat lice that grip to pubic hair and suck blood from skin. ▪ Contracted from skin to skin contact during sexual activities or intercourse.
Scabies	<ul style="list-style-type: none"> ▪ Highly contagious skin disease. ▪ Mite that lives in the genital region and lays its eggs underneath the surface of the skin. ▪ Transmitted through direct skin to skin contact. ▪ Signs and symptoms include itching, skin rash of small red bumps or welts and silver coloured lines where the mite has burrowed the skin.
HIV/AIDS	<ul style="list-style-type: none"> ▪ Attacks and weakens the immune system's ability to fight off infections in the body. ▪ A person can have flu-like symptoms with a fever, headache and constant tiredness. Other symptoms include rapid weight loss, unusual marks or bumps on the skin, constant coughing and swollen lymph glands on the neck. ▪ Without treatment, the virus will multiply and destroy immune cells.

Adolescents are most susceptible to STIs, because they are the age group that are most likely to engage in sexual activity with a number of partners outside a committed adult relationship. To avoid catching an STI, it is important to use condoms and safe sex practices, have open discussions regarding sexual health and if necessary, have medical tests.

Internet activity

Log on to TitanOnline to complete Activity 6.8 by researching the prevalence of STIs in Australia.

Asthma

Over two million Australians suffer from asthma. Individuals who suffer from asthma find it hard to breathe as their airways narrow when exposed to certain triggers. Individuals are typically diagnosed with having one of two forms of asthma:

- **Intermittent asthma:** sufferers don't have symptoms all the time, yet experience occasional attacks. Episodes of asthma are typically short and in response to a respiratory infection or allergen. This is by far the most common type of asthma, particularly in children.
- **Persistent asthma:** sufferers have more frequent symptoms and attacks and typically require preventer and reliever medication to control their symptoms.

Once asthma has been diagnosed by a health professional, it can often be effectively controlled and managed with medication and slight alterations to daily life.

Drug abuse

Drug abuse occurs when an individual is using a substance in a destructive pattern, causing substantial problems. This can lead to drug dependence or addiction, where the body develops a tolerance to this abuse or suffers withdrawals from the drugs.

Drug abuse is more damaging than any other preventable health condition, with drug abuse often leading to death, disability and long-term illness. The risk of accidents and injuries, medical problems and violence is much higher for those people who live with drug dependency. Drug abuse can affect neurotransmitters in the brain and can cause changes in normal behaviours such as aggressiveness, impulsiveness, limited self-control, reduced judgement, and paranoia.

Insights from the latest data about drug use in Australia include:

- The highest proportion of drug-induced deaths (32 per cent or 569 deaths) occurred in residents of the most disadvantaged areas.
- The majority (76 per cent) of opioid-induced deaths were accidental.
- In 2021–22, counselling was the most common treatment for alcohol (35 per cent of treatment options).

Source: Australian Institute of Health and Welfare.

Internet activity

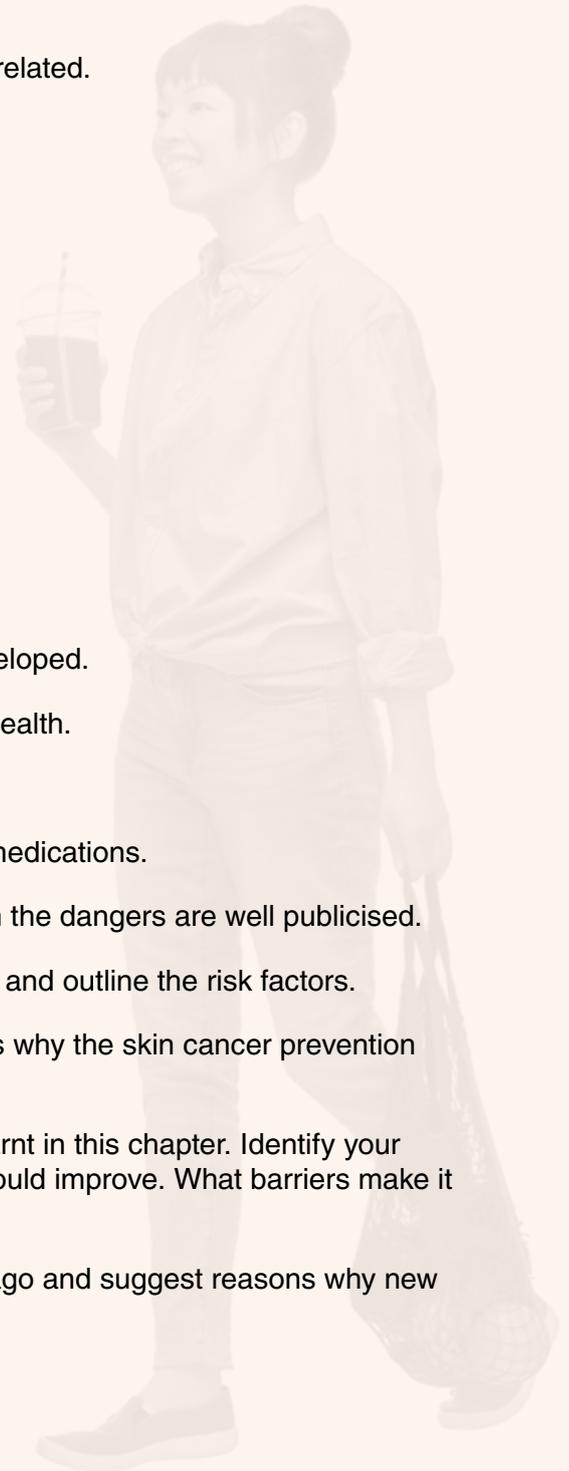
Log on to TitanOnline to complete Activity 6.9 on drug abuse in Australia.

Learning activity

1. Research and interpret morbidity and mortality trends for young people in relation to one of the studied health issues.
2. Examine how personal lifestyle practices, and environmental and sociocultural factors contribute to health status.
3. Create a list of places where people access information about their health. Discuss whether these sources are reliable and how a person can determine if a source is trustworthy.
4. Highlight the potential problems with self diagnosing health problems by using the internet in preference to visiting the doctor.

Revision questions

1. Identify and provide a definition of each lifestyle component.
2. Discuss the term 'balanced lifestyle'.
3. Evaluate how the factors influencing lifestyle can be interrelated.
4. Provide a definition and example for the following terms:
 - a. recreational activity
 - b. organised activity
 - c. competitive activity
 - d. non-competitive activity.
5. Identify a range of foods high in:
 - a. carbohydrates
 - b. protein
 - c. fat
 - d. fibre.
6. Evaluate why the Australian Dietary Guidelines were developed.
7. Explain the relationship between nutrition, exercise and health.
8. Discuss how nutritional imbalances can impact health.
9. Differentiate between over-the-counter and prescription medications.
10. Provide reasons as to why young people use drugs when the dangers are well publicised.
11. Research current road trauma statistics for young people and outline the risk factors.
12. Explain ways to prevent skin cancer and suggest reasons why the skin cancer prevention message is not always followed.
13. Analyse your own lifestyle based upon what you have learnt in this chapter. Identify your strengths and propose strategies to address areas you could improve. What barriers make it difficult to improve and how can they be overcome?
14. Research illegal drugs that were not available ten years ago and suggest reasons why new drugs are now available in the community.



CHAPTER 7

Individual sports applications

Throughout this unit, students will explore appropriate skills in order to fluently participate in individual games and sports. They are developing their performance characteristics in relation to understanding of rules, technical equipment, dynamics and performance outcomes. They explore the responsibilities of participants in a chosen activity and safety, legal requirements, ethical issues and etiquette. They interpret a number of performance measures, including scoring procedures, standards of performance and competition and handicaps. Students evaluate strategies and tactics necessary in a chosen sport and the psychological aspects of competing. They explore the stages of skill acquisition, types of training and developing and implementing training programs.

Syllabus outcomes

A student:

- applies the rules and conventions to a range of physical activities (1.1)
- demonstrates ways to enhance safety (1.2)
- explains the principles of skill development (2.1)
- selects appropriate strategies and tactics for a range of movement contexts (3.1)
- designs programs that respond to performance goals (3.2)
- plans strategies to achieve performance goals (3.3)
- demonstrates competence and coordination in a range of movement contexts (4.4).

Focus areas

- Elements of individual performance
- Individual performance and competition
- Practice, training and individual performance



Figure 7.1: Golf is a popular individual sport.

Elements of individual performance

Individual games and sports are those that are completed individually as opposed to team sports. Examples of popular individual sports include:

- athletics
- golf
- swimming
- cycling
- gymnastics
- tennis.
- dance
- rowing

There are elements that determine the effectiveness of an individual's performance as outlined below.

Performance characteristics

There are many factors that contribute to successful performance. An individual must consider and understand the following elements of their game or sport:

- the rules that govern the activity
- the specific techniques required
- the specified performance outcomes
- equipment used
- how space, time, rhythm and relationships relate to the sport.

By examining and developing the performance characteristics, individuals are able to develop confidence, skill and ultimately succeed in their chosen game or sport.

Rules

Rules are essential in sport for several reasons. They ensure that all athletes have an equal chance to compete and win based on their skill and ability. Without rules, the strongest and most aggressive athletes may dominate, leading to an unfair advantage.

Rules help to prevent injuries and keep players safe by setting boundaries and limiting dangerous behavior. For example, rules in football that prohibit tackling above the shoulders help to prevent head and neck injuries. For example, rules in wrestling that prohibit choking help to prevent joint and neck injuries. This allows players, coaches, officials, and fans to understand and expect the same standards of conduct and play in every game.

Rules create accountability for players, coaches, and officials. They can be held responsible for breaking the rules and face consequences such as penalties, fines, or suspension from play. Rules add excitement and drama to sport by creating tension, suspense, and surprises. They also provide a clear structure and goals for spectators to follow and understand, which enhances their enjoyment of the game.



Figure 7.2: Rules ensure that all athletes have an equal chance to compete and win based on their skill and ability.

Did you know?

Golf is the only sport that has been played on the moon.

Technique

Technique relates to the specific execution of a skill to enhance movement and performance. There are many different techniques for each sport that participants can refine. Learning and mastering these techniques can improve the performance of the athletes and help them achieve their desired results. An athlete can actively change and improve their technique through knowledge and practice of these skills.

A coach can help in ensuring the athlete is performing the techniques correctly and prepare the athlete both physically and mentally to execute the techniques in game play/competition. For example, archery is a sport that relies heavily on the techniques of the athlete. The archer must use the correct stance, body position and grip in order to properly execute the movement.

Equipment

Most sports and games rely on the use of equipment. This equipment can be items such as balls or racquets. There is also protective equipment that is used to considerably minimise the risk of injury, such as helmets, mouthguards or shin pads. This type of equipment can protect an athlete by absorbing or deflecting the impact of tumbles or collisions.

Safety suggestions include:

- Ensure that handheld sporting equipment is gripped the correct way. For example, the risk of developing tendonitis (tennis elbow) increases if a tennis racquet is held incorrectly.
- Shoes should provide comfort, grip, support and protection.
- Equipment should be appropriate to the age, size and level of competition for the athlete.
- The use of protective equipment should not only be used for competition, but should also be worn during training.
- Equipment should be checked regularly and replaced if necessary.

Learning activity

1. Conduct a class survey on participation in individual sports as opposed to participation in team sports and suggest the reasons underpinning the statistics.
2. Provide examples of sporting injuries that can occur as a result of poor technique.
3. Discuss the use of rules, technique and equipment in the following individual sports and one more of your choice:
 - a. cycling
 - b. swimming
 - c. tennis.
4. Analyse the key performance characteristics in relation to a range of individual sports.



Figure 7.3:

Archery is a sport that relies heavily on the techniques of the athlete.

Internet activity

Log on to TitanOnline and complete Activity 7.1 by analysing the techniques used in a range of sports.

Space, time, rhythm, relationships

Space is the surroundings in which movement takes place. An individual's success in sports such as dance, gymnastics and tennis is largely dependent on their ability to use the space available to them successfully.

Time is an important aspect in all games and sports. It governs the length and structure of the sport activity. Most of the individual sports have a definitive beginning and end in which the game or sport must be competed. However, time or duration of specific sports can depend on other factors such as how fast they finish a race.

Rhythm refers to the time and flow of sport in any sport activity. Rhythm involves movement of the body in relation to space, time and dynamics. It plays an important role in the ability of an athlete to move fluidly and succinctly throughout the game and sport, allowing them to change directions easily and to move in time according to their opposition and apparatus). Rhythm is used in sports such as gymnastics to put together a routine that flows with the beat and tempo of the music.

When playing a game or sport, an athlete should be considerate of both the positioning of their body and how the body parts work together to complete movement, as well as the relationship between their body and the space around them, including other people. In a sport such as tennis, the athlete must position themselves accurately to receive the ball and hit the ball back with force. To do this, an athlete has to know where their body is in relation to the court and how to coordinate their movements in relation to the ball. In a sport such as dance, an athlete must focus on their movement and their relationship with other dancers on the stage. The elements will be constantly changing. By understanding and performing movement according to space, time, rhythm and dynamics, an athlete can successfully perform the movements required of their game or sport.

Specified performance outcomes

Specified performance outcomes are the outcomes that must be achieved in order for the performance to be deemed to be of a certain standard. These outcomes may be mandated by a sporting organisation to establish certain standards and maintain the integrity of the competition. It provides athletes with clear indications of what performance is required. Sports such as gymnastics will specify certain performance elements that need to be included in routines and will have performance outcomes explicitly describing the outcomes that are being sought. These outcomes will often provide a framework for judging.

Practical activity

1. In groups of three, create a movement sequence that focuses on the use of rhythm and relationship. Perform the movement to the class.
2. Analyse the other groups' use of rhythm and relationship and how the components can be applied to a game or sport scenario.

Internet activity

Log on to TitanOnline and complete Activity 7.2 by analysing a tennis video to illustrate your understanding of space, time, rhythm and relationships.

Participant responsibilities in the chosen activity

Individuals who participate in sport have several responsibilities. Every person involved in sport should be treated with respect and fairness. This means avoiding any form of discrimination, harassment, or unsportsmanlike behaviour.

Participants must follow the rules of the sport they are playing. They should also respect the decisions of the officials and accept their rulings. They should take reasonable steps to ensure their safety and the safety of others while participating. They should use proper equipment and techniques, follow safety guidelines, and report any unsafe conditions or incidents.

Participants should strive to compete fairly and honourably, without cheating or taking unfair advantage. They should respect the spirit of the game and avoid any actions that could harm the integrity of the sport. They should exhibit sportsmanship, which includes treating others with respect, accepting victories and defeats gracefully, and supporting and encouraging their opponents.

Safety

All stakeholders in sport have a responsibility to engage in safe behaviours and ensure sport is a healthy, enjoyable and safe experience. Administrators and officials must conduct activities in a manner that does not put themselves or others in harm's way. It is a player's responsibility to maintain a level of fitness that enables them to participate safely and reduce the likelihood of injury.

Each player should actively practise the skills of the game and focus on technique that minimises the chances of injury. A skilful player is less likely to suffer contact injuries or repetitive, overuse injuries. Playing by the rules reduces the incidence of injuries for the player and the opposition. It is essential that players understand and comply with the rules that are designed to eliminate dangerous play and situations that commonly cause injuries.

Players should take advantage of protective equipment and advances in technology to access any aids that may make their participation safe. They have the ultimate responsibility for their own health and should treat injuries, recovery and return to play after injury as a serious matter.



Figure 7.4:
A skilful player is less likely to suffer repetitive, overuse injuries.



Figure 7.5:
Every person involved in sport should be treated with respect and fairness.

Internet activity

Log on to TitanOnline and complete Activity 7.3 by researching strategies to improve safety in sport.

Did you know?

Overuse injuries account for half of all sports injuries suffered by high school students.

Legal requirements

In Australia, the law provides consequences for individuals who are in a position of authority and act in a manner that causes harm to others. In the context of sport, this means that coaches, officials and teachers must act responsibly and minimise or avoid the risk of injury for players.

This is known by the commonly used term 'duty of care'. Duty of care refers to the legal duty of a person to take reasonable care of another and avoid actions that may harm them. To do this, there are steps that must be taken to identify the harm or risks involved in any type of action. This must be done through the use of knowledge, skills and experience within this area. If the assessment identifies the risk of harm as likely, the carer is required to put in place a reasonable amount of care to avoid harm.

The following arrangements are common examples of what needs to be undertaken to achieve the duty of care:

- There must be supervision of children when they are participating in a game or sport.
- Prior to the sport or game starting, the facilities must be checked to ensure safety by removing any hazards.
- Equipment must be checked to ensure it is in proper working condition.
- Injuries must be assessed accurately and there should be no pressure on athletes to play on if injured. In situations of serious injury, a clearance to recommence involvement should be provided from an accredited doctor or physiotherapist.
- Proper accreditation must be provided for coaches and sport officials.
- Behaviour that has a chance of promoting injury must be discouraged. Infringements must be penalised and persistent offenders must be dealt with.
- Athletes and participants should be accurately prepared for the game or sport they are competing in. This can be done through fitness training, health and fitness checks and coaching.



Figure 7.6:

Facilities must be checked prior to the start of competition, to ensure the safety of all participants.

Learning activity

Describe how the following factors influence safe participation in an individual sport of your choice:

- skill level
- technique
- grounds and facilities
- weather conditions
- protective equipment.

Ethical issues

The term ethics refers to morals and the principles of right and wrong. Ethics in sport relates to four main qualities including fairness, integrity, responsibility, and respect.

Fairness

- Participants and coaches are required to abide by the rules of their game or sport.
- Access to technology should not be limited to particular teams or individuals.
- Participants and coaches must not be discriminated against on terms of race, age, or sexual orientation.
- Rules must be enforced equally by all. They should not be swayed by pressure.

Integrity

- The principles of integrity are similar to those of fairness. Any participant who aims to create an unfair edge over their competitors is breaking the spirit of the game or sport.
- Integrity is demonstrated in golf by players reporting scores, counting penalty strokes, and admitting rule violations, even if they go unnoticed. Participants are expected to uphold the spirit of fair play and not use scores to gain an unfair advantage.

Responsibility

- Participants and coaches should take responsibility for their feelings on the field or court and act in a sportsmanlike manner.
- Participants and coaches are required to have a good knowledge of the rules and guidelines of the game.
- Participants and coaches are expected to exhibit responsible behaviour on the field as well as on the sidelines.

Respect

- Sport provides a positive environment where participants can exercise, compete and enjoy themselves. Ensuring that the needs of all participants are met and that issues of bullying, abuse and harassment are not tolerated is essential.

Internet activity

Log on to TitanOnline and complete Activity 7.4 by discussing the ethical issues surrounding the merger of the PGA Tour and LIV Golf.

Did you know?



Figure 7.7:

Participants must not be discriminated against on the basis of race, age, or sexual orientation.

Etiquette

Etiquette is a code of behaviour, sometimes unwritten, sometimes prescribed, that defines the manners and sportsmanship that is expected in a particular sporting situation.

Examples of sporting etiquette for individual sports:

- Shaking hands and wishing each other good luck after the coin toss at the beginning of a game.
- Shaking hands with the opposition at the conclusion of a game.
- As a sign of respect, a competitor may applaud a rival as they are introduced to the sporting arena.
- As a sign of best wishes, an injured player may receive applause from the spectators if they are forced off the field after receiving treatment.
- In some sports, such as golf, players are expected to remain quiet as the opposition plays a shot.
- Acknowledging an opposition player's major achievement, such as setting an official record.
- Bowing to an opponent before a martial arts competition.
- Complying with dress codes.



Figure 7.8: Shaking hands with an opponent at the conclusion of a game is good etiquette.

Learning activity

1. Discuss how an individual can participate in a game or sport in an ethical way.
2. Analyse the importance of fairness for the competitor and opposition.
3. Describe the etiquette expected for an individual sport of your choice.
4. For an individual sport of your choice, research and discuss some of the main ethical issues that they face.

Practical activity

Participate safely in individual activities observing accepted conventions.

Case study – Promoting values in individual sports

Gabe is a junior golfer playing off a handicap of 4. Despite possessing considerable talent and skill, he often disregards fundamental values associated with sportsmanship. He frequently violates etiquette norms, such as failing to maintain proper pace of play, disrespecting other players, failing to repair divots and displaying unsportsmanlike behaviour on the course. He has also been engaging in unfair practices, such as not accurately reporting his own scores, and disregarding rules to gain an unfair advantage.

The potential ramifications of Gabe's behaviour include:

- **Damage to personal reputation.** Gabe's behaviour tarnishes his reputation within the golf community. Fellow competitors, coaches and officials may develop a negative perception of him, impacting his future playing and sponsorship opportunities.
- **Strained relationships.** Gabe's lack of etiquette, fairness, integrity, responsibility, and respect creates strained relationships with other junior golfers. His actions can lead to animosity and a breakdown of trust among competitors, diminishing the spirit of healthy competition and camaraderie.
- **Stunted personal development.** Gabe may miss out on valuable opportunities for personal growth. Learning to exhibit fairness, integrity, and respect helps develop character and values that are vital for success in all aspects of life, including sports.
- **Impact on performance:** Gabe's unethical behaviour can negatively impact his own performance. The mental stress resulting from disregarding etiquette and fairness may lead to distractions and affect his concentration during important shots, ultimately hampering his ability to achieve optimal results.
- **Lack of recognition and support.** Golfing associations typically prioritise and support players who demonstrate exemplary conduct, both on and off the course. Gabe's consistent disregard for etiquette and fairness might result in less recognition, coaching opportunities, and scholarships that could otherwise be available to him.
- **Ethical development.** By neglecting important values, Gabe fails to cultivate ethical decision-making skills. These skills are essential not only for success in golf, but also for navigating various challenges and ethical dilemmas that arise in life beyond sport.

1. What steps can be taken to address Gabe's lack of etiquette, fairness, integrity, responsibility and respect in tournaments?
2. How might Gabe's behaviour affect his relationships with coaches, fellow competitors and potential sponsors?
3. What strategies can be employed to help Gabe recognise the importance of displaying sportsmanship and developing ethical behaviour?
4. How might Gabe's actions impact his mental state and overall golfing performance?
5. What measures can golf associations and organisations take to promote and encourage sportsmanship among junior golfers?
6. In what ways can Gabe's parents, coaches and mentors help him understand the long-term consequences of his behaviour and the importance of character development?



Individual performance and competition

Individual performance is an essential aspect of sport for several reasons. Focusing on individual performance allows athletes to set personal goals and work towards improving their skills and abilities. By continually striving to improve, athletes can push themselves to be the best they can be and reach their full potential.

Individual performance is often evaluated by coaches and other professionals to determine an athlete's potential and suitability for higher levels of competition. Strong individual performances can lead to opportunities for scholarships, professional contracts and other rewards.

Sport is inherently competitive, and individual performance is essential for success in competition. In many sports, individual performance determines who wins and who loses. Performing well in sport can bring personal satisfaction and a sense of accomplishment to athletes. Achieving personal goals, setting records, and performing at a high level can be deeply rewarding and motivating.

Performance measures

In many sports, the time it takes to complete a race or event is a crucial performance measure. For example, in track and field, the time it takes to complete a race determines the winner.

In sports such as archery, shooting or darts, accuracy is a crucial performance measure. The ability to hit a target consistently can determine the winner.

In sports such as gymnastics, figure skating or diving, technical execution is a critical performance measure. Judges evaluate athletes based on their technique, form, and difficulty of the skills they perform.

The performance measures used to determine sporting success depend on the sport and the specific event being measured. Some measures are objective, such as time or distance, while others, such as technical execution, may involve subjective evaluation by judges.



Figure 7.9:

Tennis uses an objective method of scoring.

Scoring procedures and calculations

Scoring refers to a measuring system that determines the outcomes of a particular sport or game. Each game or sport has its own separate criteria in which it is scored from. This is usually developed by the sport's governing body who set these rules and standards and enforce them over every association. Although scoring systems are individual to each sport, the way performance is measured can be categorised as either objective or subjective.

Objective sports are those that are scored using impartial measurements. It is based on the outcome of the event, where the score is determined without human interpretation. Scoring systems include devices such as timing systems, measuring devices or are based on a 'point' system in which there is a definitive winner of an event. These scoring systems are easier for spectators to understand and are generally free from bias. Sports that use an objective method of scoring include:

- track and field athletic events
- swimming
- tennis
- archery.
- cycling

Subjective sports are those that are governed by the observers or judges' opinion on how the skills in the sport are performed. They are measured by quality and skill of the performance. Scoring systems can be intricate and difficult to understand as points are added and deducted. Sports that use a subjective method of scoring include:

- diving
- gymnastics and rhythmic gymnastics
- figure skating
- dance.
- equestrian

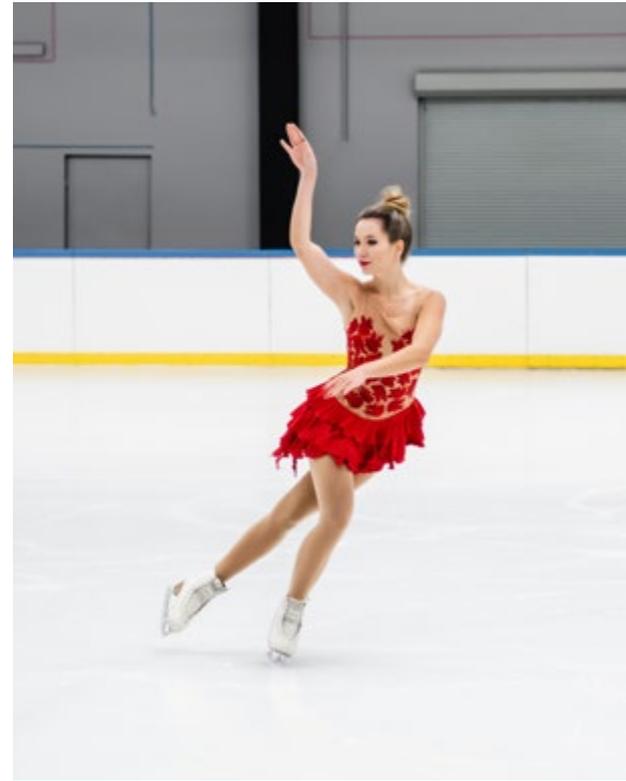


Figure 7.10:

Figure skating uses a subjective method of measuring a performance.

Internet activity

Log on to TitanOnline and complete Activity 7.5 by contrasting subjective and objective evaluation of sporting performance.

Practical activity

Perform in sports which use subjective measurements to evaluate performance.

1. Nominate four people in the class to judge the performances of all the players.
2. Split the class into two groups and compete in the subjective based sport.
3. Judges subjectively rate the performances of all players without other judges knowing their ratings.
4. At the end of the game, players learn their scores and analyse the effectiveness and fairness of the subjective scoring system.
5. Analyse the differences in the way the four different judges rated the individual performances and discuss reasons for the differences.

Standards of performance

Standard of performance relates to the level of ability that athletes must display in order to participate and/or succeed in certain events. Each athlete must go through a selection process in which sporting associations choose individuals. In order for them to make it through the selection process, they must be at a specific standard of performance that is relative to each sport.

The standard of performance is often set by qualifying times. An athlete must prove they can perform to this standard in order for them to compete well against the other participants. Athletes and coaches train towards these performance standards, in order to comply with (or hopefully exceed) the required standard.

Standards of performance are used in many different sports. For example, in swimming, competitors must compete in a selection trial race in order to qualify for a higher competition. If the athlete does not win this swim race, they can still qualify if they have finished the race within the specific qualifying time. In swimming events, the qualifying times will be set out by Swimming Australia for national competitions. The qualifying times for 17-year-old swimmers to compete at the 2023 Australian Age Swimming Championships are set out in Table 7.1.

Table 7.1: Qualifying times for 17 year olds at the 2023 Australian Age Swimming Championships.

Event	Boys	Girls	Event	Boys	Girls
50m freestyle	0:24.91	0:27.70	100m breaststroke	1:09.97	1:17.90
100m freestyle	0:54.84	0:59.84	100m butterfly	0:59.62	1:05.36
100m backstroke	1:02.11	1:08.43	200m individual medley	2:16.06	2:26.84

Source: Swimming Australia (www.swimming.org.au)

Competition types

Individual sports can be framed in many different competition types and athletes may need to factor this into their training. Different types of competitions may have their own unique stresses and challenges depending on the rules. For example, professional golf tournament is traditionally played over four days of non-handicapped stroke play by all players, but in the event of a tie, the winner is decided by sudden-death stroke play with only the tied competitors and involves only a selected number of golf holes. The pressure and shot decisions are significantly different for the two formats and require different skill sets.

Some sports may include different formats in the same competition year, such as a traditional ladder competition going over the several months, with a one-off knock out competition at an alternative time. Some sports have different competition types running concurrently, such as golf (handicap, ambrose, stableford and four ball best ball).

Another variation to the type of competition may include the level of competition. The level of competition may be local, interclub, interstate or international and the type of competition and the rules that apply may vary at each level. The sport of triathlon is a good example of where the type of competition varies:

- sprint series: 500m swim, 10km cycle and 3km run
- Ironman: 3.9km swim, 180km cycle and 42km run
- Olympics: 1500m swim, 40km cycle and 10km run.

Handicaps

In sport, handicapping is used so that all competitors have an equal chance of winning. Handicapping usually works by keeping records of past performances and allocating a scoring advantage to certain competitors.

Usually, a more experienced or skilled individual is handicapped so that other competitors can still compete and have an opportunity to experience the enjoyment and satisfaction that comes with the success. Handicapping can also be used in sports such as track and field athletic events, sailing, golf and horse racing.

In handicapped track racing events, the slowest runners begin from the starting line, while the faster runners are pushed back behind the line so that they have a further distance to run to the finish line. The position of the runners is determined from the athlete's previous race scores. This means that the slower runners may cross the finish line before the faster runners do.

In a handicapped golfing game, a player's handicap is based on the average of the best ten scores recorded out of the past twenty games, multiplied by 0.96. Golf in Australia has also introduced further handicapping rules, to even out competition between members of different courses, taking into account the degree of difficulty of each golf course in Australia.



Figure 7.11: Handicapping in golf evens out competition between members of different golf courses.

Did you know?

The word 'handicap' originates from the 15th century, where disabled veterans were forced to beg for money with their 'cap in hand'.

Learning activity

1. Explain the advantages and disadvantages of objective and subjective methods of scoring.
2. Discuss the role of handicapping and the advantages it provides for participants.
3. Compare competitive and non-competitive approaches for participation in individual activities.
4. Identify how performance standards can be modified to suit the needs of the participants.
5. You are assisting a tennis coach select their best player. There are four players trying for the position. Design a series of skills tests that could be used for the selection process that involve relatively objective assessment methods.

Strategies and tactics involved in the chosen activity

Strategies describe what is trying to be achieved and tactics describe how it is going to be achieved. Strategy will generally be a larger, overall plan while tactics get very specific, often changing to specifically meet the particular opposition or game situation.

The strategy is the overall game plan and tactics and how they are executed or implemented. In coaching, viewing of match videos has been a much used tool since the 1980s as coaches and support personnel can view and analyse the match and upcoming competition.

The strategies and tactics that athletes use are designed so that athletes can gain a competitive advantage over the opposition. One of these is to use scouts to watch for any upcoming opposition and take notes about any tactics used throughout the game. The athlete and their coaching team then use these notes in order to devise a game strategy and tactics. During training sessions, an athlete should practise using the tactics and put into place any variations, in readiness for the upcoming game.

When creating a strategy plan, the coach and athlete must consider the aim, skill and strategy of the other competitors, as well as individual skill, and information about the environment and condition

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Figure 7.1:
Strategies
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Athletes should practise improvisation when rehearsing strategies and tactics. Improvisation is engaging in an activity without preparing for it. It involves decision making during the course of the game. Athletes react instinctively to what they see happening in the game and then try something new or different in order to achieve success. Athletes must be flexible when performing their planned strategies and tactics. Sometimes a strategy or tactic will not work or will have to be modified, depending on game play. Improvisation might be used where a tactic is substituted with another tactic or variation on the tactic. A number of strategies and tactics can be employed when competing in different sporting activities. Examples of tactics that can be used in individual sports are outlined in Table 7.2.

Table 7.2: Common tactics in various sports.

Sport	Common tactics
Tennis	<ul style="list-style-type: none"> ▪ Use attacking and defending formations. ▪ Use the serve-and-volley technique. ▪ Play shots to the perceived weakness of the opposition, such as using a drop shot on a player who lacks speed.
Swimming	<ul style="list-style-type: none"> ▪ Work out a pacing strategy. For example, in a 400-metre race, accelerate for the first 50 metres, pace for the middle 300 metres and sprint for the remaining 50 metres. ▪ Saving the best swimmers for semi-finals and finals.
Cycling	<ul style="list-style-type: none"> ▪ High speed jump away from other riders and accelerate to move ahead. ▪ Ride in another cyclist's slip stream.
Athletics	<ul style="list-style-type: none"> ▪ In 1500-metre race events, slip stream and then 'slingshot' in front of the competitors in the last 100 metres. ▪ In field events, perform after other athletes to learn the benchmark necessary for success.
Trampolining/ gymnastics	<ul style="list-style-type: none"> ▪ Creating a balance between performing a routine that could receive a high score and one that can be carried out effectively, free of mistakes. ▪ Keep the planned routine a secret from competitors.
Rowing	<ul style="list-style-type: none"> ▪ Perform the first and last 500m split fastest. ▪ Using the markers to gauge the pace.

Practical activity

As a class, choose an individual sport and split into groups of two.

1. In your designated group, discuss strategies and tactics that you can use to gain a competitive edge over the other group.
2. Play the game, using the strategy devised by the group.
3. Announce the strategies and tactics to the class, and include an evaluation of how effective the strategies were.
4. Discuss the different strategies used by the groups and suggest reasons why some were more effective than others.



Figure 7.13:

Athletes must concentrate to focus their efforts to effectively apply their ability to the task.

Psychological aspects when competing in the chosen activity

Individual performance requires a great deal of mental concentration and focus. Many individual sports rely on perfecting technique and constantly performing to personal best, with minimal room for mistakes. Individuals are judged solely on their performance and don't have other players to 'fall back' on, unlike team sports. This can create stress and negatively affect their performance. Mentally preparing for competition can allow an athlete to focus their energy on what they have to do and optimise their performance.

The most important mental qualities include:

- **Concentration:** Athletes must concentrate to focus their efforts to effectively apply their ability to the task.
- **Commitment:** Competing in sport depends on an athlete's full commitment, which also stimulates motivation and perseverance.
- **Confidence:** An athlete who has confidence in their own abilities will have a positive approach to the game or sport.
- **Control:** Controlling the emotions that are felt during competition and remaining composed is important for success.

These four qualities are essential to creating a healthy psychological state for successful performance. Mental rehearsal, relaxation and mindfulness are techniques that can be practised in order to achieve these qualities.

Mental practice and rehearsal

Mental practice and rehearsal means forming a mental image of the skill to be performed and visualising successful completion of the skill. When performed correctly, mental rehearsal can lead to significant improvements in performance. Because almost all skills have a measure of cognitive or mental content, mental rehearsal is an integral component of skills practice. Mental rehearsal can also be built into practice programs. It is a difficult skill to achieve at first, because it requires perseverance and concentration.

Performing mental rehearsal correctly can greatly improve performance, due to the following factors:

- In building an image of the skill in their mind, beginners save both time and energy during their physical practice.
- Increased confidence that athletes have after periods of mental rehearsal aids performance. Even in challenging situations, mental practice leads to improved self-confidence and reduced stress by visualising success.
- When athletes are visualising their skill, their brain and nervous system are practising sending impulses to their muscles, thereby improving muscle memory.
- 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 reducing stress.

Mental rehearsal is an effective way to improve performance. According to research, athletes who prepare for competition by using a combination of 'imagined practice' and actual practice often achieve much better performance than those who rely solely on actual practice.

Relaxation

Performing a number of relaxation techniques can help an athlete relieve tension that is built up in the body. Progressive muscle relaxation helps relax muscles and regulate breathing. This technique is best done in a quiet space, with tight clothing loosened, lying down and with eyes closed. Starting at the toes and progressing through each muscle group up to the scalp-flex, hold and relax each muscle group.

Meditation can also be helpful for an athlete to clear the mind and connect with the body. It can help develop behaviours that calm the body and relieve muscle tension as well as settling the mind from thinking about worries and stresses. Meditation can involve clearing the mind of all but one thought. Another technique that is commonly used is the use of a mantra, which can be a word, group of words or an utterance which is repeated over and over. Some athletes find it easier to focus on the flame of a candle to avoid all other intrusive thoughts.



Figure 7.14: Mental rehearsal can lead to significant improvements in performance.

Did you know?

Meditation can re-energise the body as effectively as sleep.

Mindfulness

Mindfulness can be a powerful tool to help athletes improve their performance. It can help athletes improve their focus and concentration, allowing them to stay fully present and engaged in the moment. By training their minds to stay focused on the present moment, athletes can improve their ability to block out distractions and stay focused on their goals.

Mindfulness can help athletes regulate their emotions, allowing them to manage stress, anxiety, and other negative emotions that can interfere with performance. By learning to observe their thoughts and emotions without judgment, athletes can develop a greater sense of emotional control and resilience. It can help athletes improve their decision-making skills by increasing their awareness of their thoughts, emotions, and physical sensations. By staying mindful and attuned to their bodies and minds, athletes can make better decisions under pressure and respond more effectively to changing situations.

Mindfulness can help athletes reduce performance anxiety and perform more confidently. By training their minds to stay focused on the present moment, athletes can reduce the tendency to worry about past mistakes or future outcomes, and instead focus on the task at hand. It can help athletes improve their recovery by reducing stress, promoting relaxation, and improving sleep. By cultivating a mindfulness practice, athletes can improve their overall wellbeing, which can have a positive impact on their physical and mental health.

Mindfulness can be a powerful tool for athletes to improve their performance, manage stress and anxiety, and promote overall wellbeing. By incorporating mindfulness practices into their training and competition routines, athletes can enhance their mental and physical abilities and achieve their full potential.



Figure 7.15: Mindfulness can help athletes reduce performance anxiety.



Figure 7.16: Mindfulness can help athletes regulate their emotions, allowing them to manage stress and other negative emotions.

Internet activity

Log on to TitanOnline and complete Activity 7.6 by practising mindfulness.

Learning activity

1. Identify and describe effective psychological strategies to improve performance.
2. Apply these strategies to an individual game or sport of your choice.
3. Analyse how these strategies worked for you and how effectively you believe they would be for other competitors.

Practice, training and individual performance

Practice and training are essential for improving individual performance in sport. Practice and training allow athletes to develop and improve their skills. Repetition of specific movements and techniques allows the body to become more efficient at performing these actions, which can lead to improved performance.

Regular practice and training can also help athletes improve their fitness. Consistent training can help athletes build strength, endurance and flexibility, which can enhance their performance in competition. It also plays a crucial role in mental preparation for competition. Athletes can use training sessions to simulate competition situations and develop strategies for coping with stress and pressure.

Regular practice and training can help athletes build confidence in their abilities. By seeing the results of their hard work and progress over time, athletes can develop a sense of self-assurance that can translate into improved performance in competition. It can also help athletes become more adaptable to different situations and opponents. By exposing themselves to a variety of training methods and challenges, athletes can develop the ability to adjust and adapt their approach to meet the demands of different situations.

Skill acquisition

Skill acquisition refers to the process that an athlete undertakes in order to develop new skills. Athletes learn, develop and define desired skills for better performance in competition.

Stages of learning

The acquisition of movement skills can take time and practice. The rate at which a learner acquires a new skill will vary and involves the three stages of learning:

- **The cognitive stage:** At this first stage, the athlete will be introduced to the new skill and will benefit from demonstrations in order to get the concept. Performance is characterised by many errors. Movements may seem jerky and uncoordinated, and the athlete has little or no idea of how to analyse or correct their errors.
- **The associative stage:** This second stage is commonly referred to as the practice stage. At this stage, emphasis is placed on practice and the correct sequencing of movement and skills. The movement and skills become more refined and the athlete makes fewer errors. Internal and external feedback is important at this stage.
- **The autonomous stage:** The third and last stage is the one at which the athlete produces the movement and skills automatically. The athlete's performance is characterised by few errors, and performance is consistent and skilful. The athlete can focus on tactics, strategies and 'reading' the game. They are able to detect and correct errors, and have a feel for the movement or skill involved.

Factors affecting skill acquisition

Each athlete has a different rate of learning. Some athletes may pick up a skill quickly whereas others may take more time. Progression through the different stages of learning, will vary, as will the final level of proficiency. The rate of skill acquisition is based on the following factors:

- **Heredity:** Heredity refers to inherited genetic traits or characteristics from parents. Inherited traits that may impact a person's ability to acquire skills include:
 - A person's somatotype, or body composition, can determine physical suitability for different game and sports.
 - The genetic composition of muscle (the mix of fast-twitch and slow-twitch fibres) can determine how successful an athlete is at a particular sport.
- **Gender:** In general, testosterone in males allows them to have a greater advantage in strength and power skills, and women have an advantage of greater flexibility.
- **Prior experience:** Learning a new skill is easier if a similar movement or skill has already been mastered. Having prior experience of similar skills can quicken the learning process, as it allows an athlete to recall the techniques and transfer the learning into more complex skills. For example, a person who has played cricket may be able to pick up the skills required in golf quickly, as both sports use hand–eye coordination and striking skills.
- **Personality:** Personality is an important determinant in a person's ability to learn new skills, with traits such as confidence, determination, focus and enthusiasm having positive effects on the learning process.
- **Ability:** Some athletes learn skills easier because they may have greater abilities than others. This may reflect a greater ability to learn, a better level of fitness, greater grasp of fundamental movement skills, better hand–eye coordination or greater mental skills.
- **Confidence:** As a learner successfully acquires components of a skill, they develop confidence in themselves and their abilities. This confidence translates into the next stage of learning and helps the athlete tackle new skills. By beginning with simple skills and developing into more complex skills, the athlete will master these and have the confidence and motivation to continue developing their skills. On the other hand, if a learner is struggling to complete the tasks, they may lose confidence in themselves, which may slow the development of skills.



Figure 7.17:

Learning a new skill is easier if a similar skill has already been mastered.



Figure 7.18:

In general, testosterone in males allows them greater strength and power.

Internet activity

Log on to TitanOnline and complete Activity 7.7 by watching the video on stages of skill acquisition.

Case study – Skill acquisition and development

Fonzie's junior tennis squad has recently welcomed ten new players, aged between five and 12 years, who have never played tennis before. The newcomers have different levels of movement skill development, so Fonzie needs to design training sessions that cater to their needs while keeping existing players engaged and enthusiastic. These are his strategies for skill development and enjoyment.

Initial assessment and group allocation

- Conduct an initial assessment of each player's movement skills and tennis experience.
- Group players based on their skill levels and age to ensure balanced and productive training sessions.
- Consider creating smaller groups within each age range to focus on specific skill levels.

Fundamental skill training

- Begin training sessions with fundamental skill development for all players, regardless of their skill levels.
- Focus on basic tennis techniques, such as grip, footwork, forehand, backhand and serving.
- Utilise modified equipment, such as smaller racquets and low-compression balls, to facilitate learning for younger or less-experienced players.

Individual skill stations

- Organise training sessions with individual skill stations that target specific aspects of the game.
- Rotate players among the stations, allowing them to work on different skills at their own pace.
- Provide clear instructions, demonstrations and guidance to ensure proper execution of each skill.

Progressive skill challenges

- Design drills/exercises that accommodate players at different skill levels.
- Incorporate progressive challenges that allow players to gradually improve.
- Adjust the difficulty level based on the players' progress and abilities.

Game-based training

- Introduce game-based training activities to enhance the players' enjoyment and motivation.
- Incorporate mini-matches, team competitions, and fun tennis-related games to develop tactical skills and reinforce the learning of technical aspects.
- Encourage positive sportsmanship and create a supportive environment where players can learn from both success and failure.

1. How can Fonzie effectively assess the skill levels of both new and existing junior players?
2. What strategies can Fonzie employ to ensure that all players, regardless of their skill levels, feel engaged and motivated during training sessions?
3. How can Fonzie create a balance between individual skill development and team cohesion within the training sessions?
4. What specific drills or exercises can be included in the training sessions to help new junior players improve their movement skills and tennis techniques?
5. How can Fonzie incorporate game-based training activities to enhance enjoyment while still focusing on skill development?

Technical aspects of performance

One of the most important determinants of success in performing with the proper technique. If athletes don't move correctly, they will not reach their full potential of time and effort in order to perfect technique. Poor technique leads to inefficient movement and possible injury.

Athletes who wish to perform well at any level of sport must learn a number of skills. The learning of skills and technique with mastery of basic technique and progresses to advanced competitive situations. It is one of the coach's main roles to give their athletes opportunities to learn and practice in a positive and constructive environment. In facilitating skill development, especially at a junior level, the coach can set the stage for the athlete's future performances.

One of the coach's most important roles is the analysis of performance skills, which means the ability to look at an athlete's movements and know what they should do next. Skill analysis can be divided into three parts:

- Observation of the athlete when they are performing the skill.
- Analysis of the performance.
- Detection and correction of errors in order to improve the performance.

In order to analyse an athlete's performance, coaches plan what to observe and how to observe it. This provides athletes with feedback on how to correct their technique and helps them effectively execute their skills.

In applying the technique correctly, athletes can eliminate wasted motion or effort by removing any unnecessary movement. By combining correct technique for running with the use of appropriate equipment, athletes can reduce the 'landing forces' and in turn, reduce the amount of stress they place on the bones and muscles and minimise the chance of injury.



Learning activity

1. Identify the stages of learning and the common characteristics of each stage.
2. Analyse how different factors can affect the rate of skill acquisition.
3. Discuss a range of methods for improving skill development and enhancing performance.
4. Assess the importance of correct technique in an individual game or sport of your choice.



Figure 7.20:

For most activities, distributed practice is generally more advantageous than massed practice.

Types of practice

The quantity and quality of an athlete's practice is an important aspect of skill development. The method of practice has a large effect on how the athlete adopts a new skill. The coach should design practice that is catered towards the type of skills that must be learned, organising the session to include drills that are appropriate to both the task and the athlete and will ensure that training sessions remain interesting and challenging. The main types of practice are described as massed, distributed, whole and part.

Massed practice

Massed practice is a continuous type of skill practice in which 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 skills that are not boring or will bring on early fatigue. Massed practice may be more beneficial for more mature athletes who have the concentration to remain focused for longer periods of time.

Distributed practice

Distributed practice is characterised by periods of rest or practice of other skills. This type of practice is best for beginners who have low motivation or who find the skill difficult or boring. Distributed practice provides variety within each practice session, thereby allowing the athlete to recover both mentally and physically.

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

Whole practice

Whole practice involves practising the skill as one complete movement. The coach might choose to teach a skill as a whole rather than to break it down into its parts or components. This type of practice is especially relevant for simple skills and for skills that are more difficult to be broken down, such as a swimming dive. When whole practice is being used in order to teach these skills, they will be demonstrated and then be practised in its entirety.

The main advantage of the whole practice method is that the learner has the opportunity to experience the feeling of the whole movement, similar to a game environment. It is also very time effective as it does not have to be broken down and pieced back together. The main disadvantage is that learners can lose motivation if they cannot perform it or they might be afraid to perform a skill that seems dangerous. They may also find it difficult to comprehend as a whole.

Part practice

Part practice is best used when a skill is complex, where it is more appropriate to break the complex movement into its component parts. The parts can be taught separately and then linked together so that 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 within the whole skill.

The triple jump is a good example of part practice teaching. First, the take off and hop are taught and practised. Then 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.

In part practice, the learner can achieve success at each point in the practice and thereby have confidence to piece the skill together. Although motivation can be affected if the learner cannot master each step.



Figure 7.21: A tennis serve is taught with the part practice method.

Internet activity

Log on to TitanOnline and complete Activity 7.8 by contrasting massed and distributed practice sessions.

Practical activity

1. As a class, choose an individual sport and select two difficult skills that an athlete uses in that sport. In groups of two, teach each other these skills using the different types of practice. Analyse which types of practice were most appropriate in this situation.
2. Practise the tennis serve by breaking it up into parts. After mastering the individual parts, progressively join them together and eventually perform the full movement.

Training programs

Training programs are designed to cater to the individual performance goals of each athlete in order to improve their performance. Each athlete is different, therefore catering to differences in age, gender, strengths, weaknesses and goals is essential. It also takes into consideration, the level of experience and the chosen event of the athlete. Creating a plan for training will make sure the athlete is prepared for competition and be at peak performance.

Training programs should be designed to incorporate the needs of the individual performer. Types of training programs include are outlined below.

Strength training

Strength training can be a valuable tool for athletes to improve their performance in many sports. Strength training helps to increase muscle strength and power, which can enhance an athlete's performance in many sports. By lifting weights or using resistance training equipment, athletes can develop the specific muscles needed to perform at a high level.

Strength training can also help to improve muscular endurance, which is the ability of muscles to perform repeated contractions over an extended period. This can be particularly beneficial in endurance sports like running or cycling, where muscle fatigue can be a limiting factor.

Strength training can also help to improve joint stability and reduce the risk of injury. By developing the muscles around a joint, athletes can improve the joint's ability to absorb and distribute forces, which can reduce the risk of injury.

Flexibility training

Flexibility training is a type of exercise that involves activities that increase the range of motion of joints and muscles. Flexibility training can help to improve joint mobility, which is the ability of a joint to move through its full range of motion. Improved joint mobility can help athletes perform movements more easily and with less risk of injury.

Flexibility training can also help to reduce the risk of injury. This is because improved joint mobility and muscle flexibility can reduce the stress on joints and muscles during physical activity, which can help to prevent injuries. It can also help to improve posture, which is essential for athletes to maintain proper form during sports performance. By improving posture, athletes can improve their balance and stability, which can help them perform movements more efficiently.

Flexibility training can also help to improve recovery after exercise. This is because flexibility exercises promote blood flow and nutrient delivery to the muscles, which can reduce muscle soreness and promote recovery.



Figure 7.22: Improved joint mobility can help athletes perform movements more easily.

Internet activity

Log on to TitanOnline and complete Activity 7.9 by designing a flexibility training program.

Aerobic training

Aerobic training is a type of exercise that involves activities that increase the heart rate and breathing rate over an extended period. Aerobic training can help to improve cardiovascular endurance, which is the ability of the heart and lungs to deliver oxygen to the muscles during exercise. By improving cardiovascular endurance, athletes can perform at a higher level for a longer period without experiencing fatigue.

Aerobic training can also help to improve oxygen uptake, which is the ability of the body to take in and use oxygen. By improving oxygen uptake, athletes can improve their energy production, reduce fatigue and improve their overall performance.

Aerobic training

Aerobic training can also help to improve recovery after exercise. This is because aerobic exercise promotes blood flow and oxygen delivery to the muscles, which can reduce muscle soreness and promote recovery. It can also help to manage body weight. This is because aerobic exercise can burn a significant number of kilojoules, which can help athletes maintain a healthy body weight and improve their overall fitness.

Anaerobic training is a type of exercise that involves high-intensity, short-duration activities that do not rely on oxygen to produce energy. Anaerobic training can help to increase muscle strength and power, which can enhance an athlete's performance in sports that require explosive movements, such as sprinting and weightlifting. It can also help to improve anaerobic endurance, which is the ability of the body to perform high-intensity activities for short periods. This can be particularly beneficial in sports that require quick bursts of energy, such as the 100-metre sprint or high jump.

Anaerobic training can help to improve speed and agility, which are essential for success in many sports. By developing fast-twitch muscle fibres, athletes can improve their ability to accelerate, change direction quickly, and react to changes in their environment. It can also help to increase lactate threshold, which is the point at which the body starts to produce lactic acid during exercise. By increasing lactate threshold, athletes can perform at a high level for a longer period before experiencing fatigue.

Skill training

Skill training is a type of practice that focuses on specific techniques and abilities required for a sport or physical activity. Skill training can help to develop proper technique and form in their sport. By practicing specific skills repeatedly, athletes can improve their memory and perform movements more efficiently.

Skill training can also help athletes increase their ability to perform specific skills. This can be particularly important in sports that require precise movements such as gymnastics or diving. It can help athletes improve their decision-making ability.

By practicing game-like scenarios, athletes can learn to make quick, accurate decisions under pressure.



Training principles

There are a range of training principles that should be applied to any training program:

- **Warm-up:** 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, has an increased core body temperature and has an increase in blood supply to the muscles.
- **Cool-down:** A cool-down is required at the end of every session to remove lactic acid, to enable the heart rate to gradually return to normal and to stretch the muscles.
- **Progressive overload:** The principle of overload recognises the fact that the body changes and adapts in order to cope with exercise that is more intense or difficult than the body is used to. Overloading the body increases a person's level of fitness.
- **Reversibility:** Reversibility recognises that a decrease in training will result in a decrease of various fitness components.
- **Specificity:** Specificity refers to the body's adaptation to training in specific ways. The greatest gains in performance occur when the movements are similar to the movements involved in the person's chosen sport or activity.
- **Variety:** A person should use a variety of training types and activities in order to both maintain motivation, target all body systems and alleviate boredom.
- **Training threshold:** The term training threshold means the training intensity that is necessary to obtain a training effect, such as a change in the athlete's fitness.



Figure 7.24:
A warm-up should be done at the beginning of each training session.



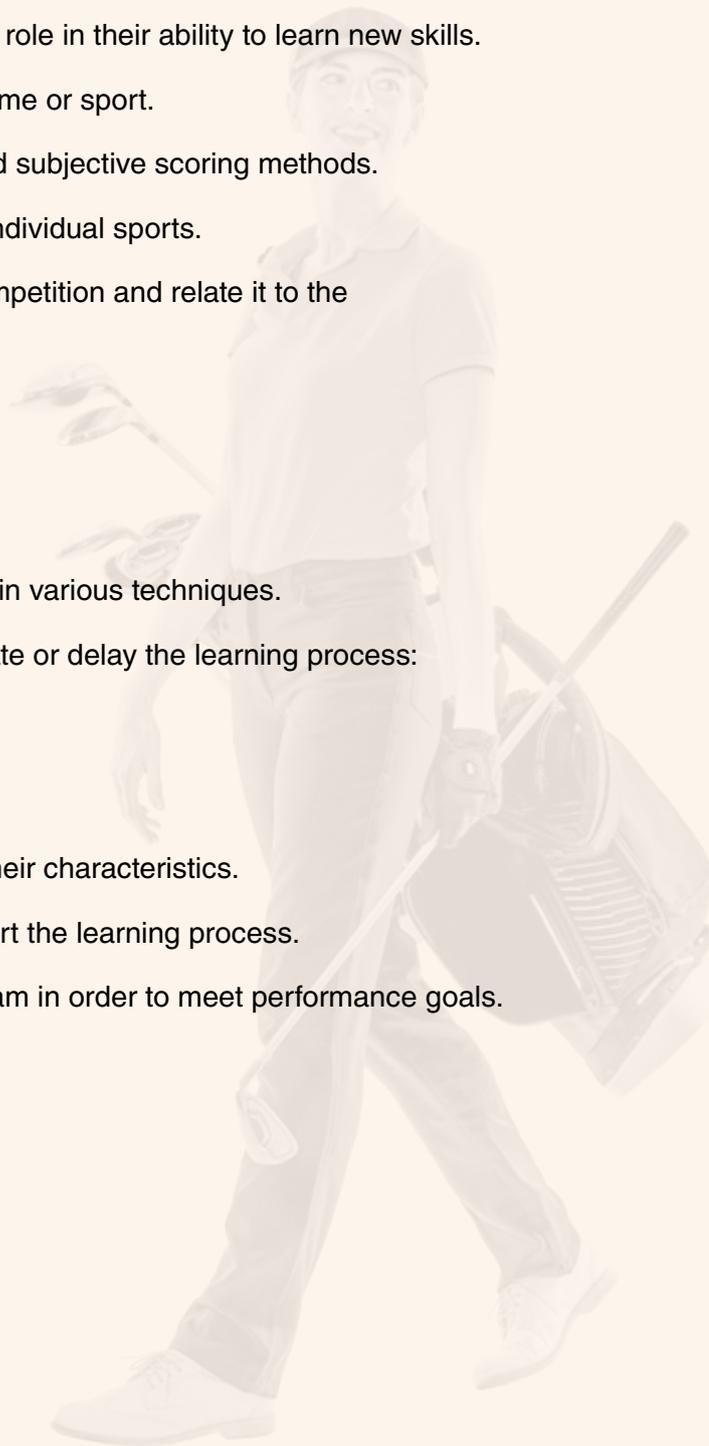
Figure 7.25:
The principle of specificity makes training on stationary rowing machines an obvious choice for competitive rowers.

Learning activity

1. Identify the principles that should be considered when developing a training plan.
2. Outline activities that could be incorporated into a rowing training program to provide variety.
3. An athlete has been doing squats as part of his strength training for his legs. Describe different ways of applying the progressive overload principle for this exercise.
4. Design a training plan for yourself, working to achieve individual fitness and performance goals.

Revision questions

1. Explain the different ways an athlete could apply the progressive overload principle to interval training.
2. Describe how an athlete's level of confidence plays a role in their ability to learn new skills.
3. Analyse how fairness can increase the safety of a game or sport.
4. Identify the benefits and weaknesses of objective and subjective scoring methods.
5. Discuss how performance standards are applied to individual sports.
6. Identify the role that strategies and tactics play in competition and relate it to the following sports:
 - a. Swimming.
 - b. Tennis.
 - c. Gymnastics.
 - d. Cycling.
7. Outline the benefits of psychological preparation within various techniques.
8. Analyse how the following factors can either accelerate or delay the learning process:
 - a. Previous experience.
 - b. Confidence.
 - c. Hereditary factors.
9. Identify the different types of practice and describe their characteristics.
10. Discuss how different methods of practice can support the learning process.
11. Analyse the benefits of a personalised training program in order to meet performance goals.



CHAPTER 8

Outdoor recr

Throughout this unit, students will develop a range of skills necessary for participating safely in outdoor recreation pursuits. Students identify the suitable Australian climate and terrain for participation in outdoor recreation. They explore the reasons why people participate in outdoor recreation, including physical challenge, social benefits, personal growth and development, psychological benefits and appreciation of the environment. Students are introduced to skills of navigation and learn skills such as compass reading, route planning and natural navigation. They learn about preservation and conservation of natural landscapes as well as wilderness first aid and weather interpretation skills. Students learn to practise appropriate equipment requirements and campsite planning and safety requirements.

Syllabus outcomes

A student:

- applies the rules and conventions that relate to a range of physical activities (1.1)
- demonstrates ways to enhance safety in physical activity (1.2)
- investigates and interprets the patterns of participation in sport and physical activity in Australia (1.4)
- selects and participates in physical activities according to individual needs, interests and abilities (2.3)
- assesses and responds appropriately to emergency care situations (3.6)
- plans strategies to achieve performance goals (4.1)
- demonstrates leadership skills and a capacity to work cooperatively in movement contexts (4.2)
- demonstrates competence and confidence in movement contexts (4.4).

Focus areas

- Outdoor recreation opportunities
- Skills involved in outdoor recreation
- Planning in outdoor recreation





Figure 8.2:

Many of Australia's natural environments are famous for their beauty and diversity.

Outdoor recreation opportunities

Opportunities to engage in outdoor recreation in Australia are varied and relatively affordable. Despite Australia being populated mainly in cities and towns, most people have ready access to a wide variety of recreational pursuits.

Suitability of Australian climate and terrain

The majority of Australia enjoys a temperate climate which is ideal for various types of outdoor recreational activities all year round. Australia's environment is blessed with natural beauty, home to many World Heritage listed sites, including some of the oldest rainforests on earth and approximately one third of the world's protected marine areas. Many of Australia's natural environments are famous for their beauty and biological diversity, with tourists coming from around the world to embrace outdoor recreational opportunities in areas such as the Great Barrier Reef, tropical Northern Queensland, Uluru, Kakadu, the Kimberley and Tasmania's wilderness. There are also lesser known, but equally beautiful areas throughout the country, ranging from rugged mountain ranges, beautiful coastlines, pristine waterways and the remote outback.

With such a diverse range of climates and terrains throughout Australia, there are ample opportunities for all types of outdoor recreational activities.

Reasons for participation

People participate in outdoor recreational activities for a number of reasons. These reasons include social benefits, personal growth, physical development, psychological benefits, appreciation of the environment and to provide a personal challenge.

Challenge

Being challenged is a concept many individuals enjoy and strive for. It involves being outside one's comfort zone and learning new skills in order to handle new situations. Some challenges that individuals may encounter will require them to:

- be resilient
- use problem solving
- trust those around them
- deal with adverse weather conditions
- display leadership skills.

The challenges individuals face through their involvement with outdoor recreational activities can also be categorised as physical or psychological, which will be explored later in this chapter.

Social benefits

Participation in outdoor recreational activities can provide many social benefits. People might choose to participate in outdoor recreation because their friends encourage them to and to strengthen existing friendships and relationships. Individuals might also make new friends and form new relationships through their involvement in outdoor recreation. Some of these activities require participants to put the safety in the hands of someone else – such as rock climbing or abseiling – which can create an unusual and unique bond between strangers.



Figure 8.3: Many people enjoy challenging outdoor recreation activities.



Figure 8.4: Participation in outdoor recreation can strengthen existing friendships.

Did you know?

Over 90% of Australia is covered in native vegetation.

Learning activity

1. Create a list of outdoor recreational activities and categorise them according to:
 - a. how dangerous they are
 - b. how much experience is needed to participate safely
 - c. popularity (in Australia)
 - d. cost.
2. Describe the health benefits of the outdoor recreation activities you have participated in.
3. Reflect on the reasons for your choice of these specific activities.

Personal growth

Outdoor recreation provides multiple opportunities for personal growth and development. Life today, particularly in the western world, is heavily reliant on technology. One major aspect of outdoor recreation is being away from technology. Many people find this challenging, but as challenging as it might be; it provides opportunities for personal growth. Simple concepts such as being able to navigate or use maps – common skills needed for many outdoor pursuits – have become redundant due to the development of GPS systems such as Google Maps.

Involvement in outdoor recreation can create a sense of personal accomplishment, leading to increased confidence and self-esteem.



Figure 8.5: Involvement in outdoor recreation can create a sense of accomplishment.

Physical development

The type of recreational pursuit will determine the physical skills and attributes needed. Certain activities such as rock climbing and fishing require a completely different set of physical skills. Activities such as rock climbing, abseiling and white-water-rafting are quite physical and will require individuals to develop their fitness levels. If an individual is participating in outdoor recreation to improve their fitness, it is important to continue to challenge oneself and push past what they have become accustomed to. They should continue to make it challenging so they are getting as much physical gain out of the activity as possible.

Activities such as fishing or hunting do not require high levels of fitness but rather require skills specific to the activity, such as casting a line or tracking an animal.

Psychological benefits

There are many psychological benefits to be gained from participating in outdoor recreational activities. These activities often require individuals to be immersed in the natural environment, which can allow for a different type of psychological activity than what one can expect to experience in a busy city or crowded office. The psychological benefits of participating in outdoor recreational activities include:

- developing confidence and self-esteem
- becoming more efficient at problem-solving and decision-making
- identifying ways to be sustainable.

Appreciation of the environment

Outdoor recreation allows individuals to experience the environment and appreciate the natural landscape. Through involvement in bush walks within national parks, for example, individuals learn about how damaging littering can be and the impact of pollution on the natural environment. This can foster a new appreciation of the land. Also, if individuals practise recreational activities such as surfing, they may become familiar with conservation and ethical issues concerning the water and marine life, and may begin campaigning for these issues.

Outdoor activities

There are a range of outdoor activities to suit the needs and wants of everyone. Outdoor activities can be physically challenging, such as white water rafting, skiing or rock climbing. Outdoor activities can also help with spiritual development and mental clarity, such as surfing or bush walks. No matter the type of activity an individual participates in, they should always be aware of safety considerations, skills and techniques and equipment required.

Safety considerations

Participating in outdoor activities requires individuals to consider the safety precautions they should be taking. Individuals should dedicate appropriate time to planning and organising. If, for example, there is a group planning to go on an overnight hike through a national park, the group needs to plan:

- Who is bringing specific items, such as a shovel, garbage bags, tents, and toilet paper?
- Who is notifying the national park and other appropriate authorities?
- Informing family or loved ones of the plan in case anything happens.

Other important safety considerations include:

- remaining hydrated
- managing injuries
- avoiding dangerous and unfamiliar areas
- being cautious of wildlife.

Whenever participating in outdoor activities, it is important to have a back-up plan in case something should go wrong.

Skills and techniques

Specific outdoor activities will require certain skills and techniques. For some outdoor activities, these skills and techniques can be developed each time an individual partakes in this activity, such as surfing, bushwalking, mountain biking, etc. However, in some cases, using the correct skills and technique is vital to ensure safety. For example, using the wrong technique when abseiling may result in injury or death.

Developing the correct skills and techniques often requires good instruction, plenty of practise and effective feedback.



Figure 8.6: Snorkelling requires specific skills and techniques to ensure safety.



Figure 8.7: Keeping hydrated is an important safety consideration while hiking.

Internet activity

Log on to TitanOnline and complete Activity 8.1 by researching a range of safety considerations for the outdoor recreation activities listed.

Equipment

The equipment used for outdoor recreation can make the difference between completing the activity or not completing it, between getting injured and not getting injured and between enjoying the activity or not enjoying it. The types of equipment to consider include:

- **Clothing:** clothing should be weather and terrain appropriate. If hiking, clothes should be light and water proof, but also insulated. Ensure shoes fit correctly and have been 'worn in'. Extra socks are always a good idea in case of rain and/or blisters.
- **Backpack:** if doing any activity that requires some sort of backpack, it is important to ensure it is being worn correctly to prevent neck and back soreness and possible injury. Straps should be tightened so the backpack is secure against the back. The pack should not be unbearably heavy, especially if it is going to be worn for several days.
- **Safety equipment:** such as helmets, knee pads, shoulder pads, and harnesses should always be worn when it is appropriate. Equipment should be tested to see if it is in working order before being used in the outdoors. First aid kits should be taken and must be checked before leaving for the activity to ensure it is stocked with supplies.
- **Navigational equipment:** such as maps and compass. Make sure the map is up to date and that someone is familiar with how to use a compass.
- **Food and water:** adequate food and water should be taken. If there is safe drinking water throughout the hike for example, there is no need to carry litre upon litre of water as this adds weight to the back. Foods that take up little room and do not have much waste are ideal.

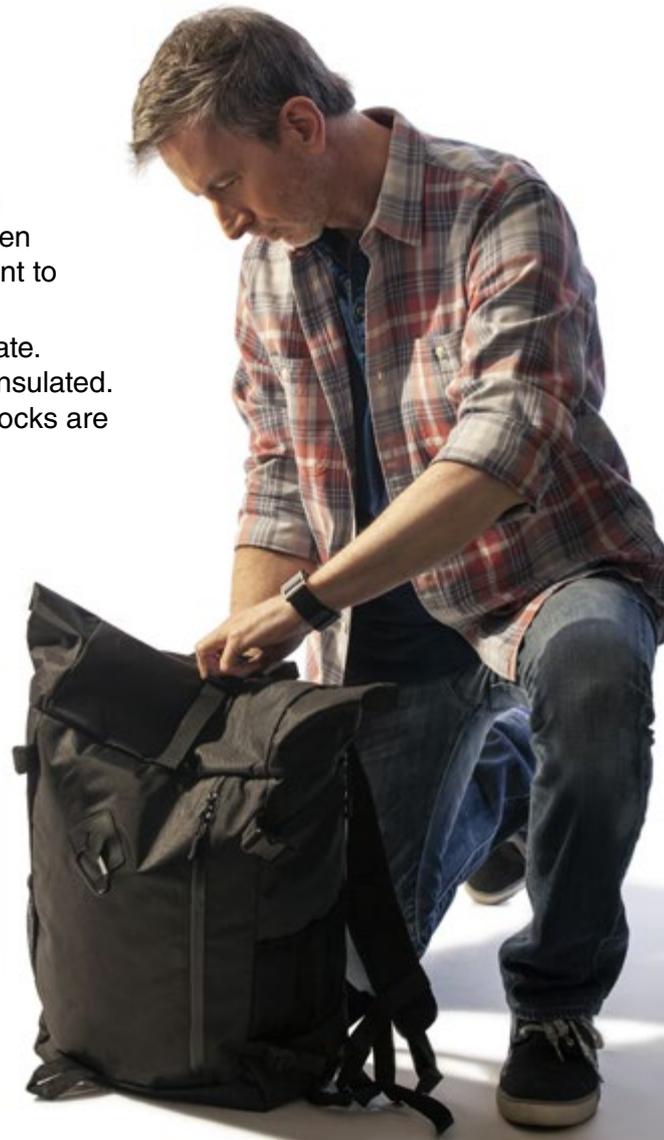


Figure 8.8:

A pack must not be too heavy, especially if it is going to be worn for several days.

Learning activity

1. Assess the suitability of Australia's natural environment for participation in a range of outdoor recreation activities.
2. Identify outdoor recreational facilities that can be accessed in the local area.
3. Analyse the reasons why people choose to participate in a variety of outdoor activities.
4. Discuss the feelings people experience from participating in outdoor recreational activities.

Skills involved in outdoor recreation

Outdoor recreation involves a wide range of activities and skills, depending on the specific activity and environment. Knowing how to use a map and compass, read GPS coordinates, and identify landmarks can help you navigate unfamiliar terrain. Being able to build a shelter, find food and water, and start a fire can be crucial for surviving in the wilderness.

When participating in outdoor recreation, particularly any activity that involves camping or hiking through national parks, it is essential to be mindful of the flora and fauna and to minimise the impact of hiking and camping.

Navigation

Navigation involves knowing how to get from one point to another when in various environments. Navigation includes compass reading, map reading, route planning and natural navigation. A range of bush skills can also be utilised to aid navigation.

Internet activity

Log on to TitanOnline and complete Activity 8.2 by participating in the practical activity on compass reading.

Compass reading

Compass reading is a necessary skill to have in relation to navigation. A compass is a tool that, when used correctly, indicates the direction of north. Being able to establish the direction of north is extremely important for reading and following a map, particularly in the wilderness where there may be no specific landmarks to associate with the map.

A compass will have north, south, east and west pointed out, as well as degrees from 0 degrees to 360 degrees. In the middle of the compass is the needle. The needle will move depending on where the individual holding the compass is and the direction they are facing. There is also a direction of travel marking, which should also be facing away from the compass reader.

When reading a compass, individuals should:

- Hold the compass flat in the hand, at a height between the chest and belly button.
- Make sure the direction of travel arrow marking is facing away from the person and should be pointing the same way as the middle finger.
- Ensure the needle arrow matches up with north. North will not always be in the same direction as the direction of travel marking. Do this by twisting the dial until it matches up.
- Note that once the needle is on north and the direction of travel mark is directly in front of the compass reader, the direction will become clear.

If an individual is trying to find the bearing of a specific spot on a map, the compass can be placed on the map, with the direction of travel arrow facing the same way as the specific spot.

It is also important to consider the difference between true north and magnetic north. True north points to north as according to the planet's axis, that is the North Pole. Magnetic north relates to the planet's magnetic field. There will be, depending on where the reading is taken, differences between true north and magnetic north of a few degrees.

Practical activity

In groups of 3-4:

1. Design an outdoor recreational activity to participate in at school.
2. List all the equipment required.
3. Complete a risk assessment, identifying all the possible risks associated with the activity and how they will be managed.
4. Devise an emergency plan in case something unexpected occurs.
5. Reflect on the feelings experienced during and after participating in the outdoor recreational activity.

Map reading

A map is an accurate depiction of the land, detailing the gradient, terrain and many other relevant details. Topographic maps are detailed maps that show the terrain features of a geographic area, including the contours of the land and the elevation of different features. Some of the features that topographic maps should include:

- **Contour lines:** these lines show the elevation of the land and help to illustrate the shape and slope of the terrain.
- **Scale:** topographic maps should include a scale that indicates the distance between different features on the map.
- **Legend:** a legend or key should be included to explain the different symbols and colors used on the map.
- **Geographic coordinates:** topographic maps should include geographic coordinates, such as latitude and longitude, to help users navigate the map and locate specific features.
- **Water features:** topographic maps should show water features, such as rivers, lakes, and streams, and indicate their depth and flow direction.
- **Vegetation:** topographic maps should show the types of vegetation in the area, such as forests, grasslands, and wetlands.
- **Man-made features:** topographic maps should show man-made features, such as roads, buildings, and bridges.
- **Relief shading:** some maps include relief shading, which uses color and shading to show the shape and steepness of the terrain.

Maps provide a great deal of information for people engaged in outdoor recreation. To successfully use a map, one must understand:

- commonly used symbols that are shown in the legend
- scales used on a map which enable an individual to calculate distances
- how to orientate a map so that north on the map matches the real north
- how to use grid references to establish locations on the map
- how to calculate bearings that will enable an individual to plot a route.

If using a map of an area to try to follow a route, it is essential to orientate the map using the compass, so the north on the map is really pointing north. To do this, rotate the circular housing until north is in line with the direction of travel arrow. Then put the compass on top of the map and continue to rotate the map until the grid lines are parallel with the lines on the compass housing (maps always have north to the top). The map is now orientated to the north and objects and landmarks would be able to be identified as they appear on the map.

Route planning

Route planning involves devising how to get from point A to point B. There are specific factors that need to be considered when planning a safe route that meets the needs of the group, including:

- the steepness and surface of the terrain
- appropriate areas for rest or camping
- the availability of water
- potential dangers and alternative routes in case of emergencies
- estimated travelling times.

Practical activity

1. Calculate the distance around the school oval.
2. Walk at a comfortable pace for 1km and establish the walking speed.
3. Obtain a map of the closest national park. Plan a one day walk, outlining a safe, achievable route.
4. Nominate significant landmarks, indicate walking times and plot compass bearings.
5. Identify the starting and finishing grid references.
6. Indicate the terrain at different sections on the route.

Natural navigation

Natural navigation involves finding a location, plotting a position or course by using natural references rather than man made equipment such as a compass. To use the sun to navigate (in the southern hemisphere) line up the 12 on a watch face with the sun. Halve the angle between the hour hand and the 12. This direction is north (note: adjust daylight savings out of this exercise for an accurate reading). Many people do not use analogue watches, but even if an individual can tell the time with their phone or a digital watch, one can still draw a watch face in the dirt to complete the task.



Figure 8.9: Compass and map reading are essential navigation skills.

Preservation and conservation

Preservation and conservation are important in outdoor recreation for a number of reasons. Preserving and conserving natural areas and wildlife helps to maintain the ecological balance and diversity of ecosystems. This is important for the health of the planet and for the long-term sustainability of outdoor recreation activities. By preserving natural areas and habitats, we can ensure that future generations can continue to enjoy these areas and the recreational activities they offer.

Conservation can help to protect natural resources that are vital for human survival, such as water, air, and soil. By implementing conservation measures, we can reduce the negative impact of outdoor recreation on these resources, ensuring that they remain healthy and sustainable.

Preservation and conservation can also help to maintain the aesthetic and cultural value of natural areas. Many people enjoy outdoor recreation because of the beauty and unique features of natural areas. By preserving these areas, we can ensure that they remain visually appealing and culturally significant for future generations. By practicing responsible outdoor recreation and supporting conservation efforts, we can help to ensure that these areas remain healthy and available for future generations to enjoy.

Flora and fauna

Flora relates to plant life and vegetation, whereas fauna relates to animals and insects. When participating in outdoor recreation, it is necessary to consider the flora and fauna of the environment and take extra precautionary measures to ensure they are not harmed. Table 8.1 on the following page outlines possible harms to flora and fauna and measures that can be taken to reduce the risk of causing permanent damage.

Learning activity

Research the following flora and fauna and discuss where they are found, how dangerous they are and what to do if an individual comes in contact with them:

- box jellyfish
- salt water crocodile
- deadly nightshade
- honey bee
- black bean
- stinging nettle.



Figure 8.10:

It is necessary to take precautionary measures to ensure flora and fauna are not harmed.

Internet activity

Log on to TitanOnline and complete Activity 8.3 by describing a range of preservation and conservation considerations when participating in outdoor recreation.

Did you know?

Male platypus' have spurs on their back legs that hold toxic venom.

Table 8.1: Measures to protect flora and fauna.

Risk	Protective measure
Erosion of riverbanks and noise pollution	<ul style="list-style-type: none"> ▪ Bans in specific protected areas. ▪ Noise regulations. ▪ Speed restrictions. ▪ Policing of waterways. ▪ Licence tests to drive boats.
Four-wheel driving in off-road environments	<ul style="list-style-type: none"> ▪ Stay on tracks where possible. ▪ Avoid creating ruts or large holes in tracks. ▪ Do not go four-wheel driving during or just after rainfall.
Sewerage and waste disposal	<ul style="list-style-type: none"> ▪ Do not leave anything behind. ▪ Recycle and use appropriate waste collection services. ▪ Do not leave any sanitary products behind.
Horse riding in environmentally sensitive areas	<ul style="list-style-type: none"> ▪ Only use established trails. ▪ Ride in small groups. ▪ Stay out of protected or sensitive areas.
Human waste disposal in campsites	<ul style="list-style-type: none"> ▪ Keep waste away from waterways. ▪ Bury waste at a sufficient depth. ▪ Only leave a campsite in equal or better condition as it was found.
Visiting Aboriginal art rock sites	<ul style="list-style-type: none"> ▪ Be culturally aware and respectful. ▪ Do not touch the artworks. ▪ Keep areas surrounding Aboriginal art rock sites clean.

Low-impact hiking and camping

Low-impact hiking and camping involves causing little to no damage to the environment. This is important because it prolongs the life of the natural landscape. Specific rules or guidelines hikers and campers can abide by to ensure low impact hiking and camping include:

- stay on established paths
- take out what is taken in
- do not take souvenirs
- if there is rubbish from previous hikers or campers, dispose of it rather than leaving it
- avoid camp fires and, if they are essential, keep them under control; extinguish all fires properly
- do not alter the natural environment
- notify authorities for safety and ease of rescue if required.

**Figure 8.11:**

It is essential to minimise the impacts of camping and be mindful of flora and fauna.

The Bushwalker's Code of Conduct

Minimal impact bushwalking

- We leave no trace.
- We leave campsites better than we found them.
- We use existing fireplaces or carry cooking equipment when possible, and do not scar the landscape with fire rings.
- We comply with fuel-stove only requirements.
- We remove our rubbish from the bush and bury human waste away from watercourses.
- We do not pollute the ground and waterways with soaps and detergents.
- We do not remove plants or rocks from national parks.
- We do not disturb native wildlife.
- We avoid easily damaged places such as peat bogs, cushion moss, swamps and fragile rock formations.
- We use existing tracks where possible and avoid creating multiple tracks which lead to erosion.

We preserve Australia's biosecurity

- We seek to protect the natural environment from the negative impacts of pests, diseases and weeds.
- We clean our clothing, equipment, cars, wheels and vessels to prevent the spread of pathogens and diseases that threaten biosecurity.
- We report significant or unusual pests, diseases and weeds.

We mitigate incidents

Because incidents and rescues have the greatest impact on the environment:

- We prepare for, and carefully plan each trip
- We share our trip intentions
- We act safely
- We are self-reliant
- We seek appropriate training in remote area first aid and rescue.

We take responsibility for acting safely

- We always carry clothing and equipment appropriate to our planned activity
- We carry first aid kits and are trained in first aid appropriate to our activities.
- We do not rely solely on GPS systems, but carry a map and compass, which we know how to use.
- We do not rely on mobile phone coverage for dealing with an emergency, but carry a Personal Locator Beacon and/or satellite phone when appropriate.
- We prepare an exit plan as part of our emergency planning.
- We check the safety status of our destinations before entering, observe the safety instructions of park rangers, and do not enter closed national parks.
- We advise appropriate authorities, friends or relatives of our walking plans
- We walk in groups of three or more so that there are sufficient people to summon help in an emergency.
- We keep emergency contact details updated on our club website
- We only light fires when it is safe to do so, and ensure they are fully extinguished.
- We ensure the safety and wellbeing of all children entrusted to our care on a bushwalk.
- We engage in bushwalking without being impaired by alcohol or use of drugs.

Figure 8.12:
Bushwalkers should not rely on GPS systems.



The Bushwalker's Code of Conduct

(continued)

We are self-reliant

- We carry sufficient food and water in order to survive unexpected delays.
- We wear and carry appropriate clothing and equipment for our comfort and safety in expected weather conditions, and carry gear to suit the worst possible conditions we are likely to encounter.
- We ensure we have sufficient training, experience and expertise to safely carry out our planned activity.

We respect fellow bushwalkers

- We welcome people from all walks of life irrespective of gender, age, race, religion, culture, colour, sexuality; and behave in a harmonious manner.
- We appreciate difference and welcome learning from others, building relationships based on mutual respect.
- We do not tolerate bullying, harassment or discrimination in any form.
- We encourage, respect and support our leaders as competent and motivated leaders are essential to the success of our activities.
- We respect the right of our leaders to accept or reject walker applicants for specific activities based upon the assessed degree of difficulty and the assessed competence of individual walkers.
- We respect the right of bushwalkers to enjoy the peace and quiet of the bush without undue disturbance from technology.
- We help fellow bushwalkers in need, in situations such as assisting with emergency communications, offering medical aid for which we are qualified, carrying the gear of an injured person, or sharing equipment.



Figure 8.13:

Bushwalkers should not pollute waterways with soaps and detergents.

We respect Indigenous culture

- We acknowledge the traditional owners of the land on which we walk.
- We treat sites of spiritual or cultural significance with respect.
- We obtain permission from traditional landowners or the relevant land manager to visit sensitive areas.
- We do not damage Aboriginal rock art or camp under overhangs that contain Aboriginal rock art.

We respect landowners

- We respect landowners and do not trespass on their land.
- We leave farm gates as we find them.
- We respect the rules of National Parks, and other land managers, regarding camping conditions, maximum numbers in wilderness areas, pets, permitted activities and park closures.

Source: Bushwalking NSW.

Wilderness first aid

Injuries in the wilderness differ from other injuries in that they are often difficult to manage because supplies may be limited and access to medical services may also be restricted. Outdoor adventurers have an increased responsibility to be trained in first aid and have relevant skills, knowledge and equipment to meet their own first aid needs for extended periods of time. In a wilderness emergency, first aiders should still follow the DRSABCD procedure, which is explored closely in the Chapter 3 of this textbook.

Outdoor adventurers should consider what first aid supplies they will take with them as well as how to improvise in particular first aid situations.

Essential first aid supplies

The need for a comprehensive first aid kit needs to be balanced with the need to have a manageable backpack. The essentials will be determined by the length of the hike, the terrain, the weather and the health status of the participants. The following list details some of the essential first aid supplies:

- thermal blanket
- adhesive bandages (such as Band-Aids)
- antiseptic
- sting relief spray
- cotton wool
- plastic bags
- elastic bandage
- tweezers
- water purifying tablets
- diarrhoea tablets
- gloves
- ice pack
- paracetamol
- gauze
- tape
- splints.

The chances of needing all of these supplies on the one hike are low; however it is important to have them in case something does happen. Hikers can have a communal first aid kit, where supplies are divided up among hikers in multiple, smaller first aid kits, but this does pose a danger if the group becomes separated and an emergency arises.

Common first aid injuries that are likely to occur in outdoor recreational activities include:

- **Burns:** signs and symptoms of burn injuries include blistered skin, pain, swelling and shock. To manage a burn, use DRSABCD, contact medical assistance (if a serious burn), and hold burn under running water.
- **Stings or bites:** signs and symptoms will vary depending what an individual has been bitten or stung by, but generally includes pain, sweating, nausea, swelling and increased pulse. Management techniques include DRSABCD, removing or scraping away the stinger, reassure the casualty, apply ice and seek medical assistance.



Figure 8.14:
All hikers should have a basic understanding of first aid.

Internet activity

Log on to TitanOnline and complete Activity 8.4 to learn more about the first aid treatments for common hiking injuries.

- **Bleeding:** can be a result of cuts, abrasions, contusions and lacerations. Blood pressure can drop and bleeding casualties can enter into shock as a result of the bleeding. Management techniques of bleeding include DRSABCD, applying pressure to the wound, elevating the wound to minimise blood flow to the site and seek medical assistance.
- **Fractures or sprains:** signs and symptoms of fractures or sprains include bruising, pain, protruding bones, swelling and immobility. To manage fractures and sprains, the injured area should be raised, immobilised with a sling, splint or bandaging and medical services should be contacted.
- **Hypothermia:** occurs when the body temperature falls below 35 degrees Celsius. Signs of hypothermia include feeling cold, shivering, clumsiness, slurred speech and irrational behaviour. Pulse can become difficult to find and the heart rate slows. Management techniques include DRSABCD, finding a warm place for the casualty, removing wet clothing and replace with dry layers, share body heat, reassure the casualty and seek medical assistance.
- **Hyperthermia:** occurs when the body temperature rises above 37 degrees Celsius. Signs of hyperthermia include feeling hot, exhausted and weak, headaches, nausea, fainting, fatigue, shortness of breath and confusion. Management techniques include DRSABCD, moving the casualty to somewhere cool and out of the heat, applying cold packs to body parts such as neck, groin and armpits, giving fluids to the casualty if conscious and seeking medical assistance.

Learning activity

1. List and discuss measures that can be taken in order to preserve the natural environment while engaged in outdoor recreation.
2. Develop strategies for the prevention and management of common wilderness first aid situations such as:
 - burns
 - fractures
 - sprains
 - hypothermia.
3. Demonstrate your route planning skills by planning an overnight hike in a local recreational area. Prepare an alternative plan that you would use if strong storm weather was approached during the hike.

Improvisation

Improvisation involves being flexible and responding to a situation on the spot, with little (if any) prior preparation. Common sense, thorough planning and risk minimisation can reduce the likelihood of injury. However, sometimes the best plans can fail and even the most experienced adventurers can find themselves in unexpected situations. Improvisation in outdoor recreation means thinking creatively and solving problems using whatever resources are available. Examples of improvised first aid while participating in outdoor recreation may include:

- using a stick or other piece of wood as a splint
- resting a bleeding leg on a backpack to slow the bleeding
- using a rope or t-shirt as a sling.

Internet activity

Log on to TitanOnline and complete Activity 8.5 by practising how to improvise and treat fractures in remote locations.

Did you know?

Australia is home to the world's most venomous snake, the Inland Taipan.

Weather interpretation

Outdoor recreational activities are often suited to specific weather conditions, for example some activities are most successful in windy conditions, whereas others may be most successful in clear, sunny weather. Weather interpretation involves being able to evaluate or estimate what the future weather may be like based on predictions from sources such as the Bureau of Meteorology, National Parks and Wildlife, the internet and television weather reports.

Meteorological charts

Meteorological charts show predicted weather conditions over a chosen area at a specific time. Various features, such as shading and lines, depict where certain weather conditions are going to occur, such as areas with heavy rain or high tides. Knowledge of meteorological charts may help avoid getting caught in a lightning storm or rising flood waters.

Meteorological charts show the movement of low and high pressure systems. Isobars are lines on these maps that link points of equal atmospheric pressure. The closer the isobars, the stronger the winds.

In high pressure systems, winds move in an anti-clockwise direction and dry, relatively cloud free conditions can be expected. In a high pressure system, the air will sink down from the sky, causing it to warm up, usually creating stable weather conditions. In low pressure systems, winds move in a clockwise direction. During a low pressure system, the warm air will rise up from the ground. As this air rises, it cools, usually creating clouds and possible rain and unsettled weather.

Another feature identifiable on a meteorological chart is a cold front. A cold front involves cold polar air moving in and replacing warm air. During these situations, strong winds can be expected as well as drastic temperature differences.

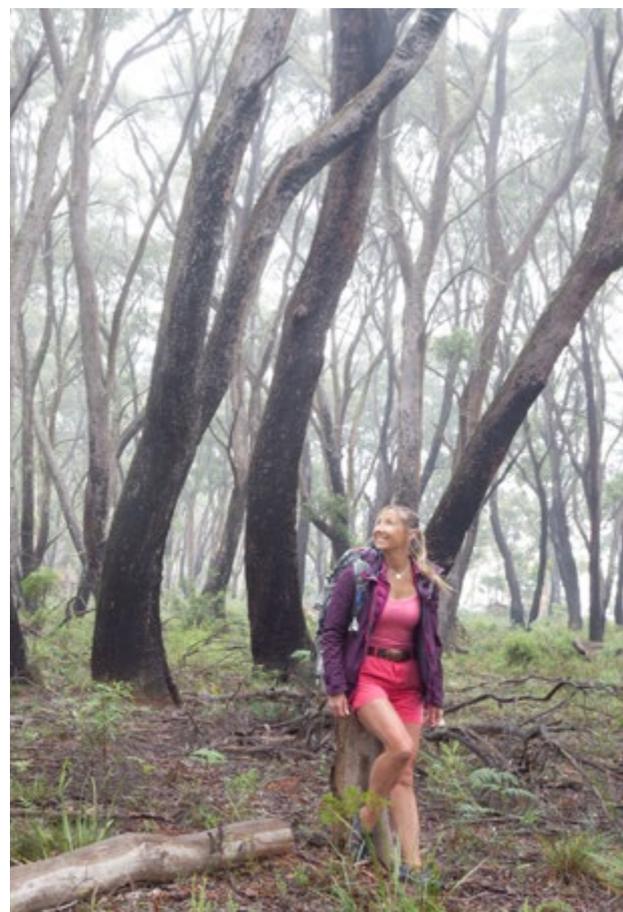


Figure 8.15: Low pressure systems usually create clouds, rain and unsettled weather.

Internet activity

Log on to TitanOnline and complete Activity 8.6 by identifying and comparing weather trends on meteorological charts.



Figure 8.16: One way of using natural signs to predict weather is by assessing the types of clouds in the sky.

Natural signs

If engaging in outdoor recreation, one should become familiar with natural signs that indicate possible weather conditions. This will help make informed decisions regarding safety. Most people are capable of looking outside and making a general assessment of weather conditions; for instance dark clouds mean it could rain with possible thunder and lightning. One way of using natural signs to predict weather is by assessing the types of clouds in the sky, as each can be associated with certain types of weather. Table 8.2 outlines the common features of clouds.

Table 8.2: Common features of clouds.

Cloud	Appearance	Associated weather
Cirrus	<ul style="list-style-type: none"> ▪ High clouds. ▪ Look very thin. ▪ Made of ice. 	<ul style="list-style-type: none"> ▪ Fine, clear weather.
Stratus	<ul style="list-style-type: none"> ▪ Low clouds. ▪ Cover most of the sky. 	<ul style="list-style-type: none"> ▪ Associated with overcast weather. ▪ May be darker in appearance and bring rain.
Cumulus	<ul style="list-style-type: none"> ▪ White and fluffy clouds. ▪ Can also be dark and heavy looking. 	<ul style="list-style-type: none"> ▪ When white and fluffy, fine weather. ▪ If dark and heavy, can bring rain or hail.

Practical activity

1. Practise navigation using a compass and a map.
2. Practise navigation using the stars and the sun.
3. Draw conclusions from interpreting weather reports.

Case study – Outdoor training

Michelle started doing Spartan races at the beginning of the year. She had wanted something new to challenge her and push her out of her comfort zone. In high school, the teachers would always make running torture. It was used as punishment, like if students didn't bring their uniform they would have to run laps, or if they were mucking up they would have to run laps. Michelle always found running boring and it wasn't until she started the Spartan races that she really started enjoying it. Spartan races are large obstacle courses that involve a combination of running and various obstacles such as a rope climb, monkey bars, crawling under netting and so on. The length of running is dependent on the level of difficulty of the race.

Michelle likes to vary her training so as to keep it interesting and prevent boredom. Part of her regular training involves a run through the Blue Mountains National Park. The National Park is an ideal track with different inclinations and running surfaces, which is perfect fitness for the Spartan races.

Michelle is part of a Facebook group where members post different trails they are planning to run and others can join them if they are in the area. This way they can discuss the equipment and resources they need and divide it up between themselves.

The Blue Mountains is a popular track and there are normally at least four or five people who will do this track whenever it comes up. However, there has been a lot of rain lately and group sizes have been smaller. On this particular day, there was only two others going and they were going to meet Michelle at the train station. But when she arrived, the other two runners were not there. She waited a while before trying to contact them on social media. Michelle was running late – she had arrived around half an hour after the arranged time and when she called their phones, they went straight to voicemail. The reception in the Blue Mountains is not the best and when in the National Park it is really hard to get reception anywhere. Michelle assumed the other two have already started the hike. In Michelle's pack is water, glucose lollies, a basic first aid kit with a few Band-Aids, antiseptic and a small blanket.

Due to the bad weather, the three were planning on only doing a short track, about 10km, which would only take a couple of hours. For this reason, Michelle didn't pack any food, only a few lollies for energy, and she didn't pack a jumper or long pants either.



Figure 8.17:
It is important to consider safety precautions when participating in outdoor activities.

Case study – Outdoor training*(continued)*

Michelle decided to start the trail run anyway, despite not being able to get in contact with the other two runners. She hadn't met them before and didn't want to come across as annoying, so when they didn't answer her initial call, she decided to go in and try to find them. About two hours into the hike, she realised her map did not match up to where she is meant to be. She eventually establishes her location on the map, and realises that she is about one and half hours in the wrong direction. She figures if she traces her steps back to the place where she went off track, she would only be about half an hour from where she entered the mountains and she will be able to get back out and go home. Plus by that time, she would have nearly run her 10km.

On the way back to the part Michelle went off track, she realises she is lost again and can't locate where she is anywhere on the map. Everything looks the same. Only the people in the private Facebook group know she has gone on the hike, but when she didn't show up in time, the other two runners would probably assume her missed call was just to say she couldn't make it.

It's been six hours since she entered the mountains and Michelle is running out of water. She sits down to try the map again but this proves to just make her more confused. She feels a sting on her knee and scratches it away. She looks at the ground to see a big brown spider scurrying away. The bite is swollen and painful and it is getting bigger. Michelle doesn't know what to do.

1. List the precautions Michelle overlooked that she should have considered before beginning her run.
2. Suggest items that are essential for every hiker to have in their first aid kit.
3. Analyse Michelle's actions. What would you have done differently/the same?
4. Outline how Michelle should deal with the spider bite having limited first aid supplies.
5. Michelle did not notify authorities that she would be running in the national park. Create two endings to this case study:
 - a. One where authorities were notified
 - b. One where authorities were not notified.
6. Create a blog post for track runners, including the following:
 - how to plan a track run
 - what to take
 - what to wear
 - who and how to notify
 - how to deal with emergency situations.

Planning in outdoor recreation

Planning in outdoor recreation is a vital part of the outdoor experience. Time and care needs to be put into planning to ensure maximum enjoyment and safety for all participants. Planning includes considering equipment requirements, safety requirements and campsite planning and skills.

Equipment requirements

When participating in outdoor recreation, there are a number of equipment requirements that need to be considered. These include the maintenance of equipment, clothing requirements and food and water requirements.

It is important to consider and pack the essential equipment when participating in outdoor recreational activities. In many cases, adventurers will need to carry their equipment so it is necessary to only take what is needed and to try to use sustainable resources. Individuals need to consider requirements in relation to first aid, toiletries, sleeping and shelter, cooking, eating, drinking, cleaning and navigation equipment. Table 8.3 outlines the essential equipment for most hikes and bushwalks.

Table 8.3: Equipment requirements.

Equipment	Specific items
First aid	Adhesive bandages, cloth bandages, bite/sting cream, insect repellent, paracetamol, sunscreen, scissors, flares, personal medications, lip balm.
Toiletries	Deodorant, toilet paper, feminine products, toothbrush and toothpaste.
Sleeping and shelter	Tent, mattress, sleeping bag, warm sleepwear, tarp, poles, rain coat/poncho.
Cooking, eating, drinking and cleaning	Matches, portable cooker, fuel, paper towels, cutlery, plate/bowl, rubbish bag, cup, long-life foods, non-perishables and can opener.
Navigation	Compass, map, torch or head light, watch.

Adventurers should create a checklist of everything they need before they start packing for their outdoor experience. This way when they are packing, they can tick each item off as they go.



Figure 8.18: Equipment for cooking, eating, drinking, sleeping and shelter will need to be carried to and from the campsite.

Internet activity

Log on to TitanOnline and complete Activity 8.7 by researching the equipment required for an outdoor recreation activity.

Maintenance of equipment

Maintenance of equipment needed for outdoor recreation is important for a number of reasons. If equipment is not maintained adequately, it can:

- become a safety hazard
- rip, break or tear
- go mouldy.

Different equipment will need specific maintenance. One of the most important things to consider is airing and drying out camping equipment. Even if it does not rain, equipment such as tents, tarps and floor mats will get wet and moisture forms mildew. Once returning from a hike or camp, tents and any other similar materials need to be laid out to dry properly. Some people will apply a spray that deodorises the tent. One should also check for any rips or tears so that they can be repaired or replaced before it needs to be used again.

When camping, it is best for the environment not to use strong cleaning products – just wash with water and wipes or paper towels. Upon arriving home from camping, cooking utensils should be cleaned properly with detergent.

Campers should completely unpack their backpacks and should check each pocket or compartment. This is to ensure there are no scraps or perishables left in the bag for extended periods of time. Camping equipment will generally come with instructions on how to care for it properly. These instructions are best to follow to maintain the longevity of the equipment.

Clothing requirements

While participating in outdoor recreation, it is important to wear the correct clothes, not only for comfort but for safety as well. Long pants and long sleeved shirts help to avoid bites and scratches, and protect from weather conditions such as rain or sunburn. However, they should also be light weight to prevent overheating and hyperthermia. Long clothes also protect individuals when participating in activities that require a harness.

Individuals should pack appropriate clothing for when the sun goes down and the temperature drops. This might include packing thermals and an extra pair of thick socks to sleep in.

Shoes and footwear should be appropriate for the activity that is being completed. For many outdoor recreational activities, hiking boots or running shoes are most appropriate. If buying a new pair of shoes, adventurers should wear their shoes in before the activity to prevent blisters and aches. Some activities will require water shoes, such as flippers or aqua shoes. When hiking, it is important to consider how many pairs of socks to pack.

It is always better to pack extra socks than not enough, because hiking in damp or dirty socks can be very uncomfortable.



Figure 8.19:

Campers should completely unpack their backpacks after each trip.

Food and water requirements

Deciding on appropriate food to bring on outdoor recreational activities depends on:

- duration of the activity
- physical demands of the activity
- cooking utensils available
- rubbish and disposal facilities.

Foods to avoid when camping include:

- perishables (foods that go off quickly)
- foods with excessive packaging
- foods that need refrigerating
- foods that may cause constipation or diarrhoea
- foods high in salt, as it can cause dehydration.

Foods ideal for camping should be nutritious and dense in kilojoules. This is to help adventurers maintain enough energy throughout their outdoor recreational activities. Foods should be lightweight and easy to prepare. Include things like trail mix, dried fruits, pre-made pancake mix, muesli bars, carrot sticks or tinned goods such as tuna, beans and potatoes.

It is a good idea to create a meal checklist before packing camping food. It would be appropriate to plan breakfast, lunch and dinner and what ingredients are needed for each meal. Campers should also plan out snack foods to give extra energy that are edible 'on-the-go'.

Before leaving for any hike or camping trip, it is essential to check if there will be access to safe drinking water. If not, hikers should bring water purifying tablets. A bottle made from metal such as stainless steel will help to keep the water cold for longer and is ideal for camping.

Other outdoor activities, such as marathons through national parks or surfing competitions, will entail different food and water requirements. For an activity like a marathon, participants will not be stopping for three meals, but rather need something high in electrolytes and energy, such as a sports drink or protein bar.



Figure 8.20:

Before leaving for any hike or camping trip, it is essential to check if there will be access to safe drinking water.



Figure 8.21:

Foods ideal for camping should be nutritious and dense in kilojoules.

Internet activity

Log on to TitanOnline and complete Activity 8.8 by creating a menu for a three-day hike.

Safety requirements

When participating in outdoor recreation activities, it is essential to prioritise safety to minimise the risk of accidents and injuries. Some general safety requirements include:

- plan and prepare
- notify relevant authorities
- dress appropriately
- use proper equipment
- stay hydrated and nourished
- know your limits
- be aware of your surroundings
- consider alternate plans
- plan escape routes
- communicate and carry emergency supplies
- travel in groups where possible
- respect the environment.

Notification of authorities

Notifying authorities is very important in relation to safety while participating in outdoor recreational activities. Anything can happen during outdoor recreation that can alter the rest of the plan. If authorities have been notified and provided a copy of the group's plan, they will be able to respond quickly if something happens. For instance, if a group is meant to be away for a week and it has been eight days and they haven't arrived home, authorities can organise a search party if needed. Notifying authorities is also ideal for individuals who may not be very experienced in their outdoor recreational pursuit because authorities can offer advice and tips. Specific information one should know when notifying authorities include:

- how many people in the group
- where they are going
- how experienced they are
- starting and finishing times
- any medical conditions of members in the group that could impact the activity
- emergency contact details.



Figure 8.22: Carrying emergency supplies is essential when participating in outdoor recreation activities.



Figure 8.23: It's important to notify authorities of camping or hiking plans, as phone reception may not be available in remote areas.



Figure 8.24:

Having alternative plans gives you the flexibility to explore less crowded areas for your activities.

Alternate plans

Alternate plans are important in outdoor recreation. Outdoor environments are inherently unpredictable. Weather conditions, trail closures, or natural disasters can arise unexpectedly, making it necessary to have alternative plans. Having backup options ensures that you can still enjoy outdoor activities even if your original plan is disrupted.

Sometimes, certain outdoor activities may become unsafe due to changing weather, hazardous conditions, or personal limitations. Having alternate plans allows you to adapt to these circumstances and choose activities that are safer and more suitable for the current conditions.

Popular outdoor destinations can become overcrowded, particularly during peak seasons or holidays. In such cases, having alternative plans gives you the flexibility to explore less crowded areas or choose less popular times for your activities. Additionally, some recreational areas or facilities may have limited access or require reservations, so having backup options ensures you can still enjoy your time outdoors.

Outdoor recreation is subjective, and individual preferences may vary. Having alternate plans allows you to tailor your activities based on your preferences, such as choosing between different trails, routes, or activities that align with your interests and goals.

Engaging in a variety of outdoor activities can provide valuable learning experiences and skill development. Having alternate plans allows you to diversify your experiences, try new activities, and broaden your knowledge and abilities in different recreational pursuits.

Escape routes

Escape routes are important in outdoor recreation for emergency preparedness and ensuring personal safety. Outdoor activities can occasionally involve unforeseen emergencies, such as sudden changes in weather, natural disasters, or accidents. Having designated escape routes allows you to quickly and safely evacuate the area in case of an emergency. This could be particularly important in remote or isolated locations where immediate access to medical help or rescue services may be limited.

Outdoor environments can present various hazards and risks, including rugged terrain, steep slopes, cliffs, or areas prone to flooding or landslides. In the event of encountering a hazardous situation or finding yourself in an unsafe location, knowing the escape routes enables you to navigate to a safer area efficiently.

Outdoor recreation often involves exploring unfamiliar terrain or following trails and routes that may be challenging to navigate. In case you become disoriented, lost, or encounter obstacles that hinder your progress, having escape routes helps you retrace your steps or find an alternative path back to a known location or a safe point.

Even with careful planning and preparation, situations can arise that require a change in plans or an early exit from the outdoor activity. It could be due to personal factors like fatigue, injury, or illness, or external factors like unexpected closures, time constraints, or changes in weather conditions. Escape routes provide a way to safely and efficiently exit the area when needed.

When participating in outdoor activities with a group, having established escape routes is essential for effective communication and coordination. It ensures that everyone is aware of the designated exit points and can regroup or evacuate together in case of an emergency or unforeseen circumstances.



Figure 8.25:

No matter how well something is planned, there are things that can force the plan to change.



Figure 8.26:

Outdoor environments can present a variety of hazards and risks.

Practical activity

1. Construct an emergency shelter.
2. Demonstrate competence in a range of camp skills, including:
 - setting up a tent
 - packing a backpack
 - cooking a camp dinner
 - navigation and map reading.
 - starting a camp fire

Emergency procedures

All members of a group should be aware of appropriate procedures in case of an emergency. Everyone in the group, not just the leader, should be trained and prepared on how to handle a situation, just in case they become separated from the group and need to fend for themselves. Specific scenarios that could occur and result in the need for emergency procedures include:

- serious injury such as bleeding, fractures or bites
- hypothermia or hyperthermia
- extreme weather conditions, such as hail or bushfire
- running out of food or fresh drinking water
- becoming lost or separated from the group
- equipment failure, such as a harness or compass breaking.

All adventurers should be familiar with:

- DRSABCD
- escape routes
- emergency contact numbers
- map reading skills
- using natural signs to navigate.

While it is important to have an escape route, situations can arise that prevent hikers from using an escape route, such as there being a bushfire or another hiker having a serious injury making them immobile.



Figure 8.27: Signs of hyperthermia include feeling weak, headaches, nausea and confusion.



Figure 8.28: All members of a group should be aware of procedures in case of an emergency.

Learning activity

1. Research identifiable star constellations and how they can be used for navigation.
2. Explain the importance of notifying authorities when participating in outdoor recreational activities.
3. Analyse the types of considerations adventurers should make when planning what food to take camping.
4. Discuss maintenance measures campers should practise upon returning home from camping.
5. Describe ideal attire for an overnight, summertime hiking trip in Australia.

Campsite planning and skills

When camping, it is important to carefully plan the choice of campsite and to acquire the necessary set of skills for hiking. Hikers need to consider site selection, roles and responsibilities and camp skills.

Site selection

Site selection can greatly add to or detract from the camping experience. Important factors to consider when selecting a campsite are outlined in Table 8.4.

Table 8.4: Site selection.

Factor	Explanation
Drainage	Make sure the campsite is dry and has good drainage. Sandy soil is ideal as it helps with keeping the surface dry. A slight slope will assist with drainage.
Respect for fellow campers	Everyone is participating in outdoor recreation for their own reason, which is why it is important to be mindful around other campers. It is good etiquette to leave space between one's campsite and other camping groups. Be mindful of noise, particularly as it gets dark; not only for other campers but for the wide life. Make sure to take all rubbish and leave the campsite clean.
Approval from authorities	It is necessary to acquire the relevant passes and approval for camping. Approval from authorities helps protect the flora and fauna and also the campers.
Fire rules	Knowing the rules and regulations regarding fires is vital. Some campsites will have complete fire bans and others will change depending on weather and seasonal conditions.
Overhead hazards	Try to avoid campsites with any overhead hazards such as tree branches or transmission towers, especially if hiking in windy or stormy weather.
Surface check	Check the surface of the campsite and clear it of any small rocks, sticks or glass. If the site has any larger rocks, choose another site so as to not disturb the natural landscape.
Fresh water supply	Make sure there is fresh water available. Make sure to not bathe, wash utensils or brush teeth in fresh running water, particularly not upstream. Keep a safe distance from the water's edge in case of heavy rainfall or flooding.
Protection from wind	Consider the exposure to wind and choose a sheltered site to maximise comfort and safety.

Internet activity

Log on to TitanOnline and complete Activity 8.9 by describing the reasons for a campsite selection.



Figure 8.29:

Tasks such as cooking, cleaning, and putting the tent up are roles that can be divided up among campers.

Roles and responsibilities

Designating specific roles and responsibilities to adventurers helps with managing outdoor recreational activities. Roles and responsibilities help hikers understand who is in charge of various elements throughout the adventure. All members should have, at the very least, a basic understanding of first aid and DRSABCD. While camping, everything has to be carried in back packs, so groups can divide up camping equipment and individuals can be responsible for specific equipment. Tasks such as cooking, cleaning, fetching drinking water, and putting the tent up and down are roles that can be divided up among campers.

Did you know?

Sydney's Royal National Park was Australia's first national park. Many years ago, it had rabbits, foxes and deer introduced for the purposes of hunting.

Learning activity

Develop a detailed plan for an outdoor recreational activity. Include:

- intended duration
- maps
- safety action plan
- roles and responsibilities of group members
- contact details of authorities from which to gain permission.

Camp skills

Camping requires a specific set of skills in order to be efficient in the natural environment and to ensure safety is not compromised. Some of these skills include camp fire management, sourcing and purifying water, campsite cooking, setting up tents and packing a backpack. Table 8.5 explains these skills.

Internet activity

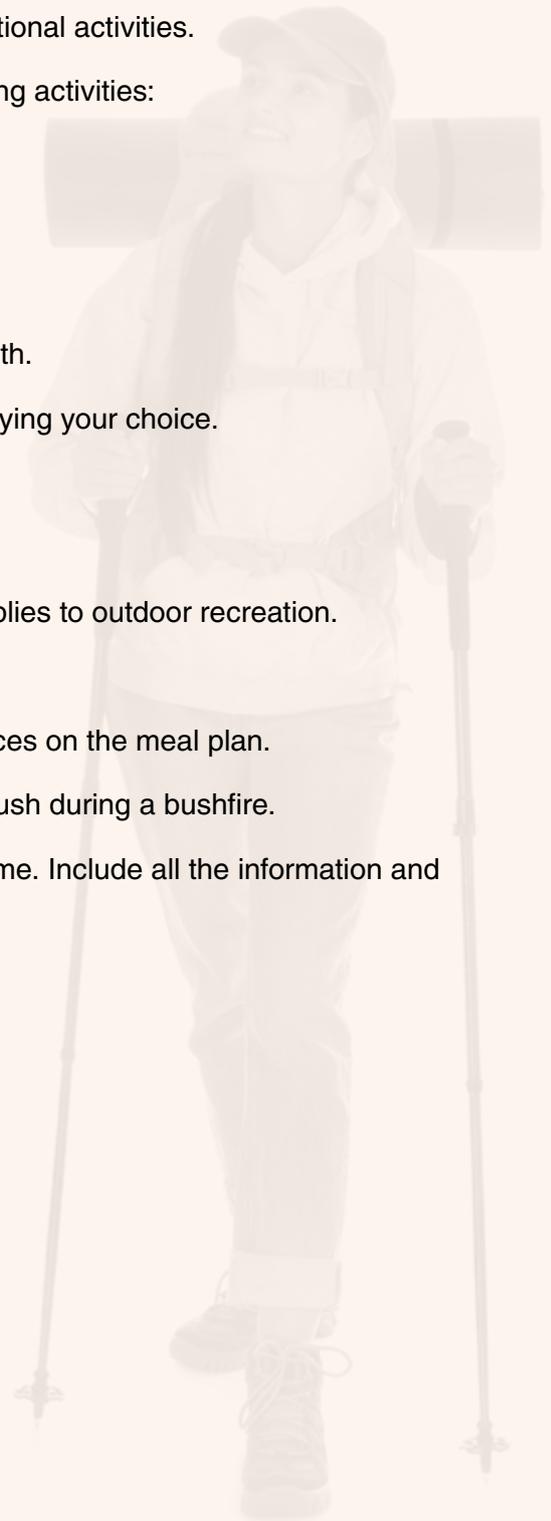
Log on to TitanOnline and complete Activity 8.10 by identifying the camp skills required when hiking overnight.

Table 8.5: Camp skills.

Skills	Instructions
Camp fire management	<ul style="list-style-type: none"> ▪ Do not damage the environment when collecting fire wood. ▪ Use fire pits that already exist. ▪ Be aware of fire bans. ▪ Do not let the fire burn excessively. ▪ Extinguish fires completely before leaving. ▪ Keep a safe space between the fire and tents, bush, people, etc.
Sourcing and purifying water	<ul style="list-style-type: none"> ▪ Low lying, dark green, lush vegetation often indicates a water supply. ▪ After rainfall, keep an eye out for natural puddles or rock pools ▪ If hard to reach, improvise by creating a vessel to drink from; possibly by folding a large leaf or branch in the middle. ▪ Placing a plastic bag over big, leafy foliage during rainfall can collect water. ▪ Collect water from streams where the water is running, and not where people are swimming or camping. ▪ If collecting water that has not come from a running stream, water can be boiled or a purifying tablet can be added.
Campsite cooking	<ul style="list-style-type: none"> ▪ Camp oven: cast iron pot with a lid. ▪ Billy: small tin with a handle used to boil water or cook certain foods ▪ Pot grabber: used as a handle that attaches on to camp pots so that they can be moved without burning anyone ▪ Trangia stove: portable, small stove ideal for camping
Tent set up	<ul style="list-style-type: none"> ▪ Select a flat site to erect the tent. Fasten securely. ▪ Use a fly sheet to avoid condensation.
Packing a bag	<ul style="list-style-type: none"> ▪ Only pack what is needed. ▪ Lay everything out and do a final check before packing. ▪ Line the bag with a large garbage bag to protect items from moisture. ▪ Place heavier items lower in the pack. ▪ Heavy gear should be divided up between hikers.

Revision questions

1. Identify reasons why people participate in outdoor recreation.
2. List possible social benefits of participating in outdoor recreational activities.
3. Discuss the safety considerations associated with the following activities:
 - a. white-water rafting
 - b. abseiling
 - c. horse riding
 - d. snorkelling.
4. Highlight the difference between true north and magnetic north.
5. Nominate five items to take in a first aid kit when hiking, justifying your choice.
6. Define what a meteorology chart is.
7. Evaluate areas of consideration when choosing a camp site.
8. Describe how the saying 'failing to plan is planning to fail' applies to outdoor recreation.
9. Discuss appropriate clothing for mountain biking.
10. Create a meal plan for a three day hike. Justify the food choices on the meal plan.
11. Create a fact sheet outlining a survival plan if caught in the bush during a bushfire.
12. Design a manual for a small group going hiking for the first time. Include all the information and advice required.



CHAPTER 9

Resistance training

Throughout this unit, students will discuss the concept of resistance training. They will discover the uses of resistance training, particularly in relation to developing power, strength, muscular gain, body shaping, muscular endurance and competitive weight lifting. Students explore the major muscles in the human body and appropriate exercises for these muscle groups. They analyse various forms of training, resistance activities and training terms such as repetition sets, and resistance. Students apply key concepts of resistance programming into their own training sessions. They discuss the importance of goals, overload techniques, monitoring progress and safety precautions. Students complete the unit with a critical study concerning the facts and fallacies related to resistance training.

Syllabus outcomes

A student:

- explains the relationship between physical activity, fitness and healthy lifestyle (1.2)
- demonstrates ways to enhance safety in physical activity (1.3)
- explains the principles of skill development and training (2.1)
- analyses the fitness requirements of specific activities (2.2)
- selects and participates in physical activities that meet individual needs, interests and abilities (2.3)
- describes the relationship between anatomy, physiology and performance (2.5)
- designs programs that respond to performance needs (3.2)
- measures and evaluates physical performance capacity (3.3)
- demonstrates competence and confidence in movement context

Focus areas

- Uses of resistance training
- Muscles of the body
- Training methods
- Resistance programming
- Facts and fallacies



Figure 9.1:

Strengthening the muscles around the joints can enhance stability and protect against injuries.

Uses of resistance training

Resistance training, also known as strength training or weight training, is a form of exercise that involves using resistance to stimulate muscle contraction and build strength, endurance and muscle mass. The resistance can be provided by various means, such as free weights (dumbbells, barbells), weight machines, resistance bands, or bodyweight exercises.

During resistance training, the muscles are subjected to external resistance, which creates tension in the muscle fibres. This tension stimulates the muscles to adapt and grow stronger over time. Resistance training can target specific muscle groups or the entire body, depending on the exercises performed and the training program.

There are different types of resistance training techniques, including:

- **Isometric training:** this involves static muscle contractions without joint movement (for example, holding a plank position).
- **Isotonic training:** focuses on dynamic muscle contractions with joint movement, divided into concentric (muscle shortening) and eccentric (muscle lengthening) phases. This can be achieved through exercises like bicep curls or squats.
- **Isokinetic training:** uses specialised machines that provide resistance through the full range of motion, ensuring constant speed and tension on the muscles.

Resistance training offers numerous benefits, including:

- **Increased muscle strength and power:** regular resistance training promotes muscle growth and enhances muscular strength, allowing individuals to perform daily tasks with less effort.
- **Improved bone density:** resistance training places stress on the bones, stimulating them to become denser and stronger, reducing the risk of osteoporosis.
- **Enhanced body composition:** resistance training increases muscle mass while reducing body fat, leading to a more defined physique.
- **Boosted metabolism:** as muscle mass increases, the metabolic rate also tends to rise, increasing energy expenditure even at rest.
- **Improved joint stability and flexibility:** exercises around the joints can enhance stability and range of motion while maintaining or improving flexibility.
- **Enhanced athletic performance:** resistance training can improve athletic performance by increasing power and overall muscular endurance.

When starting resistance training, it is important to learn proper technique and form to prevent injury. Consulting with a fitness professional can help design a suitable program based on your fitness level, and any pre-existing conditions.

Figure 9.2:

Resistance training helps build lean muscle mass.



There are many types of resistance training you can undertake whether at home or the gym, such as:

- **Free weights:** classic strength training tools such as dumbbells, barbells and kettlebells.
- **Medicine balls or sand bags:** weighted balls or bags.
- **Weight machines:** devices that have adjustable seats with handles attached either to weights or hydraulics.
- **Resistance bands:** like giant rubber bands, providing resistance when stretched. They are portable and can be adapted to most workouts. The bands provide continuous resistance throughout a movement.
- **Suspension equipment:** a training tool that uses gravity and the user's body weight to complete various exercises.
- **Your own body weight:** can be used for squats, push-ups and chin-ups. Using your own body weight is convenient, especially when travelling or at work.

Power

Power is the combination of strength and speed used to create explosive movements. Power is essential in most sports and in particular activities that involve acceleration, jumping and throwing. Improvements in power can be achieved through training techniques such as resistance training and plyometrics.

Power is one of the skill-related components of physical fitness. For success in sports such as football, weightlifting, athletics and boxing, power is a vital component. A range of fitness tests can be used to measure the power of different parts of the body.

Strength

Strength is defined as the ability of a muscle to exert force against a load or resistance. Absolute strength is the maximum amount of weight that can be lifted once. Training to improve muscular strength includes resistance training as well as compound exercises, such as squats with weights, and bodyweight exercises, such as sit-ups.

Strength is one of the health-related components of physical fitness. Strength is essential for many sports such as gymnastics, rugby league and athletics. In certain sports, such as weightlifting, it is the most important physical attribute. A range of fitness tests can be used to measure the strength of different parts of the body.



Figure 9.3: Resistance training can improve athletic performance by increasing power.



Figure 9.4: Your own body weight can be used for squats, push-ups and chin-ups

Muscular gain and body shaping

Muscular gain, also known as hypertrophy, is a term for the development and increase of the size of muscle cells. Muscular gain occurs as a result of resistance training, utilising the overload principle and adequate nutritional intake. When a person begins a resistance training program, adaptations occur to the cells of the muscle being exercised. The resistance training program places stress on the muscle. The muscle adapts to this stress by increasing in size and strength.

The goal of most resistance training programs is to develop lean muscle mass. Lean muscle mass is developed by a combination of resistance training and dietary intake. While a greater intake of kilojoules is required to fuel workouts and repair muscle tissue it is critical to eat the right combinations of food.

Body shaping is defined as toning and shaping of the body through exercise. It can also be defined as alteration of the natural body, something done to control or enhance the appearance of the body. Body shaping usually involves lowering levels of body fat, increasing muscle mass, improving symmetry and addressing areas of the body that are perceived as unattractive.

Muscular endurance

Muscular endurance is the ability of a muscle or group of muscles to repeatedly contract for extended periods without tiring. It is very important for people playing sports and those who have to sustain an activity for long periods of time. Examples of sports that require high levels of muscular endurance include triathlon, mountain bike riding and distance running.

Competitive weightlifting and bodybuilding

Competitive weightlifting and bodybuilding are two distinct sports, with different objectives and training methodologies.

Competitive weightlifting, also known as Olympic weightlifting, focus two main lifts: the snatch and the clean and jerk. The goal is to lift as much weight as possible in these specific movements, showcasing strength, power, and technique. These lifts require explosiveness, technique, and coordination to lift a maximal load overhead.

Bodybuilding is more about aesthetics and muscle development. The goal is to sculpt the body and develop well-defined muscles, emphasising muscle size, and overall physique. Bodybuilders typically perform a wide range of exercises targeting specific muscle groups, using a variety of equipment such as dumbbells, barbells, machines and cables. The focus is on isolating and developing individual muscles.



Figure 9.5:

Weightlifting requires explosiveness, technique, and coordination to lift a maximal

Competitive weightlifters prioritise training for explosive power, strength, speed, and technique in the snatch and clean and jerk. They perform exercises like squats, deadlifts, pulls, and variations of the snatch and clean and jerk to improve their performance in these lifts.

Bodybuilders focus on hypertrophy (muscle growth) and shaping their physique. Training often involves high-volume workouts, targeting individual muscle groups from various angles, using techniques like isolation exercises, drop sets, supersets, and time under tension.

In weightlifting competitions, participants compete in various weight classes and attempt maximum lifts in the snatch and clean and jerk. The individual's best lift in each category is combined to determine their overall score. Bodybuilding competitions involve contestants performing mandatory poses, showcasing their muscular development, symmetry, and overall presentation. Judges evaluate and compare competitors based on muscle size, definition, proportion, and overall aesthetics.

Weightlifters tend to have a more compact and athletic physique. Their training focuses on developing explosive power, functional strength, and mobility to excel in the specific lifts. Bodybuilders aim to achieve a highly muscular and sculpted physique with a focus on symmetry, muscle definition, and overall muscle mass. They often strive for low body fat levels, to enhance muscle visibility.



Figure 9.6:

Weightlifters tend to have a more compact and athletic physique than bodybuilders.

Internet activity

Log on to TitanOnline and complete Activity 9.1 by watching the YouTube clips and comparing the physiques of strongman and bodybuilding competitors.

Did you know?

Arnold Schwarzenegger won seven Mr Olympia titles during his bodybuilding career.

Learning activity

1. Describe the difference between power, strength and muscular endurance.
2. Research the resistance, repetitions, sets, exercise speed and rest between sets for the following types of resistance training:

<ol style="list-style-type: none"> a. Power b. Strength 	<ol style="list-style-type: none"> c. Hypertrophy/lean muscle mass d. Muscular endurance
---	--
3. List examples of sports, where athletes would benefit from:

<ol style="list-style-type: none"> a. power-based resistance training b. strength-based resistance training 	<ol style="list-style-type: none"> c. muscular endurance resistance training.
---	--
4. Investigate the impact of strength training on the performance of athletes (e.g. gymnasts, sprinters, rowers).
5. Research the types of activities commonly involved in Strongman competitions.
6. Identify the benefits of resistance training for the general population.
7. Research what is meant by 'agonist' and 'antagonist' in regards to muscle action.

Muscles of the body

The muscular system is the body's system through which strength, power and movement are facilitated for various body parts. Muscles are able to contract actively in order to facilitate the force for movements of body parts. Muscles facilitate not only the movements that are under our conscious control but the movements that are responsible for activities such as breathing, digestion of food and the movement of blood around the body.

The muscular system has several roles in the human body. It is essential for locomotion, balance and posture, absorption of shock and heat, breathing, and digestion of food.

The body has three types of muscle, as outlined in Table 9.1.



Figure 9.7: Resistance bands are portable and can be adapted to most workouts.

Table 9.1: Types of muscle.

Muscle type	Properties
Skeletal 	<ul style="list-style-type: none"> Skeletal muscles are attached to the skeleton by tendons. They facilitate our ability to move. They work in pairs: one muscle moves the bone in one direction and the other moves it back again. Skeletal muscles are voluntary muscles – in other words, a person thinks about what movements they want to make and send messages via the nervous system to tell the appropriate muscle(s) to contract. Muscle contractions can be short, single contractions or longer ones.
Cardiac 	<ul style="list-style-type: none"> The cardiac muscle is found only in the heart. It can stretch, just like smooth muscle, and contract like skeletal muscle. It only does short single contractions. The cardiac muscle is involuntary. Contractions occur without conscious control.
Smooth 	<ul style="list-style-type: none"> Smooth muscle is found in the internal organs, in the digestive system, blood vessels, bladder, and respiratory organs and, in a female, the uterus. Smooth muscle can stretch and maintain tension over extended periods. Smooth muscles are involuntary muscles that are controlled automatically by the nervous system.

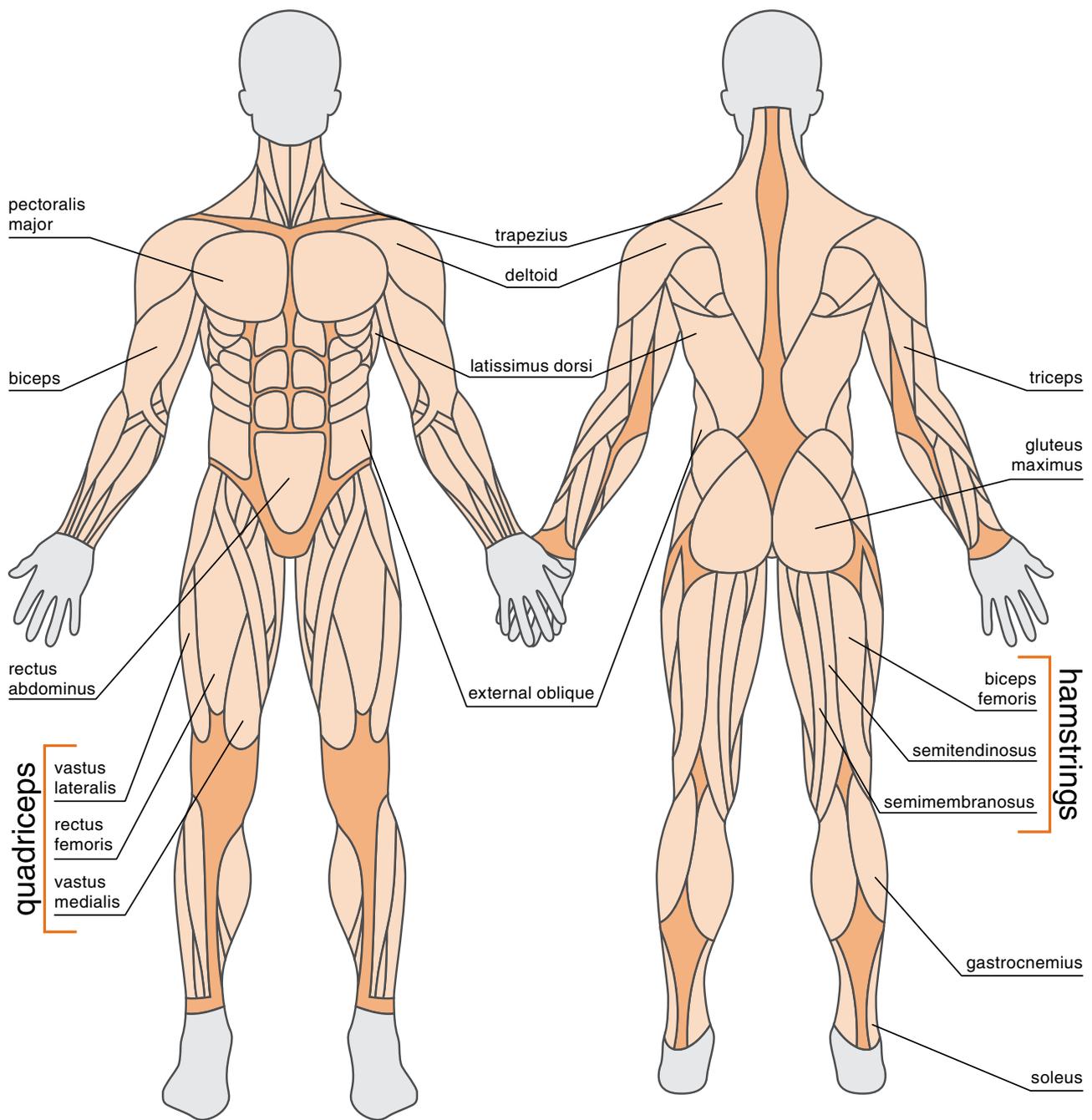


Figure 9.8:
Major muscles of the muscular system.

Major skeletal muscles

Skeletal muscle is the only voluntary type of muscle tissue in the human body – it is controlled consciously. Every physical action that a person consciously performs (including speaking, walking, and writing) requires skeletal muscle. The function of skeletal muscle is to contract, which moves parts of the body closer to the bone that the muscle is attached to.



Figure 9.9: Isometric training, such as planking, involves static muscle contractions without joint movement.

Skeletal muscle derives its name from the fact that these muscles always connect to the skeleton in at least one place. Most skeletal muscles are attached to two bones through tendons. Tendons are tough bands of dense regular connective tissue whose strong collagen fibres firmly attach muscles to bones. Tendons are under extreme stress when muscles pull on them, so they are very strong and are woven into the coverings of both muscles and bones.

Muscles move by shortening their length, pulling on tendons, and moving bones closer to each other. Skeletal muscles rarely work by themselves to achieve movements in the body. More often they work in groups to produce precise movements. The muscle that produces any particular movement of the body is known as an agonist or prime mover. The agonist always pairs with an antagonist muscle that produces the opposite effect on the same bones. For example, the biceps muscle flexes the arm at the elbow and during this movement the triceps is relaxing. As the antagonist for this motion, the triceps muscle extends the arm at the elbow. When the triceps is extending the arm, the biceps would be considered the antagonist.

In addition to the agonist/antagonist pairing, other muscles work to support the movements of the agonist. Synergists are muscles that help to stabilise a movement. If a person lifts something heavy with their arms, stabilisers hold the body upright and immobile so that they maintain their balance while lifting.

Internet activity

Log on to TitanOnline and complete Activity 9.2 by labelling the major skeletal muscles.

Learning activity

1. Identify and memorise the major skeletal muscles involved in the production of human movement.
2. Break down the movement of walking into each action and identify the agonist and antagonist muscles involved in each movement.

Exercises for major muscles

There are a multitude of exercises to develop strength in the major muscles of the body. Beginners should choose between eight and 10 exercises, which works out to one exercise per major muscle group. The list below offers some examples:

- **Chest:** bench press, chest press machine, push-ups, pec deck machine.
- **Back:** seated row, back extensions, lat pulldowns, chin-ups.
- **Shoulders:** overhead press, lateral raise, front raise.
- **Biceps:** bicep curls, hammer curls, concentration curls, seated barbell curls.
- **Triceps:** tricep extensions, dips, kickbacks.
- **Quadriceps:** squats, lunges, leg extension and leg press machines.
- **Hamstrings:** deadlifts, lunges, leg curl machine.
- **Abdominals:** crunches, reverse crunches, oblique twists.

The following pages have examples of resistance training exercises for the major muscle groups.

Back exercise: wide grip pull downs to the front

Muscles targeted: latissimus dorsi and back

- Sit at machine with knees fixed in place and back straight. Take a wide grip on the bar with your palms facing forward.
- Don't grip excessively wide. About 10–15 centimetres outside shoulder width is fine (too close will involve the biceps too much while too wide will reduce the amount of weight you are able to use).
- Start with your torso vertical and your arms overhead.
- As you begin to pull down lean back slightly, arching your lower back and puffing your chest out to meet the bar.
- Pull the bar down to your mid-pectorals, concentrating on pulling with your back muscles rather than pulling with the biceps.
- When you get to the bottom of the movement, try to squeeze your shoulder blades behind your back for a second then slowly let the bar go back up.



Figure 9.10:
Wide grip pull downs to the front.

**Chest exercise:
flat barbell bench press**

**Muscle targeted:
pectorals and chest region**

- Lie down on a flat bench with your feet flat on the floor.
- Grip the bar approximately 15 centimetres wider than shoulder width.
- Experiment with grip widths until you feel comfortable.
- Take the bar off the rack and hold it out at arms-length.
- Inhale and lower bar to chest at nipple height.
- Exhale as you are pressing up and return the bar to starting position.



Figure 9.11:
Flat barbell bench press.

**Bicep exercise:
standing dumbbell curl**

Muscle targeted: biceps

- Grasp a dumbbell with a palms-up, shoulder-width grip.
- Without swaying, swinging or lifting at the shoulders and keeping your upper arms at your sides, lift the dumbbell up in a wide arc from your thighs up to shoulder level. Lower and then repeat.
- Body position is very important with the dumbbell curl.
- Keep your chest high and your shoulders down and back.
- It is also very important that you keep your knees slightly bent in order to take stress off your lower back.



Figure 9.12:
Standing dumbbell curl.

Tricep exercise: tricep pulldown

Muscles targeted: triceps

- Stand facing a high pulley with a short pushdown bar.
- The hands should grip the bar relatively close, 10–15 centimetres apart.
- Establish a strong upright position – back straight, eyes forward, knees slightly bent and feet shoulder width apart.
- The bar should be lowered to a position where the forearms are parallel to the floor.
- Keep your elbows pinned tightly into your sides and do not let your wrists bend back.
- Let the bar up. Let up your upper arms angle up again until the bar is at chin level. Repeat.
- Ensure that only the arms move during the exercise.



Figure 9.13:
Tricep pulldown.

Shoulder exercise: seated dumbbell shoulder press

Muscles targeted: anterior deltoids

- These are done using an adjustable incline bench to sit on. Set the bench to just under 90 degrees.
- Using two dumbbells, with a palms forward grip and starting with the dumbbells at shoulder level, press them up overhead in an arc.
- Do not crack them together at the top and do not lock your elbows out (this will keep tension on the deltoids).
- Lower slowly and repeat.



Figure 9.14:
Seated dumbbell shoulder press.

Quadricep exercise: leg extensions

Muscles targeted: quadriceps

- Sit in a leg extension machine with the pads over the top of your ankles and your back against the back pad.
- Your upper calves should be about one to two centimetres from the seat pad and your knees even with the pivoting cam of the machine.
- Extend your legs up (straightening them), and squeeze at the top.
- As you bring the weight back down, do not allow your knees to go past 90 degrees of bend. This will minimise knee stress.



Figure 9.15:
Leg extensions.

Hamstring exercises: leg curls

Muscles targeted: hamstrings

- Lie face down on the machine with chest, stomach and hips flat against the bench.
- The back of your ankles should be against the pads and your knees should be in line with the rotating cam of the machine.
- Exhale and flex the legs at the knee joint only until the pads are touching the back of your legs.
- Squeeze at the top then lower slowly back down to the starting position.
- Do not use momentum to swing the weight up as this will reduce the effectiveness of the exercise.
- Do not allow your hips to come up off the bench as you curl up.
- This takes tension off the hamstrings and can place it on the lower back and gluteus maximus.
- A good leg curl machine will not have a flat bench but will be angled slightly.
- You can accomplish this on a flat-benched machine by placing a towel under your hips.



Figure 9.16:
Leg curls.

Abdominal exercise: crunches

Muscles targeted: rectus abdominus

- Lie down flat on your back with your knees bent and your feet on the floor.
- Fold your arms across your chest with your hands on your shoulders.
- The typical crunch is taught by instructing you to simply roll your upper torso forward. Repeat.



Figure 9.17:
Crunches.

Gluteus maximus exercises: lunges

Muscles targeted: quadriceps and glutemus maximus

- Hold two dumbbells in your hands by your sides.
- Step forward with one leg and lower your upper body down, bending your leg (don't step out too far). You should have about 60–75 centimetres between your feet.
- Do not allow your knee to go forward beyond your toes as you come down, keeping your front shin perpendicular to the ground.
- Push up and back and repeat with the other leg or do all the reps with one leg then switch.
- It is very important to keep your upper body as vertical as possible during the movement.
- Think about sitting back when doing these. This will prevent you from leaning too far forward.
- Now push yourself back up all the way to the standing position with a powerful push from your front leg. Repeat.



Figure 9.18:
Lunges.

Calf exercises: standing calf raises

Muscles targeted: gastrocnemius and soleus

- Stand on the foot block of a standing calf raise machine on the balls of your feet and duck under the shoulder pads. You should have a comfortable separation between your feet and your toes should be pointing forward.
- Start with your heels down as far as possible in a good stretch. Keep your knees straight and stiff but not locked. Rise up onto the balls of your feet and squeeze, moving only at the ankles.
- If you don't have access to or don't wish to use a calf machine for various reasons, calf raises can be done freestanding on just about anything raised up (e.g. stairs, blocks, or books) or even from the floor.
- They can also be done one leg at a time. This is a more advanced variation for those who have built up some strength in the calves.



Figure 9.19:
Calf raises can be done freestanding on the floor.

Practical activity

Demonstrate exercises, other than those previously mentioned, to develop the strength of the following major skeletal muscles.

- | | | |
|--------------|--------------|--------------------|
| ▪ Pectorals | ▪ Quadriceps | ▪ Latissimus dorsi |
| ▪ Abdominals | ▪ Biceps | ▪ Calves |
| ▪ Deltoids | ▪ Triceps | ▪ Hamstrings. |

Learning activity

Distinguish between the agonist and antagonist muscles in the following strength-training exercises.

- | | | |
|---------------|--------------|-------------------|
| ▪ Bench press | ▪ Half squat | ▪ Shoulder press. |
|---------------|--------------|-------------------|

Case study

Neville is a 17-year-old football player who wants to enhance his strength and power to improve performance on the field. Strength and power are crucial for explosive movements, such as sprinting, jumping and tackling. Considerations for Neville:

- Assess Neville's current strength levels, movement patterns, and any existing injuries.
- Design a program that prioritises compound exercises like squats, deadlifts, bench presses, and Olympic lifts. These exercises recruit multiple muscle groups and enhance overall strength and power.
- Incorporate high-intensity training techniques such as progressive overload, plyometrics, and explosive movements to maximise power development.
- Ensure adequate rest periods between sessions and incorporate proper warm-up and cool-down routines to minimise the risk of injuries.
- Implement a periodised training program that gradually progresses in intensity, volume, and complexity to avoid plateaus and optimise performance gains.

Luke is a 17-year-old long-distance runner seeking to improve muscular endurance for enhanced performance during races and reduced fatigue over long distances.

Considerations for Luke:

- Assess Luke's current endurance levels, running mechanics, and any imbalances or weaknesses that may need attention.
- Develop a program that emphasises higher repetitions and lower weights, focusing on muscular endurance rather than maximal strength.
- Incorporate exercises targeting major muscle groups involved in running, such as lunges, step-ups, calf raises, and core exercises to enhance stability and posture.
- Increase the number of sets and repetitions with lighter loads to promote muscular endurance.
- Incorporate tempo training (controlled and steady-paced movements) to simulate the demands of long-distance running. Ensure sufficient recovery between training sessions to prevent overtraining.
- Consider integrating cardiovascular exercises like cycling or swimming to improve cardiovascular endurance without excessive impact on the joints.

1. How would you determine the appropriate starting point and progression for Neville's strength and power training program?
2. What exercises would you include in Luke's training program to specifically target the muscle groups involved in running?
3. How would you ensure that both athletes maintain proper form and technique during resistance training exercises?
4. What other considerations should be taken into account for both athletes to support their respective training goals?
5. How would you monitor and evaluate the progress of both athletes over time to assess the effectiveness of their resistance training programs?

Muscle contraction

Muscular contraction is a complex physiological process involving the interaction between muscle fibres, nerve impulses, and the release of chemical signals.

Skeletal muscles, responsible for voluntary movements, consist of different types of muscle fibres – slow-twitch (Type I) and fast-twitch (Type II) fibres. Slow-twitch fibres contract slowly but have a high endurance capacity, making them suitable for sustained activities like posture maintenance or endurance exercises. Fast-twitch fibres contract rapidly and generate more force, but fatigue more quickly.

Within the muscle fibre, there are myofibrils composed of repeating units called sarcomeres. Sarcomeres contain two types of protein filaments: thick filaments (composed of myosin) and thin filaments (composed of actin).

During muscle contraction, myosin heads bind to actin filaments, forming cross-bridges. This interaction is facilitated by the presence of calcium ions.

The contraction cycle begins when calcium ions bind to troponin, a protein on the actin filament. This binding causes a shift in the position of tropomyosin (another protein on the actin filament), exposing the myosin-binding sites on actin.

The myosin heads undergo a series of conformational changes, pulling the actin filaments inward (toward the center of the sarcomere). ATP (adenosine triphosphate) provides the energy required for the myosin heads to detach from actin and reset for the next cycle.



Figure 9.20: Fast-twitch muscle fibres contract rapidly to generate force.



Figure 9.21: Generating force causes fast-twitch fibres to fatigue quickly.

Learning activity

1. Explain the physiology changes that happens to muscle fibres due to strength training.
2. Design a circuit of ten stations that uses isotonic exercises only.
3. Describe the correct breathing technique when using free weights.



Figure 9.22:

Using body weight for resistance training is cost effective and convenient.

Training methods

There are many ways a person can strengthen their muscles, whether at home or the gym. Different types of resistance training include:

- **Free weights:** classic strength training equipment, such as dumbbells or barbells.
- **Weight machines:** these are resistance training devices that usually feature cables, pin-loaded weight stacks and levers to provide safe, specialised movements. Some machines utilise hydraulics, plates or body weight rather than weight stacks.
- **Medicine balls:** weighted balls.
- **Resistance bands:** look like giant rubber bands and provide resistance when stretched. They are portable and can be adapted to most workouts. The bands provide continuous resistance throughout a movement.
- **A person's own body weight:** can be used for squats, push-ups and chin-ups. Using a person's own body weight is cost effective and convenient, especially when travelling or at work.

Forms of training

As the muscle contracts, tension develops. Tension is developed in the shortening and lengthening phase. It can also be developed even when the resistance is held stationary. There are three major types of resistance training that can be utilised by individuals: isometric training, isotonic training and isokinetic training.

Isometric

An isometric (static) contraction occurs when tension is developed, but muscle length does not change. As there is no change in the angle of the joint, there is no bone movement and the origin and insertion stay fixed. The tension or load should be maintained for at least six seconds.

Isometric exercises produce a training effect in the muscle, but only at the angle that the joint is positioned at and not through a full range of movement. For example, pushing the palms of both hands against each other to develop the muscles of the chest.

The advantages of isometric training include:

- It is cheap, as it requires no expensive equipment.
- Relatively few injuries occur using this method.
- Any weaknesses in a specific muscle can be identified and targeted.

The disadvantages of isometric training include:

- It is more time consuming for the development of strength.
- Strength is only developed at one angle.
- It is more difficult to progressively introduce greater workloads.

Isotonic

Isotonic exercises are the most commonly used for strength training. These exercises rely on the same weight being taken through the full range of movement. Muscle length changes during an isotonic contraction.

Concentric contractions occur when the muscles shorten, such as in the upward phase of a bicep curl. Eccentric contractions occur when the muscle lengthens while the resistance is maintained, such as in the lowering phase of the bicep curl. Each exercise should be performed over three to five sets and up to 10–20 repetitions, depending on the training program and age of the performer.

The advantages of isotonic training include:

- The technique of the exercise is easy to understand and perform.
- Progressively increasing the training load is easy to administer.
- Equipment is relatively cheap to purchase.
- Movements can be easily designed to specifically match sporting movements.



Figure 9.23: Wall sits are a form of isometric training that focus on improving thigh strength.



Figure 9.24: Isotonic exercises, such as bicep curls, are the most commonly used type of exercise for strength training.

The disadvantages of isotonic training include:

- The potential risk of injury is increased, and greater awareness of correct lifting technique and spotting is required for safety
- Training equipment requires room for use and storage.

Isokinetic

Isokinetic exercises usually involve machines that allow the muscle to exert force throughout the movement at a constant speed. While the machine can be set for a certain speed, the individual exerts force through the muscle for the entire movement. Examples include the Cybex and Orthotron types of machinery.

Isokinetic exercises are used in rehabilitation programs, as the stress can be reduced on the joint when it is injured or weak. The greatest advantage of this form of strength training is that it offers constant strength gains throughout the full range of a movement.

The advantages of isokinetic training include:

- It develops strength through a full range of movement.
- The resistance can be very easily altered to achieve an overload effect.
- Modern day machines are a very safe way of improving strength, as most have safety mechanisms in place and encourage correct technique.

The disadvantages of isokinetic training include:

- The machines are extremely expensive to purchase.
- The storage of the machines can be an issue.
- Although muscle development is excellent, smaller stabilising muscles and ligaments and tendons are not targeted as much as other forms of resistance training because the machines are providing stability for the movement occurring.



Figure 9.25:
Isokinetic exercises are used in rehabilitation programs.

Practical activity

1. Choose a muscle group and demonstrate three exercises which improve strength, using each form of training.
 - a. Isotonic.
 - b. Isometric.
 - c. Isokinetic
2. Develop a resistance program that incorporates several forms of training.



Figure 9.26: Free weights, such as kettlebells, allow the exerciser to move in any direction and provide a great variety of routines.

Resistance activities

Resistance training works the muscles with some form of weight or ‘resistance’. Some common examples include lifting free weights or using weight machines at a gym. A person’s body weight can also be used by doing push-ups and chin-ups. Resistance bands can also be used. These can be anchored under the foot, to a door handle or around a bedpost. Other examples of resistance activities include calisthenics, aquatic activities and plyometrics.

Calisthenics

Calisthenics consist of a range of dynamic exercises. They generally consist of simple rhythmical movements with little or no equipment. Calisthenics are designed to improve flexibility and strength (including core strength). They involve activities where the person’s body weight is used for resistance and a range of movements such as jumping, twisting and kicking.

Calisthenics can improve fitness components such as strength, flexibility, cardiovascular endurance, agility, balance, and coordination. Examples of calisthenic exercises include lunges, star jumps, sit ups, push-ups, crunches, pull-ups, squats, burpees and dips.

Free weights

Free weights such as dumbbells or barbells are not attached to a specialised weight machine. Free weights allow the exerciser to move in any direction and provide a great variety of routines. However, they do not isolate individual muscle actions as effectively as weight-training machines, and the resistance does not remain constant throughout the range of movement of the muscle being exercised.

Examples of free weight exercises include anterior shoulder raises with dumbbells, shoulder shrugs with bar, dumbbell kickback, dumbbell flys, wrist curls, bodyweight calf raises, standing dumbbell overhead (military) press and bench press with dumbbells or barbell.

Machine systems

Modern training facilities utilise a range of machines for resistance training. Most machines target a specific muscle group and are ergonomically designed to encourage correct lifting technique. Most machines adjust in a number of ways to accommodate different body sizes and different load settings. Machines have some advantages over free weights, including: ease of changing loads, safe lifting technique, and improved isolation of the muscle being trained. Disadvantages compared to free weights include: the cost, space required, maintenance, stabilising muscles are not engaged as much, and they exclude compound exercises.

Examples of resistance machines include pin loaded machines, kinetic machines, hydraulic machines, plate loaded machines, and pneumatic machines.

Aquatic activities

Aquatic activities provide a natural resistance of up to 12 to 14 per cent more than air, which tones muscles without the stress on the body that weightlifting or running can create. With almost all muscles being engaged, aquatic activities provide one of the best full body workouts.

Examples of aquatic activities include aqua jogging/walking, aqua aerobics, strength toning, flexibility training and relaxation, hydrotherapy and rehabilitation, deep water running, exercises using the pool wall, lap swimming and a variety of social or competitive water sports like water polo.

Plyometrics

Plyometric training, is a form of exercise that focuses on explosive and rapid movements to develop power, strength and speed. It involves using quick, forceful muscle contractions to generate maximum force in a short period of time. Plyometric exercises typically involve jumping, hopping, bounding and other dynamic movements.

The primary goal of plyometric training is to enhance the neuromuscular system's ability to produce powerful movements by improving the stretch-shortening cycle (SSC) mechanism. The SSC refers to the rapid lengthening of a muscle (eccentric phase) followed by an immediate shortening (concentric phase) to generate force. Plyometric exercises take advantage of the SSC to maximise muscle recruitment and force production.



Figure 9.27:

Most machines target a specific muscle group and are ergonomically designed to encourage correct technique.



Figure 9.28:

Aquatic activities provide one of the best full body workouts.

Benefits of plyometric training:

- **Increased power:** plyometric exercises improve muscular power by enhancing the efficiency of the SSC and increasing the rate of force development. This translates to greater explosiveness and speed in movements such as jumping, sprinting, and throwing.
- **Improved strength:** plyometric training strengthens the muscles and connective tissues, particularly in the lower body, by subjecting them to high-intensity loads. This improves muscle force production and reduces the risk of injuries.
- **Enhanced athletic performance:** athletes in various sports, such as basketball, football (soccer), volleyball, and track and field, can benefit from plyometric training. It improves agility, quickness, vertical jump height and overall athletic performance.
- **Bone health:** the high-impact nature of plyometric exercises stimulates bone remodeling and improves bone mineral density, promoting stronger and healthier bones.
- **Time efficiency:** plyometric training can be a time-efficient method for improving multiple aspects of physical fitness. A well-designed plyometric workout can provide a comprehensive full-body workout in a relatively short period.

Examples of plyometric exercises:

- **Box jumps:** jumping onto a sturdy box or platform and immediately jumping back down.
- **Depth jumps:** stepping off a box, landing softly, and immediately jumping vertically or horizontally.
- **Medicine ball throws:** explosively throwing a medicine ball against a wall or to a partner.
- **Bounds:** performing long, exaggerated strides with maximum power and height.
- **Tuck jumps:** jumping vertically and bringing the knees toward the chest before landing and immediately repeating the movement.



Figure 9.29: Plyometric exercises typically involve jumping, hopping, bounding and other dynamic movements.

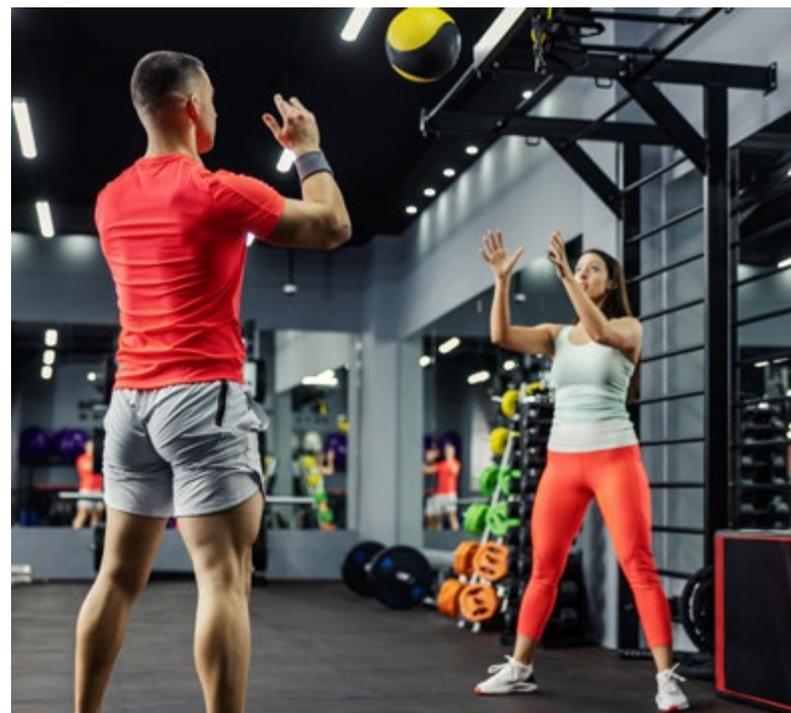


Figure 9.30: Medicine ball throws are a form of plyometric exercise.

Important considerations:

- **Proper technique:** plyometric exercises require proper form and technique to maximise effectiveness and reduce the risk of injury. It is essential to receive guidance from a qualified coach or trainer when starting plyometric training.
- **Progression:** plyometric training should be gradually progressed to allow the body to adapt and minimise the risk of overuse injuries. Beginners should start with low-intensity exercises and gradually increase the difficulty and intensity over time.
- **Safety:** plyometric exercises involve high-impact movements, so it is important to perform them on appropriate surfaces, wear supportive footwear, and have adequate strength and mobility before attempting advanced exercises.
- **Individualisation:** plyometric training should be tailored to an individual's fitness level, goals, and specific sport or activity requirements. Different individuals may require variations in exercise selection, intensity and volume.

Learning activity

1. Explain the benefits of calisthenics for certain sports (e.g. rowing).
2. Assess the advantages and disadvantages of free weights and machine systems.
3. Investigate the contribution of aquatic activities to strength development.
4. Devise and implement flexibility routines that complement resistance programs.

Training terms

Like most sports, resistance training has its own unique training terms. Most are basic concepts to describe training techniques and programs specific to resistance training.

Repetitions

Repetitions, also known as reps, are the number of times a weight is lifted and lowered in one set of an exercise. For example, if a person lifts and lowers a weight 10 times before setting the weight down, they have completed 10 reps.

Sets

Sets are a group of repetitions of a resistance training exercise followed by a rest period. For example, if a person performs 15 reps of the bench press, rests, completes 15 more reps, rests and finishes with another 15 reps, they have completed three sets of the bench press.

Resistance

Resistance is the load or amount of weight lifted in one movement. It can mean working out with weights or using the body to resist another type of force. This includes a wide spectrum of motion, from push-ups to dumbbell curls.

Rest

The term 'rest' refers to the pause between sets of an exercise, which allows muscles to recover partially before beginning the next set. Usually rests between sets can be anywhere from 30 seconds to two minutes, depending on the type of workout.

Rest also refers to providing adequate time between workouts to allow muscles to repair and adapt. As a general rule, rest the muscle group for up to 48 hours before working the same muscle group again.

Repetition maximum

Repetition maximum (RM) refers to the maximum amount of weight an individual can lift for a given exercise, performed for a specific number of repetitions, while maintaining proper form and technique. It is commonly used as a measure of strength and to determine training intensities.

The number associated with the RM indicates how many repetitions an individual can perform with a specific load relative to their maximal effort. RM values are often used to prescribe training loads in resistance training programs:

- 1RM (one repetition maximum) represents the maximum weight a person can lift for a single repetition. It is commonly used to assess absolute strength and as a reference point for determining training loads.
- 5RM (five repetition maximum) represents the maximum weight that can be lifted for five repetitions. This value is frequently used for strength-focused programs.
- 10RM (ten repetition maximum) represents the maximum weight that can be lifted for ten repetitions. This value is commonly used in hypertrophy programs to build muscle size.

Using RM values, trainers can tailor programs to individual needs and goals. For example, someone targeting muscular endurance might perform exercises at 40–60 per cent of their 1RM for lower repetition counts, while someone targeting strength might perform exercises at 80–90 per cent of their 1RM for higher repetition counts (e.g. 12–15 reps).

It is important to note that when testing 1RM, proper testing protocols should be followed. Testing should be done with maximal effort carried out with proper form, technique, and safety. It is advisable to work with a qualified professional, a coach, or a guide and supervise the test to ensure safety.

Figure 9.31:

Someone targeting muscular endurance might perform exercises at 40–60 per cent of their 1RM for



Speed of lift

An important and often overlooked component of resistance training is the speed of lift, also known as ‘tempo’. The speed of the lift refers to how quickly the weight is lifted (the concentric part of the exercise) and how quickly the weight is lowered (the eccentric part of the exercise).

As a general rule, the faster the speed of the repetition, the lesser the tension is developed in the muscle. Reducing the speed of the repetition increases muscle tension. Performing faster repetitions allows for heavier weights to be lifted. However, greatest gains in strength occur when the tension is higher.

As a general rule for beginners, a concentric lift of approximately two to three seconds, and eccentric lowering of approximately three to four seconds should apply. This is a ‘controlled’ or moderately slow repetition.



Figure 9.32:

The faster the speed of the repetition, the lesser the tension is developed in the muscle.

Internet activity

Log on to TitanOnline and complete Activity 9.3 by watching the World Weightlifting Championships. Describe the lifting technique of the clean and jerk.

Learning activity

- Define the following training terms:

a. repetitions	c. resistance	e. repetition maximum
b. sets	d. rest	f. speed of lift.
- Identify how these concepts are adjusted to apply to programs for strength, power, lean body mass and muscular endurance.
- Explain how each training variable can be manipulated to overload muscles.

Practical activity

- Outline a training session using aquatic exercise equipment such as foam dumbbells. List the exercises that would provide a full body workout. If resources permit, participate in an aquatic workout.
- Improvise and find an area in the school or equipment that enables jumping up and down, such as a flight of steps or foam boxes. Design and lead your class through a range of plyometric exercises targeting the lower body.
- Visit a gym that provides pin loaded machines equipment and choose five exercises to complete. Keeping the loads constant, experiment with different rest periods between sets and report on the training effect you felt.



Figure 9.33:

Resistance training programs should be varied to avoid boredom and plateauing.

Resistance programming

Designing any type of training program requires knowledge of the sport and familiarity with its terminology. An effective resistance training program is more complicated than just joining a fitness centre or randomly choosing exercises and beginning a workout. It requires a needs analysis, program design and documentation in order to monitor progress. Before beginning any resistance program consider the following:

- **Set goals:** goals should be part of any fitness training program. Follow the SMARTER acronym (specific, measurable, achievable, relevant, time-bound, evaluated and reviewed) and make sure both short- and long-term goals are set.
- **Number of workouts:** three days per week (every second day) for 45 minute sessions should be enough for most individuals to see gains when beginning a resistance training program.
- **Rest:** periods of rest for beginners should be between 30 seconds to two minutes.
- **Keep a diary:** keeping an exercise diary of sets, reps, type of exercise and how many times a person exercises is critical for noting progress and identifying areas of weakness. Write down sets, reps, and weights used for all workouts. Keeping an exercise diary also acts as a motivator.
- **Variety:** avoid staying with the same routine for more than five to six weeks. Resistance training programs should be varied to avoid boredom and plateauing (training results begin to plateau or level off).
- **Safety:** ensure an adequate warm-up and cool-down.

Goals

Goal setting is an important part of any athlete's training regime as it helps to give direction and a focus on attempting to achieve certain rewards. Individuals have different needs and expectations, and training programs need to be tailored specifically to the individual.

When undertaking the questioning and self-analysis process, an individual might consider why they are training – for performance or appearance, for strength or power, rehabilitation from injury or for injury prevention, to gain muscle mass or lose weight, or to promote muscular endurance.

The athlete should select areas to improve on and then set some short- and long-term goals that will be within reach. Ensure goals are not too easy. The SMARTER acronym for goal setting is a framework for setting goals:

- **Specific:** goals should be clear, well-defined, and specific, answering the questions: What do you want to achieve? Why is it important? Who is involved? Where will it happen? This clarity helps in focusing efforts and guiding actions.
- **Measurable:** goals should be measurable so that progress can be tracked and evaluated. It involves defining criteria or indicators that can be used to assess success or progress towards the goal. This allows for objective measurement and helps in determining when the goal has been achieved.
- **Achievable:** goals should be challenging yet attainable. They should stretch individuals or teams to improve their skills and capabilities, but they should not be so unrealistic or unattainable that they become demotivating. Setting achievable goals promotes a sense of accomplishment and motivation.
- **Relevant:** goals should be relevant to the broader objectives, vision, or purpose. They should align with personal or team values, priorities, and strategic direction. This ensures that efforts are focused on meaningful and impactful goals that contribute to overall success.
- **Time-bound:** goals should have a specific timeframe or deadline by which they are to be achieved. This creates a sense of urgency and helps in planning and prioritising training. A time-bound goal provides a clear target and helps in tracking progress.
- **Evaluated:** goals should be regularly evaluated to assess progress, identify any challenges or obstacles, and make necessary adjustments. Regular evaluation ensures that the goals remain relevant, and if needed, modifications can be made to improve effectiveness.
- **Reviewed:** goals should be periodically reviewed to ensure they are still aligned with current needs, priorities and circumstances. This allows for flexibility and adaptation as situations change. Regular review helps in staying on track and maintaining focus.

Once these have been established, an athlete and a trainer can work out the steps to attain these goals. These steps now become the short-term goals. Achieving daily, weekly or fortnightly targets can be very satisfying and motivates a person to keep striving for their long-term goals.

Figure 9.34:

Setting achievable goals promotes a sense of accomplishment



Exercises

When beginning a resistance training program or coming back after a long break, it is recommended that an athlete uses light to medium weights and performs general exercises focusing on improving the strength of the whole body. It is recommended to use body weight and then machines, as these can guide movements more safely than free weights. Over time, as the body becomes stronger, more advanced exercises and machinery can be used. Resistance exercises tend to be categorised as either compound exercises that use a combination of major muscle groups during a movement or isolation exercises that target one specific muscle or muscle group.

Method

Planning each training session correctly creates a routine for the athlete to follow. Training programs and the activities structured should be set up so that the athlete can achieve their goals.

As training begins, it is important to follow a few suggestions:

- Train on a regular basis for improvements in strength to occur.
- Always adequately warm-up, cool-down and stretch.
- Work the large muscle groups before the smaller ones.
- Compound exercises come before the isolation exercises.
- Gradually increase the load and intensity.
- Remember that muscles work in pairs, so balance out the sequencing of exercises.
- Set up and plan reps, sets, speed, loads and rest periods.
- Have a positive attitude and persevere.
- Ensure good nutrition and hydration.
- Training should occur at least three times a week for a gain in strength over time.
- Be safety conscious while training.



Figure 9.35:
For beginners, machines can guide movements more safely than free weights.



Figure 9.36:
As the body becomes stronger, more advanced exercises can be used.

Did you know?

Isolation exercises are movements that focus on one muscle group. Compound movements focus on multiple muscles.

Split programs

A split program is one that is used by athletes who generally train five or six days a week. A split routine is a resistance training format in which specific muscle groups are trained on specific days of the week or at predetermined intervals. For example:

- Monday: triceps/chest
- Wednesday: legs/shoulders
- Friday: biceps/back.

This is an alternative to training the entire body with each workout. There are many possible combinations to use when designing this type of program. Split routines have been the format of choice for many years with bodybuilders and strength athletes. This type of routine can provide sufficient training volume for each muscle group to achieve hypertrophy (muscle growth), while allowing adequate recovery time before training the same muscle group again. There is no scientific research that shows one split routine to be superior to another, and in fact it's a good idea to change routines periodically to avoid plateaus.

Overload techniques

In resistance training programs there are many techniques that individuals can use to achieve an overload. Achieving an overload puts the body under stress, causing it to adapt in order to cope, so creates a training effect. The overload can be designed to build strength, power, mass, muscle bulk or a combination of these. Popular overload techniques are forced repetitions, pyramiding, pre-exhaustion and super-sets.

Blitzing

Blitzing is the practice of working a muscle group with different exercises from different angles until fatigue occurs. A variety of exercises are used so that a training effect occurs over the full range of movement. This strengthens the muscle groups around the main muscle being worked. For example, doing dumbbell curls then doing lateral incline shoulder raises both the deltoid and subscapular muscles.

Did you know?

Overload techniques are used



Figure 9.37:

Achieving an overload puts the body under stress, causing it to adapt in order to cope, and in doing so creates a training effect.

Forced repetitions

Forced repetitions involve a spotter or partner assisting the athlete to complete a few more repetitions once fatigue has set in. It usually involves helping the lifter overcome a particularly difficult part of a lift where the biomechanical advantage is least, and the muscle is at its weakest point. This support can continue until the athlete can no longer complete the lift, even with the partner's support.

Pyramiding

There are numerous variations of pyramiding that can be performed however they all involve increasing resistance while decreasing repetitions or vice versa. Each set should be performed to muscular failure. This method is extremely effective at building muscle as it works the muscles to exhaustion, causing greater blood flow into the muscle as well as more oxygen. This overload technique is beneficial in building strength and muscle size. It also helps surpass any plateauing in terms of strength and weights. An example of pyramiding is set out below:

- Set 1: 12 reps at 50 kilograms.
- Set 2: nine reps at 60 kilograms.
- Set 3: six reps at 70 kilograms.
- Set 4: three reps at 80 kilograms.

Pre-exhaustion

Pre-exhaustion refers to exercising to isolate and fatigue a particular muscle to exhaustion. This is followed by a more complex exercise that recruits other muscles as well as the fatigued muscle. This more complex exercise enables further fatiguing of the targeted muscle that would not be possible if it was working alone.

For example, perform five sets of single-joint isolation movements first in the training routine, such as leg extension. This serves to fatigue and isolate the quadriceps muscle very effectively from the start. Then after the single-joint isolation movements, multi-joint compound exercises are performed, such as squats.

During the multi-joint compound exercises for that body part, the muscle will already be fatigued. Be mindful of safety and injury when working a muscle to fatigue or failure and manage loads accordingly.



Figure 9.38: Forced repetitions involve a spotter assisting the athlete to complete a few more repetitions once fatigue has set in.



Figure 9.39: Pyramiding helps surpass any plateauing in terms of strength and weights.

Internet activity

Log on to TitanOnline and complete Activity 9.4 by watching the video clip on pyramiding. Record the number of sets, reps, variations in loads and the amount of rest between sets.

Super-sets

Super-sets are used to perform two or more exercises back to back with no rest period in between. Normal rest periods are used, but only after the exercises have been completed. The two or three exercises are either from opposing muscle areas such as bicep-tricep (bicep dumbbell curl and tricep kickbacks) or the same muscle area such as the pectorals (dumbbell bench press and barbell incline bench press). The advantages of this technique include:

- Super-sets targeting the same muscle area undergo increased muscle stress and so require the use of more muscle fibres.
- Super-sets targeting opposing muscle areas are very time efficient because while one area is working the other is resting.
- Super-sets are good for muscle tone and strength endurance.

Internet activity

Log on to TitanOnline and complete Activity 9.5 by watching the video clip on how to perform super-sets. Record the exercises that are grouped together to target the chest area and legs.

Learning activity

1. Outline the potential advantages and risks associated with forced repetitions.
2. Identify a range of exercises that could be used to super-set the chest area, the legs and the back.
3. Describe the indicators of an athlete experiencing a training plateau and explain how the plateau can be addressed.
4. Identify a range of compound and isolation exercises.
5. Describe how the SMARTER acronym can be applied to a resistance training program.

Practical activity

1. Participate in a range of overload techniques for specific exercises and training programs.
2. Plan, implement and monitor a resistance program based on personal goals.
3. Plan a warm-up suitable for particular strength training sessions.
4. Devise methods of recording progress and achievement in training programs.
Use the gym workout sheet below as a guide.

Gym workout sheet CARD NO. 1

Name: _____ Workout focus: _____ Start date: ____ / ____ / ____ WEEK NO: ____

EXERCISE (Include major muscle group)	No. of sets	No. of reps	Weight	Rest	Mon	Tue	Wed	Thu	Fri	Sat	Sun
SAMPLE											

Monitoring progress

Monitoring progress in a resistance training program is essential to track improvements, make adjustments and ensure continued progress towards goals. Maintain a training journal or log where you record details of each workout, including exercises, sets, reps and weights lifted. This allows you to track your progress over time, identify trends and make informed adjustments to your training. Periodically assess your strength by performing exercises at specific rep ranges or testing your one-repetition maximum for key exercises. Compare your results over time to see if there are improvements in the weights lifted, repetitions performed, or overall strength levels.

Track changes in body composition by measuring parameters such as body weight, body fat percentage, circumferences (of waist, hips, arms, etc.), or using skinfold calipers. Regular measurements help monitor changes in muscle mass, fat loss, and overall body composition. Take progress photos at regular intervals to visually assess changes in muscle definition, size, or overall physique. Comparing photos can provide a visual representation of progress that may not be apparent through other methods.

Design specific performance tests or benchmarks related to your training goals. For example, if your goal is to improve power, you could track vertical jump height or broad jump distance. If your focus is on muscular endurance, you could monitor the number of push-ups or squats performed within a set time. Use a subjective rating scale to assess the level of effort or intensity experienced during each training session. This can help gauge the overall challenge and progress of your workouts.

Monitor the progression of training loads over time. Gradually increasing the resistance or intensity of exercises is a common approach to ensure ongoing progress in a resistance training program. Seek feedback and guidance from qualified trainers or coaches who can objectively assess your progress, provide technique cues, and offer insights based on their expertise and experience.

It's important to monitor progress in a resistance training program consistently and over a reasonable time frame. Changes in strength or body composition may not be immediate, and progress can sometimes be non-linear. Being patient, consistent, and diligent in tracking progress will provide valuable information to help make informed decisions and optimise the resistance training program.



Figure 9.40: Changes in strength may not be immediate, and progress can sometimes be non-linear.



Figure 9.41: Regular measurements help monitor changes in muscle mass, fat loss, and overall body composition.

Safety

When beginning a resistance training program, it is crucial to prioritise safety to prevent injuries and ensure a positive training experience. If there are any pre-existing medical conditions or concerns, it is advisable to consult with a healthcare professional before starting a resistance training program. They can provide guidance based on the specific health needs and ensure that exercise is safe. Always begin the workout with a proper warm-up routine to prepare the body for exercise. This may include static stretching, light cardio and mobility exercises. Similarly, end the workout with a cool-down period that includes static stretching and gentle movements to promote recovery and reduce muscle soreness.

Learn and practise correct exercise technique and form for each exercise. This ensures effective targeting of muscles and reduces the risk of injuries. Consider working with a qualified trainer or coach initially to receive guidance and feedback on your technique. Begin with lighter weights or resistance levels that allow you to perform exercises with proper form and without strain. Gradually increase the intensity or resistance as strength and technique improve. Avoid the temptation to progress too quickly. Gradual and progressive overload is key to minimising the risk of overuse injuries. Increase weights, repetitions, or intensity gradually, allowing the body to adapt and recover.

When performing exercises with heavy weights or when pushing to fatigue, it is advisable to have a spotter or use safety equipment, such as weight racks or safety pins on a squat rack. These safety measures provide assistance and help prevent accidents or injuries. Maintain proper breathing techniques throughout the exercises. Typically, exhale during the concentric or exertion phase (when you are lifting or pushing) and inhale during the eccentric or relaxation phase (when you are lowering or returning to the starting position).

Stay hydrated before, during, and after each workout. Take rest days between resistance training sessions to allow for adequate recovery and muscle repair and growth. Pay attention to how the body feels during exercise. If experiencing sharp pain, dizziness, or any unusual discomfort, stop the exercise and seek guidance from a healthcare professional if needed. Recognise that everyone's abilities and fitness levels are different. Modify exercises as needed to accommodate individual needs, such as using lighter weights, adjusting range of motion, or selecting alternative exercises that suit individual capabilities.

Warm-up

Anyone undertaking resistance training should take at least 10–15 minutes to do a warm-up, moving gradually at first and building up the pace near the end of the warm-up. This should be followed by an appropriate stretching routine that will help to prepare the athlete both physically and mentally. A proper warm-up before each training session will ensure better overall results from the resistance program and reduce the risk of injury. The cool-down is equally important. It helps relieve the strain placed on the muscular system and returns muscle length and flexibility. It also helps to rid the body of lactic acid, which causes muscle fatigue and soreness.

Did you know?

By the age of 80 years, sedentary people will lose approximately half their muscle mass.

Safe use of equipment

While weight training machines are generally safer for resistance training than free weights, individuals should still check for:

- correct adjustment of the machine to suit the individual's body size
- frayed cables and belts
- worn pulleys and chains
- broken welds
- loose pads
- uneven or rough movement patterns.

To ensure the safe use of free weights, individuals should:

- load bars on the ground or on a properly balanced rack
- lock barbells and dumbbells with collars
- select loads which can be confidently lifted under control
- be aware of others in the training space
- return equipment after use to avoid clutter and trip hazards
- don't drop weights when finishing a set.

General safety rules for using a gym include:

- Use a towel on the equipment for hygiene reasons.
- Wear suitable footwear for protection and support.
- Do not train an injured area without medical clearance.
- Seek advice from a qualified trainer if unsure about an exercise or a piece of equipment.

Spotting

A spotter is someone who assists a person to complete a repetition if necessary. In resistance training, spotters play a crucial role in making weight lifting exercises safe. Not all exercises require spotters, but exercises such as free weights bench press and overhead press can result in serious injuries if there is no spotter present.

A spotter should be someone who is knowledgeable about resistance exercises so that they can make sure that the person performing the lift is doing it correctly and safely. Spotters should:

- be aware of how many repetitions will be performed
- be strong enough to lift the weight being used
- offer encouragement and support throughout the training session
- pay attention to the lifter at all times
- help the lifter through the lift as necessary
- ensure the weight is returned to its resting place and secured.

A spotter will need to vary their spotting positioning based on the type of exercise being executed. If particularly heavy weights are being lifted, it may be necessary to have two spotters – one at either end of the bar.



Figure 9.42:

Spotters play a crucial role in making lifting exercises safe.

Correct technique

Incorrect lifting and spotting techniques can lead to injury. Learning the correct techniques is important for a safe and effective program. Guidelines for correct technique include:

- Know how to execute an exercise correctly.
- Muscles should be exercised through their full range of movement.
- Practise exercise technique with a lighter weight prior to lifting a heavier weight to develop muscle memory.
- Do not lock joints when approaching full extension.
- Increase the resistance slowly, ensuring increased loads do not affect technique.
- Learn proper breathing techniques. Exhale during the lifting phase, or exertion phase, and inhale during the lowering phase. Never hold the breath.
- Seek feedback from training partners, trainers or use mirrors to check technique.



Figure 9.43: Learning the correct techniques is important for a safe and effective program.

Internet activity

Log on to TitanOnline and complete Activity 9.6 by watching the video clips. Describe the lifting technique used in each clip.

Learning activity

1. Explain how to assist a person completing a seated overhead dumbbell press.
2. Describe the correct technique for three resistance training exercises.
3. Outline five resistance exercises you would recommend for a shot putter.
4. Describe why monitoring progress is an important component of a resistance training program and how this can be achieved.

Practical activity

1. Demonstrate how to safely adjust weight plates on and off a barbell, and describe what could possibly go wrong.
2. Demonstrate correct spotting technique for the bench press.
3. Demonstrate correct lifting technique for the following exercises:

a. squat	d. bench press
b. biceps curls	e. dead lift
c. upright row	



Figure 9.44:

Customising programs to individual needs and goals is important for optimal results.

Facts and fallacies

There are a number of facts and fallacies that circulate when beginning a resistance training programs. Examples of facts include:

- **Progressive overload:** one of the fundamental principles of resistance training is the concept of progressive overload. Gradually increasing the demands placed on the muscles by adding resistance, increasing repetitions, or adjusting intensity is essential for continued progress and strength gains.
- **Proper technique matters:** performing exercises with correct technique and form is crucial to maximise the benefits of resistance training while minimising the risk of injury. Proper alignment, control, and range of motion are key elements of effective and safe training.
- **Individual differences:** individuals respond differently to resistance training due to factors such as genetics, age, gender and training history. Customising programs to individual needs and goals is important for optimal results.
- **Rest and recovery:** adequate rest and recovery are essential for muscle repair, growth and overall progress. Allowing sufficient time for recovery between training sessions is important to prevent overtraining and optimise performance.
- **Nutrition and hydration:** proper nutrition and hydration play significant roles in supporting resistance training. A well-balanced diet that includes adequate protein, carbohydrates, and healthy fats, along with proper hydration, can enhance muscle recovery, fuel workouts and support overall performance.

Examples of fallacies include:

- **Spot reduction:** it is a common misconception that targeted exercises can reduce fat in specific areas of the body (such as doing abdominal exercises to reduce belly fat). In reality, fat loss occurs throughout the body as a result of overall kilojoule expenditure, not from specific exercises targeting certain areas.
- **Toning and bulking:** the terms ‘toning’ and ‘bulking’ often create confusion. Toning typically refers to the development of lean muscle mass and reducing body fat to achieve a defined, sculpted appearance. Bulking refers to a phase of intentionally increasing kilojoule intake and resistance training to gain muscle mass. Both processes involve proper nutrition and exercise but have different goals and approaches.
- **More is not always better:** assuming that more training, more sets, or more repetitions will automatically lead to better results is a fallacy. Overtraining can lead to diminished progress, fatigue and increased injury risk. Finding the right balance between training volume, intensity and recovery is essential for optimal results.
- **Women and weightlifting:** there is a persistent myth that resistance training will cause women to become bulky or develop masculine features. In reality, women generally have lower levels of testosterone, making it more challenging to achieve significant muscle hypertrophy. Resistance training can help women build strength, enhance body composition, and improve overall health without excessive muscle gain.
- **Age and resistance training:** contrary to the misconception that resistance training is only for young individuals, people of all ages can benefit from resistance training. It helps maintain muscle mass, bone density, and functional capacity, and can contribute to improved overall health and quality of life at any age.

It is important to separate fact from fiction when it comes to resistance training to make informed decisions and create effective training programs. Consulting with qualified trainers, coaches, or healthcare professionals can provide accurate information and guidance based on individual needs and goals.



Figure 9.45:

Resistance training can help women build strength without excessive muscle gain.



Figure 9.46:

People of all ages can benefit from resistance training.

Protein and other nutritional supplements

For individuals looking to increase size and strength through resistance training, a well-rounded diet that supports muscle growth and recovery is essential. Consume a kilojoule surplus to support muscle growth. Ensure you're consuming more calories than you burn in a day, typically by aiming for 1000–4000 kilojoules above your maintenance level.

Adequate protein intake is crucial for muscle synthesis. Aim for around 1.6–2.2 grams of protein per kilogram of body weight. Good sources include lean meats, poultry, fish, eggs, dairy products, legumes, and plant-based protein sources like tofu and tempeh. Carbohydrates provide energy for intense workouts. Opt for complex carbohydrates like whole grains, fruits, vegetables and legumes, while minimising refined sugars and processed foods. Include healthy fats from sources such as avocados, nuts, seeds, olive oil and fatty fish like salmon. They help with hormone production and overall health.

Consume a balanced meal or snack containing protein and carbohydrates about one or two hours before your workout to provide sustained energy. Have a meal or snack rich in protein and carbohydrates within one to two hours after training to aid muscle repair and recovery. Fast-digesting protein sources like whey protein can be beneficial. Stay adequately hydrated throughout the day, as it supports overall performance and recovery. Aim for around three to four litres of water per day, adjusting based on your activity level and individual needs. Ensure you're getting a variety of vitamins and minerals through a well-balanced diet. Include plenty of fruits, vegetables, and whole foods to meet your micronutrient requirements. Consider a multivitamin if you struggle to meet them through diet alone.

Spread your calorie and protein intake across multiple meals throughout the day. Aim for around four to six meals/snacks to support muscle protein synthesis and maintain a steady supply of nutrients. Be consistent with your diet and resistance training program. Gradually increase the intensity and volume of your workouts while ensuring your diet supports your increased energy expenditure.

Protein supplements, such as whey protein powder, can be a convenient way to increase protein intake, which is essential for muscle growth and repair. They offer a quick and easy source of high-quality protein without the need for extensive meal preparation. Supplements like branched-chain amino acids (BCAAs) or creatine may aid in muscle recovery, reduce muscle soreness, and enhance muscle repair after intense resistance training sessions. They can help support the body's natural recovery processes, allowing for more frequent or intense workouts. Some supplements like creatine, have been shown to promote increased mass and strength gains, which can be advantageous for individuals looking to build size and strength through resistance training.

Did you know?

The recommended serving size of meat for an adult is only about the size of a deck of cards. Athletes seeking to increase muscle bulk require



Figure 9.47:

Protein supplements can be a convenient way to increase protein

Nutritional supplements can be expensive, especially when consumed regularly over an extended period. This cost can add up, particularly if multiple types of supplements are used simultaneously. Certain supplements may have potential side effects or interactions with medications. It's crucial to be aware of any potential risks associated with specific supplements and consult with a healthcare professional before starting any new supplement regimen.

The supplement industry is not as strictly regulated as pharmaceuticals, which can lead to inconsistencies in product quality, safety and efficacy. It's essential to choose reputable brands and look for third-party testing or certification to ensure the supplement's quality and purity. Relying too heavily on supplements without focusing on a balanced diet can lead to a dependency on these products. It's important to remember that supplements should complement, not replace, a nutrient-dense diet. Some individuals may develop a reliance on supplements to achieve their desired results, which can create a psychological dependence and overlook the importance of overall lifestyle factors, including nutrition, training and recovery.

Ultimately, the use of nutritional supplements for resistance training should be approached with caution. While they can provide certain advantages, it's important to prioritise a well-rounded diet that includes whole foods as the foundation of a healthy and sustainable approach to muscle growth, strength development, and overall wellbeing. Consulting with a registered dietitian or healthcare professional can help determine if and which supplements may be beneficial based on individual needs and goals.



Figure 9.48: It's important to remember that supplements should complement, not replace, a nutrient-dense diet.

Internet activity

Log on to TitanOnline and complete Activity 9.7 by describing the advantages and disadvantages of using creatine.

Learning activity

1. Explain the reasons why weightlifters and bodybuilders use protein and other nutritional supplements.
2. Research two weight gain supplements such as Rule 1 Clean Gainer, Max's Super Size Ultra, Mass Tech Elite and Evolve Incredible MASS. Discuss the advantages and disadvantages of using these types of supplements.

Ergogenic aids

Ergogenic aids are substances, techniques, or interventions that are used to enhance athletic performance. They are employed by athletes to gain a competitive advantage and improve their physical and mental capabilities. The role of ergogenic aids in sport can vary depending on the specific aid used and the context in which it is employed. Examples of ergogenic aids (both legal and illegal) used in strength training include:

- **Performance enhancement:** the primary purpose of ergogenic aids is to improve performance by increasing strength, power, speed, endurance, focus, or other desired attributes. For example, anabolic steroids are used to enhance muscle growth and strength, while caffeine is often consumed to enhance alertness and reduce fatigue.
- **Recovery and injury prevention:** certain ergogenic aids can aid in the recovery process and help prevent injuries. This includes methods such as cryotherapy (cold therapy), compression garments, and nutritional supplements that promote recovery and reduce inflammation.
- **Psychological benefits:** some ergogenic aids can have psychological effects, such as boosting confidence, reducing anxiety, or enhancing concentration. Techniques like visualisation, meditation, or the use of cognitive enhancers fall into this category.
- **Oxygen enhancement:** methods that increase oxygen availability to the body can improve endurance performance. These include altitude training, which stimulates the production of red blood cells, as well as the use of blood doping or supplemental oxygen.
- **Nutritional support:** proper nutrition plays a crucial role in athletic performance. Ergogenic aids in this category include sports drinks, energy gels, protein supplements, and specialised diets that optimise nutrient intake and fuelling strategies.
- **Technological advancements:** advances in technology have introduced various ergogenic aids in the form of equipment, gear and monitoring devices. Examples include wearable sensors and real-time feedback devices.

It's important to note that while some ergogenic aids have been shown to be effective, others may be associated with health risks. It is crucial to consult with a healthcare professional and trainers before using any ergogenic aids. Additionally, athletes should be aware of the regulations governing the use of these aids in their respective sports.

Did you know?

Strychnine, caffeine, cocaine, and alcohol were often used as performance enhancers by cyclists and other endurance athletes in the 19th century.



Figure 9.49:
Some ergogenic aids

As a result of the negative impacts of drugs and ergogenic aids in sport, organisations such as the World Anti-Doping Agency (WADA) and Sport Integrity Australia were founded. 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 Sport Integrity Australia's approach to drugs and substances in sports. Sport Integrity Australia 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.

Sport Integrity Australia conducts both in-competition and out-of-competition testing of Australian athletes. They coordinate and carry out testing in accordance with international standards and work collaboratively with national sporting organisations to implement anti-doping programs. They develop educational programs and resources to raise awareness about the dangers of doping and promote clean sport. They provide information and support to athletes, coaches, and other stakeholders to help them make informed decisions and understand their responsibilities.

Sport Integrity Australia has the authority to investigate suspected anti-doping rule violations and gather intelligence related to doping practices. They collaborate with other organisations and agencies to gather evidence and pursue appropriate actions against individuals or organisations involved in doping. They ensure that Australian sports organisations and athletes comply with the rules and regulations set by the World Anti-Doping Code. They work with national sporting organisations to help them establish and maintain effective anti-doping policies and programs.



Figure 9.50:

It is crucial for athletes to consult with experts before using any ergogenic aids.

Internet activity

Log on to TitanOnline and complete Activity 9.8 by describing how a range of banned substances improve performance and their side effects.

Learning activity

1. Assess the performance benefits and health risks associated with ergogenic aids used in resistance training.
2. Create a fact file on banned NRL player Bronson Xerri and the procedure he must follow to be allowed to play rugby league again.
3. Research a protein shake available at your local supermarket and compare the recommended dosage with the recommended intake of protein for a trained athlete.
4. Express your opinion on whether you believe it is possible or desirable to have a completely drug free professional sporting environment.

Case study – Supplements vs steroids

Cole and his mate Daniel are in Year 11 and have been talking about going to the gym together, but haven't been able to get it happening yet. A lot of the other guys in their year have been training and have bulked up and it seems to make them very popular with the girls. It doesn't seem to matter what Cole eats, his fast metabolism just won't let him put on any weight. He has never been very strong and has always opted for sports like soccer instead of rugby.

Cole and his friends get asked to go to the beach for the day with some of the girls from his year. They said that they were going to take down a beach cricket set and some food and have a day to hang out. Cole was approached by Dee, who he has liked for a couple of months, who said that she was looking forward to seeing him down there. He really wanted to go but was self-conscious about taking his shirt off, especially with the other guys that would be there as well. He was worried that he would look too skinny and un-manly against everyone else so he decided that he wouldn't go.

He spent the day looking up pictures and videos of bodybuilders and other muscle-bound, famous people. He looked at himself in the mirror and was ashamed with what he saw. Cole started researching meal plans of the bodybuilders and the workouts that they were doing. He called up Daniel and said that he wanted to start going to the gym with him.

The next weekend, Daniel and Cole signed up to one of the cheaper gyms in their suburb. On their first training session, they walked in and looked around. Everyone was really buff and were using really heavy weights. Cole sat down to do a bench press like he had seen in the workouts that he researched, and put 10kg weights on each side of the bar.

He could only do one rep before his arms gave way. He took the weights off each side and just used the bar as resistance. Daniel, however, has always been quite bigger than Cole and already has developed muscles from previous resistance training workouts. Cole was so disappointed and embarrassed with himself. For the rest of the gym session, he had to use small weights and saw that all the other guys in the gym were looking at him. He felt like they were judging him.



Figure 9.51: The use of nutritional supplements for resistance training should be approached with caution.

Case study – Supplements vs steroids*(continued)*

Cole was so embarrassed about his first experience at the gym that he didn't want to go back. Daniel has approached him several times encouraging him to go with him but he didn't want to. Cole was feeling more and more self-conscious and thinking about the gym made it worse.

A couple of days later, Daniel came up to him and said that he has started using supplements at the gym and they are making him lift weights so much easier and he has been gaining muscle more quickly. Daniel convinced Cole to just go down to the supplement store with him and get some samples before a workout. While he was there, Cole was convinced by the bodybuilder at the desk, that the supplements will help him bulk up and gain muscle much faster. Cole bought a range of supplements including protein powder, pre-workout and creatine.

Cole went to the gym loaded up on supplements and felt like he could finally lift more weight – he had so much more energy. After a couple of weeks, he could feel himself getting a bit more muscle, but he still wasn't as big as Daniel and the other guys at school.

He was taking more and more supplements and was working out every day as hard as he could. At first, he was really pleased with his progress but as his body got used to the supplements, his gains slowed and Cole was getting frustrated.

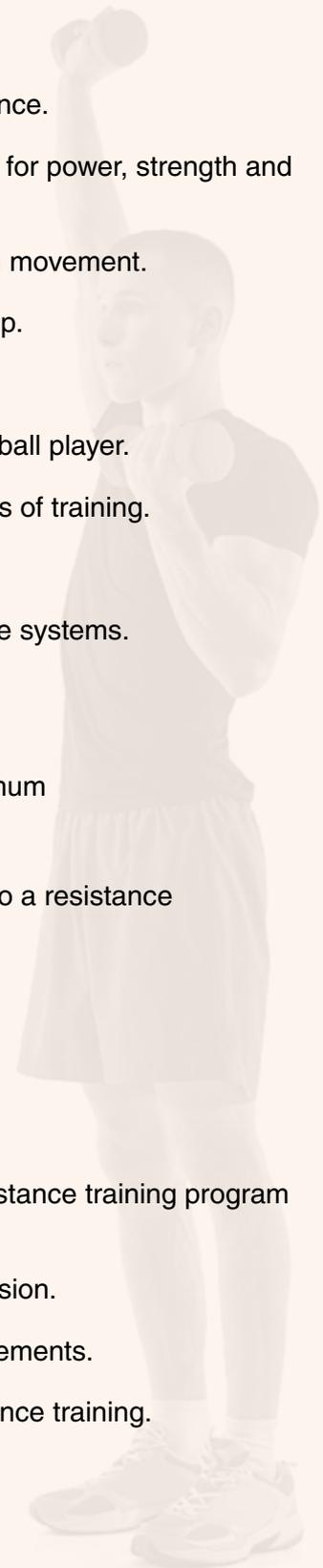
He was just starting to get bigger and when he looked in the mirror, he could see he was starting to get shape in his arms and abdominals. He went back onto his computer to take another look at the workouts that the bodybuilders were doing and went to the gym the next day and started pushing weights that were straining his body and were really difficult for him to do. Annoyed that he wasn't able to complete the workout, he started researching other ways that could make him get bigger muscles quicker.

He found an article about how many bodybuilders use steroids to build muscle. He looked up a little bit more about steroids and thought it was a great solution, disregarding the negative side effects that they would have. He spoke to Daniel about it, who mentioned that another guy at their school was also on steroids and that he could 'hook them up' with some. Cole was so hyped up about it and felt that he could finally get his dream body.

1. Discuss the impact that body image had on Cole's decisions.
2. Identify the supplements that Cole used and discuss their effects on the body.
3. Discuss the consequences of steroid use, both mentally and physically.
4. Describe your understanding of the term 'toxic masculinity'.
5. Research the penalties around steroid use in sport, focusing on the regulatory body Sport Integrity Australia.

Revision questions

1. Describe the difference between power, strength and muscular endurance.
2. Describe how sets, repetitions, rest and speed of repetitions are varied for power, strength and muscular endurance gains.
3. Identify the major skeletal muscles involved in the production of human movement.
4. Identify the agonist and antagonist muscles engaged in doing a push up.
5. Outline the difference between concentric and eccentric contractions.
6. Outline a range of resistance training exercises for a professional baseball player.
7. Describe the difference between isometric, isotonic and isokinetic forms of training.
8. Analyse the benefits of plyometric training.
9. Outline the advantages and disadvantages of free weights and machine systems.
10. Define the following training terms:
 - a. repetitions
 - b. sets
 - c. resistance
 - d. rest
 - e. repetition maximum
 - f. speed of lift.
11. Describe how the SMARTER acronym for goal setting can be applied to a resistance training program.
12. Define the following terms:
 - a. blitzing
 - b. forced repetitions
 - c. pyramiding
 - d. pre-exhaustion
 - e. super-sets.
13. Describe why monitoring progress is an important component of a resistance training program and how this can be achieved.
14. Design a suitable warm-up and cool-down for a resistance training session.
15. Discuss the advantages and disadvantages of using weight gain supplements.
16. Define ergogenic aids and provide a range of examples used in resistance training.
17. Design a strength training program using bodyweight exercises only.
18. List the effects anabolic steroids have on the body.
19. Describe five different exercises that target the biceps.
20. Outline what is meant by a trainer's statement that their resistance program "balances muscle groups and develops symmetry".



CHAPTER 10

Social perspectives of games

Throughout this unit, students will explore the role of sport in Australian society. They will explore patterns of participation in games and sports, factors affecting access and participation, the connection between sport and national identity, and the role of sport in society. Students will consider the impact of media on sport and sports coverage, the inequalities of male/female participation, the economics behind sport and the Olympics. They explore the reasons for this behaviour and the ethics behind drug use in sport.

Syllabus outcomes

A student:

- investigates and interprets the role of sport and physical activity in Australian society (2.4)
- describes how societal influences affect participation in sport in Australia (2.4)
- analyses the impact of professional sports on society (4.5)
- recognises the skills and abilities required to participate in sport and adopt roles that support health and physical activity (4.5).

Focus areas

- Sport in Australian society
- Sport and the mass media
- Economics and sport
- Drugs in sport
- Careers in sport



Figure 10.1:

Sport is an integral component of the cultural make-up of Australia.



Figure 10.2:

Australia's national identity evolved with sporting success in local and international competitions.

Sport in Australian society

Sport is an integral component of the cultural make-up of Australia. The history of games and sports date back to colonial Australia, when popular games and sports included cricket, boxing, horse racing and football (soccer). Australia's national identity evolved with sporting success in local and international competitions. Famous sporting events and icons in Australia's history, such as the Ashes cricket series, Cathy Freeman and Phar Lap have all contributed to the status of sport in present day society. In the past, sporting participation was largely associated with gender, class and ethnic background and choice was somewhat limited. Access is no longer such an issue and the variety of sporting choice reflects sports from around the world.

Continuum of play, games and sport

Australians participate in a range of activities that can be classified as play, games or sport:

- **Play:** to amuse oneself by engaging in a recreational activity. Play is typically not structured or organised.
- **Game:** a contest to determine a winner. Games typically have some rules.
- **Sport:** a skilful physical activity governed by a set of rules or customs. Sports typically require an official umpire or referee.

Participation in games and sport

People can be involved in organised sport and physical activity as players, participants or competitors, or in non-playing roles. Important non-playing roles in sport include coaches, referees and umpires, administrators, scorers, timekeepers and medical support personnel. A person can be involved in more than one kind of sport or physical activity, and in more than one role.

Over the past 20 years, participation in sport-related activities has remained relatively stable, although Australians are also increasingly participating in convenient non-sport-related activities such as walking and going to the gym. Participation rates in 2021–22 included:

- 41 per cent of Australians (aged 15+) participate in a sport-related activity at least once a week.
 - 49 per cent male (15+)
 - 32 per cent female (15+)
 - 62 per cent young adults (15–19)
 - 30 per cent older Australians (55+)
 - 25 per cent Australians with disability (18+)
 - 31 per cent Indigenous Australians (18+)
 - 39 per cent speak a language other than English at home (18+)
- 43 per cent of children (aged 0–14) participate in organised outside-of-school hours sport-related activity at least once a week.
- 14 per cent of Australians (15+) volunteer in the sport and active recreation sector at least once a year.
- Children (0–14) are more likely to participate in organised outside-of-school hours sport and physical activities if:
 - a parent participates in sports or physical activity
 - they come from a high-income family
 - they have one or two siblings.
- Physical health and fitness is the strongest motivator for Australians 15+ to participate in sport and physical activity. Participating in sport and physical activity for social, psychological, and mental health reasons has increased over the past five years.
- The main barrier to participating in sport or physical activity for Australians 15+ is due to poor health/injury. The common barrier of ‘not having enough time or too many other commitments’ has declined over the past five years.
- Running/athletics is the most popular sport-related activity for males (15+). Swimming is the most popular for females (15+) and boys and girls (0–14).

Source: Australian Sports Commission.



Figure 10.3:

Running/athletics is the most popular sport-related activity for Australians aged over 15.

Reasons for participation

Participating regularly in sport and physical activity can help:

- achieve and keep a healthy body weight
- lower both total blood cholesterol and triglycerides, and increase HDL (or the 'good' cholesterol)
- reduce blood pressure in people who already have hypertension (high blood pressure)
- reduce the risk of developing some cancers
- reduce feelings of stress, anxiety and depression
- build and maintain healthy bones, muscles, and joints
- keep older adults physically strong and better able to move about without falling or becoming too tired.

The motivators for people to participate regularly in sport and physical activity include:

- health and fitness benefits
- weight control or loss
- feelings of wellbeing
- challenge or competition
- feelings of enjoyment
- relaxation
- wanting to try something new
- the influence of parents and peers.
- social reasons

When an individual participates regularly in games and/or sport, they not only improve the way in which their body functions, producing physiological benefits, they also improve their sense of personal wellbeing. The longer the program is continued, the better the body functions, and the better the person feels.

Patterns of participation

Most active 18–24 year olds (37 per cent of this age group) play sport and do other physical activity in their suite of activities that keep them moving. They do slightly less sessions and activities than active 15–17 year olds but still significantly exceed the physical activity guidelines and see physical activity as a critical part of their routines.

Insufficiently active 18–24 year olds (54 per cent of this age group) are more likely to stick to just sport or physical activity. They are developing other interests, which they feel are more important than being active every day. They are capable of doing more, but are choosing not to. Sport and physical activity is less likely to be part of their daily or weekly routine.



Figure 10.4:

Swimming is the most popular sport-related activity for Australian women aged over 15.



Figure 10.5:

Participating regularly in sport and physical activity can help reduce feelings of stress, anxiety and depression.

Did you know?

Australian football was originally created to keep cricketers active in their off season. Now it is one of the most popular sports in Australia.

Inactive 18–24 year olds (nine per cent of this age group) admitted the true barrier was a lack of motivation, reduced free time and ‘busyness’ that comes with having a family, feel they would have to sacrifice personal time to exercise, consider the cost of gyms and organised sport as a major barrier, particularly for women.

Table 10.1: Participation in sport or physical activity, 2016–2022.

Age (years)	At least once per week participation (000s)					
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
15–17	680.6	702.7	697.0	765.7	725.0	747.1
18–24	1,938.9	1,948.8	2,022.9	1,937.0	1,886.1	1,925.7
25–34	2,925.4	3,125.1	3,030.3	3,167.7	3,104.0	3,217.5
35–44	2,714.9	2,751.8	2,835.1	2,855.4	2,853.0	2,904.2
45–54	2,658.7	2,675.6	2,742.4	2,692.4	2,661.8	2,723.2
55–64	2,286.4	2,396.4	2,417.8	2,401.7	2,388.3	2,439.9
65+	2,991.2	3,202.8	3,227.3	3,342.4	3,363.6	3,415.6

Table 10.2: Ten most popular sports and physical activities for adults, 2016–2022.

Sport/activity	Participation (000s)						
	2016	2017	2018	2019	2020	2021	2022
Walking	8,649.0	8,516.2	9,145.3	8,969.9	9,880.8	10,252.6	9,567.9
Fitness/Gym	6,479.6	6,764.4	7,131.9	7,609.3	7,866.8	7,936.2	8,196.7
Athletics, track and field (includes jogging and running)	3,105.0	3,071.9	3,086.0	3,410.5	4,174.8	4,139.2	3,761.2
Swimming	2,908.5	2,918.0	3,128.2	3,242.2	3,591.5	3,677.8	3,727.0
Cycling	2,325.6	2,250.9	2,381.0	2,374.8	2,998.9	3,094.3	2,923.3
Bush walking	1,198.5	1,158.0	1,165.6	1,310.9	1,804.1	1,994.2	2,142.5
Yoga	876.0	939.7	1,090.4	1,130.5	1,460.1	1,555.5	1,391.5
Football/soccer	1,143.6	1,108.5	1,006.2	1,090.0	1,158.0	1,243.1	1,363.6
Golf	1,024.9	978.6	955.9	877.6	1,130.5	1,211.3	1,313.6
Tennis	926.4	922.7	885.1	861.0	1,046.4	1,254.1	1,251.3

Source: Australian Sports Commission.

Factors affecting access and participation

Several factors can influence access to and participation in sport and physical activity. These include:

- **Socioeconomic status:** income, wealth, equipment, coaching and organised access may face financial barriers or have limited access to physical activities
- **Geographical location:** the availability of sports spaces can affect access to physical activity, while urban areas may have more options but also safety concerns.
- **Gender:** gender stereotypes and social norms can influence participation rates in different sports. Certain sports and physical activities may be more culturally associated with one gender or may face discrimination or lack of support for participants of a particular gender.
- **Cultural and social factors:** cultural traditions, and attitudes towards sports can influence access and participation. Some cultures prioritise specific sports or physical activities, while others may discourage participation due to cultural beliefs or restrictions.
- **Disability and inclusivity:** access to inclusive facilities, adaptive equipment and supportive policies are critical for people with disability to engage in sports and physical activities. Inadequate accessibility, lack of accommodations, or discriminatory attitudes can limit their participation.
- **Age:** different age groups may face various barriers to sport and physical activity. For example, children and adolescents may require safe and supervised spaces while older adults may need activities adapted to their abilities and preferences.



Figure 10.6:

Access to inclusive sports facilities, adaptive equipment, and supportive policies are critical for people with disability.

- **Education and awareness:** knowledge about the benefits of physical activity, awareness of available opportunities, and understanding of how to engage in sports can influence participation rates. Access to physical education in schools and community outreach programs can play a significant role in promoting participation.
- **Parental and peer influence:** support from parents and peers can positively impact participation, especially for children and adolescents. Lack of encouragement or role models can discourage individuals from pursuing sports or physical activities.
- **Time constraints:** busy schedules, work commitments, and other time-related factors can limit individuals' ability to engage in sports and physical activity. Access to flexible scheduling and convenient facilities can help overcome this barrier.
- **Discrimination and exclusion:** factors such as race, ethnicity, religion, or sexual orientation can lead to discrimination and exclusion from certain sports or physical activities. Inclusive policies, diverse representation, and efforts to address these biases are essential for promoting equitable access and participation.

It's important to recognise that these factors can interact and compound, creating complex barriers to access and participation in sport and physical activity. Efforts to address these factors and promote inclusivity can help create a more equitable and diverse sporting landscape.



Figure 10.7: Support from parents can positively impact participation.



Figure 10.8: Proximity of sports facilities, parks, and recreational spaces can affect access to physical activities.

Learning activity

1. Identify the characteristics of play, games and sports situations.
2. Analyse the reasons for participation at various stages of a person's lifespan.
3. Interpret the patterns of participation in sport according to both age and gender.
4. Identify a range of leisure and recreation opportunities at your school and the local community.
5. Analyse the level of impact of a range of factors that affect participation.

Sport and nationalism

Australians as a whole take great pride in the sporting achievements of our athletes. Success by Australians in international competition ‘unites’ the population. Great pride is felt when Australians succeed in events such as the Ashes, the Olympic Games and the FIFA World Cup.

The print, electronic and social media have been very important in promoting Australia’s sporting identity. Successful Australian athletes, such as Sam Kerr, Ash Barty, Dylan Alcott, Ian Thorpe and Cathy Freeman, are promoted as being sporting heroes to generations of Australians. Sporting teams and events evoke community spirit and pride, which in turn improves the overall health of a community. These improvements may be physical, spiritual or emotional.

Sport can also develop social benefits within a community, which may include:

- improved interaction within a community
- an increased sense of pride
- greater awareness and access to social services
- improved social cohesion.



Figure 10.9: Successful Australian athletes, such as Dylan Alcott, are promoted as being sporting heroes.

Internet activity

Log on to TitanOnline and complete Activity 10.1 to learn more about sport and nationalism.

Learning activity

1. Identify the national sports of a range of countries.
2. Analyse and report on the relationship between success in sport and national pride through investigation of specific case studies.
3. Create a fact file on two of the following Australian athletes:

<ol style="list-style-type: none"> a. Steve Smith (cricket) b. Latrell Mitchell (rugby league) c. Peter Bol (athletics) 	<ol style="list-style-type: none"> d. Sam Kerr (football) e. Liz Watson (netball) f. Madison de Rozario (Paralympics).
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Figure 10.10:

There have been numerous instances of politics affecting sport – particularly the Olympic Games.

Politics and sport

Most athletes and sporting administrators believe that there is no place for politics in sport and they should always be kept apart. In a country such as Australia it can be difficult to separate the two, as they are often enmeshed as part of daily life. For example, politicians may choose to attend sporting events, present trophies and associate with sporting champions in order to project the image that they have common interests with the public, or to associate themselves with the euphoric emotions of winning and to promote their popularity.

Sporting institutions also use politics to serve their own agendas. Most sporting bodies in Australia receive funding from the government. This money is used to build grass root participation, increase the popularity of the sport and build nationalism wherever possible.

Politicians glorifying sporting success, which is funded by government money, is one example of sport and politics mixing together to push their own agendas. Athletes and governments also use sport for other political purposes. This can be in the form of political statements or gestures, providing or withdrawing funding or even sporting boycotts.

Over the years there have been numerous instances of politics affecting sport – particularly the Olympic Games, because of the worldwide media coverage. Table 10.3 on the following page is a timeline of how a range of political influences have affected the Olympic Games.

Table 10.3: Political influences that have affected the Olympic Games.

Year	Incident
1916	Cancelled due to the outbreak of World War I.
1920	Austria, Bulgaria, Germany, Hungary and Turkey were not invited to the Games, based on their involvement in World War I.
1924	Germany were not invited to the Games, based on their involvement in World War I.
1940	Cancelled due to the outbreak of World War II.
1944	Cancelled due to World War II.
1948	Germany and Japan were not invited to the Games, based on their involvement in World War II.
1956	Seven countries boycotted the Games for a range of political reasons, including Egypt, Iraq, Lebanon, the Netherlands, Spain, Switzerland and the Republic of China.
1968	South Africa was expelled from the Games due to apartheid.
1972	The Palestinian terrorist group 'Black September' took members of the Israeli Olympic team hostage, murdering 11 athletes.
1980	US President Jimmy Carter issued a boycott to protest against the Soviet invasion of Afghanistan. Many nations did not participate.
1984	In response to the 1980 boycott, The Soviet Union and fourteen of its allies boycotted the 1984 Games.
1992	After disclaiming apartheid, South Africa is allowed to compete after a 32-year ban.
2008	Protests are held around the world by human rights groups over China's repressive regime. They say allowing China to host the 2008 Olympic Games legitimises their human rights abuse.
2020	The World Anti-Doping Agency (WADA) bans Russia from the Olympics and other international sporting competitions for four years after evidence shows Russian authorities manipulated drug testing data. 'Clean' athletes are allowed to compete as part of a neutral team. Russian President Vladimir Putin denies the allegations saying the ban is due to political pressure from western countries.

Internet activity

Log on to TitanOnline and complete Activity 10.2 to learn more about politics and sport.

Learning activity

1. Critically examine the ways that sport has been used for political outcomes in Australia.
2. Research and summarise the sporting boycott of South Africa during the apartheid era.

Sport and the mass media

The mass media (print, television, radio, internet and social media platforms) plays an important role in shaping behaviours and attitudes to sport in Australia. The media often uses provocative headlines to sensationalise sport. Athletes are often portrayed as 'heroes' or 'warriors' in media reports, or 'brave' when overcoming injuries.

Due to technological developments, individuals can watch a range of sports from around the world via free-to-air television, subscription streaming services, online, or on mobile devices such as smartphones. Live television coverage can be recorded, paused and rewound on smart televisions. Some viewers can even customise the camera angles they view for various sports.

Influence of the media on sport

The way an individual views sport is evolving. This change is being driven by media companies who use new technologies to deliver and market sports to different audiences.

For some time, it has been possible for fans to have personalised sports news emailed directly to their inboxes from their favourite team/organisation or sports news provider. Sports fans now have easy access to the internet for the latest sports news and results with the smartphone's rise in popularity. The internet has also made attendance at major sporting events simpler, with online ticket purchasing for sporting matches and ballots for major events such as the Olympic Games. Some pay television providers have taken this ease of access a step further with the introduction of mobile applications that allow fans to watch their favourite sports 'on the go'.

Because media companies pay huge amounts of money for the rights to show sporting events, they expect a lot in return. Matches are scheduled ahead of time to suit media companies. Games are played when they will attract the largest television audience.



Figure 10.11: Sport makes up a large proportion of news coverage.

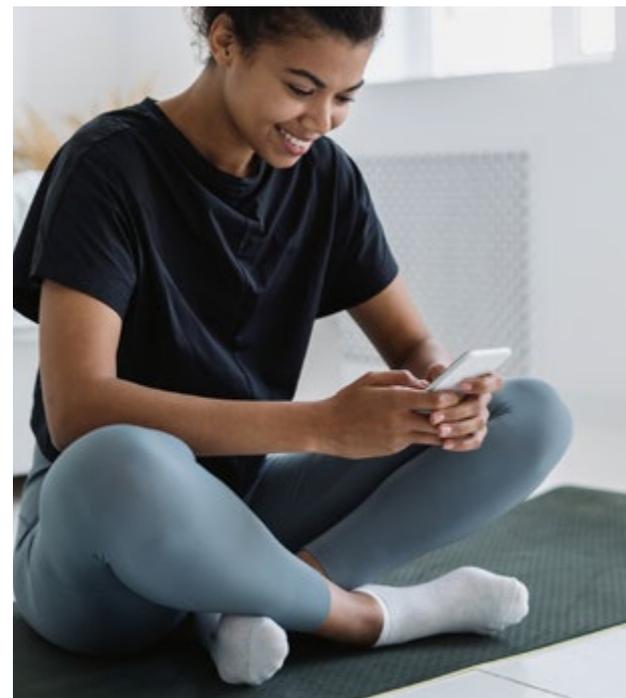


Figure 10.12: Sports fans now have easy access to the internet for the latest sports news.

Ways sports are represented

Sports are represented in different ways through the media. Sport and the media rely upon one another – sport provides the action and media provides coverage to viewers around the world.

Sport makes up a large proportion of news coverage. There are a wide variety of websites, social media accounts, and magazines specifically focused on different sports. There are also numerous television channels, particularly through streaming services, that are dedicated to sport.

The amount of money invested by media companies in sport, means they are in an influential position to prescribe what is viewed, when it is viewed and how it is viewed. Media companies have such an influence in sport that rules have been changed and playing conditions modified to enable media companies to receive the most advertising revenue as possible.

Creating a strong link between sport and the media provides many commercial opportunities for both parties. This increases the revenue stream for sport through television rights, sponsorship of sporting teams and individuals, and the naming rights for sporting stadiums. Many people view modern sport as a commodity that can be bought and sold to the highest bidder.

Promotion of sport

The media promotes sport that suits their commercial interests. For a sport to be attractive to the media, it needs to rate well and therefore make a profit for the media company. The sports that receive the most promotion in Australia include the four football codes, cricket, tennis, and the Olympic Games.

Media promotion of sport increases participation and revenue for that sport. Sports that receive little or no promotion through various forms of the media struggle to attract sponsors and revenue streams are limited.

Media companies are also investing in sporting teams. For example, the Melbourne Storm National Rugby League (NRL) team is owned by News Limited. This direct involvement in sport raises the issue of a perceived bias for certain teams and whether all teams and sports are being promoted fairly and transparently.

Learning activity

1. Discuss the positive and negative influences that the media has on sport.
2. Identify a range of sporting teams and events in Australia and the sponsors that support them.
3. Identify a range of websites specifically focused on different sports, and a range of streaming services/channels that are dedicated to sport.

Sports coverage

Sport by nature is very competitive. It is not just competition between rival athletes or teams to win the match or competition. It is competition between individual sports to create the greatest forms of revenue and attract commercial interest. This is best achieved from increasing sports coverage. Traditionally games were played on a Saturday or Sunday and the sports received coverage from news organisations and television. The increase of sports coverage has improved broadcasting fees paid by media companies, which has in turn led to an increase in sponsors, marketing opportunities and a wider viewing audience.

The introduction of dedicated sporting channels, such as Fox Sports, has increased the broadcasting rights that sports receive. Again, this has led to an increase in sponsors, marketing opportunities and a wider viewing audience. However, access to these dedicated sporting channels involves a financial cost or subscription for the viewer.

Major sports

Major sports generate a significant amount of media attention worldwide. Sports such as Australian football, soccer, basketball, rugby league and union, cricket, tennis, motor racing, and others have a massive following and attract substantial media coverage.

The level of media attention can vary depending on factors such as the popularity and cultural significance of the sport in different regions, the scale and importance of the event or tournament, the performance of notable athletes or teams, and other factors such as scandals or controversies.

Major sports events like the FIFA World Cup, the Olympic Games, State of Origin, AFL Grand Final, UEFA Champions League, NBA Finals, Wimbledon, and the Tour de France, among others, often attract global media coverage. These events receive extensive television coverage, newspaper articles, online articles, radio broadcasts and social media discussions.



Figure 10.13: Media outlets provide live broadcasts, analysis and post-match interviews to cater to the interests of sports fans.



Figure 10.14: Major sports events, such as the Olympics, attract global media coverage.

Did you know?

The most popular sport competition broadcast on Australia television is Australian Football League (AFL).

Media outlets, both traditional and digital, dedicate significant resources to cover and report on major sports events. They provide live broadcasts, analysis, interviews, post-match discussions, player profiles, and in-depth coverage to cater to the interests of sports fans. The sports sections of newspapers, dedicated sports channels, sports-specific websites, and social media platforms contribute to the widespread media attention these sports generate.

Additionally, sports news is not limited to just the events themselves. Transfer rumours, athlete injuries, contract negotiations, coaching changes, and other developments within the sports world also receive substantial media coverage. Sports personalities and their lives outside of the game often generate interest, leading to coverage of their personal lives, endorsements and charitable endeavours.

Minor sports

Minor sports generally generate less media attention compared to major sports. The level of media coverage for minor sports can vary significantly depending on factors such as the sport's popularity, cultural relevance, geographic location, and the availability of resources and platforms for media coverage.

While major sports like rugby league, Australian football and tennis dominate the mainstream media in Australia, minor sports may receive limited coverage or be featured in niche sports sections of newspapers, dedicated sports channels, or specialised sports websites. Local and regional newspapers and television stations may provide coverage of minor sports that are popular within their specific communities.

In some cases, minor sports may receive more attention during major events such as the Olympic Games or other international tournaments that bring various sports together. These events provide an opportunity for lesser-known sports to gain exposure and generate media interest.

With the rise of digital media and online platforms, there has been an increase in coverage of niche sports. Specialised websites, streaming platforms, and social media communities dedicated to specific sports have provided avenues for fans and athletes of minor sports to connect and access relevant content.

The level of media attention for minor sports is generally lower due to factors such as limited audience interest, lower commercial appeal, and fewer resources available for media coverage. Nonetheless, dedicated fans and enthusiasts of these sports often find alternative means, such as online communities and forums, to stay updated on news and events related to their favourite minor sports.



Figure 10.15: Minor sports may receive more attention during major events such as the Olympics.

Male/female sport coverage

The discrepancy in media coverage between male and female sports can be attributed to several factors, including historical, cultural, and commercial considerations. While progress has been made in recent years, there are still significant disparities that contribute to the imbalance in media attention. Key factors for this discrepancy include:

- **Historical and cultural bias:** traditional gender roles and societal norms have historically favoured male sports. Male sports have often been seen as more popular, prestigious and commercially viable, leading to more media coverage. This historical bias has created a cycle where male sports receive more attention, resources and exposure, perpetuating the discrepancy.
- **Commercial considerations:** media organisations prioritise sports that have higher viewership and commercial value. Male sports, with their larger fan bases and established market appeal, tend to attract more advertising revenue and sponsorships. This creates a financial incentive for media outlets to focus on male sports, as they can generate higher profits. The lack of investment and sponsorship opportunities for female sports hampers their visibility and media coverage.
- **Audience demand and perception:** there is a perception that audiences are more interested in watching male sports, which influences often reinforced by historical coverage patterns. However, the interest in women's sports is growing. This perception influences media coverage.
- **Limited access and exposure:** female sports have faced challenges in terms of access to resources, infrastructure, and exposure compared to male counterparts. This lack of investment affects the overall quality and competitiveness of sports leagues and events, making it harder to attract media attention.
- **Stereotypes and gender biases:** persistent stereotypes and biases regarding physical abilities, competitiveness, and masculinity have influenced media coverage decisions. There is a perception that male sports are more exciting, fast-paced, and physically demanding, while female sports are seen as less marketable. These factors contribute to the lower coverage of female sports.

There have been positive developments in recent years with increased efforts to promote and cover female sports. Initiatives like the FIFA Women's World Cup, the Women's Super League and Women's Australian Football League, along with the rise of individual female athletes, have helped raise the profile of women's sports and increase media attention. However, more work is needed to bridge the existing gap and provide equal coverage for both male and female sports.



Figure 10.16:

Female sports have faced challenges in terms of access and exposure.

Learning activity

1. Identify the percentage of coverage for female and male sports on subscription services.
2. Identify the percentage of coverage for major and minor sports in the news and on free-to-television.
3. Critically analyse the level of male and female sports coverage across several media platforms. Present this information as a bar graph.

Case study – Reducing gender disparity in sport

The issue of gender disparity in professional sports continues to gain attention. Despite the remarkable achievements and growing popularity of female athletes, there remains a stark contrast in the earnings between male and female sports professionals. In most major sports, male players consistently earn significantly higher prize money compared to their female counterparts. Factors contributing to the disparity include:

- **Media coverage and sponsorship:** male sports have received more media coverage and sponsorship, resulting in increased exposure and financial opportunities. This higher visibility leads to higher endorsement deals and commercial opportunities for male athletes, widening the earnings gap.
- **Audience and revenue generation:** men's sports have enjoyed a larger fan base and higher viewership, resulting in greater revenue generation from ticket sales, broadcasting rights and sponsorships. This revenue disparity affects the prize money allocation, with larger portions allocated to male tournaments.
- **Perceived value and stereotypes:** deep-rooted gender biases and stereotypes prevalent in society contribute to the undervaluation of women's sports. The perception that men's sports are more exciting, physically demanding and marketable has perpetuated the disparity in earnings.



Figure 10.17: Successful female athletes, such as Ash Barty, usually earn less prize money than male athletes.

Case study – Reducing gender disparity in sport

(continued)

The implications and potential solutions include:

- **Equal prize money:** ensuring equal prize money for both male and female athletes would be a crucial step toward addressing the disparity. This could be achieved by redistributing revenue streams or setting regulations mandating equal payouts.
- **Increased media coverage:** efforts should be made to promote women's sports through increased media coverage and representation. Highlighting the achievements and stories of female athletes can help change perceptions and generate more interest in their sports, leading to greater financial opportunities.
- **Sponsorship and endorsement equality:** encouraging sponsors to invest equally in men's and women's sports can help bridge the gap. Brands and organisations should be urged to consider the marketability and potential of female athletes and provide them with lucrative endorsement deals.
- **Grassroots support and investment:** fostering a strong foundation for women's sports through increased funding, training programs and infrastructure development is crucial. This investment can help cultivate talent, improve competition and enhance the overall appeal of women's sports.



Figure 10.18: Fostering a strong foundation for women's sports is crucial.

The issue of income disparity between male and female athletes is a complex and multifaceted problem. Addressing this issue requires a collective effort from sports governing bodies, media organisations, sponsors and society as a whole. By implementing measures such as equal prize money, increased media coverage, and improved financial opportunities, we can strive for a more equitable future for all athletes, regardless of their gender.

1. What are the main factors contributing to the disparity in earnings between male and female athletes?
2. How does media coverage and sponsorship affect the income disparity in sports?
3. What potential solutions can be implemented to reduce the gap in earnings between male and female athletes?
4. Research the money earned by the Matildas and Socceroos players at their recent World Cups.
5. Research the salary cap for male and female teams in the NRL competitions.



Figure 10.19:

Spending in sport comes from a variety of sources, including equipment and clothing.

Economics and sport

The measurement of the sport sector's economic contribution to the Australian economy is multi-layered, including direct, indirect, and induced economic activities, increased workforce productivity, and the value of volunteers. Outside of standard economic value categories, there can also be a notional sense of 'value' related to personal and community wellbeing and national pride derived from sport participation or perceived affiliation with sport.

Sport creates significant value for Australia, with at least seven dollars returned on every dollar expended in the sector (direct economic benefits, the network of volunteers and not-for-profits, avoided health costs, and education benefits). Community sport participation in Australia generates an estimated \$18.7 billion annual value in social capital (such as community engagement and identification, reciprocity, generalised and personalised trust).

Spending in sport comes from a variety of sources:

- **User pay:** including sports-related fees, equipment, clothing, and training.
- **The private sector:** including sponsorship and marketing.
- **Local government:** infrastructure spending.
- **State government:** sports participation, high-performance pathways, infrastructure.
- **Australian Government:** including grants and programs from the Australian Sports Commission and other Federal departments.

Community sport infrastructure helps generate \$6.3 billion worth of economic benefits, including their construction, maintenance and operation, and the increased productivity of those who are physically active as a result of such infrastructure.

The Australian sports sector is estimated to generate \$32.2 billion in annual sales, resulting in a contribution to GDP of approximately \$14.4 billion. The sector employs more than 220,000 people, with volunteers donating 158 million hours to sport each year – equivalent to nearly 90,000 additional full-time jobs and AU\$3 billion in economic value.

Sport creates \$29 billion of net health benefits each year through reduced healthcare costs and early mortality. The estimated cost of treating physical activity related injuries in hospitals was A\$764 million, while managing health conditions due to physical inactivity (such as coronary heart disease and type 2 diabetes) cost the health system \$968 million.

Australia has been successful in attracting many of the world's biggest sporting events. These events stimulate economic activity, encourage domestic and international tourism, provide international exposure through broadcast and media, and generate other potential economic and social benefits:

- The 2015 Asian Cup event created \$128 million in direct expenditure and a six per cent increase in club registrations affiliated with Football Australia.
- The Gold Coast 2018 Commonwealth Games helped create an estimated:
 - \$2.5 billion increase in gross state product over nine years; including 21,000 jobs.
 - 100 national and international events secured in Queensland
 - 1.3 million visitors leading up to, during and after the Games, spending more than \$1.1 billion in the region.

Source: Australian Sports Commission.

Internet activity

Log on to TitanOnline and complete Activity 10.3 to

Amateur vs professional s

An amateur athlete is defined as someone that is not p their sporting performance. Many amateur athletes cor simply for the love of the sport or as part of developme preparation for professional competition.

Professional athletes are paid for their sporting perform This may be in the form of a monetary contract, prize r and appearance fees. There are also opportunities to supplement their income through endorsements from sponsors.

Figure 10.20:

Many amateur athletes compete simply for the love of the sport.



Funding

Various funding programs and concessions are available from government and non-government sources to provide financial assistance in the sport and active recreation sector to organisations, community groups, and individuals. The Australian Sports Commission (ASC) primarily funds and supports national sporting organisations (NSOs) to coordinate and deliver sport participation and development programs, to increase participation, and achieve high performance outcomes. The ASC also provides a range of grants aimed at athletes, learning and development, and organisations to assist in developing sporting excellence and increasing participation and achievement by all Australians.

Athletes

- **dAIS Athlete Grants:** the dAIS scheme provides an opportunity for athletes with direct financial support to enable them to focus on training and competitions to achieve the strategy targets in Olympic, Paralympic and Commonwealth Games sports.
- **Local Para Champions:** grants for coaches, officials and competitors aged 12–24 participating in state, national or international championships for athletes with disability.
- **Local Sporting Champions:** this program provides financial assistance for coaches, officials and competitors aged 12–18 participating in state, national or international championships.
- **Compensation Grant Program:** to provide financial support to Paralympians whose disability support pension payments have been affected due to travelling outside Australia for training and/or competitions exceeding the general travel allowance of 28 days in a financial year.
- **AIS Education Scholarship:** the scholarship has been established from a private donation for the sole purpose of supporting Australian high performance athletes in their pursuit of study and educational experiences.



Figure 10.21:

There are grant opportunities available for primary and secondary schools.



Figure 10.22:

Financial support is available for athletes with disability.

Learning and development

- **Women Leaders in Sport:** funding and support to help provide women with development opportunities to reach their leadership potential in the sports industry. Opportunities include leadership workshops, individual grants and organisation grants.
- **AIS Elevate Learning Grants Program:** targets performance pathway coaches, performance pathway practitioners and performance support team members currently working directly with performance pathway athletes categorised as emerging, developing or podium potential.
- **NSO/NIN Coach Development Grant:** to support an organisation's capability to drive the development of high performance coaches.
- **AIS Research Grant Program:** to support the undertaking of quality research and development projects delivering outcomes aligned to the national high performance sport research agenda.

Schools

- **Sporting Schools:** offers grant opportunities for primary schools, and targeted grant opportunities for secondary schools in relation to Year 7 and Year 8 students. Grants support the delivery of sport-based programs to help students build the confidence and capability to be active for life. The ASC has partnered with more than 35 NSOs to facilitate delivery of Sporting Schools programs.

Source: Australian Sports Commission.

Life after sport

Following retirement from their chosen sport, many athletes continue their involvement within the sporting industry, performing roles such as coaches, officials, commentators and sports journalists. In many sports, athletes retire at an early age and still have a lifetime ahead of them requiring an income stream to support their living expenses.

Elite athletes spend many years training to perform at peak levels. This often involves sacrifices, both financial and personal, that the public do not see. These sacrifices are made to pursue personal goals, which may or may not have been achieved once an athlete retires.

For many athletes retirement may come suddenly, due to injury or suspension. They may not have time, or are unwilling, to plan a path through to retirement.

Many athletes struggle with the concept of retirement and what they will do after their sporting careers have finished. The transition to retirement is often difficult for an athlete as they deal with the changing demands on their time, withdrawal from the media spotlight and the mateship if they are involved in a team sport.

Many athletes struggle to deal with the financial side of retirement, especially if they haven't invested wisely to provide an ongoing income stream. Finding alternative employment often proves difficult, competing for positions against others with greater training and experience. High profile athletes, such as Australian Olympic swimming champion Ian Thorpe and a host of prominent players from the AFL and NRL competitions, have spoken about their mental health battles following their retirement from elite competition.

The spectator

Sports have become a part of everyday life in most western cultures, and even those who are not directly involved are exposed to them. While people take part in sports for a variety of reasons, for most enthusiasts, sports provide entertainment. What it means to be a sports fan today is different than what it meant to be a fan fifty years ago. Aggressive sport marketing now targets fans to generate more revenue for the sports industry. The sports organisations of today are embracing their roles as entertainment providers with the realisation that their product is unique.

Due to the introduction of improved facilities, weather is no longer an issue for teams and games can be played anywhere at any time of the year. New stadiums are created to provide greater comfort, increased capacity and exciting atmospheres. Corporate and government financial support, together with revenue from increased attendance has made it possible to develop these sporting facilities. Stadiums now feature luxury boxes and suites, which are considered cost-effective corporate networking options. Linking business activities with sporting events takes spectating to a new level and also provides another valuable revenue source for sporting clubs.

New and improved stadiums are only the beginning when it comes to making a fan's experience to a sporting event a great experience. More and more money is being put into fireworks, music, dancing, singing and electronic sightscreens to complement the sport and make the event as entertaining as possible.



Figure 10.23: Sports organisations are embracing their roles as entertainment providers.



Figure 10.24: Stadiums are now created to provide greater comfort, increased capacity and exciting atmospheres.

Learning activity

1. Compare and contrast amateur and professional status through investigation of a variety of sports.
2. Analyse a professional sporting team's home ground in your local area. Research the facilities that are provided for spectators to enhance their 'sporting experience'.
3. Choose one of the following retired athletes and write a report based on their life and career path after sport:

<ol style="list-style-type: none"> a. Ricky Ponting – cricket b. Johnathan Thurston – rugby league c. Ian Thorpe – swimming 	<ol style="list-style-type: none"> d. Cathy Freeman – athletics e. Ash Barty – tennis.
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Sponsorship and sport

Sponsorship has become an increasingly integral component within the sporting industry. Whether it be individual, team, or children's sport, the relationship between sponsorship and sport has become vital to funding the growth and development of the industry.

In Australia, a relatively small number of sports receive the bulk of the sponsorship dollar with less popular sports, or sports not attracting adequate media coverage, left to compete for the remaining funds.

Sponsors in Australia are generally attracted to male sports and established sports. The major sponsors of the sport industry are likely to be multi-national companies coming from sectors such as finance, brewing, food/beverages, telecommunications, airlines, sporting goods manufacturers and the motor industry.

Sponsorship and the Olympic Games have a long history, dating back to the first modern Olympics in 1896. Sponsorship is an integral part of both the winter and summer Olympic Games and is a mass marketing platform for companies around the world.



Figure 10.25:

There were 7,994 different official merchandise products for sale at the Tokyo 2020 Olympic Games.

Did you know?

Australian golfer Cameron Smith was paid \$140 million to sign with the LIV golf tour.

Table 10.4: Sponsorship at modern Olympic Games.

Games	Sponsorship impact
1896 Athens	Companies (including Kodak) provided revenue for advertising in the souvenir program.
1920 Antwerp	The official program was so full of advertising that spectators had difficulty finding any information on events.
1924 Paris	Advertising signage at the stadium was permitted for the first and only time.
1936 Berlin	The first Games to be televised, using only three cameras.
1964 Tokyo	The number of corporate sponsors rose to 250. A new cigarette brand generated over US\$1 million in revenue (tobacco sponsorship was later banned). Satellite coverage was used for the first time allowing people from across the world to view footage.
1976 Montreal	The number of corporate sponsors rose to over 600. The Olympic committee offered three levels of sponsorship – official sponsors, official supporters and official promoters.
2000 Sydney	In the four years leading up to the Sydney Olympics, approximately \$3.5 billion was raised in revenue – mainly from the sale of broadcasting rights, sponsorship, tickets and official licenses.

Table 10.4: Sponsorship at modern Olympic Games.*(continued)*

Games	Sponsorship impact
2008 Beijing	These Games had 12 TOP (The Olympic Partner) sponsors who marketed their products and services to billions of people throughout 200 countries and territories around the world.
2012 London	TOP Programme awarded exclusive worldwide marketing rights for the summer and winter Games, representing the most significant level of Olympic sponsorship to date.
2016 Rio De Janeiro	Revenues raised include: 40 per cent from local sponsors, 12 per cent from international sponsors, 25 per cent International Olympic Committee (IOC) contribution, 16 per cent ticket sales and 7 per cent from licensing.
2020 Tokyo	IOC raised US\$7.6 billion in revenue, 7,994 different official Olympic merchandise products for sale, 3.05 billion people watched the Games.

Internet activity

Log on to TitanOnline and complete Activity 10.4 to learn

Endorsements

The marketing industry has become a vital and important income for athletes. Product endorsements are increasing a significant part of an athlete's income. An endorsement is a written or verbal declaration of support for a product. Major companies are increasingly using athletes to endorse their products to encourage consumers to purchase these products.

The increase of sporting coverage in the media has led marketing companies to sign athletes to endorse products on social media and television, in advertisements, and while they are competing. Endorsement deals range from sporting gear and apparel to cars, fashion and cosmetics. When an athlete signs an endorsement, usually for a specified time frame, they are paid to be a representative of that company.

If an athlete signs a clothing or shoe endorsement, they will be expected to train and play in the company's equipment and times. Most professional sporting teams endorse sports apparel and equipment. There are usually penalties or fines if an athlete is seen or photographed using a competitor's brand of apparel or equipment.

**Figure 10.26:**

Most professional sporting teams endorse sports apparel and equipment.

Responsibilities

The sports sponsorship market in Australia is over \$1.5 billion and growing. Sporting organisations need to develop a sponsorship strategy that identifies potential sponsors that do not promote goods or services that conflict with the message of a healthy lifestyle and participation in sport and physical activity. They need to know the market and their assets and negotiate a sponsorship agreement that is fair, equitable and workable for all concerned.

Sporting organisations need to carefully consider all the advantages and disadvantages of sponsorship and the associated problems that sponsorship may bring. When preparing a sponsorship proposal they need to consider factors, such as what type of support they are seeking, what they can offer potential sponsors and the types of businesses that could provide support. Sporting organisations must ensure they have an evaluation strategy in place to measure the success of the agreement.

There are various ethical issues associated with sponsorship in sport. Examples may be when a company requires exclusivity for their products or targets young athletes with unhealthy product promotion. An example of ethical issues in sponsorship includes the direct advertising of tobacco products that was associated with sport in the 1970s and 1980s. The most notable sponsorship agreements were between Winfield and NSW Rugby League and Benson & Hedges and the Australia Cricket Board. Both major agreements were said to be worth \$15 million each over five years. As such sponsorship promoted tobacco use. It was eventually legally prohibited for tobacco companies to associate with sponsorship in Australia.

Managers and agents

Sporting managers and agents provide a range of skills to ensure their clients can focus on their responsibilities – training and performing. Sporting managers are involved in the negotiation of contracts and endorsements and ensure a smooth transition between the athlete's personal and sporting life. The role of sports managers and agents varies depending on their clientele. The roles and responsibilities they provide their clients include:

- being a spokesperson
- promoting a positive image of the athlete to the media
- organisational duties
- organising media training for the athlete
- organising social media awareness and training
- solving problems
- liaising with team officials
- mentoring.

It is vitally imperative that players manage their money well throughout their careers. Sports managers and agents are also involved in providing expert advice for their clients. They generally have relationships with legal, financial and taxation experts who work side by side with their clients.



Figure 10.27:

Sporting managers are involved in the negotiation of contracts and endorsements.

Learning activity

1. Outline the benefits sponsors expect when they engage an up and coming athlete.
2. Analyse the positive and negative outcomes of sponsorship for the athlete.
3. Identify the worldwide Olympic partners for the 2024 Paris Olympic Games.
4. Browse through a range of websites, social media, magazines, newspapers, product packaging and television commercials for examples of sports celebrity endorsements. List the sports celebrity and the product and/or service they endorse.
5. Create a fact file on an Australian sports management company. Include:
 - a. the services they provide
 - b. their clients
 - c. what they charge
 - d. testimonials.

Economics and major sporting events

Major sporting events attract tourists, fill stadiums with spectators and also appeal to sponsors. While the cost of hosting major sporting events is expensive, there are numerous advantages. These include:

- hosting rights
- media rights
- improvements in infrastructure
- social benefits
- cultural benefits.

For international events such as the Olympics and World Cups, estimating the economic benefit can be difficult.

The benefits do not merely include the production and employment that comes from spending money on building a new stadium, the athletes' village and the tickets sold.

What has to be considered is the long-term benefit of hosting major sporting events for the city or country involved. The resources that are developed not only give an immediate boost to the economy, but provide ongoing social and economic benefits to the community.



Figure 10.28: Estimating the economic benefit of events such as the FIFA World Cup can be difficult.

Olympics

The first city to return a profit after hosting the Olympic Games was Los Angeles in 1984, mainly due to the sale of television rights and sponsorship from multinational companies. When Sydney was chosen to host the 2000 Olympic Games, it was announced that the Sydney Organising Committee for the Olympic Games (SOCOG) would have a profit of almost \$30 million after the Games. As the Games approached, this profit was repeatedly downsized until it was announced that SOCOG expected a profit in the thousands rather than millions.

The cost of running the Paris 2024 Olympics is estimated to be \$14 billion. Rising building costs for new infrastructure saw the original budget of \$10 billion surpassed 12 months before the start of the games. The need for extra security also impacted the budget. Each day in Paris there will be 11,000 police officers and 25,000 security guards.

Table 10.5: Hosting the Olympic Games.

Benefits to the economy	<ul style="list-style-type: none"> ▪ Tourism promotion of the city as a tourist destination. ▪ Increased international recognition. ▪ Cash influx to the economy during the Games. ▪ Increase in jobs. ▪ Increased opportunity for trade. ▪ Improved infrastructure, e.g. transport, sporting venues.
Income sources	<ul style="list-style-type: none"> ▪ Ticket sales. ▪ Corporate sponsorship. ▪ Payments for television broadcast rights. ▪ Sale of Olympic merchandise. ▪ Tourism. ▪ Increase in spending which flows on to increases in tax revenue.
Costs	<ul style="list-style-type: none"> ▪ Construction of venues and Games village. ▪ Administration and wages. ▪ Security. ▪ The opening and closing ceremonies. ▪ Setting up transport infrastructure. ▪ Drug testing.



Figure 10.29: A major cost of hosting the Olympics in Sydney was the construction of venues and Games village.



Figure 10.30: The cost of running the Paris 2024 Olympics is estimated to be \$14 billion.

Did you know?

Ticket sales for the Paris 2024 Olympics are expected to exceed 10 million.

Elite competitions

There are many advantages and disadvantages of hosting elite competitions.

The advantages include:

- **Raising the profile of a city or country:** major cities around the world have increased their profile after hosting elite competitions such as the Olympic Games. There is an increase in tourism during the competition as well as increased tourism for many years after the event. Sydney saw a huge influx of tourists during the 2000 Olympic Games as well as increased numbers after the event. The raised profile can also provide economic benefits such as investment in infrastructure and employment.
- **Long-term investment in infrastructure:** infrastructure is also provided by cities or countries hosting elite competitions. Most cities don't have enough infrastructure currently in place to cope with the demand of hosting elite competitions. Hosting cities usually require additional stadiums and improvements to transport. The long-term investment in infrastructure also creates additional employment opportunities before, during and after the event.
- **Creating a positive environment of enthusiasm and excitement:** most elite competitions require a substantial number of volunteers for the event to be a success. The enthusiasm of the volunteers and the event itself raises community spirits and the performances of the athletes inspires greater participation in sporting activities and healthy lifestyles.
- **Short-term economic benefits:** elite competition provides increased numbers of tourists, media and competitors. This aids the local economy though the increase in spending in areas such as hospitality, such as restaurants, transportation, cafés and motels.

The disadvantages of hosting elite competitions include:

- **The cost of building new infrastructure:** infrastructure is extremely expensive. This expense is usually met by the taxpayer.
- **Abandoned infrastructure:** many of the new stadiums that are built are seldom used, and careful planning is required to minimise this happening. For example, the Sydney Olympic stadium underwent alterations and is now used by the major football codes as well as concerts, and the Olympic village was converted to public housing.
- **Increase in security measures:** elite competitions around the world have had to significantly increase the levels of security to provide a safe environment for spectators and athletes.
- **Higher taxes:** many cities hosting elite competitions have needed to increase taxes to pay for the cost of the competition.

Learning activity

1. Examine the economic cost and benefit for the community associated with the Sydney 2000 Olympic Games.
2. Research a range of sporting venues and facilities that were built for the Sydney 2000 Olympic Games. Describe what they are now used for.
3. Research the corruption scandal involving FIFA and the World Cup selection process and outline the implications you think this will have for countries bidding for major international sporting events in the future.
4. Outline the advantages and disadvantages for Australia of hosting the 2023 FIFA Women's World Cup.

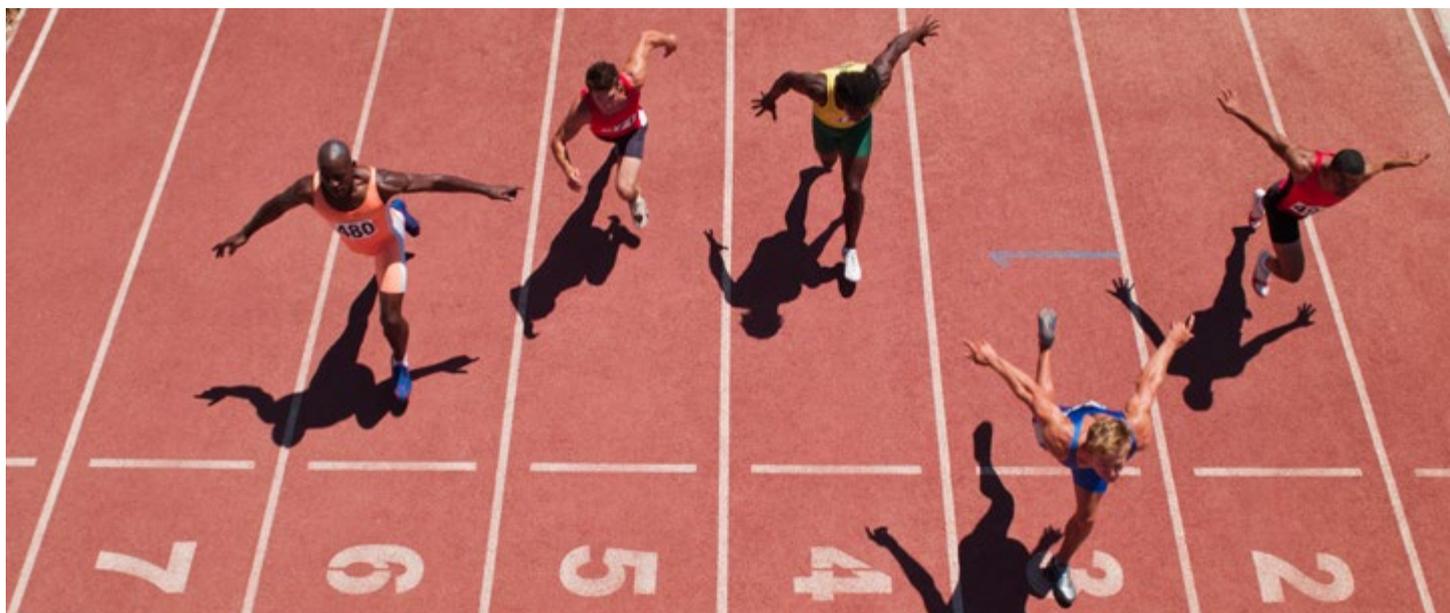


Figure 10.31:

One of the primary motivations for using banned substances is to enhance athletic performance.

Drugs in sport

Throughout history, there have been athletes who have tried to gain an edge over their competitors through the use of performance- and image-enhancing drugs (PIEDs). Ancient Greek athletes are known to have used special diets and stimulating potions in order to fortify themselves. During the 19th century, cyclists and other endurance athletes started using strychnine, caffeine, cocaine or alcohol for the same purpose.

Technological developments have been accompanied with an increase in both the incidence and the sophistication of drug cheating. While 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 there is minimal knowledge of their short- and long-term effects. Table 10.6 contains a summarised history of drug scandals that have occurred in sport.

Table 10.6: A summarised history of drug scandals in sport.

Year	Incident
Ancient Games	<ul style="list-style-type: none"> ▪ Extracts of mushroom and plant seeds were used to enhance performance.
1896	<ul style="list-style-type: none"> ▪ The first drug-use death in sport was recorded. Cyclist Arthur Linton overdosed on the drug trimethyl. At the time, doping was not illegal.
1904	<ul style="list-style-type: none"> ▪ American marathon runner Thomas Hicks collapsed after he had mixed strychnine with brandy. Strychnine was not illegal at the time.
1930s	<ul style="list-style-type: none"> ▪ Use of synthesised drugs such as amphetamines became apparent in sport.

Table 10.6: A summarised history of drug scandals in sport.*(continued)*

Year	Incident
1950s	<ul style="list-style-type: none"> ▪ Athletes in the USSR started to use male hormones. ▪ Steroids were developed in the USA. ▪ Distance athletes started to experiment with blood doping.
1960	<ul style="list-style-type: none"> ▪ At the Rome Olympics, Danish cyclist Knut Jensen collapsed, having fractured his skull after ingesting amphetamines, and later died.
1967	<ul style="list-style-type: none"> ▪ British cyclist Tommy Simpson died during the Tour De France after taking amphetamines.
1968	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ The first track-and-field athlete was barred after 'testing positive'.
1976	<ul style="list-style-type: none"> ▪ At the Montreal Olympics, female East German swimmers won 11 out of 13 events. During the 1990s, it was revealed that their coaches had been systematically injecting them with steroids during the mid-1970s.
1984	<ul style="list-style-type: none"> ▪ At the Los Angeles Olympics, Swedish wrestler Tomas Johannson and Finnish runner Martti Vainio were both stripped of their Olympic silver medals after failed drug tests.
1987	<ul style="list-style-type: none"> ▪ EPO (erythropoietin), 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	<ul style="list-style-type: none"> ▪ At the Seoul Olympics, Canadian Ben Johnson won the 100-metre sprint and set a new world record. After the race, he tested positive to anabolic steroids and was stripped of both his medal and his world record.
1991	<ul style="list-style-type: none"> ▪ 20 former East German swimming coaches admitted under oath to having systematically doped their former athletes.
1992	<ul style="list-style-type: none"> ▪ Three German sprinters submitted identical urine samples during a drug test, but escaped penalty due to a technicality.
1994	<ul style="list-style-type: none"> ▪ Argentinean football champion Diego Maradona was banned from competing in the World Cup after testing positive to five drugs.
1995	<ul style="list-style-type: none"> ▪ 65 weightlifters were banned after testing positive to anabolic steroids and stimulants.
1998	<ul style="list-style-type: none"> ▪ Irish four-time Olympic swimming champion Michelle Smith 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. ▪ At the world championships, in Perth, four Chinese swimmers were banned for four years after testing positive to diuretics.

Table 10.6: A summarised history of drug scandals in sport.*(continued)*

Year	Incident
1999	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Cricketer Shane Warne tested positive to diuretics and was banned for one year.
2006	<ul style="list-style-type: none"> Rugby union player Wendell Sailor tested positive to cocaine and was banned for two years.
2007	<ul style="list-style-type: none"> American gold medallist Marion Jones pleaded guilty to having used steroids before competing at the Sydney 2000 Olympic Games. Her results from September 2000 onwards were consequently voided. Australian football player Ben Cousins was arrested for drug possession and had his contract with AFL club West Coast Eagles terminated.
2011	<ul style="list-style-type: none"> American Lance Armstrong, who had won the Tour De France seven times, came under a USA federal investigation for doping. He denied all allegations, continued to compete, and retired later in the year. In 2012, the United States Anti-Doping Agency banned Armstrong for life, from competing not only in cycling but in any sport, and stripped his titles from him. Armstrong maintained his innocence at this time, but admitted in 2013 to having undergone doping during his career in an interview with Oprah Winfrey. He admitted using performance-enhancing drugs throughout his career, and also agreed that his successes in the Tour de France would not have been possible if he was drug free.
2013	<ul style="list-style-type: none"> The headlines read 'The Darkest Day in Australian Sport'. On February 7th, the Australian Crime Commission released a report in which it confirmed that performance-enhancing drugs were being widely used across a number of Australian sports. ASADA (Australia's former anti-doping agency, now replaced with Sport Integrity Australia) especially turned its attention to two football clubs – Essendon (AFL) and the Cronulla Sharks (NRL). ASADA interviewed players and officials from both clubs as well as players from other clubs. Canberra Raiders winger Sandor Earl was suspended and was issued with an infraction notice for having used peptides, especially the peptide CJC-1295. He cooperated with ASADA in its investigations. 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.
2014	<ul style="list-style-type: none"> Players from the Cronulla Sharks team were served with show-cause notices by ASADA. The show-cause notice alleged they were administered banned substances during the 2011 season. The players were offered, and accepted, a deal by the NRL and ASADA where they would receive a 12-month backdated ban, meaning they only missed the last three games of the 2014 season.

Table 10.6: A summarised history of drug scandals in sport.*(continued)*

Year	Incident
2015	<ul style="list-style-type: none"> Rugby union player Karmichael Hunt (formerly with the Gold Coast Suns and Brisbane Broncos) and six other Gold Coast Titans players were charged with supplying cocaine. Hunt pleaded guilty and was fined \$2,500 by the courts. He was also suspended for six matches and fined \$30,000 by the ARU.
2016	<ul style="list-style-type: none"> 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'.
2018	<ul style="list-style-type: none"> Russia was banned from competing at the 2018 PyeongChang Winter Olympic Games 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. Instead, they performed under the Olympic flag.
2019	<ul style="list-style-type: none"> Swimmer 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. Swimmer Shayna Jack tested positive to Ligandrol. After initially being banned for four years, Jack appealed her suspension to the Court of Arbitration for Sport (CAS). In November 2020, CAS reduced her suspension to two years, citing their view was that Jack had not ingested Ligandrol intentionally. Jack returned to the Australian team in 2022, winning a gold medal in the women's 4 × 100-metres freestyle relay at the World Swimming Championships in Budapest, and gold, silver and bronze medals at the 2022 Birmingham Commonwealth Games.
2020s	<ul style="list-style-type: none"> Russia was again banned from competing at both the summer and winter Olympic Games due to systematic doping violations and attempted cover-ups. 'Clean' Russian athletes were only allowed to compete under the Russian Olympic Committee (ROC) flag.

Learning activity

- 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.
- Investigate and create a fact file about how either the Cronulla Sharks or Essendon were involved in the anti-doping investigation.
- Investigate and create a fact file about banned cyclist Lance Armstrong.

Reasons for drug use

There are several reasons why athletes use banned substances. One of the primary motivations for using banned substances is to enhance athletic performance. Some substances, such as anabolic steroids, can increase muscle mass and strength, leading to improved performance in activities that require strength and power. Stimulants can enhance alertness and reduce fatigue, giving athletes an edge in endurance sports.

The desire to win and succeed at the highest level of competition can create immense pressure on athletes. They may feel compelled to use banned substances to keep up with or surpass their competitors who might be using such substances. The fear of falling behind can drive athletes to take risks and compromise their integrity. Athletes often face injuries or experience chronic pain due to the physical demands of their sport. Banned substances, such as certain painkillers or muscle relaxants, can help mask pain or enhance recovery, allowing athletes to continue training or competing even when injured. This can be particularly tempting when the stakes are high, such as during important competitions or when a lucrative contract is at stake.

Some athletes may unknowingly use substances that are banned because they are not adequately informed about the rules and regulations of their sport. They might rely on coaches, trainers, or advisors who provide improper guidance or inadvertently overlook the banned status of certain substances. In such cases, the athletes may use banned substances unintentionally.

Success in sports can lead to significant financial rewards, including lucrative contracts, endorsements and sponsorships. The financial gains associated with winning can tempt some athletes to use banned substances as a shortcut to achieving better results. The potential financial benefits may outweigh the risks for some individuals, especially if they believe they can evade detection or face minimal consequences.

It's important to note that the use of banned substances undermines the principles of fair play, integrity, and the overall spirit of sportsmanship. Anti-doping efforts, including rigorous testing programs and penalties for those caught using banned substances, aim to preserve the fairness and integrity of athletic competition.



Figure 10.32: Athletes may unknowingly use substances that are banned.



Figure 10.33: Anabolic steroids can increase muscle mass and strength, leading to improved strength and power.

Effects of drug use

Some drugs, medications and substances are banned in sport, as are some methods. Athletes competing in sports governed by a World Anti-Doping Code compliant anti-doping policy need to be aware that they can't just take any drug or medication, or even use certain methods.

Each year, WADA updates and publishes a Prohibited List. The Prohibited List is the international standard that outlines the substances and methods that are prohibited in sport. It reflects the latest scientific and medical advances and is finalised after a consultative process facilitated by WADA.

In Australia, Sport Integrity Australia is responsible for anti-doping arrangements in accordance with the WADA code.

Following is a list of the banned substances in WADA's Prohibited List (2022):

- **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, but they can cause anabolic effects when they are taken into the bloodstream. 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) growth and has an anal body. Banned hormone testolactone, raloxifene, adenosine monophosphol These modify the effect decelerate specific enz
- **Diuretics and other m** use of diuretics can aid cause dilution of urine s substances, such as an steroids, cannot be dete



Figure 10.34:

It's important for sportspeople the ingredients of any supplerr

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, which 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. For example, cortisone injections.
- Non-approved substances, such as peptide Body Protecting Compound 157 (BPC-157).

Source: Sport Integrity Australia.

Physical effects

Banned substances in sport can have various physical effects on athletes. These substances are typically used to enhance performance and gain an unfair advantage over competitors. The specific effects can vary depending on the substance, dosage, and individual response. The use of banned substances in sport is not only unethical but also poses significant health risks. Athletes who engage in doping may face penalties, including disqualification, loss of rankings, fines, and damage to their reputation. Additionally, the long-term effects of these substances can have serious implications for an athlete's overall health and wellbeing.



Figure 10.35:

Anabolic agents aid in the building and repairing of muscle tissue.

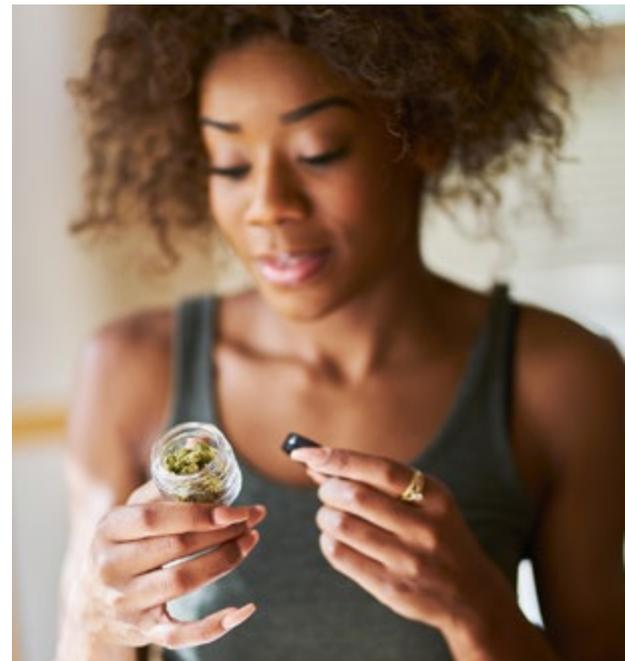


Figure 10.36:

Cannabinoids are banned in sport due to their pain-relieving effects.

Anabolic androgenic steroids and other anabolic agents

Anabolic androgenic steroids are a group of synthetic drugs that are similar to the male sex hormone testosterone. They regulate the development and maintenance of male characteristics having a tissue building and masculinising effect.

Anabolic agents that have similar characteristics to anabolic androgenic steroids, however influence other systems such as the heart and central nervous system (e.g. Clenbuterol). This class include selective androgen receptor modulators (SARMs). SARMs are experimental medicines claiming to build muscle mass and bone density without the side effects of steroids. They are not only banned in sport, but many have not undergone clinical trials and have not been deemed fit for human consumption.

Anabolic agent use has been linked to:

- thickening and enlargement of the heart
- heart attack and stroke
- arteriosclerosis (hardening of arteries)
- liver disease and cancer
- kidney or prostate cancer
- acne
- fluid retention
- depression, aggression and psychosis.

In men, anabolic agent use has also been linked to gynaecomastia (breast enlargement), suppressed spermatogenesis (reduced sperm count), testicular atrophy, erectile dysfunction, hair loss, and prostate problems. In women, it's been linked to facial hair growth, deeper voice, change in facial features, disturbances to menstrual cycle, and decreased breast size.

Peptide hormones, growth factors, related substances and mimetics

There are three categories of substances in this class:

- **Erythropoietin and agents affecting erythropoiesis:** Erythropoietin (EPO) is a hormone produced by the kidney and released into the blood when a reduction in oxygen is detected. It stimulates the formation of new red blood cells from blood stem cells in the bone marrow (erythropoiesis).
- **Peptide hormones and their releasing factors:** Peptide hormones consist of small chain amino acids, which circulate in the blood and bind to receptors on specific organs and tissues. They enable or disable biological pathways coordinating development, growth and reproduction. For example, luteinizing hormone (LH) stimulates the reproductive system. Releasing factors stimulate the body to produce and release specific hormones, e.g. pituitary gland secrete LH when it detects presence of LH-releasing factor in the blood.
- **Growth factors and GF modulators:** Growth factors are a group of secreted proteins that stimulate the growth of specific tissues. Unlike hormones, which are produced by glandular tissue, growth factors can be produced by many different tissue types. For example, Insulin-like Growth Factor-1 (IGF-1), and its analogues.

The use of peptide hormones, growth factors, related substances and mimetics have been linked to:

- increased risk of bleeding
- shortness of breath
- swelling of arms and legs
- thrombosis
- thick blood which can cause heart attack
- gynaecomastis
- increased risk of cancer
- acromegaly
- increased risk heart disease and diabetes
- cushings syndrome.

Source: Sport Integrity Australia.

Beta-2 agonists

Beta-2 agonists are a group of medication, which mimic epinephrine and norepinephrine attaching to B2 receptors in muscles found in lungs, digestive tract, uterus and some blood vessels. This causes a chemical response, which facilitates smooth muscle relaxation for example bronchodilation of the airways.

The use Beta-2 agonists has been linked to:

- tachycardia
- headache
- excessive sweating
- dizziness
- tremors
- anxiety
- rash
- chest pain
- muscle cramps.

Diuretics and masking agents

Diuretics are classified as a substance that has the ability to dilute urine and therefore potentially impair or mask banned substance that would otherwise be found in athletes. Diuretics are medicines that increase the amount of urine produced. Urination is a method of removing excess salt and water from the body. Diuretics are commonly used to treat condition that have fluid retention and reduces blood pressure.

Diuretics use has been linked to:

- increased urination
- increased sodium loss
- affects blood potassium levels
- dizziness
- increased blood sugar
- dehydration
- muscle cramps
- joint disorders (gout).

The use of diuretics affects the levels of electrolytes in your system and can create an imbalance, which leads to severe health problems. The interaction of diuretics with certain medical conditions such as diabetes is not safe.

Manipulation of blood and blood components

Blood is a bodily fluid that is the pumped by the heart to circulate throughout the body to supply essential substances in order for the cells and organs to function. Blood doping is the method of introducing blood or red blood cells products into the circulatory system. This manipulation alters the natural capacity to transfer oxygen throughout the blood.

Manipulation of blood and blood components has been linked to:

- heart problems
- high blood pressure
- blood clots
- infections
- decrease platelets
- increased viscosity
- damage to the kidney and liver.

Changing the components of your blood can be life-threatening, as this technique can lead to heart diseases, stroke and pulmonary embolism.

Source: Sport Integrity Australia.

Gene and cell doping

Cells are the building blocks of life, responsible for all of life's processes. A gene is a section of DNA within the genome that contains the information that gives humans their individual characteristics. Gene doping refers to the process of modifying your genes, where genetic materials or substances are introduced into the body that changes the expression of genes. They alter the way the cells function within the human body.

What are the risks of gene and cell doping?

Gene and cell doping has been linked to:

- cancer
- irreversible damage to functional systems
- growth factors are compromised (cause tumour cells)
- infections from transfer methods
- contaminated products introduced into the body
- loss of normal functions (alterations).

With the nature of altering your genetic makeup through gene and cell doping, once genetic modification has occurred the cells will continue to synthesise the substances throughout your lifetime. The changes are irreversible.

Source: Sport Integrity Australia.

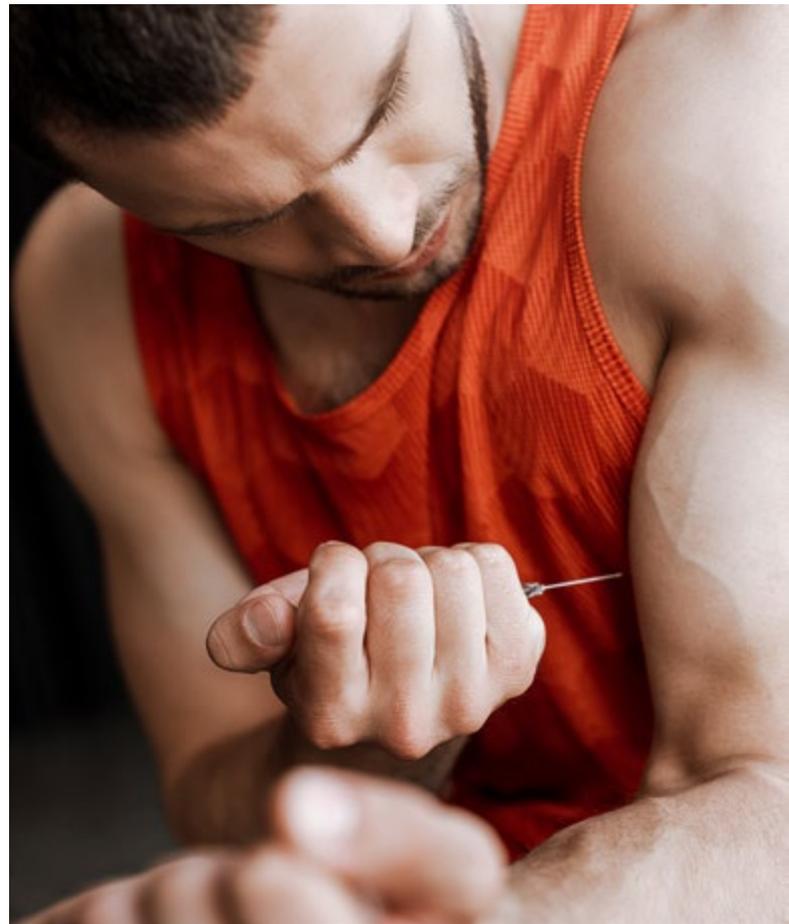


Figure 10.37:

Gene doping alters the way the cells function within the human body.

Internet activity

Log on to TitanOnline and complete Activity 10.5 to learn more about the side effects of banned substances in sport.

Learning activity

1. Analyse the personal, social and environmental reasons for drug use in sport.
2. In pairs, research four substances (other than the ones in the table) that have been banned in sport. For each one, state:
 - a. How it results in performance improvement.
 - b. Its side effects.
 - c. The sport in which it would improve performance.
3. Present the information to the class using relevant ICT software.
4. Create a fact file on two Australian athletes that have tested positive to banned substances.

Case study – Doping in sport

Harmer is an ambitious athlete with aspirations of excelling in his soccer career. However, he feels anxious to achieve outstanding results and secure a place in the top teams. This anxiety, combined with peer pressure to try doping and the allure of improved performance, has led him to consider the use of banned substances.

Harmer is unaware that banned substances often pose significant health risks. Substances such as anabolic agents, EPO or stimulants can have adverse effects on various bodily systems, including cardiovascular, endocrine and musculoskeletal systems. Using banned substances can lead to psychological issues, such as mood swings, aggression and dependency. Harmer should understand the potential impact on his mental wellbeing and personal relationships. He should also consider the ethical use of PIEDs. By resorting to such measures, he undermines the principle of fair competition and disadvantages his opponents who choose to compete naturally. The use of banned substances is not only against the rules of sports organisations, but also illegal in many jurisdictions. Harmer may face legal consequences and damage to his reputation if caught.

Harmer admits his uncertainty regarding how banned substances can enhance his performance. It is important for him to understand that these substances can lead to short-term performance gains by increasing strength, endurance, or power. However, relying on artificial enhancements can hinder long-term skill development and natural growth as an athlete.

1. What are Harmer's motivations for considering the use of banned substances? Are there other strategies he can explore to improve his performance within legal and ethical boundaries?
2. What are the potential long-term consequences of using banned substances? How might this affect Harmer's overall wellbeing and athletic career?
3. How can Harmer better educate himself about the risks and benefits of banned substances? What resources and support systems are available to him?
4. What are the legal and ethical implications Harmer should consider before making a decision? How might his actions impact his reputation and future opportunities?
5. What strategies can Harmer implement to cope with the pressures and expectations he faces as an athlete? How can he develop a healthy mindset and focus on his long-term development as a player?

Drug testing

A Sport Integrity Australia official (or an accredited official acting on behalf of Sport Integrity Australia) may require an athlete to provide a sample at any time and at any place.

An athlete may commit an Anti-Doping Rule Violation (ADRV) and may receive a sanction for evading, refusing or failing to submit to sample collection during or after they are notified. The penalty for evading, refusing or failing to provide a sample upon a valid request may be the same as providing a sample that contains a prohibited substance.

The doping control program complies with:

- World Anti-Doping Code
- International Standard for Testing and Investigation (ISTI)
- Sport Integrity Australia Act 2020
- Sport Integrity Australia Regulations 2020, including the National Anti Doping (NAD) scheme.

The test can be either in-competition or out-of-competition. The test can be at an athlete's training venue or home address. The test can be with no advance notice and sample collection can include the collection of urine, blood or both.

Once an athlete has been requested to undergo sample collection, the athlete has a responsibility to:

- remain within direct observation of the doping control officer or chaperone at all times from the point of notification until the completion of the sample collection procedure
- provide their first sample for collection
- produce appropriate identification
- comply with the directions of the doping control officer and chaperone during the sample collection session
- report immediately for sample collection, unless there is a valid reason for a delay.

Source: Sport Integrity Australia.



Figure 10.38:

Sport Integrity Australia's doping control program complies with the International Standard for Testing and Investigation.



Figure 10.39:

Drug testing can include the collection of urine, blood or both.

Internet activity

Log on to TitanOnline and complete Activity 10.6 to learn more about drug testing in sport.

Ethics

The use of banned substances in sport is considered unethical for several reasons:

- **Fairness:** the essence of sport lies in fair competition, where athletes compete on a level playing field, showcasing their natural abilities and skills. The use of banned substances, such as performance and image enhancing drugs (PIEDs), provides an unfair advantage to athletes who utilise them. It undermines the principles of fair competition and diminishes the achievements of those who choose to compete without resorting to artificial enhancements.
- **Health and safety:** many banned substances pose significant risks to health. They can have severe side effects, both short- and long-term, that can jeopardise the wellbeing of the individuals involved. Sports organisations implement bans to protect the athletes' health and prevent them from engaging in practices that could be detrimental to their physical and mental wellbeing.
- **Integrity and spirit of the game:** the use of banned substances goes against the integrity and spirit of the sport. Sport is meant to be a display of human achievement, determination and discipline. It celebrates the development of skills, the pursuit of excellence and the testing of one's limits. The use of banned substances undermines these values by replacing natural talent and hard work with artificial means.
- **Role model and inspiration:** athletes often serve as role models and sources of inspiration for others, particularly younger generations. When athletes engage in doping or the use of banned substances, it sends the wrong message to aspiring athletes and fans. It promotes the idea that success can be achieved through shortcuts and cheating, rather than through dedication, perseverance and fair play.
- **Negative effects on the sport:** the use of banned substances can have a detrimental impact on the sport itself. It erodes the credibility and integrity of competitions, leading to doubts about the legitimacy of results. It also undermines public trust and interest in the sport, as fans may become disillusioned and sceptical about the performances they witness.

To uphold the ethics of sport, various sports organisations, such as the IOC, WADA and Sport Integrity Australia have implemented anti-doping policies and testing programs. These efforts aim to preserve the fairness, health, integrity, and spirit of sport, while promoting clean competition and protecting athletes from the dangers associated with the use of banned substances.

Learning activity

1. Discuss the dilemmas associated with drug use in sport, such as:
 - a. How can testing procedures keep up with drug development?
 - b. Should drug use be considered a legal aid?
 - c. If an athlete cannot beat the drug cheats, why not join them?
2. Respond to the following ethical questions regarding drug use in sport. Explain and justify your opinion:
 - a. Is it fair that some athletes get a chemical advantage while others can only imagine how good they may have been if they weren't competing with cheats?
 - b. Is it fair that athletes are deprived of income and recognition for performances that would win in a drug free environment?
 - c. Should the sporting world allow PIEDs to enable equal competition, and should these drugs be prescribed by recognised medical personnel?

Careers in sport

A career in the sporting industry involves working with a range of different individuals, a diverse range of groups and people with disability. It can also include a career in teaching, such as health and physical education, personal development or outdoor education. A range of institutions such as universities, TAFEs and private registered training organisations offer a wide range of sports- and recreation-related courses. Opportunities in the sport industry include:

- professional athlete
- coaching
- professional trainer
- athlete development
- umpire/referee/official
- player agent/management
- massage therapist
- physiotherapist
- operations/logistics
- administration
- sales and marketing
- event management
- teaching
- journalism
- photography
- director/board member.

Administration

Sports administrators manage sports clubs, associations and peak bodies, undertaking activities such as promoting their sport, obtaining corporate sponsorship and refining the rules and structure. Sports administrators usually work with a voluntary board or committee to develop strategies and programs to achieve the aims and policies of the club, association or peak body. Sports administrators may perform the following tasks:

- Talk to members, fans and stakeholders.
- Plan and organise sporting and other related events.
- Develop programs and services that meet the needs of members, fans and stakeholders.
- Consult widely to develop short- and long-term business plans for their sport.
- Supervise design, planning and maintenance of facilities.
- Supervise staff and volunteers.
- Coordinate the business activities of a sport or club.
- Report to various committees and/or government agencies.
- Plan and oversee promotional and marketing activities.
- Secure funding, and prepare and implement budgets.

Source: Australian Sports Commission.



Figure 10.40:

Sports managers and agents are involved in providing expert advice for their clients.



Figure 10.41:

Sports administrators plan and organise sporting and other related events.

Internet activity

Log on to TitanOnline and complete Activity 10.7 to learn more about careers in sport.

Coaching

Coaching sport is a rewarding but challenging task. The characteristics and qualities of the coach will directly influence the athletes' performance and enjoyment of their sport. Coaching styles will vary depending on the age of the performer and their skill level. The coaching characteristics displayed by successful coaches is outlined in Table 10.7.

Internet activity

Log on to TitanOnline and complete Activity 10.8 to learn more about coaching opportunities.

Table 10.7: Characteristics of successful coaches.

Knowledge	<ul style="list-style-type: none"> ▪ Shows a thorough knowledge of the sport, techniques, training methods and fitness needs. ▪ Has a thorough knowledge of their players' needs, skills and goals. ▪ Has an understanding of coaching principles suited to the ability and age level of the athletes.
Organisational ability	<ul style="list-style-type: none"> ▪ Is punctual and equipment is ready for training and competition. ▪ Training sessions are planned and participation is maximised. ▪ Safety is considered and time allocated appropriately. ▪ Activities are organised and varied.
Communication	<ul style="list-style-type: none"> ▪ Good listener as well as a good instructor. ▪ Instructions are clear and concise. ▪ Uses both verbal and non-verbal communication. ▪ Communicates in a way that is suitable for the age and concentration levels of the athlete.
Leadership	<ul style="list-style-type: none"> ▪ Acts as a role model. ▪ Maintains a high standard of behaviour. ▪ Focuses on achieving agreed goals. ▪ Remains positive and supportive at all times
Instructional style	<ul style="list-style-type: none"> ▪ Knows that different styles of coaching are suited to different groups and different sports, e.g. authoritarian, democratic, laissez-faire. ▪ Uses appropriate instructional styles for a particular setting.

There are a number of coaching courses available through the Australian Sports Commission. The courses are designed according to the age and skill level of the participants. Each course has a number of modules that a coach can complete online. Each module develops the skills required to coach effectively and promote safety, inclusiveness and enjoyment. Examples of the coaching courses include:

- **Coaching learners:** learn how to create safe, fun and inclusive environments for beginners to learn how to participate in sport.
- **Coaching social participants:** learn how to create a positive sporting environment where your participants feel motivated to play sport for life.
- **Coaching competitors:** learn how to nurture competitive environments where fair play and good sportsmanship are the norm.
- **High performance coaches:** identifying, developing, attracting and retaining world-class coaches to enhance the experiences and success of Australian athletes.

Source: Australian Sports Commission.

Journalism

Journalism generally requires some form of tertiary qualification such as a university degree. Sports journalism provides a unique opportunity to work within the sporting industry and may require an individual to work across several mediums and possibly several sports. Sports journalists can be employed by a media outlet or work freelance.

Examples of sports journalist jobs include:

- sports reporter or editor for news media (including television, radio, newspapers, magazines and online news)
- sports announcer/commentator for radio or television
- host, producer or director of radio or television sports shows, or sports podcast
- sports information specialist
- media representative for sports teams, associations or major venues.



Figure 10.42:

Successful coaches communicate in a way that is suitable for the age and concentration levels of the athlete.



Figure 10.43:

Sports journalists can be employed by a media outlet or work freelance.

Did you know?

The world's oldest sports journalist was still working when he died, aged 96.

Tourism

The tourism industry has recognised the importance of sports tourism as an increasing and viable market to generate revenue streams. Sport tourism generally includes:

- **Sport event tourism:** people travel to attend major sport events, such as travelling to Qatar for the FIFA World Cup.
- **Active sport tourism:** people travel to participate in sport events, such as travelling to Hawaii to compete in Spartan races.
- **Nostalgia sport tourism:** people travel to famous sport-related attractions, such as travelling to Bowral to visit the Bradman Museum.

The benefits of sport tourism include:

- sports are an investment in the tourism industry
- creates economic growth through bookings with hotels, restaurants and retail establishments
- creates exposure and a positive image for the community
- creates a new product, a new tourism destination
- maximises facility use in the community
- builds relationships and strengthens corporate support
- creates youth opportunity/entertainment
- attracts high-yield visitors, with many being repeat tourists
- generates a favourable image for the destination
- develops new infrastructure
- generates tourism growth
- increases community support for sport and sport events.



Figure 10.44:

The 2022 FIFA World Cup brought tourists to its host country, Qatar.



Figure 10.45:

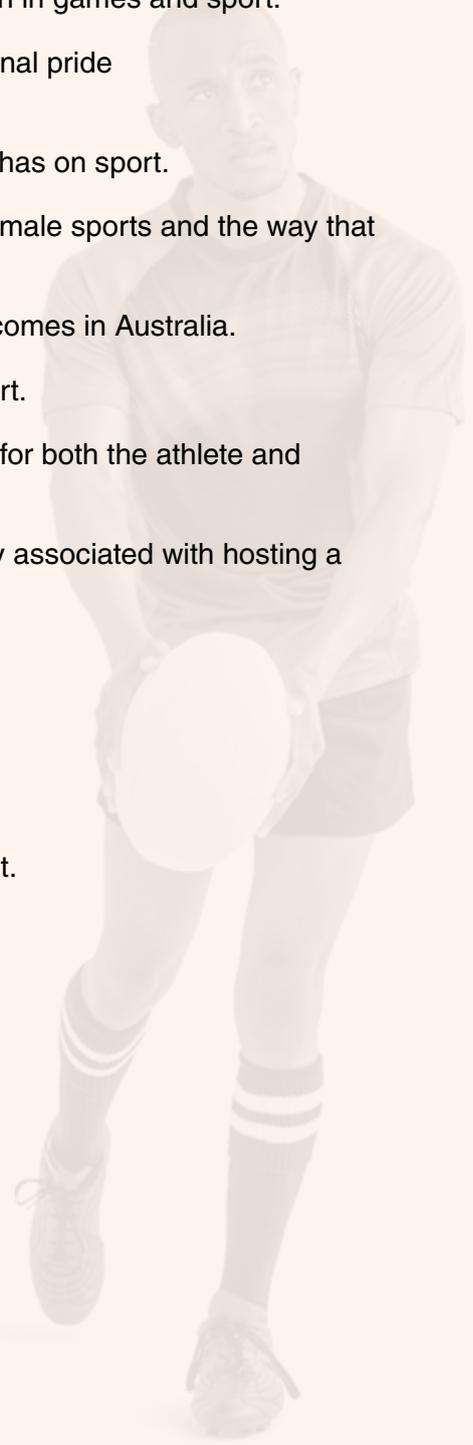
Some people travel to participate in sporting events such as Spartan races.

Learning activity

1. Analyse career opportunities in sport in terms of:
 - a. job description and requirements
 - b. courses available
 - c. future prospects for the industry.
2. Research four different roles within the sport industry. Provide a short description and a range of courses that relate to the role. Look at TAFE and universities for related courses.
3. Summarise the Australian Sports Commission coach's code of conduct.
4. Research and summarise the Australian Sports Commission community coaching essential skills modules.
5. Research a range of guided sport tourism opportunities offered by Australian companies. Summarise two tours including information on:
 - a. cost
 - b. itinerary
 - c. tour highlights
 - d. tour hosts
 - e. other inclusions

Revision questions

1. Define play, games and sport.
2. Outline the reasons for participation in games and sport.
3. Identify a range of factors that affect access and participation in games and sport.
4. Analyse the relationship between success in sport and national pride through investigation of a specific case study.
5. Discuss the positive and negative influences that the media has on sport.
6. Critically analyse the level of media coverage of male and female sports and the way that these sports are portrayed.
7. Describe the ways that sport has been used for political outcomes in Australia.
8. Define the terms amateur and professional in regards to sport.
9. Analyse the positive and negative outcomes of sponsorship for both the athlete and the sponsor.
10. Examine the economic costs and benefits for the community associated with hosting a major sporting event.
11. For four substances banned in sport describe:
 - a. how it results in improved performance
 - b. its side effects
 - c. the sport in which it could be used.
12. Outline the role of Sport Integrity Australia in Australian sport.
13. Discuss the ethical issues associated with drug use in sport.
14. Summarise the skills required to be an effective coach.



CHAPTER 11

Sports administration

Throughout this unit, students will become accustomed with the organisational structure and procedures of sports administration. They will develop an understanding of club structures, executive roles, formal meeting procedures and constitutions and liability. Students will discuss various types of competition, including round robin and knock out. They will investigate draw coefficients and practise applying handicapping, seeding, relegation and repechage. Students explore events including carnivals, competitions, corporate and community events. They evaluate public relations, media, and financial planning in relation to sports communication strategies and liaising with stakeholders. Students examine the legal and safety considerations involved in sports administration, as well as the facility responsibilities and effectively evaluate

Syllabus outcomes

A student:

- applies the rules and conventions that relate to participation in a range of physical activities
- demonstrates ways to enhance safety in physical education (1.3)
- describes how administrative procedures affect successful performance outcomes (1.6)
- describes how societal influences impact on sport in Australia (2.4)
- designs programs that respond to performance
- demonstrates leadership skills and a capacity to cooperate in movement contexts (4.2)
- recognises the skills and abilities required to support health, safety and physical activity

Focus areas

- Organisational structures and procedures
- Competitive events
- Event management



Figure 11.1: Specific roles are needed in order to ensure a club functions at an optimal level.

Organisational structures and procedures

Organisational structures and procedures are crucial aspects of sports clubs that ensure efficient operations and effective management. These structures provide a framework for decision-making, coordination, and communication within the club, enabling it to function smoothly and achieve its objectives. While there is no one-size-fits-all approach, several common structures and procedures are commonly found in sports clubs.

Club structures

Club structure relates to the way in which a sporting club is designed or set out, including the specific roles that are needed in order to ensure the club functions at an optimal level. Most clubs, if not all, will share a similar structure, with similar tiers in terms of roles and responsibilities.

One commonly observed structure is the hierarchical model, where authority flows from top to bottom. In this structure, a board of directors or executive committee holds the ultimate decision-making power, while various departments or committees handle specific areas such as finance, marketing and operations. This structure allows for clear lines of authority and accountability, ensuring that tasks are assigned and completed in an organised manner.

Another popular structure is the matrix model, which combines functional departments with cross-functional teams. This approach promotes collaboration and flexibility by allowing individuals from different departments to work together on specific projects or initiatives. It encourages teamwork, innovation, and knowledge-sharing, while still maintaining functional specialisation.

To support these structures, sports clubs typically have established procedures for various aspects of their operations. This may include membership processes, financial management protocols, event planning guidelines and dispute resolution mechanisms. Clear procedures ensure consistency and fairness, while also providing a roadmap for members and staff to follow.



Figure 11.2: Clear procedures ensure consistency and fairness.



Figure 11.3: Clubs often establish channels for feedback and suggestions.

Communication plays a vital role in organisational procedures. Regular meetings, both at the executive and operational levels, allow for information sharing, decision-making, and problem-solving. Additionally, clubs often establish channels for feedback and suggestions, such as suggestion boxes or online platforms, to engage with their members and ensure their voices are heard.

Many sports clubs implement performance evaluation systems to assess the effectiveness of their structures and procedures. This may involve periodic reviews of the club's financial performance, membership growth, event outcomes, and member satisfaction. These evaluations enable the club to identify areas for improvement and make necessary adjustments to enhance overall performance.

Executive positions

All clubs should have an executive committee, which is a governing body and consists of a president, vice president, secretary and treasurer. There will also be other members on the committee with different responsibilities, such as grading committee, umpire convenor, coaching coordinator and public relations.

Roles and duties of officials

The president is elected to provide leadership and oversees all aspects of the running of the club. Most clubs operate in a democratic manner with the committee, but ultimately the president is held responsible for the club and its members. The president is responsible for setting the agenda for the club and holding meetings to make decisions. The president should be well communicated throughout the club. A president should know everything there is to know about the specific sport, rules, policies and procedures. They will generally run the meetings and facilitate the meeting in a manner that addresses important issues, concerns or ideas to be raised.

Depending on their size, clubs might also elect a vice president. The vice president usually helps the president by providing support and sharing the workload. They often take on other roles within the club as well as the vice president role, such as being in charge of fundraising or organising the club. The vice president will step up and fill in for the president if ever unable to attend a meeting or other club-related activities.

The secretary is responsible for the administrative side of the club. During club meetings, the secretary will be responsible for recording the minutes. The secretary normally notifies club members of events or any other important dates. They are the person to whom a member has an issue, question or concern.



Figure 11.4:

The president is elected to provide leadership and direction for

The treasurer is responsible for the club's finances. They need to keep a detailed record of the money coming into the club and the money that the club is spending. The treasurer should prepare a budget at the beginning of the season, taking into account the projected costs and expenditures of the year ahead. They should address each meeting and discuss how the club's finances are progressing and what plans they have to increase revenue for the club. For a local sporting club, this may include selling chocolates, holding dinners, and attaining sponsorship. Clubs will spend money on uniforms, equipment and end of year gifts for their players. In larger amateur clubs and those at a professional level, the treasurer may find themselves involved in negotiating media payments, financial planning, asset management and player remuneration. It is essential that clubs have a treasurer that is financially literate, well organised and responsible.

There are also a number of other positions present within most sporting clubs, some of which are outlined in Table 11.1.

Table 11.1: Other positions in sports clubs.

Position	Role
Grading committee	The grading committee is responsible for placing players into divisions or teams based on their age, sex and ability. The grading committee need to grade the players fairly and according to their ability without letting any personal biases interfere.
Umpire convenor	The umpire (or referee) convenor is responsible for looking after the umpires within the club. They should coordinate adequate training and development courses so that younger members of the club can begin to learn how to umpire and become badged. They should be present on competition days so that if any umpire or referee has an issue during the game they can be helped.
Coaching coordinator	The coaching coordinator oversees all coaching activities within the club. They are responsible for allocating each team a coach after the grading process has occurred. They should ensure all coaches have the appropriate qualifications and should provide opportunities for development throughout the season.
Public relations	The public relations (PR) manager and/or team is responsible for the social side of the club. They may be involved in tasks such as running the club's social media, producing the club newsletter, and organising social events and fundraisers. In professional clubs, PR staff will be responsible for promoting and maintaining the reputation of the club, its coaching staff and its players. They manage incidents which could bring the club into disrepute and deal with the media whenever necessary.



Figure 11.5: The treasurer should address each meeting to discuss the club's finances.

Internet activity

Log on to TitanOnline and complete Activity 11.1 to learn more about the financial responsibilities of the treasurer.

Meetings

Meetings are a necessary part of the successful running of any club. They provide opportunities for the executive and other members of the club to meet, discuss and organise matters relating to the club. There are generally meeting procedures, a specific role of the chair or president, minutes, and recommendations and action plans.

Meeting procedures

Clubs will have meetings throughout the season to provide an opportunity for members to gather and discuss a specific agenda. At the start of each meeting, the minutes from the previous meeting are distributed, read and formally accepted or amended to ensure that they are a true and accurate record. Attendance and apologies for non-attendance is recorded. The agenda is usually decided upon before the meeting and therefore if anyone has an area they want to discuss they should let the secretary know prior to the meeting. Each item on the agenda is brought up and people at the meeting have a chance to have an input into the issue. If anyone motions (requests or suggests) a change, another person within the meeting will have to second it. If another person seconds it, everyone will vote whether or not they want the change to take place. The outcome of the vote will decide the fate of the request. This is to ensure that changes cannot be made without a general consensus. The treasurer will also be asked to address the meeting and provide a summary of the finances such as upcoming expenses and any news that impacts the financial status of the club.

Role of chair

The president will chair each meeting, unless for some reason they cannot make it and in that case the vice president will fill the role of chair. The chair should facilitate the meeting – they need to ensure all individuals at the meeting are given an adequate opportunity to express their opinion without being interrupted, cut-off or shut down unfairly. The chair also needs to ensure that correct protocol is followed – that the minutes are being recorded, each article on the agenda is discussed and that motions are granted or denied legitimately. Qualities required of an appropriate chair include being organised, fair, actively listening and have a personable nature.



Figure 11.6:
Clubs will have meetings for members to gather and discuss a specific agenda.



Figure 11.7:
The chairperson needs to ensure that correct meeting protocol is followed.

Internet activity

Log on to TitanOnline and complete Activity 11.2 to learn more about effective meeting procedures.

Did you know?

The chairperson of Cricket Australia is former NSW Premier Mike Baird.

Minutes

The minutes are a vital part of the meeting. They are the proof of what has been discussed and what conclusions have been made. Without them, keeping track of important policy decisions can become difficult and problematic. The minutes detail the date, venue, club, and time, as well as who is chairing the meeting. If anyone could not make the meeting and they let someone know to pass on their apologies, their name is recorded. Each item that is brought up during the meeting is recorded in the minutes. Minutes that are organised with sub headings are the easiest to understand. The minutes should end with the time the meeting closed.

AGM Minutes

May 30th, 2023 – The Mill Hotel, Milperra

Chair: S.Harrison

Apologies: J.Fitzgerald, C.Beazley

Opening: 7.35 pm



Minutes from April meeting:

End of year presentation discussed, venue decided on, recommendation to ask for proper cleaning of toilets and change rooms during competition days accepted. Recommendation for pre-grading two week training camp to prepare new players for the grading process accepted.

Treasurer's report:

The club is sitting comfortably with \$11,000 in the account. This will increase after late registration fees are added. A portion of this money will be going towards buying new equipment for the coaching kits, including balls, bibs and cones. New uniforms still yet to arrive, but the remaining balance of \$5200 will be paid once they're here. Players will need new uniform by Week 4 of competition, which should create a profit on the \$5200 expenditure.

General business:

1. **Players registering and asking to play in another girls' team:** a few girls upset because this has been promised to them and hasn't ended up being the case after grading. Explain there are no guarantees, but make a note of the request on registration form so that grading committee are aware.
2. **Transition into new uniform:** new uniforms aren't available until at least Week 4, meaning new players may have to spend \$90 on an old uniform that they won't be able to wear after Week 4. Post on the Facebook page asking existing players to donate, loan or sell their old uniforms (for a reduced price).
3. **Training courts:** the netball courts have been booked on a Wednesday night and no other clubs will be there. All teams need to contact Simone and let her know what timeslot their team will be training so she can create allocations for courts. Influx in teams this year so some teams will have to share training courts as lighting on bottom half of courts is too dim and is a safety hazard.
4. **Lighting:** request more lighting to be put in at park.

Meeting closed: 9.30 pm

Recommendations and action plans

Recommendations are proposed ideas that should benefit the club and/or sport in the future. They are changes to the existing or new rules, laws and ideas that create a more positive experience for all involved. The types of recommendations that are being made will depend on the club. For example, a local netball club might want to improve the retention rate of netballers in their younger teams, while the South Sydney Rabbitohs may be focused on increasing club memberships by 15 per cent per year for the next five years. Once a recommendation has been accepted, an action plan will be put into place. The action plan should detail how the recommendation will be met. This may include a proposal, financial planning, and target times.



Figure 11.8: Once a recommendation has been accepted, an action plan will be put into place.

Learning activity

1. Outline the purpose of keeping accurate minutes of a meeting.
2. Define the acronym AGM, and outline the activities that usually occur at the AGM.
3. Distinguish the roles and responsibilities of different administrative positions, including:

a. president	c. secretary
b. vice president	d. treasurer.
4. Outline the role of the coaching coordinator.
5. Discuss the role of the chairperson in meetings.

Practical activity

Participate in a class meeting to plan the school athletics carnival. The class will need to elect:

- | | |
|-------------------------|--|
| ▪ chairperson/president | ▪ treasurer |
| ▪ vice president | ▪ five people to bring up issues of concern. |
| ▪ secretary | |

The rest of the class will need to be involved in providing possible solutions to issues raised, questions and seconding proposals.

Constitutions and liability

Constitutions and liability are crucial aspects of sports clubs that help establish their governance framework and ensure legal compliance. A well-crafted constitution serves as a guiding document that outlines the club's purpose, structure, and operating procedures, while liability considerations help protect the club and its members from potential legal risks.

The constitution of a sports club typically defines its mission, vision and objectives. It outlines the club's organisational structure, including roles and responsibilities of key positions such as the board of directors, executive committee, and other governing bodies. The constitution also establishes membership criteria, rights, and obligations, ensuring transparency and fairness in the club's operations.

In addition to organisational structure, the constitution outlines procedures for decision-making, such as how meetings are conducted, voting rights, and the process for amending the constitution itself. These provisions help maintain a democratic process within the club, ensuring that all members have a voice in key decisions.

Liability is a crucial consideration for sports clubs to protect both the organisation and its members from legal risks. Clubs often establish legal entities such as non-profit organisations or limited liability companies (LLCs) to separate the club's liabilities from individual members. This separation helps shield members from personal liability for club-related debts or legal issues, provided they act within the boundaries defined by the constitution and applicable laws.

To further mitigate liability risks, sports clubs may also obtain liability insurance. This insurance coverage protects the club, its directors, officers, volunteers, and members against claims arising from accidents, injuries, or property damage that may occur during club activities. Liability insurance can provide financial protection and peace of mind to both the club and its members.

Proper risk management is another essential aspect of liability consideration for sports clubs. This involves identifying potential risks, implementing safety measures, and developing appropriate policies and procedures. For example, clubs may establish codes of conduct for members, coaches, and officials to ensure a safe and respectful environment. Adequate facilities maintenance, participant waivers, and comprehensive emergency response plans are also important components of risk management.

It is important for sports clubs to regularly review and update their constitutions to reflect changes in the club's objectives, membership, or legal requirements. Additionally, seeking legal advice from professionals experienced in sports law can help ensure that the constitution and liability measures are comprehensive, compliant and protective of the club's interests.



Figure 11.9:

Clubs often establish legal entities such as non-profit organisations to separate the club's liabilities from individual members.

Role of the volunteer

Volunteers make up a large proportion of sporting clubs, particularly local sporting clubs. In fact, without volunteers, a lot of what is achieved through local sporting competitions would otherwise not be possible. In the typical local club, the only paid role is the umpires or referees. All other roles such as coaching, scoring, time keeping and first aid are voluntary roles. The positions on the committee are also nearly always voluntary. Volunteers may be parents or relatives of players, ex-players or someone with a genuine passion for the sport.

The most common volunteering activities are fundraising, preparing and serving food, teaching or providing information, and fulfilling administrative duties. The range of voluntary opportunities that are available in physical activity and sport includes:

- coaching
- managing
- refereeing
- providing transportation of players
- officiating
- serving as a committee member
- supervising the canteen
- convening the fundraising
- managing the equipment
- providing services for the spectators
- serving as a marshal
- serving as the pre-event coordinator
- undertaking logistics
- serving as registrar.



Figure 11.10:

Volunteers make up a large proportion of local sporting clubs.

Learning activity

1. Evaluate the organisational features of a club including its structure, procedures and constitution.
2. Reflect on the class meeting that planned the school athletics carnival as outlined in the previous practical activity. Explain how decisions were made. Discuss whether this was fair and what the majority wanted.
3. Analyse the role and importance of volunteers.
4. Think about a range of sporting events. Discuss how the event would be different if there were no volunteers helping.



Figure 11.11:

The type of competition that is chosen for an event will depend on a number of factors.

Competitive events

Competitive events are organised activities in which individuals or teams compete against each other to showcase their skills, abilities, and knowledge in a particular field or discipline. These events aim to determine the best performers or teams based on specific criteria and rules.

In the realm of sports, competitive events are prevalent and diverse. They encompass individual and team sports such as athletics, football (soccer), basketball, swimming, tennis, and many others. These events often involve participants competing against each other to achieve the highest scores, fastest times, or greatest achievements within the designated rules and regulations of the sport.

Types of competition

The type of competition that is chosen for an event will depend on the following range of factors:

- the tournament's objectives, such as to determine a winner or to promote participation
- the participants' characteristics, such as their age and ability
- the available facilities
- time constraints
- the type of event.

There are different types of competition that will be used depending on the sport, the age and the ability of the players. These include round robin, ladder and knock out competitions.

Round robin

Round robin competitions promote participation and involvement as the structure allows teams to continue to compete and practise, even if they have lost most of their games. Round robins are played when there are at least four teams in the competition. Each team will play all of the other teams before a winner can be decided. The teams will play a number of games and the winning team of each round will be awarded points. Generally, a win is worth two points, a draw is worth one point and a loss equals zero points.

The winner of a round robin competition can be decided using one of two methods – the team with the most points at the conclusion of the rounds, or a series of finals played between the top scoring teams throughout the rounds. The latter option is best when there are a number of divisions. For example, in a specific competition, there may be 40 teams wanting to play. These 40 teams may be divided into four divisions with ten teams in each. The first division will have the top ten teams, the second division will have the 11th to 20th best teams, and so on. At the end of the rounds, the winners of the first and second division will play off, and the winner will compete against the winner of the third versus fourth division winners.

There are a number of pros and cons to using the round robin competition. The advantages of a round robin competition include:

- it allows for maximum participation
- if players are having a bad game, they will not be eliminated and will have more opportunities to participate
- it is one of the fairest ways to determine an overall winner for a large competition.

Some of the disadvantages include:

- they require more time to complete and require teams to play a large number of games
- more organising and facilities required for them to run successfully
- it may be difficult to facilitate a large number of teams.

An example of a six-team round robin draw is shown in Table 11.2.

Table 11.2: 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



Figure 11.12:

International football (soccer) competitions often feature a series of round robin tournaments in the group stage.



Figure 11.13:

The Cricket World Cup uses a round robin format for its preliminary stage.

Internet activity

Log on to TitanOnline and complete Activity 11.3 to learn more about round robins.



Figure 11.14:

Most seasonal sports where games are played weekly will use the ladder style of competition.

Ladder

Ladder competitions are ideal for sports that have a weekly game for an entire season. In a ladder competition, teams will play and receive points based on the result. Like round robins, it will generally be two points for a win, one point for a draw and zero points for a loss. Teams will be placed in order based on the results.

When teams are on equal points in a ladder competition, the higher placed team is determined by their points for and against. For example, if Team A has scored 150 points and conceded 50, their points differential would be 100. If Team B has scored 130 points and conceded 70, their points differential would be 60. Team A would be ranked higher on the ladder.

There will be a set number of rounds where teams will all get a chance to play each other. Throughout the season, players or teams may go up and down on the ladder, depending on how well they play each week. At the end of the competition, there will normally be semi-finals, preliminary finals and grand finals. There a number of ways the finals can play out, but one example is shown in Figure 11.15.

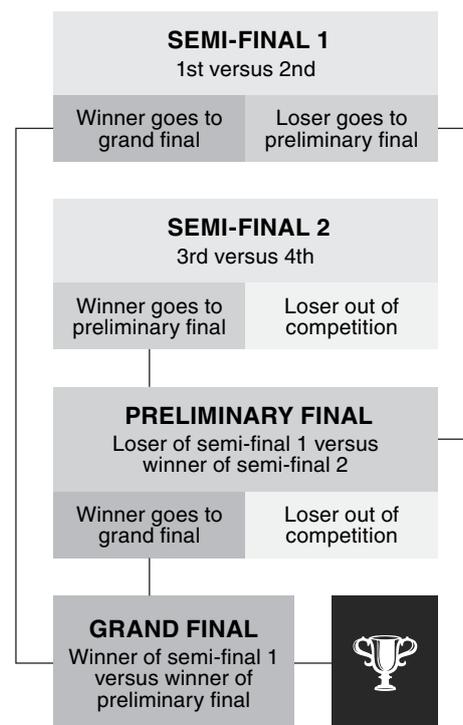


Figure 11.15:

Example of a finals draw for a ladder competition.

Knock out

One of the most common competition styles is the knock out. In this type of competition, only the winner of each match will progress to the next round. Using this logic, half the teams will be knocked out each round, meaning the competition progresses quickly. Knock out competitions are also known as single elimination or sudden death.

The advantages of knockout competitions are that:

- they are the simplest type of competition 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
- if an individual or team is having an 'off-game', they will be knocked out, when they could actually be the most skilled individual or team
- they are the least flexible type of tournament for participants.

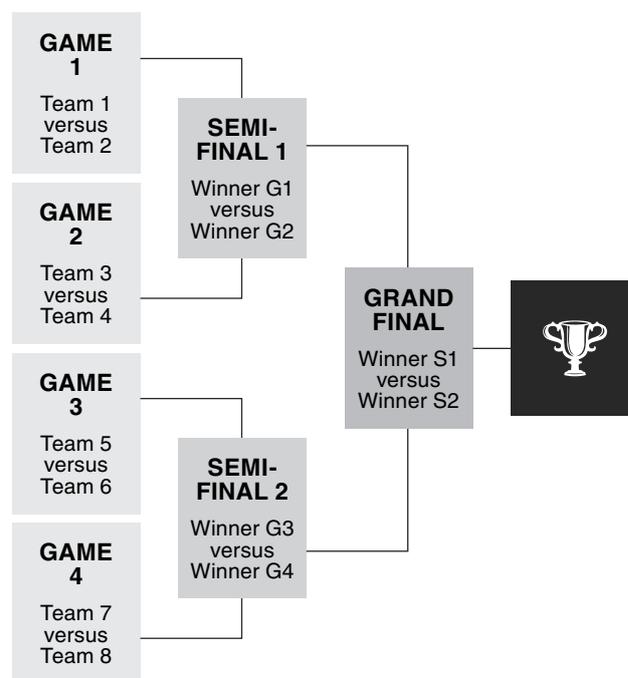


Figure 11.16:
Example of a knockout draw.

Internet activity

Log on to TitanOnline and complete Activity 11.4 to learn more about competition structures.

Practical activity

Design and administer a sports initiative, such as a school lunch-time knock out tournament. Provide a plan detailing, including:

- how players will be recruited and placed in teams
- how much time is available, game duration and the number of games to be played per week
- the type of competition to be used
- the roles of volunteers.



Figure 11.17:

Handicapping is used in events such as the Sydney to Hobart Yacht Race.

Draw construction

The design of a draw in sporting competitions involves the careful planning and organisation of matches or fixtures to determine the match-ups between teams or participants. The specific design can vary depending on the format and structure of the tournament or competition.

When designing draws, organisers also consider logistical factors such as venue availability, travel arrangements, and broadcast schedules. They aim to create a schedule that maximises spectator interest, minimises conflicts, and provides a fair and exciting competition for all participants.

Ultimately, the design of a draw in sporting competitions is a complex process that involves considering various factors such as format, seeding, fairness, and logistical constraints. The goal is to create a balanced, competitive, and engaging tournament for participants and spectators alike.

Handicapping

Handicapping is used as a way of making competitions fairer and giving all competitors an equal chance of winning. The main purpose of handicapping is to give an advantage to less experienced players so that they are not overly challenged, or adding a level of difficulty to experienced players to provide them with more of a challenge. Handicapping is used in sports such as golf and sailing.

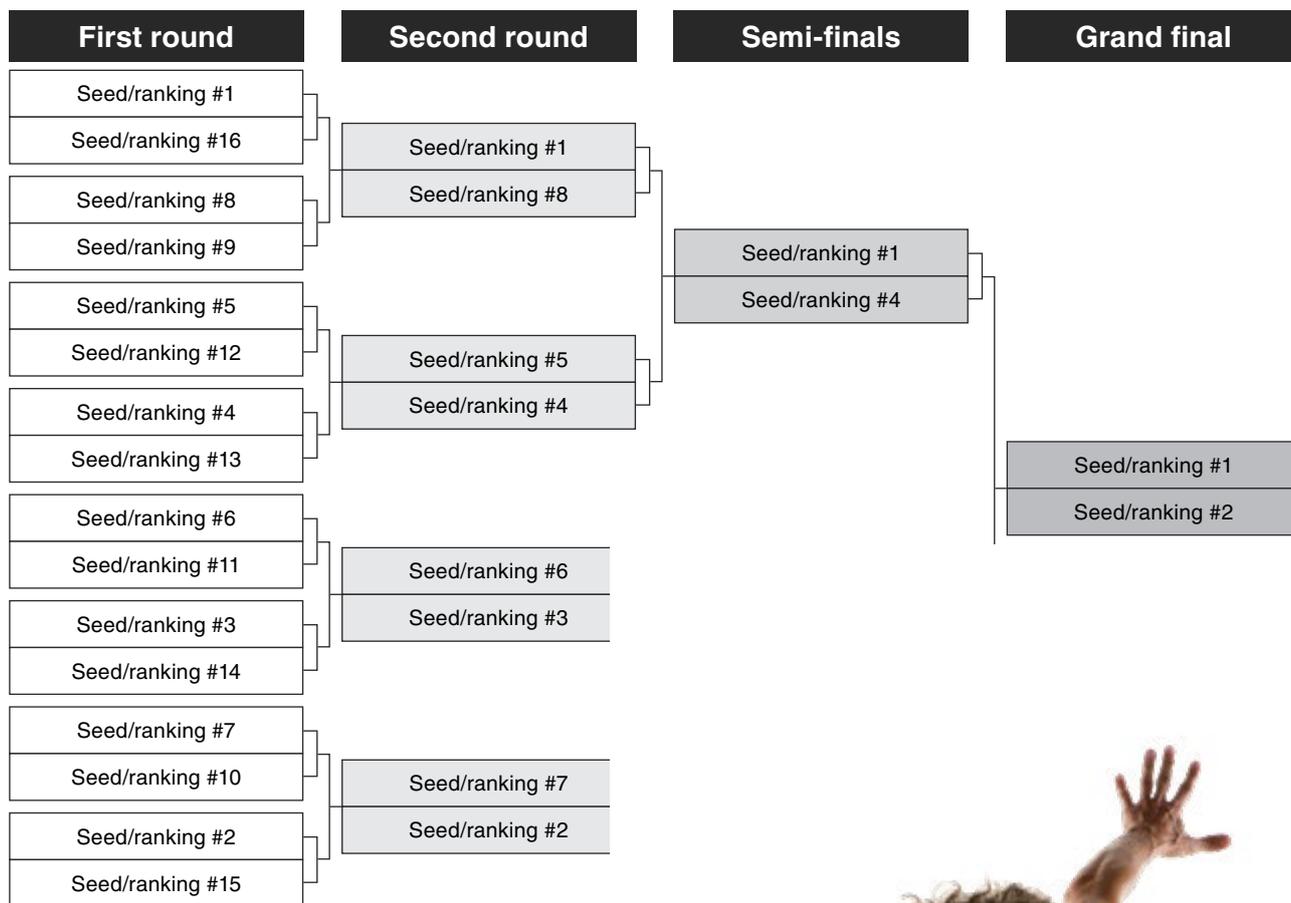


Figure 11.18:
An example of a seeded draw where the highest ranks t

Seeding

The main purpose of seeding is to prevent the top teams or players competing against each other in the opening rounds and getting knocked out. For example, in a knock out competition, if the two best teams compete against each other in the first game, one will be eliminated. If the two weakest teams compete against each other, ultimately one of them will make it to the next stage. This is not fair, because the second best team has been knocked out and the second weakest team remains in the competition. International event that use seeding include:

- FIFA World Cup
- Rugby World Cup
- Australian Open Tennis.



Figure 11.19:
Tennis grand slam tournaments use seeding.

Promotion/relegation

Promotion and relegation are terms used to explain the moving or shifting of teams between divisions based on their performance in the previous season. Promotion relates to moving a team to a higher division because they have played well. Relegation involves moving a team down a division. Relegation can occur because a team performed at the bottom of the ladder, or because there are a lot of new players and the team is less experienced than the previous year.

Decisions to promote or relegate teams will depend on how many other teams are in each division and whether promoting or relegating teams proves to be beneficial for the majority of the teams involved. Ultimately, the decision to promote or relegate a team will be up to the governing body of the competition. Club committees can request promotion or relegation, and they can also put forward a case to reject promotion or relegation.

Repechage

Repechage is a term used to explain when teams or individual competitors miss out on qualifying by a small margin and are given a second chance to qualify. Repechage is used in a number of sports, including track and field athletics, sailing, cycling and rowing.

Typically, after a round of competition, the winner of each heat will progress to the next round. When repechage is used, players who come second and have a very close score to the winner will be placed into a secondary heat where they compete against other competitors with similar results. They compete for the chance to fill the remaining spots in the next round of events.



Figure 11.20:

Repechage races give non-qualifiers from the heats a second chance to advance in a competition.

Learning activity

1. Analyse the impact of different types of tournaments on performance and enjoyment.
2. Apply handicapping procedures to balance the outcome of a competition. Create a mock competition to do so, or use your plan from the previous practical activity.
3. Discuss the terms 'promotion' and 'relegation' in relation to sporting events.
4. Research the promotion and relegation in English football and describe the impact it has on competing teams.

Event management

Event management involves creating, developing and managing various events in sport. Event management is a growing field, outside of and within the sporting sector. In relation to sport, event management encompasses competitions, fundraisers, sporting tours, carnivals and organising sponsors. When involved in event management, it is necessary to consider the types of events, public relations and the media, financial planning, legal and safety considerations, equipment and facility responsibilities and evaluating the event.

Types of events

There are many different types of events that a sports administrator can be asked to manage. Each different type may have its own unique organisation and purpose. Generally, the organiser will need to organise a team, allocate roles, consider catering and venue hire, set dates, allocate resources and communicate to all stakeholders.

Carnivals

Athletics, cross-country events and swimming carnivals are examples of carnival events that are held at schools. Each carnival is unique in relation to the number, type and structure of the events that are on offer. There are three common ways to structuring these types of events:

- **Traditional carnivals:** Typically, in this type of carnival, the participants are able to enter as many or as few events as they choose. The main disadvantage is that the focus is on winning more than participation. For example, a poor swimmer could choose not to participate in swimming-based events.
- **Tabloid carnivals:** In this type of carnival, the participants are divided into teams and are rotated through a number of activities. Emphasis is placed on having all the participants remain actively involved, and ideally, all the participants are challenged.
- **Novelty carnival:** In this type of carnival, traditional events are either partially or totally replaced with novelty events. Emphasis is placed on enjoyment and on having all the participants remain actively involved in a number of events.

Deciding which type of carnival is most suitable depends on

- the type of carnival it will be – athletics, swimming or cross-country
- the age of the competitors
- the number of participants
- the competitors' ability level.

Internet activity

Log on to TitanOnline and complete Activity 11.5 to learn



Figure 11.21:

Most schools host athletics, cross-country and swimming carnivals each year.

Competitions

Competition events are designed to be challenging and to end with at least one winner or more, depending on the size of the event. Round robins, pool tournaments and knock out tournaments are all examples of competition events. These are often based specifically on one event or sport and rounds or games of that sport are played until a final winner is reached. The focus on competition is to be the best and play the best, and therefore weaker players may sometimes be knocked out early or not given much court time. These types of events require lots of pre-event planning. Draws and divisions (if necessary) need to be created. Officials need to be organised so that the event runs smoothly and on time.

Corporate events

Corporate sporting events are becoming more popular with Australian companies. Companies often use corporate events to reward/motivate staff members, to network and develop business relationships, or to promote their brand. Corporate events relate to any event that has a direct link to a business or company. Corporate events can be internal or external, or can be related to sponsorship. Internal events occur within the company and may include activities such as exercise classes at lunch, or having the afternoon off to play a cricket, touch football, or basketball game. External events may include competing against another corporation or business. External events might also include activities such as entering a work team into fun runs, or charitable fund raising events such as the 'Balmoral Burn'.

Community events

Community events relate to local sporting events. These include local competitions as well as events that are held periodically such as once a season or once a year. Examples of community events include colour runs, fun runs and the City2Surf. These events often require participants to pay an entry fee in order to cover the costs of running the event, as well as to fundraise, often for a charity. Details that need to be considered for community events include advertising, a registration process, volunteers, possible road closures, stand-by ambulance or first aiders, bag storage, and drink stations.



Figure 11.22:

The focus of school swimming carnivals can be more on winning than participation.



Figure 11.23:

A registration process needs to be established for community events.

Public relations and the media

Public relations and the media play a vital role in event management, offering numerous benefits to organisers, participants and stakeholders. Their importance lies in various key aspects that contribute to the success and impact of sports events.

One crucial role of public relations in event management is to generate buzz and create anticipation. Through strategic communication efforts, public relations professionals work to build excitement, promote ticket sales, and attract media coverage for the event. By effectively engaging with the media, organisers can generate pre-event publicity, increase awareness, and create a positive image surrounding the event.

Media coverage is an essential component of event management, as it provides a platform to reach a wider audience. Media outlets, both traditional and digital, play a vital role in disseminating information about the event, including schedules, participant profiles, and event updates. This coverage helps increase visibility, attract spectators, and create a sense of anticipation and engagement among the public.

Public relations also play a crucial role in managing stakeholder relationships. By establishing effective communication channels, organisers can engage sponsors, vendors, volunteers, and other stakeholders involved in the event. Public relations professionals work to build strong relationships, address concerns, and ensure mutual understanding, fostering a collaborative environment.

During the event itself, media coverage is essential for capturing and sharing the highlights and moments of the event. Media outlets provide live updates, broadcast the event, or share real-time updates on social media platforms. This coverage not only enhances the spectator experience but also reaches a wider audience, extending the event's impact beyond the physical venue.

Post-event, public relations efforts help in sustaining the momentum and maximising the event's impact. Organisers can leverage media coverage to showcase the success of the event, highlight key moments, and share inspiring stories. This coverage not only serves as a valuable record but also helps in building a legacy for future events, attracting participants, sponsors, and spectators for subsequent editions.



Figure 11.24:

Media coverage helps increase visibility, attract spectators, and create a sense of anticipation.

Using the media

The media is a major part of daily life, particularly in the western world in the 21st century. Table 11.3 identifies how different types of media, including social media, can be used in relation to sport.

Table 11.3: The media and sport.

Source	Use
Twitter	<ul style="list-style-type: none"> live Twitter feed during competition training and preparation progress posted by players or teams threads connecting strangers through use of hashtags
Facebook	<ul style="list-style-type: none"> publicise events run contests and giveaways athletes or teams having pages and groups with regular information
Instagram	<ul style="list-style-type: none"> post photos, reels and stories live from sporting events and share with followers professional athletes may share photos, reels and stories of their progress run contests and giveaways use of hashtags to generate a trend
TikTok	<ul style="list-style-type: none"> collaborate with influencers utilise trending challenges and hashtags showcasing athletes and teams run contests and giveaways cross-promotion on other platforms
Newspaper	<ul style="list-style-type: none"> report on results betting odds off-field news
Television	<ul style="list-style-type: none"> live stream of competitions and matches sports updates advertisements news concerning off-field stories
Radio	<ul style="list-style-type: none"> live commentary interviews news highlights advertisements



Figure 11.25: Sport players may use social media to increase their profile.



Figure 11.26: Television broadcasts of competitions and advertisements can help events succeed.

Press releases

Press releases are commonly conducted by players, coaches, administrators or public relation officers. They can be in the form of written statements, read statements, press conferences, interviews or video release. The purpose of press release is usually to inform the public of a development such as an injury, to address an incident that has been reported in the news, or to promote an upcoming event.

It is important to know exactly the message that needs to be communicated, but to also be flexible in case a hard or off-topic question is asked. It is also important to consider which medium is best for a press release, as messages can be misconstrued or misunderstood based on factors such as body language and paralinguistics.

When conducting a press release, it is essential to ensure all information is correct. In a written press release, spelling and facts should be checked. One should avoid 'waffling on' or going over the top with details, but rather keep it short and sweet, whilst making sure no key detail is left out. A written press release should include:

- the name of author
- the date of publication
- the club and sport
- concise information regarding the issue at hand
- contact details for further information.



Figure 11.27:

It is important to consider which medium is best for a press release.

Learning activity

1. Examine the organisational steps involved in a significant sports event, such as your school's swimming carnival.
2. Using a sporting game from the weekend or a current issue in sport, create a mock press release.
3. Identify the groups that need to be consulted and liaised within the administration of an event.

Communication strategies

In relation to sport and event management, having a variety of communication strategies as well as being able to communicate with a variety of different personnel will greatly benefit the process. In sports management, coordinators will need to be able to organise and orchestrate groups of people, all with different goals and intentions. These people will include:

- players
- coaches
- venue owners
- venue staff
- managers
- sponsors
- first aid
- local councils
- volunteers
- security
- press/media
- commentators
- referees/umpires
- fans.

When communicating, one should be assertive and consider how their message is being perceived by those they are communicating with. The event coordinators should practise active listening, appropriate style of questioning, and being professional as well as personable.

Liaison with key groups

Liaising with key groups is an important aspect of event management, specifically for one-off or annual events that require a great deal of work and effort to bring together. Table 11.4 highlights different key groups that may need to be contacted and examples of why they are important.

Table 11.4: Liaising with key groups.

Group	Example
Police	<ul style="list-style-type: none"> ▪ event security ▪ prevent unruly crowd behaviour
Transport	<ul style="list-style-type: none"> ▪ alternative transport if roads are closed ▪ free public transport ▪ more frequent buses and/or trains
Council	<ul style="list-style-type: none"> ▪ road closures ▪ register and seek approval for event
First aid	<ul style="list-style-type: none"> ▪ tend to injuries
Ambulance	<ul style="list-style-type: none"> ▪ tend to injuries ▪ transport casualties to hospital
Local residents	<ul style="list-style-type: none"> ▪ inform them of changed traffic conditions, influx of people, noise

Did you know?

The NRL bunker is based at the Australian Technology Park in Eveleigh, NSW.



Figure 11.28:

Coordinators need to be able to organise and orchestrate groups of people.



Figure 11.29:

Event managers may need to request permission from authorities to close roads.

Financial planning

Financial planning is a critical aspect of event management that ensures the successful execution and sustainability of the event. It involves the careful and strategic allocation of resources, budgeting, and forecasting to achieve financial objectives. There are several reasons why financial planning is essential in sport event management. Financial planning enables event organisers to establish a comprehensive budget that outlines all the anticipated expenses and revenue sources. This includes venue rentals, logistics, marketing, staff, security and other operational costs. By creating a budget and monitoring expenses, event organisers can control costs, avoid overspending and ensure financial stability.

Effective financial planning helps identify various revenue streams for the event. This can include ticket sales, sponsorships, merchandising, broadcasting rights, concessions and partnerships. By analysing potential revenue sources and setting realistic targets, event organisers can maximise income and offset expenses. Financial planning also identifies opportunities for revenue generation.

Financial planning allows event organisers to identify and mitigate potential financial risks. By conducting contingency planning, organisers can prepare for adverse circumstances, such as adverse weather, low ticket sales, or sponsorship withdrawal. Backup plans in place can help minimise risks on the event's financial health. Financial planning also enables event organisers to allocate resources effectively. This includes determining the appropriate marketing and promotion, staffing requirements, and technology. By prioritising resources and expected returns, organisers can optimise their resources and enhance the overall event experience.

Financial planning plays a crucial role in ensuring the sustainability of sport events. By managing costs and profitability, organisers can ensure the long-term viability of events in the future. Financial planning also provides a framework for improvement, measure the event's performance, and make informed decisions to enhance the event's sustainability. Financial planning promotes accountability and transparency of event finances. Clear financial reporting enables event organisers to track income and expenses, report to stakeholders, and demonstrate responsible financial management. This builds trust with sponsors, partners, and participants, fostering future collaborations.

Figure 11.30:

Financial planning plays a crucial role in the management of sport events.



Budgeting

Budgeting is essential in event management, as the expenses that are associated with the 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. Financial planning is crucial and 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 in order 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.

Many smaller sports clubs or teams will have one person responsible for all the budgeting – the treasurer. The treasurer keeps a detailed record of all the money being spent and all the money coming in to the club. This information should be recorded accurately and kept up to date, so that it can be accessible if anyone in the committee wants to track the clubs progress and financial status.

Sponsorship

Sponsorship relates to organisations or companies donating money to sporting events, teams or athletes in return for having their name advertised during the event. This advertising can be demonstrated around in a variety of ways, including the venue, on the uniforms, on advertisement breaks if the event is being televised, and on the event tickets.



Figure 11.31:

Sponsors are advertised during events such as the Australian Open.

Did you know?

The minimum annual price for a company to be a sponsor of the Australian Tennis Open is \$3.1 million.

Internet activity

Log on to TitanOnline and complete Activity 11.6 to learn more about sponsorship.

Grants submissions

Grant submissions are when organisations provide funding to another organisation trying to create an event in order to help get the event started. The grant is somewhat of a good will gesture, and is often given if the event holds some benefit for a specific group in society or targets a specific issue. There are three main types of grants, which are highlighted in Table 11.5.

Internet activity

Log on to TitanOnline and complete Activity 11.7 to learn more about sports grants.

Table 11.5: Types of grants.

Type	Explanation
Government	Government grants provide financial support at a local, state and national level. Government grants can help cover the costs of coaches and umpires/referees completing professional development. Government grants can be used to upgrade and renovate existing facilities such as canteens, car parks and toilets.
Business or corporate	These grants can provide the same benefits as government grants, but have more of a privatised approach. They may help fund special events or tournaments that promote maximum participation. Usually any deal that links the sporting event with the business or corporation will derive benefit for the company providing the grant. Examples of big companies that may give grants include Westfield, the Commonwealth Bank and Foxtel.
Charitable	Charitable bodies that provide grants may do so because the event is going to benefit or bring attention to disadvantaged or priority groups within society, such as people with disability, homeless, youth, aged, or refugees.

Legal and safety considerations

Legal and safety considerations play a crucial role in event management, ensuring the wellbeing of participants, spectators and event organisers. They are designed to safeguard the wellbeing of participants and spectators. By adhering to these regulations, event organisers create a safe environment where participants can compete without unnecessary risks. Safety measures such as venue inspections, emergency plans, medical support, and security protocols help prevent accidents, injuries and other potential harm.

Compliance with legal requirements helps mitigate potential legal risks and liability for event organisers. By following regulations related to health and safety, insurance, licensing, permits, and contracts, organisers demonstrate their commitment to providing a secure and legally-compliant event. This reduces the chances of lawsuits, penalties, or reputational damage resulting from non-compliance.

Legal and safety considerations contribute to the fair and ethical conduct of sport events. Regulations related to anti-doping, athlete eligibility, and competition rules help maintain integrity and fairness in sports. Adhering to these requirements protects the reputation of the event and ensures that participants compete on a level playing field.



Figure 11.32:

Legal and safety regulations help ensure the wellbeing of participants and spectators.

Complying with legal and safety requirements enhances the reputation and credibility of event organisers. Stakeholders, including sponsors, participants, and spectators, place trust in events that prioritise safety and follow legal guidelines. A strong reputation for safety and compliance can attract more participants, sponsors, and spectators, contributing to the long-term success of the event.

Many insurance policies and venue agreements require event organisers to adhere to specific legal and safety requirements. Failure to meet these obligations can result in the nullification of insurance coverage or the cancellation of venue agreements. Compliance with legal and safety regulations ensures that event organisers can fulfil these contractual obligations and protect their financial interests. Sport events often operate within a regulatory framework governed by local, state, or national authorities. Compliance with legal requirements ensures that event organisers are in good standing with the relevant regulatory bodies. It also helps maintain positive relationships with authorities, ensuring smooth operations and reducing the risk of fines or penalties.

Insurance

Sports administrators have many aspects of the event that can potentially go wrong and insurance provides some financial safeguards. Risks that are commonly insured against include:

- public liability – insures against members of the public injured at the event
- workers compensation
- professional indemnity
- player insurance – insures against injury and loss of income in some circumstances
- cancellation due to adverse weather
- property damage and equipment loss.

Duty of care

Duty of care relates to the responsibility one person has to protect and keep safe another individual or group of individuals. In the case of local weekend sport, duty of care would largely be placed on the coach. The coach needs to make decisions related to the safety and wellbeing of their players. Areas of concern a coach should be cautious of include:

- rain and lightning
- dehydration
- exhaustion
- drop-off and pick-up (make sure all players are safe with their parents before the coach can leave)
- playing/training surface (free from hazards such as ditches or broken glass)
- playing on with an injury
- warming-up, stretching and cooling-down efficiently.

Liaison with medical services

Liaising with medical services is important when managing and planning events. It is important to speak with medical services so that they are aware of the event and can roster extra medical professionals on so that in the case of injuries, there are enough personnel to help and provide first aid. Part of liaising with medical services involves informing them of any pre-existing injuries or health concerns of players or competitors. If a player has a condition such as epilepsy or diabetes, is important that medical professionals know so they can monitor these players closely throughout the event.



Figure 11.33:
It is important that medical professionals know of any pre-existing injuries.

Internet activity

Log on to TitanOnline and complete Activity 11.8 to learn more about concussion protocols in sport.

Internet activity

Log on to TitanOnline and complete Activity 11.9 to learn more about the medical services available for major sporting events.

Learning activity

1. Prepare a submission seeking sponsorship from a local business for an amateur soccer club. Outline different levels of sponsorship, the costs of each level and the proposed benefits that would result from the sponsorship.
2. List the skills and knowledge a treasurer would need in order to budget effectively.
3. Discuss legal and ethical issues that impact on the sports administrator.
4. Research what is generally covered by professional indemnity insurance.
5. Evaluate the need to liaise with medical services before and during an event.

Case study – Effects of concussion

Glen Critcher (Critch), a star football player, had a successful career spanning over a decade in the National Rugby League (NRL). Known for his aggressive playing style, Critch frequently engaged in body-to-body collisions and absorbed several hard hits to his head throughout his career. Over time, these impacts took a toll on his health, leading to his retirement.

During a critical game in his fifth season, Critch suffered a severe concussion after a forceful head knock. He experienced symptoms such as dizziness, confusion, memory loss, and sensitivity to light and noise. Despite the symptoms, Critch returned to the field shortly after, driven by his determination to win and secure his place on the team.

Over the course of his career, Critch encountered several more concussions. Each time, he downplayed the symptoms, considering them as normal consequences of the sport. However, the cumulative effects of these head injuries became increasingly evident. Critch began experiencing frequent headaches, memory problems, difficulty concentrating and mood swings.

After retiring from professional football, Critch's health continued to deteriorate. He was diagnosed with post-concussion syndrome, a condition characterised by persistent symptoms following a concussion. The condition significantly impacted his quality of life, limiting his ability to work, engage in social activities, and maintain healthy relationships.



Figure 11.34:
The cumulative effects of head injuries and concussion can be debilitating.

1. What are the common causes of concussions in contact sports?
2. What are the potential short-term symptoms of a concussion?
3. How can the mismanagement of concussions, as seen in Critch's case, exacerbate the long-term effects?
4. How can athlete education and awareness play a role in reducing the risks of concussions?
5. How have sports organisations and governing bodies, such as the NRL, enforced stricter concussion protocols and guidelines to protect athletes?
6. What support systems should be in place for retired athletes who are experiencing post-concussion symptoms?

Equipment and facility responsibilities

Equipment and facility responsibilities are vital aspects of event management, as they directly impact the safety, efficiency, and overall experience of participants and spectators. Providing well-maintained equipment and facilities is essential for ensuring the safety of participants and spectators. High-quality equipment and well-designed facilities contribute to the optimal performance of athletes. Sports equipment that is in good condition and appropriate for the specific sport enhances performance, while well-maintained and properly prepared facilities allow athletes to compete at their best. This creates a fair and competitive environment that enhances the overall quality of the event.

Effective management of equipment and facilities helps mitigate risks associated with potential failures or malfunctions. Regular inspections, equipment maintenance, and facility upgrades reduce the likelihood of accidents or disruptions during the event. Proper risk management measures also contribute to the event's overall success, reputation, and the wellbeing of all involved. Sporting events often have specific regulations and standards in place regarding equipment and facilities. Adhering to these regulations is not only a legal requirement but also ensures fair competition and the safety of participants. Compliance demonstrates a commitment to upholding industry standards and can prevent potential legal and reputational issues.

Well-maintained facilities and quality equipment contribute to an enhanced spectator experience. Comfortable seating, clear signage, clean facilities, and proper audio-visual equipment all contribute to a positive atmosphere for spectators. This, in turn, encourages attendance, engagement, and positive reviews, benefiting the overall success of the event. Effective management of equipment and facilities also considers their long-term sustainability. Regular maintenance, repairs, and upgrades extend the lifespan of equipment and facilities, reducing the need for frequent replacements. This promotes cost-efficiency, environmental sustainability, and the ability to host future events with minimal disruptions or additional expenses.

Venue booking

Venue booking is very important when event planning. It is essential that careful consideration goes into choosing a venue that is the right for the players or competitors. Things to consider when booking a venue include:

- indoor or outdoor options
- playing surface
- price of venue hire
- seating and parking for spectators
- catering facilities
- toilet facilities.

Equipment management

Managing equipment is important to consider when organising events; whether it is hired or equipment that the organisers own. Sporting equipment is expensive and it is important to track any damage to the equipment. This is also part of the duty of care to ensure the equipment being used is safe and in optimum working order. A good way of keeping track of equipment hire is to keep a record that people have to fill out before and upon returning equipment.

For events that last a season with weekend games and training, most clubs will give each team an equipment bag with necessary equipment for the season. At the end of the season, these equipment bags are usually returned, checked and upgraded for the next season.

Evaluating an event

Evaluating an event honestly and critically during and after is important in order to avoid repeating mistakes in the future and to develop ideas for improvements while the activities are still fresh in people's minds. It helps to analyse what elements worked well and what needs to be planned better the next time the event is held. When evaluating an event, one should consider participant feedback, reporting mechanisms and cyclic planning.

Participant feedback

Participants should be given an opportunity to provide their feedback on the event. Feedback can be gathered informally through discussions or in a formal manner with surveys, suggestion boxes or as an agenda item at a meeting. Feedback may address issues such as the:

- playing surface
- equipment
- parking
- toilet facilities
- planning
- type of competition format used
- grading
- first aid available
- level of communication regarding the event
- availability of help on the day.

Participants may be asked to evaluate the event in a number of ways. Some ways that participants may be asked to provide feedback include:

- filling out a questionnaire at the event
- receiving a phone call from an event official
- filling out an online survey.

This data will be collected and analysed for feedback purposes.

Reporting mechanisms

After collecting feedback and evaluating it, the next step is to report the findings. The report should be presented to the relevant stakeholders. Reports can be presented in person or online if the meeting room is available. Many amateur clubs may meet in clubhouses and may benefit from hard copies. Reports often benefit from the use of graphs and tables to represent data in a format that is easier to understand. A well-presented report informs the committee and others in a clear and precise manner and leads to improved outcomes.

Figure 11.35:

Participants should be given an opportunity to provide their feedback on the event.



Cyclic planning

Cyclic planning is a crucial aspect of event management that ensures the smooth execution and continuous improvement of sporting events. It involves the systematic process of planning, implementing, evaluating, and adapting event strategies over time. Cyclic planning allows event organisers to learn from past experiences and make improvements for future events. By evaluating each event cycle, organisers can identify strengths, weaknesses and areas for enhancement. This enables them to refine processes, streamline operations, and deliver a better overall experience to participants and spectators.

Sporting events often face unpredictable circumstances, such as weather conditions, changes in participant availability, or shifting market trends. Cyclic planning provides a framework for flexibility and adaptability in response to these factors. By regularly reviewing and adjusting event strategies, organisers can proactively address challenges and seize opportunities, ensuring the event's success despite changing circumstances.

Cyclic planning encourages stakeholder engagement throughout the event management process. By involving key stakeholders, such as sponsors, participants, venue owners, and community representatives, organisers can gather valuable insights, perspectives and support. This collaborative approach fosters stronger relationships, enhances communication, and improves overall event outcomes. It also allows event organisers to continually assess and improve stakeholder satisfaction. By gathering feedback, conducting surveys, and analysing data from previous events, organisers can identify areas for improvement and address any concerns raised by participants, spectators, sponsors, or other stakeholders. This focus on stakeholder satisfaction enhances the event experience, fosters loyalty and encourages continued support.

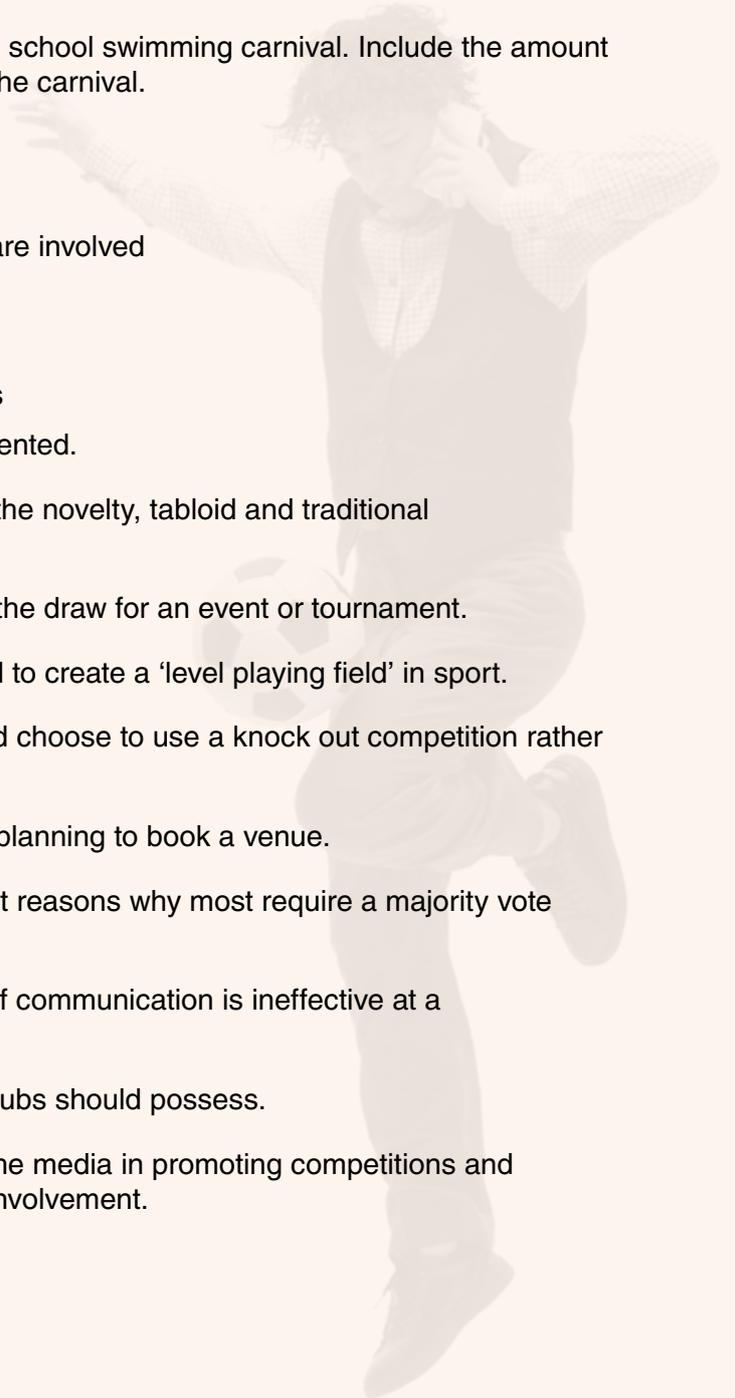
Cyclic planning ensures that event strategies remain aligned with the overarching goals and objectives. Through regular evaluation and reflection, organisers can assess whether the event's mission, vision, and values are being upheld. This helps maintain consistency, focus, and direction throughout each event cycle, ensuring that all efforts contribute to the desired outcomes.

Learning activity

1. Evaluate a major event and devise recommendations for improvement.
2. Create a short, user friendly feedback sheet that participants would be willing to complete at the end of a knock out competition.
3. Reflect on a sporting event and provide feedback on how well it was organised (venue, equipment, amenities, type of competition, catering).
4. Create an equipment hire sheet that could be implemented for sporting equipment hire during school lunch breaks.

Revision questions

1. In relation to the event management process, explain how important it is for all people and subcommittees to understand their roles and responsibilities.
2. Identify all the costs associated with running the school swimming carnival. Include the amount and type of income that will be generated from the carnival.
3. Choose a major event, and analyse:
 - a. its structure
 - b. the roles of the leaders and managers who are involved
 - c. the roles of the volunteers who are involved
 - d. the promotional strategies used
 - e. the finances, budget and sponsorship issues
 - f. how any innovative ideas have been implemented.
4. Evaluate the advantages and disadvantages of the novelty, tabloid and traditional carnival formats.
5. Explain how seeding can be used to determine the draw for an event or tournament.
6. Give two examples of how handicapping is used to create a 'level playing field' in sport.
7. Provide reasons why an event coordinator would choose to use a knock out competition rather than a round robin competition.
8. Highlight the factors one should consider when planning to book a venue.
9. Define the purpose of a constitution and suggest reasons why most require a majority vote to change.
10. Describe the type of problems that could occur if communication is ineffective at a carnival setting.
11. Research the types of insurance that sporting clubs should possess.
12. Outline how sports administrators can engage the media in promoting competitions and describe the benefits that can flow from media involvement.



CHAPTER 12

Sport coaching

Throughout this unit, students will evaluate the role of the coach. They will explore characteristics of a coach, legal and safety implications or requirements of coaching. Students discuss planning and organisation of a training session, including time allocation, session structure and groupings. They investigate the structure of a coaching program and key components of each part. Students explore the importance of correct technique and will analyse the impact of instruction, demonstration, explanation and feedback on performance. They define the impact of psychology on coaching and performance. Students design a coaching program, focusing on analysing performance and analysis of coaching and support personnel.

Syllabus outcomes

A student:

- applies the rules and conventions that relate to a range of physical activities (1.1)
- demonstrates ways to enhance safety in physical activities (2.1)
- explains the principles of skill development (2.2)
- analyses the fitness requirements of specific physical activities (3.1)
- selects appropriate strategies and tactics for specific movement contexts (3.1)
- designs programs that respond to performance goals (4.1)
- demonstrates leadership skills and a capacity to lead in movement contexts (4.2)
- recognises the skills and abilities required to support health, safety and physical activity (4.3)

Focus areas

- The roles and responsibilities of the coach
- Aspects of a coaching session
- Psychology and coaching
- The coaching program
- Evaluating a coaching program



Figure 12.1:

An effective coach has an intimate knowledge of their sport.



Figure 12.2:

A coach's role is to improve player performance and build on the potential of an individual and/or a team.

The roles and responsibilities of the coach

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 athlete-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, but will no doubt bring their own personality and techniques to the role.

Characteristics of an effective coach

Anyone can coach, but the most successful coaches have certain characteristics and qualities that improve athletic performance such as:

- **Knowledge:** an effective coach has an intimate knowledge of the sport. They must also have a detailed understanding of the sport, from the fundamental skills to innovative tactics and strategy.
- **Seeks out new information:** effective coaches have a thirst for knowledge. They stay up to date with new research, training and rehab information. They attend coaching clinics and seek advice from knowledgeable people within the industry.
- **Knows the athlete:** being aware of individual differences in athletes is also an important component for coaching success. Being able to recognise and address the different needs of the athlete, enables a coach to motivate, communicate and teach in a way that best suits the individual.
- **Communicator:** the effective coach is a coach who communicates well and conveys sincerity, proficiency, admiration and authority. An effective coach should be able to explain skills, tactics and drills clearly. Clear communication allows goals to be set, feedback can be given and key messages are reinforced.
- **Motivator:** an effective coach is able to provide motivation with a positive attitude and passion. The ability to motivate and enthuse is part of their recipe for success.
- **Is a good listener:** part of effective communication is listening. An effective coach should encourage player questions and comments. The effective coach is open to and encourages feedback from players.
- **Is disciplined:** an effective coach sets clearly defined boundaries and rules both on and off the field. They are responsible for upholding these rules and boundaries and should follow these rules and boundaries themselves.
- **Leads by example:** the effective coach observes the same rules they expect of the players. A coach that leads by example is able to show and receive respect.
- **Displays commitment:** effective coaches are committed to their players and their sport. They look out for the best interests of their players and their sport and put their players and sport before themselves.



Figure 12.3:

The ability to motivate and enthuse is part of a coach's recipe for success.



Figure 12.4:

An effective coach is open to and encourages feedback from players.

Internet activity

Log on to TitanOnline and complete Activity 12.1 to learn more about the characteristics of effective coaches.

Knowledge

A coach with extensive knowledge of the sport can effectively teach and develop the skills required to excel in the game. They can break down complex techniques into simpler components, provide clear instructions, and offer valuable insights to help athletes improve their performance. Knowledge of the sport allows a coach to develop effective strategies and game plans. They can analyse the strengths and weaknesses of both their own team and the opposition, identify tactical opportunities, and make informed decisions during matches or competitions. This knowledge helps the coach optimise the team's performance.

Coaches need to have a solid understanding of sports science, anatomy and physiology to ensure the safety of their athletes. They should be aware of proper warm-up and cool-down techniques, injury prevention strategies, and how to identify signs of fatigue or overexertion. With this knowledge, coaches can design training programs that minimise the risk of injuries and promote the overall wellbeing of their athletes.

Every athlete is unique, with different strengths, weaknesses and learning styles. A knowledgeable coach can assess each athlete's abilities and tailor their coaching approach accordingly. They can identify areas for improvement, provide personalised feedback, and offer specific drills or exercises to address individual needs. This individualised coaching approach can greatly enhance the development and performance of athletes.

During competitions, coaches often need to make quick decisions and adapt their strategies based on the changing dynamics of the game. A well-informed coach can rely on their knowledge and experience to make informed choices under pressure. They can recognise patterns, anticipate opponents' moves, and adjust their tactics accordingly, which can have a significant impact on the team's performance.

Organisational ability

In organising training sessions, coaches need to plan in advance how they will manage the athletes, the equipment and the area in which they are coaching. An organised coach uses training time effectively and minimises set up time and the time between drills. Athletes are kept active and engaged. Effective planning ensures activities are safe and enjoyable and challenge the athlete to improve.



Figure 12.5:

Coaches need to stay up to date with new research, training and rehab information.



Figure 12.6:

Being aware of individual differences in athletes is important for coaching success.

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 in order 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 12.7:
Coaches need to communicate effectively.

Case study

Lisa is a newly appointed AFLW coach. Her passion for Australian football and knowledge of the sport led her to become a head coach. However, despite her expertise, she is struggling to effectively convey the game plan, strategies, and tactics to her team. This lack of clear communication is hindering the team's ability to execute on the field.

Some of the factors contributing to communication challenges include:

- Lisa is facing difficulties in articulating her thoughts and instructions clearly to her players. Effective communication requires not only a deep understanding of the game but also the ability to express ideas concisely and in a manner that resonates with different learning styles.
- The game plan, strategies, and tactics in AFLW is complex and multi-layered. Lisa is providing her team with an overwhelming amount of information, making it difficult for the players to comprehend and implement it effectively. Simplifying and breaking down the information into manageable components could help improve communication.
- Visual aids, such as diagrams, videos, and presentations, can significantly enhance communication by providing visual references for the players. Without such aids, it is challenging for the team to visualise and grasp the intended strategies and tactics. Incorporating visual aids into Lisa's coaching sessions can help bridge this communication gap.
- Effective communication is a two-way process. Lisa should encourage her players to actively participate in discussions, ask questions, and provide feedback. By fostering a collaborative environment, Lisa can better understand her players' perspectives and tailor her communication to suit their needs.

Case study*(continued)*

Proposed solutions to the communication challenges may include:

- Lisa should consider attending workshops or training sessions focused on enhancing communication skills specific to coaching. These programs can provide her with practical techniques and strategies to improve her ability to convey the game plan, strategies and tactics effectively.
- Lisa should streamline the information she provides to her team. Breaking down the game plan into key principles and focusing on a few essential strategies at a time can help the players grasp and implement them more effectively. Gradually introducing more complex concepts as the team progresses can ensure a smoother learning curve.
- Incorporating visual aids such as smartboards, presentations, and video analysis can greatly enhance communication. Lisa can use diagrams and videos to illustrate positioning, movement patterns, and tactical scenarios. This visual representation can help players better understand and retain information.
- Lisa should create a collaborative environment during team meetings and training sessions. Encouraging players to ask questions, provide feedback, and actively participate in discussions can foster better communication. This approach will enable Lisa to address any misunderstandings promptly and adjust her coaching style accordingly.

1. What specific areas of communication does Lisa struggle with the most?
2. How can Lisa improve her ability to articulate the game plan and strategies more clearly?
3. Which visual aids could Lisa incorporate into her coaching sessions to enhance communication?
4. How can Lisa encourage active participation and feedback from her players during team meetings and training sessions?
5. What steps can Lisa take to simplify and streamline her team?

Leadership

When coaches are implementing their training program:

- 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
- 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 in order to increase their influence over their players and athletes.



Figure 12.8: Training programs should have a clear aim.

Instructional style

The instructional style a coach employs will vary according to the coach's personality and the type of sport or physical activity. Coaches tend to use instructional styles and procedures particular to their personality.

They may vary coaching styles dependent on the sport or age of the athlete, and may adopt styles specific to an individual athlete. Following is an outline of the three main styles of coaching:

- **Authoritarian:** In this style of coaching, the coach focuses on being in control. They are commonly strict and disciplined and has a 'do as I say' mentality. They are responsible for all decision making and solicit little communication from athletes. The focus of authoritarian coaching is on winning, and the coach allows for little flexibility in their coaching operations. This style of coaching may cause conflict with athletes who want to have input into their training or dislike a dominant approach.
- **Democratic:** In this style of coaching, the focus is on communication and cooperation between coaches and athletes. It is an athlete-centred style in which decision making is shared and interaction is high. The coach can form a positive relationship with the players, and their motivation is arguably high when their coach uses this style of coaching. However, coaches using this style have to be wary of their status as a coach. If they become too friendly with their athletes, the coach risks losing credibility.
- **Laissez-faire:** This style of coaching is casual or easy-going, and is characterised by less dedication to the task of coaching and more focus on enjoyment and participation in the organised sport in question. In this style, the decision-making power lies with the athletes. However, the athletes can feel frustrated because of the lack of organisation and commitment from their coach. Also, an athlete's potential might not be realised due to the coach's informal and relaxed approach.

The three styles are extremes on the coaching spectrum. Coaches instead tend to combine elements of each in order to create their own style that is specific to their personality and coaching philosophy. Each style of coaching has its advantages and disadvantages. Most successful coach-athlete partnerships are characterised by a combination of the styles being used, depending on the situation.



Figure 12.9:

Player motivation may be higher if their coach uses a democratic coaching style.



Figure 12.10:

An authoritarian coaching style may cause conflict with athletes.

Internet activity

Log on to TitanOnline and complete Activity 12.2 to learn more about the different coaching styles.

Coaching skill questionnaire

Coaching style

1. Did the coach smile at, praise and encourage participants, in order to reinforce their actions when they performed correctly?
2. Did the coach reward participants for their effort as well as the outcome of the match?
3. Was the coach consistent and fair in their treatment of all the participants?
4. Did the coach encourage participants to provide input during the team's decision making, and did they listen to participants when they had something to say?
5. Did the coach reinforce the team rules fairly and consistently?
6. Was the coach patient with participants and supportive of them?
7. While the coach was coaching, did they demonstrate the enthusiasm that they expect participants to demonstrate?
8. Did participants have fun during the training and/or the match?
9. Did the coach place too much emphasis on winning?
10. Did the coach exercise self-control in any situations during which they became angry?
11. Was the coach sensitive to each participant's needs?
12. Did the coach personally demonstrate good sporting behaviour?
13. During the match, did the coach argue with any officials or complain about them?
14. Did the coach encourage the players' parents to attend the match?
15. Was the coach patient and tolerant with each participant, regardless of skill level?
16. Did the coach give each participant equal time during the match, or over-play the more skilled participants?

Source: Australian Sports Commission.

Session planning and implementation

1. Was the coach well prepared and organised for the training session?
2. Did the coach keep participants' level of maturity in mind when planning the training session?
3. Was the coach prompt in arriving at the training session and the match?
4. For the training session, had the coach organised the equipment, and did they run the session smoothly?
5. Did the coach make the training session varied and interesting, to challenge participants and develop their confidence?
6. At the training session, did the coach demonstrate instructions appropriately? Did they model instructions well? Could all participants see the instructions the coach was demonstrating? Did all participants understand the instructions?
7. Was the coach able to assist participants, in order to correct an error when they made one?
8. Did participants have a chance to play with a minimum amount of guided instruction from the coach?
9. Did the coach use a variety of teaching and coaching methods?
10. Did the coach group participants appropriately and give all the participants a chance to develop their skills?
11. Did the coach give participants constructive and specific feedback?
12. Did what the coach said to the participants match their non-verbal actions towards them?
13. Did the coach 'over-coach' during the training session and/or the match by giving participants too many instructions?
14. Did the coach change communication methods to suit participants' needs?

Practical activity

Observe a coach during a training session and a match. Analyse their behaviour as outlined in the coaching skill questionnaire on the previous page. In your workbook, record either a (M) mostly, (S) sometimes or (N) never, for each question.

Learning activity

1. Outline the advantages and disadvantages of the different coaching styles.
2. Describe the coaching style that would suit your personality. Justify your response.
3. Identify and assess the characteristics of an effective coach.
4. Design and apply criteria for assessing coaching ability.

Legal and safety implications

The main aim of safety in sport is to reduce the risk of injury. To ensure sport is as safe as possible:

- Make checks prior to the game or practice session to identify and remove any hazards from the environment where the game or practice session will take place.
- Participants should be encouraged to wear protective clothing and equipment during games and practice sessions. An understanding of the rules will help to ensure safety.
- Supervision, during games and practice sessions, is essential at all times, particularly if children are involved.
- Ensure properly trained medical personnel are available. This guarantees that if an injury does occur it can be minimised and the appropriate treatment is sought immediately.
- Participants should have the required skill level and fitness to safely participate in the chosen game or sport. Participants that lack skills and/or fitness significantly increase their risk of injury.

The welfare of participants is the coach's main area of concern. They have a legal and moral duty to provide a safe learning environment.



Figure 12.11:

Children should be supervised at all times when they participate in sporting activities.

Accreditation

Becoming an accredited coach is an important step in ensuring that a coach is providing a quality service to the participants they are working with. The National Coaching Accreditation Scheme (NCAS) is Australia's system of training and accrediting coaches, which more than 70 sports participate in.

The NCAS is an initiative of the Australian Sports Commission (ASC) and is a progressive coach education program offering courses at various levels. NCAS training programs include:

- **Coaching general principles:** generic principles of coaching and athletic performance that apply to all sports. Coaching general principles may be included in specific training, or they can be completed separately.
- **Sport-specific:** skills, techniques, strategies and approaches to the particular sport.

Source: Australian Sports Commission.

Duty of care

Duty of care is a person's legal duty to take reasonable care to avoid injury to others. Firstly, risks must be identified. If a risk of harm is identified, reasonable care is required to prevent harm.

The following actions need to be undertaken to fulfil a duty of care:

- Sport officials and coaches must have the appropriate accreditation.
- Sporting facilities should be checked for safety and hazards. Any hazards should be removed prior to the activity commencing.
- Children should be supervised at all times when they participate in sporting activities.
- Equipment must be in good working order.
- Adequate preparation should be ensured for all participants. This includes fitness requirements, knowledge of the rules and medical checks.
- Any person suffering an injury should be withdrawn from the activity immediately.
- Everyone should be encouraged to behave safely and in an appropriate manner.

Internet activity

Log on to TitanOnline and complete Activity 12.3 to learn more about coaching accreditation.



Figure 12.12:

Accreditation ensures that a coach is providing a quality service to their athletes.



Figure 12.13:

Any person suffering an injury should be withdrawn from the activity immediately.

Occupational health and safety

After the Commonwealth's Work Health and Safety (WHS) Act 2012 came into effect, Australia's states and territories harmonised their WHS laws. This means that workers (including volunteers) and people conducting a business or undertaking (organisations and clubs) are protected by the same WHS laws across Australia. It provides greater consistency, certainty and clarity about work health and safety (formerly known as occupational health and safety), and makes it easy to understand WHS duties.

Everyone has a right to be safe at work. This includes the paid and volunteer workers (including coaches) who contribute in many different ways to Australia's diverse sporting organisations and clubs, as well as athletes. Under WHS laws, a coach must eliminate health and safety risks so far as is reasonably practicable. If eliminating risks is not possible, then risks must be minimised so far as is reasonably practicable.

Sporting organisations and coaches must provide, so far as is reasonably practicable:

- a safe workplace and safe ways of working
- equipment, tools and machinery in a safe condition
- safe and hygienic facilities, including toilets, eating areas and first aid
- information, training and supervision to all workers, including volunteers and players
- a process for consulting with workers and players, keeping them informed and involved in decisions that may affect their health and safety.

Source: Australian Sports Commission.



Figure 12.14:

Sporting organisations and coaches must provide equipment, tools and machinery in a safe condition.



Figure 12.15:

Risks must be eliminated, or minimised so far as is reasonably practicable.

Learning activity

1. Describe the differences between Level 0 and Level 1 coaching courses.
2. Outline the duty of care for a coach of a child's sporting team.
3. Describe how WHS guidelines can form a framework for coaches aiming to provide a safe environment for athletes.
4. Assess codes of ethical conduct for coaches.



Figure 12.16:

Coaches should provide timely and constructive feedback to participants during and after the session.

Aspects of a coaching session

When planning a sport coaching session, several aspects should be taken into consideration to ensure its effectiveness and success. Clearly define the goals and objectives of the coaching session. What specific skills or areas are to be focused on? Setting clear objectives helps guide the structure and content of the session. Assess the skill level and capabilities of the athletes or participants to be coached. Understanding their abilities and experience will help tailor the session to meet their needs and provide appropriate challenges.

Consider the dynamics within the team or group. Take into account individual strengths and weaknesses, team dynamics and interpersonal relationships. Adapt the coaching strategies accordingly to foster teamwork and cohesion. Plan the duration of the coaching session based on the available time and the content to be covered. Allocate sufficient time for warm-up, fitness, skill development, practice and cool-down. Incorporate a variety of drills, exercises, and activities to keep the participants engaged and motivated throughout the session. Consider different learning styles and preferences, and adapt the coaching methods to cater to diverse participants. Make the most of the time available to maximise learning and engagement.

Prioritise the safety of the participants by assessing and addressing any potential risks or hazards associated with the sport. Ensure that the coaching environment and equipment are safe, and provide appropriate instructions on injury prevention and proper technique. Provide timely and constructive feedback to the participants during and after the session. Offer individualised guidance to help improve their performance and technique. Use assessment tools or methods to evaluate progress and identify areas for improvement.

Be prepared to adapt the coaching session based on the participants' response, unforeseen circumstances, or changing conditions. Stay flexible and open to adjusting the plans to ensure the session remains effective and beneficial. Maintain clear and effective communication with the participants throughout the session. Provide clear instructions, demonstrate techniques, and use positive reinforcement to motivate and inspire the participants.

Planning and organisation

Before planning a training session, coaches should gather information about the participants, and set goals. If a coach is working with a new person or group, the type of information they might need to obtain from their athlete or athletes includes:

- previous experience in the sport
- level of development, both with the technical and tactical skills of the sport as well as their level of physical fitness
- why they like to play the sport and what motivates them
- goals and aspirations in the sport
- any illness, injury or medical condition that might restrict their ability to participate.

Goals should be established for the season as well as each training session. Goals help to guide the program and provide a reference point to monitor progress throughout the season.



Figure 12.17:

Setting clear objectives helps guide the structure and content of the session.

Tips for planning training activities

Session content

- Over-plan rather than under-plan. It is easier to omit drills than to add unplanned drills.
- The session must have a variety of activities to ensure the participants stay active and enthusiastic. Look for new ideas and adapt old favourites or games from other sports.

Appropriate activities

- Avoid activities that require inactivity or drills that eliminate participants. It is likely that the participants to be first eliminated will be the less skilled, who are the ones that need most practise.
- Use more groups with a small number of participants, rather than a few groups containing large numbers.
- The activities must be appropriate for the participant's ability and age.
- Even younger participants are capable of working independently in small groups. Develop activity station cards that explain the drill to be practised.

Progression

- Plan so that activities flow from one to the next smoothly. Have equipment close at hand and develop routines so that participants know what to do next.

Practise

- Ensure enough time for participants to practise and experiment with activities. Practise in small sided games is beneficial as it allows skills as well as technique to develop.

Source: Australian Sports Commission.

Time allocation

The aim is to organise activities so that time wasted moving from task to task is minimised. Time spent on task should be maximised. Time spent on each activity needs to be sufficient to achieve improvement, but not too long to cause boredom. Keeping rest times to a minimum will keep players warm throughout the session. Time allocation allows for fitness levels to be developed while catering for appropriate rest periods. Time should also be allocated for an appropriate warm-up and cool-down.

Safety

Risks need to be analysed and minimised or eliminated. Environmental risks and hydration needs must be considered. Equipment and facility checks must be comprehensive. Warm-ups and cool-downs must be utilised. Sport specific fitness levels should be developed to avoid injury. First aid knowledge and equipment is essential.

Routine

Routine does not mean being bound to do all training sessions exactly the same. It does provide a format that players are familiar with which lets them know generally what to expect and what is required from them. For example, consistent starting and finishing times, always start sessions with a warm-up and finish with a cool-down, and always including a fitness component. Establishing a routine ensures a more productive training session.

Variety

Providing variety allows athletes to practise the same skill in different ways. It allows fitness to be developed in different ways. The variety not only makes the training interesting and more enjoyable, it simulates real game situations where things are always changing and the player needs to be able to adjust accordingly.

Groupings

The skill of putting players into groups impacts on the quality of the training activity and group dynamics. Groups might be chosen to create equal competition. Have certain playing positions against other positions, to develop teamwork or to assist with player evaluation. There are a number of ways to quickly split players into groups and coaches should be aware of these to avoid time wastage.

Learning activity

1. Outline how to plan for effective use of time in a training session.
2. Describe a range of safety issues a coach needs to consider.
3. Design ways to vary training sessions to maintain player interest.
4. Select and demonstrate a range of grouping techniques and formations in coaching sessions.

Structure of a training session

It is essential that a coach takes time to plan each training session. They 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 to the session
- a warm-up
- a cool-down
- games and activities aimed at development of skill and fitness
- a review.

Warm-up and warm-down

Coaches should begin all sessions by having the participants warm-up in order 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 both whole-body movements (such as running) and specific stretching exercises, so the participants are physically and psychologically prepared for the activity.

Coaches should conclude all sessions by having the participants cool-down (also known as a warm-down). The cool-down should last for five to 10 minutes and should consist of both 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.

Skill practice

During any training session, the coach should aim to develop and practise sport specific skills and tactics with the participants. They will often introduce simple skills, and as the session develops, they will make the drills more complex in order to challenge the learners.

Most of the training session is taken up with practising skills. The coach should aim to revise the skills the participants have already learnt and allow sufficient time for practising new skills. Wherever possible, skill practice should include both individual and group work.

Coaches will often incorporate a fitness conditioning aspect into the skills practice to simulate the game situation.



Figure 12.18:

Coaches should begin all sessions by having the participants warm-up.



Figure 12.19:

A coach that leads by example is able to show and receive respect.

Internet activity

Log on to TitanOnline and complete Activity 12.4 to learn more about the aspects of a training session.

Internet activity

Log on to TitanOnline and complete Activity 12.5 to learn more about the structure of an individual training session.

Fitness

Fitness can be developed by dynamic, skill-oriented sessions that build the fitness base of the player. Many coaches incorporate the fitness component and skill component of a training session into one continuous practice session. Intensive skill training sessions ensure an adequate level of fitness is achieved. If speed training is included in a training session, this needs to be done immediately after the warm-up, before the players get tired.

Fitness can also be done in isolation from skill practice. Pre-season sessions often focus more on developing a fitness base.

Games

Playing games with reduced team numbers is often beneficial, as it maximises participation and creates greater opportunities to coach and provide feedback. The coach should begin with a basic game that has been adapted to the skill level and needs of the participants. As the participants become proficient with the modified game, further rules and skills are incorporated to increase the challenge and complexity of the game. Explicit teaching of skills is undertaken as participant's skills progress. As skill level develops whole group games can be utilised.



Figure 12.20: Pre-season sessions often focus more on developing a fitness base.

Learning activity

1. For a sport of your choice:
 - a. describe a warm-up that would be appropriate for the training, and make sure you include activities to raise the heart rate, appropriate 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 class-mates of varying abilities in a sport of your choice. Choose a skill, and explain how the training session could be adapted to cater for each of the three players.
4. Design a training session for a sport of your choice. Plan for the session to last for approximately 30 minutes, and remember to include the elements of a training session. Transcribe the session plan template in Table 12.1 on the following page into your book and record your training session.

Table 12.13: Training session plan template.

Training plan		
Date	Attendance	Equipment needed
Venue		
Duration		
Introduction (aims for session, reminders, etc.)		
Warm-up activities	Drills and games	Warm-down activities
Coaching tips, questions and challenges	Safety considerations	Review/evaluation (key points from session, what worked and what did not, modifications for next session etc.)

Techniques

People learn in different ways. Some like lengthy instructions while others like short, precise instructions without too much detail. Some like written instructions, while others need visual demonstrations or to actually do the activity to understand it properly. An experienced coach recognises this, and should use a range of techniques to engage all players and give them alternative ways of learning skills.

Instruction

Verbal instruction is used to coach a learner about how to perform a skill. This process typically results in the learner being able to verbalise how to perform the skill, although it does not guarantee the learner can physically execute the skill. To increase the likelihood of new skills being learnt, the coach should vary the instruction to suit the age, experience and needs of the learner.

Tips when giving instruction in a coaching session include:

- Try a variety of techniques and see what works best for the team.
- Generally, keep instructions as short and precise as possible.
- Use verbal and non-verbal communication.
- Communication should flow both ways – allow players to ask questions to reinforce understanding.

Demonstration

Demonstrations are a powerful tool to aid instructions. Tips when giving demonstrations in a coaching session include:

- Make sure all the participants can see the demonstration. Be aware of distractions such as the sun, traffic or other groups.
- The coach doesn't always have to do the demonstration. Other options include one of the players who can perform the skill, or a picture, diagram or video may help.
- Ensure that the skill is demonstrated in the context of the game situation, so that participants understand 'why' as well as 'how' it is done.
- Highlight the main points of the skill.
- Avoid pointing out things 'not to do' as this will only overload the players.
- Break the skill into separate components for the purpose of the demonstration, but ensure the complete skill is demonstrated at normal speed first and at the end.
- Let the participants practise. New information stays with people for only a short period of time unless they are able to try the skill.
- Verbal instructions are sometimes unclear, so accompany verbal instructions with a complimentary visual.

Source: Australian Sports Commission.

Explanation

Explaining a skill thoroughly enables an athlete to understand what is required and how technique impacts on performance. Tips when giving an explanation in a coaching session include:

- Keep explanations simple and brief.
- Try not to emphasise more than two or three key points at a time.

Observation

In using their observation skills, coaches are able to detect good skill execution and identify any errors in technique. Coaches who have correct observational skills should be able to:

- identify the good 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.

Tips for observation in a coaching session include:

- Try to be positioned so that observation of all players is possible as they go through a drill or game.
- Identify areas of strength as well as weaknesses and keep feedback positive and criticism constructive.
- Utilise technology.

Practical activity

Observe a coaching session or practical PDHPE lesson. Record information on the techniques used during the session. Describe the positive and negative techniques observed.

Psychology and coaching

The increased stress of competition may impact negatively on an athlete's performance. They may worry about their performance, have trouble concentrating and this in turn will affect their overall performance.

This has led coaches to take an increasing interest in the field of sports psychology and in particular how psychology can affect performance. Sports psychology focuses on techniques an athlete can utilise in training and competitive environments to optimise performance. These techniques allow an athlete to remain relaxed, focused on the task at hand and block out unnecessary distractions.

Motivational strategies

The word motivation means the will or drive to participate, learn and improve. In sport, motivation is a reference to the factors within an athlete or a player whereby they are able to be excited in their behaviour and to maintain and channel it towards achieving a goal. Motivation can be classified as being either intrinsic or extrinsic. Important motivational strategies include goal setting and feedback.

Goal setting

Participants who set a goal do so in order 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.

Internet activity

Log on to TitanOnline and complete Activity 12.6 to learn more about psychology and coaching.



Figure 12.21:

Athletes may have trouble concentrating if they're worried about their performance.



Figure 12.22:

Goals should be neither too hard nor too easy to achieve.

Feedback

Feedback is an integral component of learning. Feedback is information an athlete receives about their performance. Feedback is used to motivate athletes with supportive, informative statements regarding their performance. The different types of feedback include:

- **Internal feedback:** commonly called intrinsic feedback. With internal feedback information is sent to the brain from the senses about how the movement skill is being performed. It helps the athlete develop a kinaesthetic sense or 'feel' for the movement and make any necessary adjustments.
- **External feedback:** commonly called extrinsic feedback. This type of feedback comes from outside sources such as coach, teammates, crowd and parents. It can come in the form of applause from the crowd, comments from the coach, or a pat on the back by teammates. External feedback can occur while the skill is being performed or at a later date.
- **Concurrent feedback:** occurs while the skill is being performed. An example of this is an athlete performing a somersault. The brain receives information and processes it so that if over or under rotation is occurring in flight, the athlete can make the necessary adjustment so they still land on their feet.
- **Delayed feedback:** occurs after the skill has been performed. An example of this is the coach providing team and individual feedback regarding performances in the change rooms after the completion of a game.
- **Knowledge of results feedback:** this type of feedback utilises results to convey how successfully the skill was performed. An example of this is seeing the distance measured of a javelin throw. Knowledge of results feedback is external and occurs from people such as referees and coaches.
- **Knowledge of performance feedback:** provides information regarding the quality of the execution of the movement. An example of knowledge of performance is feedback from the coach to a gymnast that they did not achieve sufficient height in a vault. This type of feedback can occur from internal or external sources.

Types of rewards

Athletes participate in sport for a variety of reasons. These are known as intrinsic and extrinsic motivation or rewards.

Athletes who participate because of intrinsic motivation participate in sports for internal reasons, such as enjoyment and personal pride. Athletes who participate because of extrinsic motivation participate in sports for external reasons, such as material rewards like medals and trophies.

Intrinsic

Intrinsic motivation refers to 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 wants 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 whereby they train and perform because they enjoy the experience.

Extrinsic

Extrinsic motivation means the rewards an athlete or a player gains for having succeeded at the activity. They might be awarded a prize such as a certificate, a ribbon or a medal, or might be praised and congratulated by their coaches 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 in order to undermine the participants' intrinsic desire to achieve.

Aggression and performance

Aggression and performance are directly linked to the arousal levels of an athlete. In sporting terms, arousal refers to an athlete's excitement or readiness to perform.

Optimum arousal levels vary from person to person and from sport to sport. If an individual is under aroused, performance can decline due to lack of motivation or boredom. Performance can also decline if the athlete is over aroused, as the athlete has trouble staying focused leading to infringing rules and errors in technique.

The inverted-U hypothesis, as seen in Figure 12.24 attempts to explain the relationship between arousal level and performance.



Figure 12.23:

Most athletes have a combination of intrinsic and extrinsic motivations for competing in their sport.

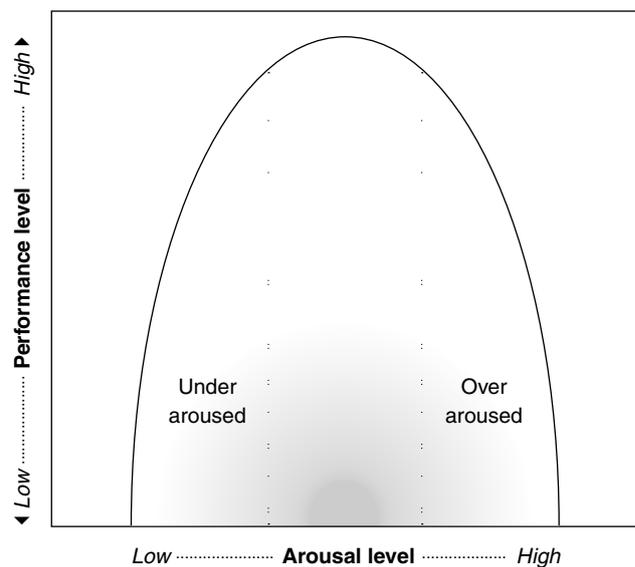


Figure 12.24:

The inverted-U hypothesis.

Learning activity

1. Assess the impact of positive and negative motivational strategies on performance.
2. Select and implement a range of coaching techniques to optimise participant attention and focus.
3. Describe sporting situations that may require higher than normal levels of controlled aggression.
4. Describe strategies that could lower levels of arousal if necessary.

The coaching program

Sporting competitions vary in their structure and timing. Some have minor events leading up to a major meeting that takes place over a small period of time. Some competitions are based around summer or winter seasons. Other competitions may continue for most of the year. Athletes need to be ready for competition, time their performance to peak at the right part of the season, avoid staleness and over-training, and factor in time to address chronic injuries. To address these issues, a coach should follow a detailed program that takes into account a scope and sequence, and human resources utilisation.

Scope and sequence of a coaching program

A scope and sequence is an important step in the design of effective coaching programs. It summarises what is to be covered in coaching sessions and the sequence in which it will be covered.

An organised and professional coach will have a season plan for the athletes under their care. The season may last as little as six months or, for some athletes, it may extend to most of the year. This plan will involve a scope and sequence, which is an overview of the competition year and the different phases within that year. These phases allow for different types of training to occur so that fitness levels and skill levels are achieved and athletes peak at the right time of the year. The breaking of the coaching season into phases is known as periodisation.

Periodisation

Periodisation is a systematic approach to organising and planning training within a coaching program. It involves dividing the training program into distinct periods or phases, each with specific objectives and focuses. The goal of periodisation is to optimise performance, prevent overtraining, and promote long-term development and peak performance during key competitions or events.

The macrocycle is the largest phase of the periodisation plan, typically spanning several months to a year. It represents the overall training cycle and is divided into smaller periods. The macrocycle is designed to address long-term goals, such as major competitions or athletic seasons. For example, in team sports, the macrocycle might cover an entire season, including pre-season, in-season and post-season phases.

Mesocycles are intermediate training blocks within the macrocycle. They usually last several weeks to a few months, focusing on specific aspects of training. Mesocycles can be classified into different types, such as preparation, competition, or transition. Each mesocycle has its training emphasis and aims to develop particular attributes or skills. For example, a preparation mesocycle might focus on building endurance and strength, while a competition mesocycle would prioritise refining skills and tactics.

Microcycles are the smallest units of training within the periodisation plan, usually lasting a week or less. They break down the mesocycles into detailed training sessions and exercises. Microcycles allow for more specific planning and adjustment based on individual or team needs. Coaches determine the volume, intensity, and type of training sessions in each microcycle, tailoring them to the athletes' abilities and goals. Microcycles often include specific drills, practice sessions and recovery periods.

Within the macrocycle, periodisation typically includes different training phases, each with its specific objectives and training focus. The common phases include:

- **General preparation phase:** this phase focuses on developing a general base of fitness, including improving overall strength, endurance and flexibility. It aims to lay the foundation for more specific training in later phases.
- **Specific preparation phase:** in this phase, the training becomes more specific to the sport or event. Athletes work on developing sport-specific skills, tactics and conditioning.
- **Competition phase:** this phase aligns with the competitive season or key events. The emphasis shifts to maintaining peak performance, refining skills, and tactical implementation. The training focuses on maximising performance during competition.
- **Transition phase:** this phase follows the competitive season and allows for recovery and regeneration. It aims to reduce training intensity while maintaining some level of physical activity, to prevent de-training. The focus is on rest, rehabilitation and mental rejuvenation.

Periodisation involves progressive overload and planned variation, gradually increasing the training load over time to stimulate adaptation and improvement. Coaches carefully monitor and adjust training parameters, such as volume, intensity, and frequency, to ensure athletes continually challenge themselves without risking overtraining. Periodisation also includes planned variations in training methods, exercises, and stimuli to prevent plateaus and enhance the athletes' responsiveness to training.

By implementing periodisation, coaches can effectively structure and optimise training programs, ensuring athletes peak at the right time while minimising the risk of injuries and overtraining. The systematic approach allows for targeted development, gradual progression, and adaptation throughout the training cycles, leading to improved performance and long-term success.



Figure 12.25:

A competition mesocycle would prioritise refining skills and tactics.



Figure 12.26:

In a transition phase, the coach would reduce training intensity while maintaining some level of physical activity in sessions.

Pre-season, in-season and post-season phases

A sports coaching program typically consists of three main phases: pre-season, in-season and post-season. Each phase has its specific focus and objectives, contributing to the overall development and success of the team or individual athletes.

The pre-season phase occurs before the competitive season begins and serves as a foundation for the upcoming challenges. The primary goals of the pre-season phase are:

- **Conditioning and fitness:** athletes work on improving their overall physical condition, including strength, endurance, agility and speed. This phase often involves intense training sessions, including cardiovascular training, resistance training, flexibility and plyometric drills.
- **Skill development:** athletes focus on enhancing their fundamental skills and techniques specific to their sport. This could include practicing specific drills, refining technical aspects, and working on individual skills.
- **Team building:** the pre-season phase is an opportunity to build team chemistry, establish team values, and develop trust among teammates. Coaches often organise team-building activities, bonding exercises, and encourage open communication to foster a cohesive team environment.
- **Tactical preparation:** coaches introduce and reinforce team strategies, tactics and game plans. They analyse opponents' strengths and weaknesses, develop strategies to exploit them, and devise appropriate game plans.

The in-season phase is the time when the team or athletes actively compete in scheduled games, matches, or tournaments. The primary goals of the in-season phase are:

- **Performance optimisation:** coaches focus on maintaining and improving the physical and mental performance of the athletes. This includes managing training loads, monitoring recovery, and optimising nutrition and hydration.
- **Skill refinement:** athletes continue to work on their technical skills during practice sessions, reinforcing good habits and addressing any areas that need improvement. Coaches provide specific feedback, individualised training, and game simulations to enhance performance.
- **Tactical implementation:** the strategies and game plans developed during the pre-season are put into action during competitive matches. Coaches may make adjustments based on real-time analysis of opponents and their own team's performance, aiming to maximise the chances of success.
- **Injury prevention:** coaches pay close attention to injury prevention and recovery strategies. They implement appropriate warm-up routines, monitor fatigue levels, and manage workload to minimise the risk of injuries. Rehabilitation programs may also be incorporated if any athletes are dealing with injuries.



Figure 12.27:

Athletes work on improving their overall physical condition in pre-season training.

The post-season phase occurs after the competitive season and typically involves reflection, evaluation and preparation for the future. The primary goals of the post-season phase are:

- **Evaluation and analysis:** coaches assess the team's performance during the season, analyse strengths and weaknesses, and identify areas for improvement. They may review match footage, statistical data, and gather feedback from athletes to gain insights for future planning.
- **Individual development:** coaches work on individualised plans to help athletes improve their skills, address weaknesses and set goals for the upcoming season. This may involve personalised training programs, workshops and specialised coaching sessions.
- **Rest and recovery:** athletes are given time to rest and recover from the physical and mental demands of the competitive season. Adequate rest is crucial to prevent burnout and ensure the long-term wellbeing of the athletes.
- **Off-season training:** depending on the sport, coaches may design specific off-season training programs to further enhance physical conditioning, skill development and tactical understanding. This phase prepares athletes for the next pre-season phase, setting them up for continued progress and success.



Figure 12.28:

Adequate rest and recovery is crucial to prevent burnout and ensure the long-term wellbeing of the athletes.

Internet activity

Log on to TitanOnline and complete Activity 12.7 to learn more about the different phases of competition.

Human resource utilisation

The head coach is the primary figure responsible for leading and managing a sports team. The task of coaching a team can be complex, so they can choose to delegate some of their roles and responsibilities to a network of support staff. These key personnel play a crucial role in different aspects of the team's operation.

Trainer

The trainer, often known as the strength and conditioning coach or fitness coach, focuses on improving the physical fitness, strength and endurance of the athletes. They work closely with the head coach to design and implement training programs tailored to the team's needs. The trainer plays a vital role in preventing injuries, optimising performance and assisting in rehabilitation.

Assistant coach

Assistant coaches work closely with the head coach to assist in various aspects of team management. They may specialise in specific areas, such as offence, defence, or specific skills, depending on the sport. Assistant coaches help with planning training sessions, player development, strategy formulation and in-game decision-making. They provide additional support and expertise to the head coach and may also act as a liaison between the players and the coaching staff.

Manager

The team manager handles administrative and logistical tasks, allowing the head coach to focus on coaching responsibilities. They are responsible for organising team travel, scheduling practices and games, coordinating with officials, and managing equipment and facilities. The manager ensures that the team operates smoothly off the field, providing support to the head coach by handling various administrative duties.



Figure 12.29:

An assistant coach may specialise in specific areas or skills, such as dribbling.

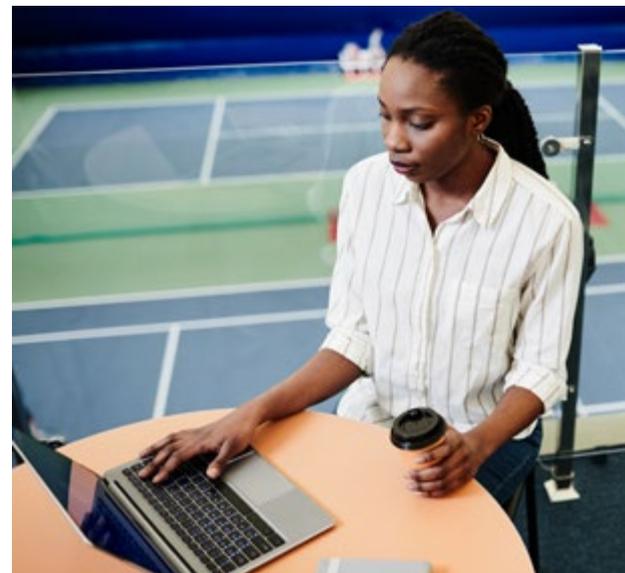


Figure 12.30:

The team manager handles administrative and logistical tasks.



Figure 12.31:

Medical support personnel work closely with the head coach to prevent, diagnose, and treat injuries and illnesses.

Selector

The selector works with the head coach to choose the best players to represent the club or representative teams. They work closely with the head coach to assess the skill levels, physical attributes and potential of athletes. They provide valuable input to the head coach during the player selection process, helping to build a competitive and well-rounded team. Selectors should follow set criteria to ensure the process is transparent and devoid of favouritism.

Medical support

The medical support personnel, including team doctors, physiotherapists, and sports therapists, play a crucial role in ensuring the health and wellbeing of the athletes. They work closely with the head coach to prevent, diagnose, and treat injuries and illnesses. Medical professionals provide immediate care during practices and games, develop rehabilitation programs, and advise on injury prevention strategies. They help the head coach manage player fitness and availability, ensuring the team performs at its best.

Learning activity

1. Develop a seasonal program including:
 - a. roles of the coaching staff
 - b. pre-season, in-season and post-season coaching plan
 - c. a checklist of the season's goals.
2. Clarify the roles of the various people involved in the coaching and team support processes.
3. Establish principles and processes for player selection.

Evaluating a coaching program

Part of creating and maintaining a coaching program is evaluating the program's effectiveness. Evaluations provide data that can be used to plan, monitor, assess, and evaluate coaching's processes and effects.

Evaluation gives those in charge of coaching programs information to improve practices and results. Evaluation results are used to redesign and refocus the program for the future as coaches learn what is working and what isn't.

The most effective evaluations include formative evaluation of the coaching program and of coaches. They include constructive feedback from multiple sources and a summative evaluation of the coaches and coaching program based on specified criteria.

Analysing player performance

One of the primary roles of the coach is to monitor and analyse the performance of individual athletes, their team and opposition teams. In the process of analysing, the coach may utilise statistics, standards, expert opinion and checklists to assess performance.

A key tool to improving sporting performance is analysis based on accurate observation. It allows coaches to analyse player performance equipped with the knowledge of the overall team or individual performance.

Performance analysis allows the creation of a valid and reliable record of performance, which is recorded through systematic observations. These records can be analysed at any time during the season to allow change to be facilitated.

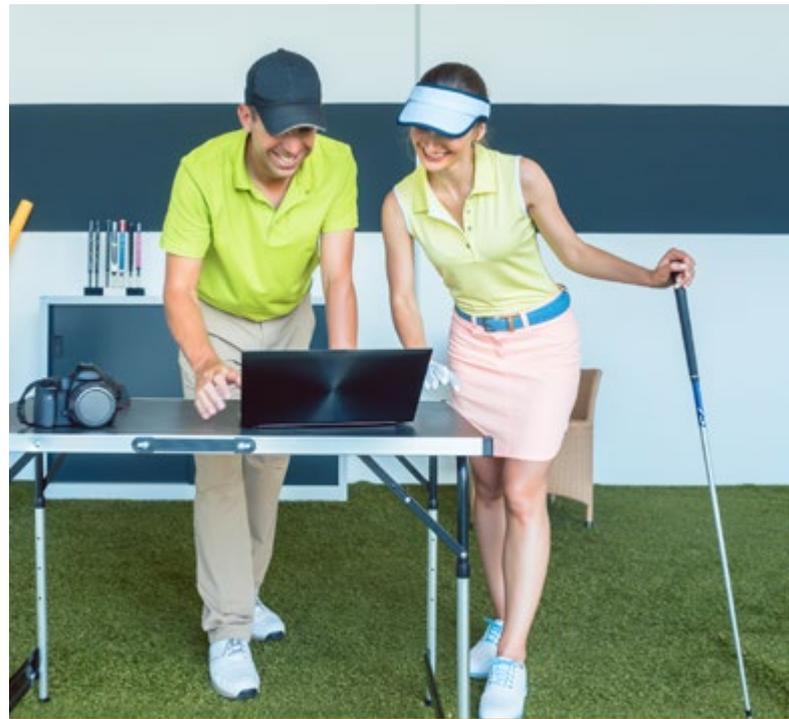


Figure 12.32:

A key tool to improving sporting performance is analysis based on accurate observation.



Figure 12.33:

Evaluation results are used to redesign and refocus the program for the future.

Statistics

Statistics is a mathematical science concerning the gathering, investigation, clarification or explanation, and presentation of data. It is applicable to a wide range of amateur and professional sports. Most professional teams employ individuals or companies to provide them with up-to-date statistics for their players and the opposition.

In Australian football, individual statistics such as disposals, kicks, marks, handballs, tackles, hit-outs, clearances, contested possessions and uncontested possessions are readily available. These statistics can be analysed at half-time or full-time and are a valuable tool for the coach and their staff. Once the statistics have been analysed, training sessions can be redesigned to improve individual or team weaknesses.

Standards

Many coaches use standards and norms to monitor athlete performance and development. Fitness testing standards are commonly used in sport. The standards are a very useful tool to interpret test results. For example, the vertical jump test is used to measure an athlete's leg power. In this test, the subject must jump as high as possible. Standards are used to determine the level of leg power.

Expert opinion

A coach should seek advice from knowledgeable individuals to improve their skills along with their players. An expert is a specialist in a subject, often technical, and provides their opinion. An expert is very skilful or has advanced knowledge in a particular area or field. Experts can help coaches identify areas of concern that have been unnoticed by the coach and their staff.

Advances in video analysis allow evaluation of individual and team performance. Video analysis is used for a variety of purposes in sport. Some of the more common uses include coaches using video analysis to review athletes' performance and to scrutinise opposition play as part of match preparation. Some sporting teams are even using video analysis to study the referees or umpires who control their games, in an effort to adjust their play to anticipate decisions that the referee might make in the game. It is also not unusual for coaches to use video analysis for self-reflection.

Source: Australian Sports Commission.



Figure 12.34:

Most professional teams employ individuals or companies to provide them with up-to-date statistics.



Figure 12.35:

Checklists are often used by coaches as memory aids to make sure that all relevant issues have been covered.

Checklists

A checklist is a set of criteria that is used to collect information and statistics. Checklists can be used during training sessions or while athletes are competing. Careful thought needs to be given to what information will be collected by completing a checklist so the information is accurate and reliable. Checklists are often used by coaches as memory aids to make sure that all relevant issues have been covered.

Coaches constantly analyse the players, athletes or participants they work with to help them further develop their skills and be the best that they can be. A coaching checklist is used to help identify a range of strengths and weaknesses. A checklist enables a coach to:

- formalise an opinion or idea about the individual and team
- identify strengths and areas for development
- monitor the success of strategies and tactics
- plan to address those areas for development.

Analysis of coaching and support personnel

Just as athletes are expected to learn new skills and to improve over time, coaches and associated support personnel must plan to develop their own skills and techniques. In order to improve, the coach must analyse how successful the current coaching program is.

Whereas most successful coaches are constantly self-analysing their activities and looking for more successful strategies, it is vitally important to seek player feedback on their perceptions of the coaching program and staff. If players have doubt or disagree with the coaching program, it undermines performance and team harmony, and signals a need for change. Even if the analysis is positive, in the end it is often the achievement of agreed goals that coaches are judged by.

Player feedback

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: Australian Sports Commission.

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.

Performance against goals

Goal setting is used by athletes as a motivational technique to measure performance and skill level. Goal setting allows athletes to remain focused and dedicated to training and performance. When goals have been set correctly, athletes can see what they have achieved.

Goals should be set in consultation with the coach during the pre-season phase of training. They should be revisited and revised as the season progresses. Goals that have been set correctly are a powerful motivating force and can be used to measure performance in training and competition.

Learning activity

1. Critically examine individual and team performance using video analysis.
2. Interpret player performance data in a sport of your choice using a range of statistics.
3. Design, apply and critique criteria for use as a player performance assessment tool.
4. Develop a strategic management plan for a coaching program that incorporates goals and indicators of performance.
5. Design a mechanism for including player feedback in the evaluation of coaching staff.



Figure 12.36:

Good coaches should be open to feedback from their athletes.



Figure 12.37:

Goal setting allows athletes to remain focused and dedicated to training.

Revision questions

1. Identify the characteristics of an effective coach.
2. Analyse the three main styles of coaching that have been identified.
3. Describe how work health and safety laws apply to coaches and sporting organisations.
4. Describe the benefits that are associated with accredited coaching courses.
5. Outline what is involved in the following elements of a training session that all coaches should include:
 - a. session introduction
 - b. warm-up
 - c. games, skill and fitness activities
 - d. cool-down
 - e. review.
6. Identify a range of safety issues a coach needs to consider.
7. Analyse how the following techniques are an important aspect of a coaching session:
 - a. instruction
 - b. demonstration
 - c. explanation
 - d. observation.
8. Outline the difference between intrinsic and extrinsic rewards, using examples to illustrate your response.
9. Describe the inverted-U hypothesis and outline how it relates to performance.
10. Describe what activities typically occur in pre-season, in-season and post-season phases of coaching.
11. Outline the role of the following coaching and support personnel:
 - a. trainer
 - b. assistant coach
 - c. manager
 - d. selector
 - e. medical support.
12. Identify a range of statistics that are used to examine individual and team performance in various sports.