PDHPE

DYNAMIC

PRELIMINARY

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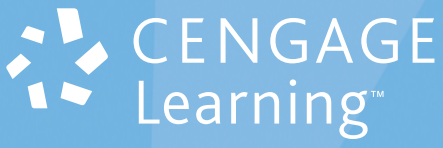

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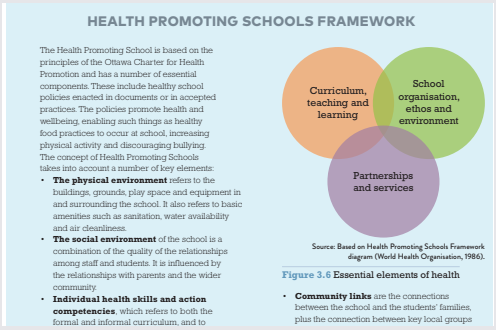
9780170386593

ABOUT THIS BOOK

This book has been completely rewritten. We have included new research in relevant areas. As well as the fresh new design, we have tried hard to give you a better, clearer, more useable book.

In each chapter



Case studies and articles throughout the text relate theory to real-life.

Rollover definitions work with the NelsonNetBook. Otherwise, go to the Glossary pages at the end of the printed book (page 335).

Investigate

Go to the Black Dog Institute website to read and watch short video clips about Headstrong 2.0 school resources.

FYI

For up-to-date figures, there is also a Global Burden of Disease study, which is published each year.

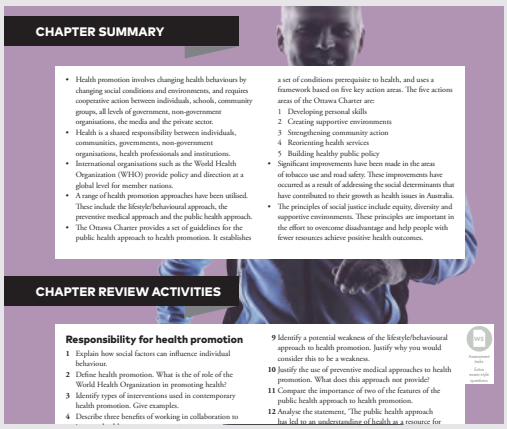
Watch

The animation 'Anatomical terms of movement' by Mark Barwell (2011) describes simply the range of movement of parts of the body.

There are many types of activities, questions and tips within the chapters.

Weblink

There are no URLs printed in the book because they change often. Instead, there is a link (http://nelsonpdhpe-prelim.nelsonnet.com.au) to a free-access website where you will find a list of all the weblinks in the book. You will not need to use your login code to access the weblinks.
A weblink icon also alerts you to web-based activities and videos.
A scaffold icon is used occasionally, to notify you that you can fill in a prepared (blank) table online. This is also on your student website.



Each chapter has a dot point summary of the relevant key knowledge at the end.
Chapter revision questions follow.
Exam-style questions with marking guidelines and some model responses are on your student website for each chapter.
Two scaffolded **assessment tasks** are on your student website at the end of each Core/Option.

On the NelsonNet website

The NelsonNet student website has:

- worksheets for extra fitness tests (Core 2)
- a few templates (scaffolds) of tables, so you can fill them in online or print them out
- exam-style questions for each chapter
- assessment tasks for each core/option.
  You will need to log in to your student website (http://nelsonnet.com.au) for these, using the code in the back of the book.

We hope you find this book and online resources useful!

ABOUT THE AUTHORS

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CORE 1: BETTER HEALTH FOR INDIVIDUALS

CRITICAL QUESTIONS

What does health mean to individuals? **2**
What influences the health of individuals? **44**
What strategies help promote the health of individuals? **69**

Source: Personal Development, Health and Physical Education Stage 6 Syllabus
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OUTCOMES

When you have finished this section you should be able to:

- identify and examine why individuals give different meanings to health
- explain how a range of health behaviours affect an individual's health
- describe how an individual's health is determined by a range of factors
- evaluate aspects of health over which individuals can exert some control
- describe factors that contribute to effective health promotion
- propose actions that can improve and maintain an individual's health
- form opinions about health-promoting actions based on a critical examination of relevant information
- use a range of sources to draw conclusions about health and physical activity concepts.

KEY TERMS

determinants of health
dimensions of health
health literacy
health promotion
Ottawa Charter
physical activity
protective behaviours
risk behaviours
sedentary behaviour
social construct
social justice

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CHAPTER 1
Individual health

IN THIS CHAPTER:

Meanings of health 2
Perceptions of health 8
Health behaviours of young people 17

MEANINGS OF HEALTH

In this chapter we will examine the dynamic nature of health by exploring:

- the interactions between the dimensions
- the concept of good health
- the health continuum
- how health changes over time
- how an individual's circumstances affect their health.

Health can have different meanings for different people. This means it is difficult to define health in a way that satisfies everyone. The way we define health is influenced by many factors, including our cultural background, age and geographic location. The way we think about health has changed over time, and health has been described and defined in many different ways throughout history. These understandings range from ancient notions of health that were linked to the supernatural, to the modern emergence of **health promotion**, which was built on the ideals promoted in the **Ottawa Charter**.

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Figure 1.1 Health means different things to different people.

Definitions of health

The definitions of health have changed over time as our understandings of medicine, science, and the influence of both the physical and social environment have increased. For example, until the middle of the 20th century, health was defined as 'the absence of illness or disease'. This one-dimensional view of health was held because at the time, communicable diseases were the most common causes of sickness and death, so it was accepted that not having a disease meant a person was healthy.

This notion was based on a biological view of health. The body was seen as a physical entity that could be harmed by biological organisms, including infectious diseases that restricted normal body functions, such as influenza.

Scientific and medical understandings of the causes of illness and disease increased throughout the 20th century. It was established that illness and disease were closely related to environmental conditions, such as poor environmental hygiene, including the state of water supplies, sanitation and waste disposal, as well as the storage and preparation of foodstuffs. This discovery changed the way health was viewed and led to greater control over infectious diseases. Improvements in medical technology meant many of these diseases could be not only controlled, but in many cases eradicated by immunisation programs (new medications) and the introduction of advanced medical procedures. This meant that many diseases could be treated and prevented, increasing life expectancy. Suddenly, good physical health could be a reality for most people.

As our understanding of health evolved, the predominant cause of sickness and death was linked to lifestyle behaviours. The impact of mental, social and spiritual wellbeing on health needed to be acknowledged. In 1948 the World Health Organization (WHO) defined health as '... a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'. In 1986, the WHO introduced the Ottawa Charter, marking the beginning of a new era of public health. The charter advocated that health should be viewed as a human right to be incorporated in all public policy and decision-making. The WHO further revised its definition of health, seeing it as 'a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities'.

HEALTH AS A HOLISTIC CONCEPT

The most widely accepted definition of health was set out in the preamble to the Constitution of the World Health Organization (WHO) in 1946. WHO encourages an holistic concept of health, defining health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO 1946). This definition includes mental and social dimensions and moves the focus beyond individual physical abilities or dysfunction.

Even more broadly, Aboriginal and Torres Strait Islander people view health as 'not just the physical well-being of the individual but the social, emotional and cultural well-being of the whole community' (National Aboriginal Health Strategy Working Party 1989). An ongoing and active relationship with 'country' means that the health of community land plays an important role in determining the health of the people themselves (Green 2008). This view of health takes a whole-of-life approach and can include the cyclical concept of life–death–life.

Source: Australian Institute of Health and Welfare 2014, *Australia's health 2014*, Australia's health series no. 14, Cat. no. AUS 178. p. 3, Canberra.

Dimensions of health

Interactions between the dimensions

The concept of health is diverse and can mean different things to different people. However, according to WHO's holistic definition, there are five interrelated dimensions of health:

- physical
- social
- emotional
- mental
- spiritual.

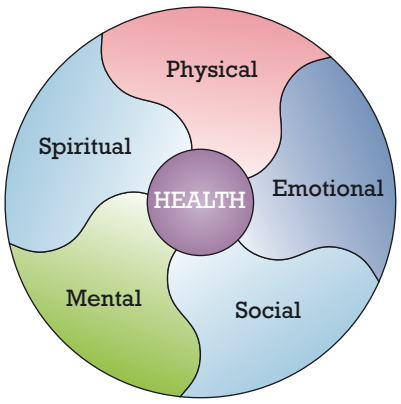

Figure 1.2 The dimensions of health

These dimensions can be seen in Figure 1.2. It is important to recognise how the interaction between these five dimensions affects a person's overall health. Health is a relative and dynamic construct, so a change in one dimension will affect the others.

Physical dimension

The physical dimension of health is concerned with how the physical matter of the body functions. This will depend on fitness, nutrition and energy levels, size, weight, movement capacity and the level of physical disease or disability suffered by the individual.

Social dimension

The social dimension of health refers to the way people interact and communicate with others. To be socially healthy, a person needs to be able to relate to family, friends, teachers or people of authority. A socially healthy person will follow accepted standards of behaviour in an environment where socialisation, interaction, companionship and friendship can be maintained with other members of society. It is important to note that this interaction will be different for most people, as it depends on the personality of the individual and the opportunities for social development that are available to them.

Emotional dimension

The emotional dimension of health refers to the way people react to certain stimuli in their life, and is reflected in a person's mood or general emotional state. To be emotionally healthy, a

person needs to maintain a realistic perspective, manage their feelings appropriately and develop resilience in order to deal with difficult situations in a positive way. Good emotional health will allow a person to minimise stress and contribute to a happy, stable environment, incorporating independence, love, affection and encouragement. Good emotional health leads to positive self-esteem and self-image.

Mental dimension

Mental health is often associated with, and sometimes indistinguishable from, emotional health. However, the mental dimension of health relates to the cognitive attributes of a person, such as their ability to problem solve. Good mental health allows an individual to maintain self-confidence, cope with stress and manage problems in a socially acceptable manner.

Spiritual dimension

The spiritual dimension of health takes on different meanings for different individuals. This dimension is often linked to the concept of an individual's overall purpose in life, and their sense of connection. For some, this can be described as moral or religious wellbeing. For others, spiritual health can mean a deep sense of life's purpose, or just being in harmony with oneself and one's surroundings. The spiritual dimension can encompass the development of a conscience, interpreting the difference between right and wrong and establishing personal beliefs, attitudes and values.

The dimensions of health are closely interrelated. Viewing health holistically helps us to understand that a change in one dimension of health will lead to changes in the other dimensions. For example, someone who is usually able to maintain areas of their life in balance, but who suffers a serious injury and requires a long period of hospitalisation, may find that certain aspects of their health are negatively affected. The impact on their physical health, such as constant pain or lack of mobility, could make it difficult to socialise with family and friends. A prolonged period of recovery could increase the risk associated with the mental and emotional dimensions of health, such as depression.

Relative and dynamic nature of health

Health is a relative concept, meaning that it can be viewed in relation to the health status of others. People often evaluate their own level of health by making comparisons to other people, or to their own health at a different point in time.

Good health

Individuals have differing personal characteristics and are influenced by different determinants, and so have unique life experiences. On the basis of these differences, each individual has their own potential for achieving the best possible health. One person's description of good health might be quite different from that of another person living in different circumstances. For example, an elderly person with limited mobility and deteriorating sight might describe their health as good, because they have a healthy mind and keep in close contact with friends, whereas a teenager in the same circumstances may not describe their health as good.

Health is a continuum

The concept of dynamic health refers to changes in health status. These can occur at any time in a person's life, and can be acute (occurring from minute to minute), often with little warning, or chronic (occurring over a longer period of time). A person who is in a healthy state but then suffers a dramatic event such as a sudden injury or illness will experience an acute change in health status. A person's health status can also change slowly over time as they age, leading to a deterioration in fitness levels and/or other bodily functions, such as hearing ability. This is a change in health status over a prolonged period, which further demonstrates the dynamic nature of health.

Health changes over time

Dynamic changes in health status require an individual to adapt in order to recover more effectively, or to develop strategies to cope with these changes. An individual's ability to adapt can have either a positive or negative influence on their health.

The relative and dynamic nature of health can best be represented on a continuum. The opposing ends of the continuum represent premature death at one end and optimal health at the other. At different times throughout their life, individuals can experience positive or negative movement on the continuum, depending on their circumstances. For example, an individual who developed type 2 diabetes during mid-life would move lower down the continuum, while an individual who participated in a **physical activity** program would move higher up the continuum. Where a person sits on the continuum is subjective, and is dependent on numerous factors. As individuals develop, grow and age, their understanding of health changes. These changes can be attributed to:

- time constraints due to the demands of school, work and family
- supportive social networks
- increasing or decreasing physical capabilities
- motivation and value placed on physical activity and good health
- gender and age.

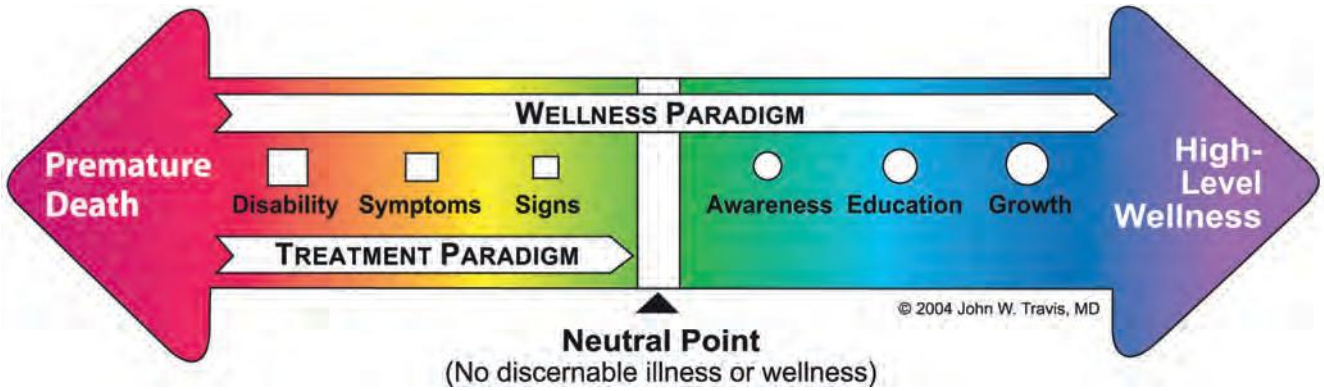

Figure 1.3 The health continuum

Weblink

AIHW reports

Visit the Australian Institute of Health and Welfare (AIHW) website. Explore the website and identify two reports that you feel are important representations of the health of Australians.

Make a brief summary of the key findings of both reports. Consider the following questions:

1 Are there any statistics that surprised you – either in terms of high or low prevalence rates or representations of age groups and differences between genders? Share your findings with a partner.

2 Discuss why you chose those particular reports to investigate.
   a Why did you think it was important?
   b Did your partner have a different reason for choosing their particular reports?

How an individual's circumstances affect their health

An individual's health status can and will vary with a change in circumstances (see Figure 1.3). A person's health status is determined by both hereditary and environmental factors. Hereditary conditions and characteristics can influence an individual's health both positively and negatively, and the environment in which a person lives can also have a profound effect. Environmental factors provide the background for lifestyle and behaviour, and include physical, sociocultural, sociopolitical and socio-economic factors. An individual's 'circumstances' result from their responses to the environment in which they live.

Physical environment

Developments in medical science have eliminated many diseases, particularly communicable diseases such as typhoid and smallpox, which were once considered serious threats to community health. The effects of other diseases such as measles have been substantially reduced through immunisation. There have also been major improvements in living conditions, including sanitation, housing and water supplies. This has contributed to improvements in life expectancy, infant mortality and mortality rates. However, there are now other physical threats emerging that could affect the health status of people across the globe.

The physical environment has both natural and built (man-made) components. Pollution is a major source of concern. Air and water quality, harmful levels of noise, the use of pesticides, and contamination from substances such as lead, radioactive materials and other pollutants can all affect health adversely. This is contributing to increases in respiratory diseases such as asthma, and other allergic reactions.

The quality of the physical environment plays a vital role in any individual's circumstances. Global warming is being monitored and scientists are trying to predict its effects. Any impacts on health will be global, though issues such as rising sea levels, food production, agriculture and climatic changes could have different consequences in different locations.

Sociocultural environment

Many inequities exist between different groups in Australia. These inequities create different circumstances for each group or individual. The capacity to respond to their circumstances in a constructive way will influence health outcomes for each group or individual.

Some of the sociocultural factors that influence health include: ethnicity, gender, education/employment and geographical location. Ethnicity refers to an individual's cultural background. This can influence the way people live, eat, carry out daily routines, interact socially and develop values and attitudes. Sex determines an individual's biological circumstances, which direct different health behaviours. Socially, gender can influence roles in society and the way people respond to different situations. Males and females in the same

Alamy Stock Photo/Penny Tweedie

Figure 1.4 Technology can help reduce isolation for people in remote communities.

environment often find themselves in different circumstances because of their different responses. For example, statistically, males are less likely than females to access health services when confronted with a potential health problem.

A lack of education may restrict a person's understanding of the need for health services, and can also limit their ability to access them. Educational attainment is also closely related to employment and socio-economic status, both of which are linked closely to health status. Control over health and access to services are more likely to improve with higher education levels and employment/financial status.

Urban residents usually have greater access to jobs, healthcare and other services than those living in rural and remote areas. Isolation and a lack of social facilities and health services can all increase the likelihood of issues such as depressive illness in rural areas. Recent advances in areas such as technology have provided smaller rural communities with increased levels of communication and support, having a positive impact on levels of educational attainment and health support.

Socio-economic environment

Low socio-economic status (SES) has been shown to have a profound and detrimental effect on health. People who experience low SES often lack the material and financial resources necessary to improve health outcomes, and are often associated with lower levels of educational attainment. Of all circumstances affecting health status, low SES is one of the most difficult to overcome. Knowledge and information are often not enough, especially in the case of children and young people, who have limited control over their circumstances. Access to quality education has been identified as one of the keys to overcoming disadvantage in the long term.

Political environment

This determinant of health status reflects on the decisions, policies and laws that will affect the community. Governments (federal, state and local) decide where money will be spent on health. Unfortunately, this can sometimes lead to inequities in health status. Examples include the closure of rural hospitals and the difficulties in finding doctors and health personnel to work in outlying areas.

Major change

In groups, select one of the four environments that influence health status: physical, sociocultural, socio-economic or political. Identify a major change that has occurred in that environment in Australia over the past 20 years.

1 Consider how the change affected the health of young people, either positively or negatively. Provide at least one example of a particular health behaviour that was affected.
2 Prepare a presentation to inform the class of your findings. After the presentations, undertake a class discussion linking the four environments together.

PERCEPTIONS OF HEALTH

In this section we will examine perceptions of health by exploring questions such as:

- How healthy am I? How healthy do other people think I am?
- How healthy do I think other people are?
- Why would my perceptions of health be similar to or different from others'?
- How might an individual's perception of health affect their behaviour and wellbeing?

Different people have different understandings of health. For some people it may be the absence of any illness, disease or physical affliction that prevents them from participating in normal life activities. For others, it could be a feeling of total wellbeing. The way people perceive health is subjective and depends on several factors, including personal experience and age.

Changing perceptions of health

Our perceptions of health change as we change. For example, a child may see health as being able to play with friends and eat food to help them grow. A teenager or young adult may see health as being physically fit and able to enjoy a good social life. An older adult may view health as the ability to complete daily chores and participate in social activities without experiencing pain or undue tiredness.

Getty Images/FatCamera

Figure 1.5 Being able to play can affect a child's perception of their health.

Everyone has their own personal interpretation of health. These personal meanings will be influenced by each individual's experiences. A person's view of their own health will affect the attitudes they develop, the choices they make and the way they behave and live. These viewpoints change throughout a person's lifetime according to factors such as age, gender, education, socio-economic status, sociocultural status, family, peers, the media, heredity and lifestyle.

An individual is more likely to think positively about health if their basic needs of food, shelter, warmth and clean air and water are met. The provision of these basic needs can help a person develop a general sense of belonging and acceptance within the family and social structure. A sense of belonging and self-esteem will encourage the individual to take opportunities when they arise, such as opportunities to improve education, career or lifestyle.

How we perceive the health of others

The way we think about the health of other people is shaped by the perceptions developed through our own unique experiences. This is because the environment in which an individual has grown up influences what they consider to be good health.

Parents

An individual whose parents enjoy good health, access health services regularly, understand the role of nutrition and are fit and active has positive role models to shape their expectations. Conversely, an individual whose parents suffer from chronic health problems may develop negative expectations of the health status of older people.

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Figure 1.6 Fit and healthy role models are a positive influence for young people.

Understanding the health of others

An individual with more diverse experience of society is more likely to develop different understandings of health status. For example, someone who has worked or lived with the elderly or the homeless will have a better understanding of the health issues each group faces, while an individual who is familiar with different cultures will be able to perceive health from a range of different cultural perspectives.

The following indicators shape perceptions of the elderly:

- general health standards and presence of chronic conditions
- levels of social interaction among peers, family and social networks
- mental health status and cognitive functioning
- mobility and physical functioning.

In many cases, an individual who has limited experience with other groups within society may develop stereotypical perceptions. These views can be restrictive, because they limit the individual's ability to change their views.

Different perceptions of health

The way people perceive health has many implications, and can influence how the community focuses on health needs. In the first half of the 20th century, when health was viewed as an absence of disease or illness rather than as optimal wellbeing and quality of life, a person's health was seen solely as their responsibility. This ignores the fact that there are many factors outside the individual's control that can contribute to illness and disease. These include hereditary factors such as sex and environmental factors such as air, water, noise and chemical pollutants. Defining health as the absence of disease does not allow for community measures to improve

the social environment and living conditions. This approach favours a curative approach, rather than taking a more holistic, preventive approach to improving health.

A more holistic view of health provides for a broader concept, involving the mind, spirit and physical body working together. A holistic view recognises the influence of environmental factors, such as education, employment, age, gender, geographic location, ethnicity, government policy and the media, on social, emotional, mental and spiritual wellbeing. When people perceive health in this way, they can develop the attitudes required to advocate for change. When communities view health in this way, they can work together with governments to improve social conditions, creating better health prospects for individuals. It is important to remember that perceptions are open to change.

Getty Images/Lynn Gail

Figure 1.7 Perceptions are always open to change.

Impact of the media, peers and family on perceptions of health

The development of an individual's personal values and beliefs is greatly influenced by their peers, family and the mass media. In today's society, the media plays a key role in the way people not only perceive health, but also the way they react to health issues.

Media

The impact of the media on health has dramatically increased in line with advances in technology, most notably through the internet, social media and increased access to media outlets via personal devices. The health messages transmitted by the media can be positive or negative. Advertisements in print and electronic media that encourage negative behaviours such as unhealthy eating and alcohol consumption are common, and are often linked to sponsorship and particular activities, such as sports events. However, the media also has the power to promote healthy behaviours in relation to diet, exercise and responsible alcohol consumption.

The media also influences the way our peers and family view health. This is significant, as peers and family often reinforce individual perceptions of health (often already absorbed through the media). Determinants that can influence an individual's relationship with peers and family and their perceptions of health include socio-economic status, unemployment and education.

Socio-economic status

Lower levels of socio-economic status relate closely to poorer levels of health. This is often due to limited access to transport and facilities, such as health professionals and clinics.

Employment

Unemployment contributes strongly to poor health status. The unemployed or those in lower-paid jobs often have limited opportunity to purchase healthy foods and to live in safer and better-quality housing.

Education

Groups that have lower levels of education are less likely to be able to access support services that can assist in raising the levels of health.

Peers

Peers can have a powerful influence on individual perceptions of health, particularly among young people. Most young people belong to a social group made up of like-minded individuals who provide support, friendship and a sense of connection. These groups often share similar goals and values, and as such can have both positive and negative influences. For example, a group of friends may influence an individual to participate in physical activity, which is positive. Conversely, they may encourage them to drink alcohol excessively, which is negative.

Peer groups may cause emotional stress through their demands that individuals conform to certain behaviours. The nature of the relationship between the individual and the peer group is critical. The influence of the peer group may hinge largely on the individual's capacity to resist negative peer influences and to support positive influences. The most important influence is the sense of belonging experienced by the individual within the peer group. Individuals who struggle to connect with others and to establish social networks are at greater risk of poor health than those who are able to form these connections.

Family

The family relationship is one of the biggest influences on our perception of health, particularly early in life. The way families perceive health influences how they think about health status and health behaviours. For example, parents who encourage children to participate in physical activity, reinforcing this as healthy, positive lifestyle behaviour will provide a different message to parents who allow their children to eat junk food on a regular basis. Young people tend to accept the basic principles of lifestyle based on their experiences throughout their own childhood. Attitudes to health formed in childhood are more likely to carry through to adulthood than to shift dramatically. Schools can have some influence, too. As young people get older, family influence can often give way to peer influence.

Investigate

Go to the Black Dog Institute website and look at their free school resources. You can find anxiety and depression checklists on the Beyond Blue website and on the NSW Active and Healthy website. There are also a range of websites and checklists that can assist with meal planning and nutritional intake, such as the NSW Healthy Kids website.

Examining my perceptions

How healthy am I?

Examining your own health requires self-analysis, and also involves accepting feedback from others. To develop an accurate self-assessment, an individual must have a holistic view of health that includes the physical, social, emotional, mental and spiritual dimensions. This requires a deep level of understanding. Remember, it can be difficult for others to draw conclusions about the health of an individual.

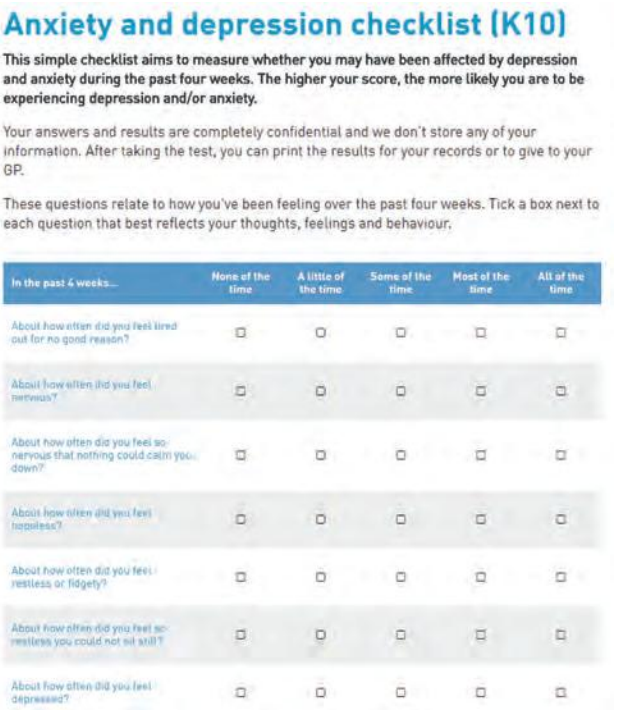
Medical records can provide a picture of physical health, but often will not provide information on the other aspects of life, such as social, emotional, mental and spiritual health. There are a range of checklists and interactive sites available that can help people to determine

their health status, but it is important to remember that a health professional should always be consulted to discuss any concerns.

Some programs for health

There are some health programs delivered in schools, such as the Black Dog Institute's HeadStrong program, which helps young people better understand mental health and teaches them how to build wellbeing and resilience. The program is designed to change the way young people think about health issues, reducing stigma and increasing understanding of mental health issues. The program also teaches students to recognise signs of mental health issues in their peers, and to provide increased support for help-seeking behaviours.

Source © 2018 Beyond Blue Ltd at www.beyondblue.org.au. Checklist based on the Kessler 10 (K10) psychological distress scale, from the work of Professor Ronald C. Kessler, Harvard Medical School.



Anxiety and depression checklist (K10)

This simple checklist aims to measure whether you may have been affected by depression and anxiety during the past four weeks. The higher your score, the more likely you are to be experiencing depression and/or anxiety.

Your answers and results are completely confidential and we don't store any of your information. After taking the test, you can print the results for your records or to give to your GP.

These questions relate to how you've been feeling over the past four weeks. Tick a box next to each question that best reflects your thoughts, feelings and behaviour.

In the past 4 weeks...	None of the time	A little of the time	Some of the time	Most of the time	All of the time
About how often did you feel tired out for no good reason?	☐	☐	☐	☐	☐
About how often did you feel nervous?	☐	☐	☐	☐	☐
About how often did you feel so nervous that nothing could calm you down?	☐	☐	☐	☐	☐
About how often did you feel hopeless?	☐	☐	☐	☐	☐
About how often did you feel restless or fidgety?	☐	☐	☐	☐	☐
About how often did you feel so restless you could not sit still?	☐	☐	☐	☐	☐
About how often did you feel depressed?	☐	☐	☐	☐	☐

Sourced from Healthy Kids at www.healthykids.nsw.gov.au

Figure 1.8 Left: The Beyond Blue 'Anxiety and depression checklist'; Right: The NSW Healthy Kids website

Reflection

1 Why is it important to discuss any health concerns you have with a health professional?
2 Why is it important to collect as much information as possible before considering the health of others?

Challenging perceptions

Search for the *ABC News* article 'The "sober generation": Australian teens snubbing alcohol and cigarettes thanks to parents, researchers say', published on 13 January 2018, or follow the link.

Weblink

1 How do you think the article challenges the way young people are generally portrayed in the media?
2 What do you think are the key reasons behind young people drinking less, as reported in the article?

How healthy do I think other people are?

The way we think about the health of others reflects our own view of health and our level of knowledge. It is influenced by education, values, family and experience. To avoid making uninformed judgements about other people's health, you need to collect information to support your views. The same process occurs at a national level, to help governments decide on priority areas and how to allocate funding. To do this, data is collected on the health status of people within particular groups in society. This collection of data is called **epidemiology**. The morbidity and mortality rates of a group at any given time, or over time, are measured. Doctors and hospitals also record the number of hospital admissions for a particular group in society, or a particular age group. This information can be found in many places, including the Australian Institute of Health and Welfare (AIHW) website.

Weblink

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Why would my perceptions of health differ from others?

Individual perceptions of health will vary, and will also change over time. This is because each person views their health based on their own experiences, as well as on what they perceive to be optimal health. A person's perception of health status is largely dependent on the following factors:

- **Sex:** Whether a person is male, female or intersex, and the health conditions that affect each sex.
- **Beliefs:** A person who believes that health is an important aspect of their life will try to engage in better health practices.
- **Age:** People of certain ages are more susceptible to particular diseases or illnesses than those of other age groups.
- **Physical environment:** The environment in which people live and the resources and facilities they have available to them will have a positive or negative effect on health status.
- **Lifestyle:** People whose lifestyle includes preventative measures, such as healthy eating and regular exercise, are more likely to enjoy better health status.
- **Socio-economic status:** A person's social and economic standing will affect their health status. Generally, the wealthier the person, the higher their level of health. Conversely, the poorer the person, the lower their level of health.

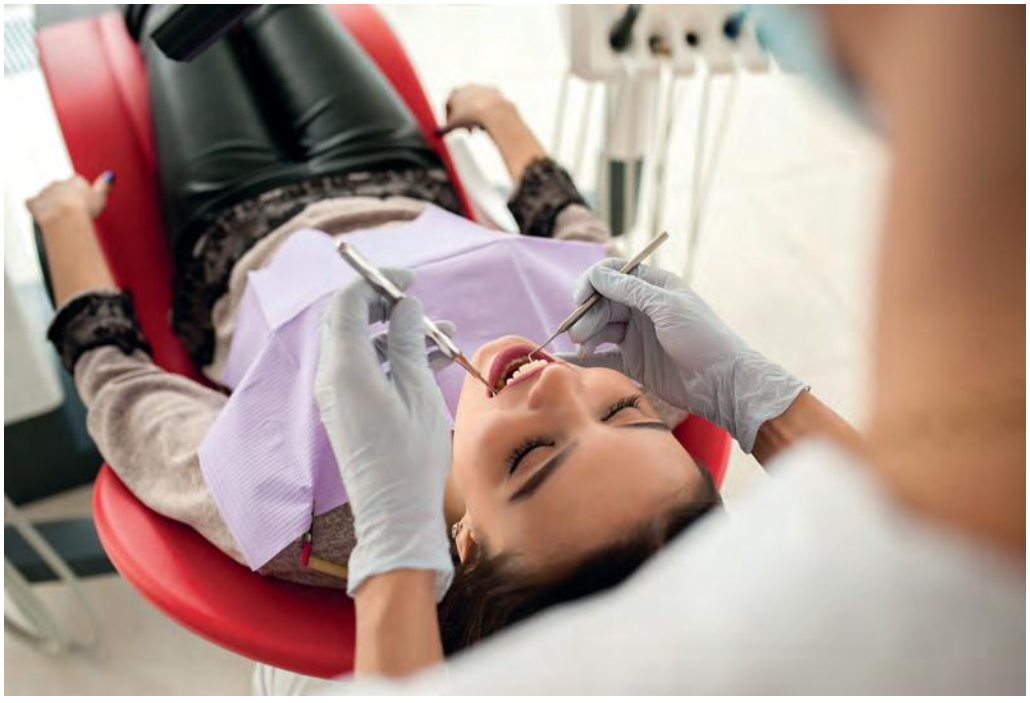
- **Cultural background:** Some cultural groups experience poor health status – in particular, Aboriginal and Torres Strait Islander people. Health may be perceived differently in different cultures. Behaviours and attitudes deemed to be positive and valuable in one culture might be seen differently in another.
- **Education levels:** Knowledge and education about healthy lifestyle can improve health status. There is a strong correlation between level of education and employment, and health status.
- **Geographic location:** Where people live can affect their ability to access adequate health resources such as experienced health professionals, and this can affect their health status.
- **Hereditary factors:** Many people's health status is compromised by an inherited disease or health condition.

How might a person's perception of health affect their behaviour and wellbeing?

Just as health sits on a continuum, so do perceptions of health, varying between positive and negative, informed or unaware. It is important that any perception regarding health is accurate. An individual who does not understand the impact of **risk behaviours**, or is unable to identify the determinants of poor health, is more likely to put their own health at risk. An individual who knows about health issues is more likely to identify the impact of risky behaviour.

Social support is important, and most individuals develop their understanding of health from family values, as well as from peers and friends. Individuals whose family and friends exhibit positive health behaviours are likely to perceive health as a positive experience that is worth protecting. Individuals whose family and friends model negative health behaviours are less likely to value health as a resource for life, and will be more likely to engage in high-risk behaviours.

Having a social view of health can also be valuable, because it can help an individual understand that health is relative and dynamic, and therefore able to be changed. Developing a positive attitude is also important. An individual with an optimistic outlook is more likely to have the motivation to maintain good health practices. Resilience is a valuable quality for achieving this.



Shutterstock.com/SFROLOV

Figure 1.9 Regular health checks help maintain good health.

Survey

1 In small groups, create a 10-question survey to determine the health status of young people. Randomly survey other members of the class (do not record any names).
2 Set up a continuum at the front of the classroom with one end labelled 'positive' and the other labelled 'negative'.
3 One member of your group should read the responses from one randomly selected survey, while another member moves up and down on the continuum to express how healthy they believe the person is in relation to that behaviour.
4 After reading all areas of health from the personal survey, the reader should ask the group to decide which position on the continuum best describes the health status of the person depicted.

Case studies

Read the following case studies and then place the person discussed in each case study somewhere on the continuum.

Compare your ratings with others in the class, and justify your choice of placement on the continuum (or change it, if you feel you were wrong).

Unhealthy _____ Healthy
1 2 3 4 5 6 7 8 9 10

Edith is a 75-year-old woman. She is mostly housebound due to an arthritic condition, and is overweight, but she eats healthy food that she prepares herself. Edith enjoys visits from her family and friends, and she likes to read, watch television and listen to the radio.

Jake is 15 years old and enjoys school and sports. He works out most days at school, and will often go to a fast-food shop with his mates on the way home. He still manages to eat the dinner his mother prepares, and he is not overweight. On the weekend, Jake spends most of his time with his family, rather than his mates.

Brian is 45 years old and works in a bank. He drinks quite heavily each day, but does not smoke. Brian does not work out, but regularly competes in sailing regattas. Brian eats well, though he often misses meals. He is a little overweight, and is not in a permanent relationship.

Josie is a 34-year-old nurse who works in the emergency ward. She often feels stressed, and finds it difficult to sleep when she is on night shift. Josie eats healthy food, goes to the gym and has a partner and a wide group of friends. Josie is a social drinker and a light smoker.

Weblink

Australia's health 2016

Access the document *Australia's health 2016* on the AIHW website.

Go to Chapter 5, Section 5.3, 'How healthy are Australia's children?' and Section 5.4, 'Health of young Australians'.

Answer the following questions:

1 What is the framework created by the Council of Australian Governments Health Council to ensure children have the best possible start in life?
2 Discuss how children's rates of preventable injury and mortality have dropped.
3 Suggest reasons why less than 25 per cent of children aged 5–14 meet the national physical activity guidelines.

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4 Discuss the phrase 'young people are active, healthy and thriving'. Do you agree with this statement? Create an argument for or against, based on the figures provided in Section 5.4 of *Australia's health 2016*.
5 Identify emerging health problems for young people that are discussed in *Australia's health 2016*.

Perceptions of health as social constructs

Health is valued in different ways depending on stage of life, living environment and the different circumstances people experience. Perceptions of health are judgements made by individuals based on their observations and experiences. Most of those judgements are based on values that have been established through interaction with family and the community over time.

The way we view health is shaped by the society around us, meaning that it is a **social construct**. Our view is influenced by factors including the social, cultural and economic environment, socio-economic status, education, culture, family, friends and location.

Social construction is the process of making meaning out of personal experience. When individuals attribute a meaning and a value to their own health, based on their own experiences and judgements, they are responding to the influence of a range of social determinants. Viewing health from a sociocultural perspective recognises that family, culture, friends, living conditions and the natural environment can all interact to influence our perceptions of health. Perceiving health as a social construct also recognises the fact that the meanings associated with health and our health status will change from person to person, from culture to culture and over time.

HEALTH BEHAVIOURS OF YOUNG PEOPLE

In this section we will explore the positive health status of young people, including current research and information identifying trends in the health behaviours of young people.

SNAPSHOT OF YOUNG PEOPLE'S HEALTH

- 93% of Australian children were fully immunised by the time they started school in 2015
- 26% of children aged 5–14 and 22% of young people aged 15–24 are overweight or obese
- 74 000 children aged 0–14 and 80 000 young people aged 15–24 were hospitalised in 2013–14 due to injury and poisoning
- 39% of young people aged 15–24 drink alcohol at levels that put them at risk of harm
- 2.5% of children aged 5–14 and 3.3% of people aged 15–24 eat enough fruit and vegetables
- 10% of children aged 4–12 were classified as having abnormal social and emotional wellbeing in 2013–14
- 14% of young people aged 12–17 had experienced a mental health disorder in the last 12 months
- 11% of young people aged 15–24 were current daily smokers in 2013, compared with 21% in 2001

Source: Australian Institute of Health and Welfare 2016, *Australia's health 2016*, Australia's health series no. 15, Section 5.4, Cat. no. AUS 199, Canberra.

Adolescence and young adulthood has been identified by the AIHW as a significant period of transition in a person's life.

The AIHW has also identified numerous modifiable behavioural risk factors that can affect both the current and future health of young people, that either emerge or become increasingly prevalent at this time. Given the importance placed on health at this age, and the fact that there are 3.1 million young people aged 15–24 in Australia, the Council of Australian Governments

(COAG) Health Council has endorsed the Healthy, Safe and Thriving: National Strategic Framework for Child and Youth Health, which identifies five strategic priorities in Australia over the next ten years.

The five strategic priorities have 27 objectives and 64 actions. Six of these objectives relate to youth health, and can be measured with existing data. See Table 1.1 below for the objectives and findings about children (1–4) and young people (1–6).

Table 1.1 Six objectives from the National Strategic Framework for Child and Youth Health (2015) that can be measured from existing data

Objectives	Findings
1 **Children and young people are active, healthy and thriving**	57% were in the normal **weight** range, 22% were overweight and 15% obese 52% of 18–24 year olds were sufficiently **active** (>150 minutes of physical activity in the previous week) Only 3% of young people ate enough **fruit**; 46% ate 2 daily serves of fruit (3 serves for 15–17 year olds), but only 4% had 5 serves of **vegetables** a day (4 serves for 15–17 year olds). (Australian Dietary Guidelines)
2 **Children and young people have lower rates of preventable injury and mortality**	In 2013–14, there were over 80 000 **hospitalisations** (2572 per 100 000) due to injury and poisoning. Rates have changed little since 1993–94. Causes of hospitalised injuries by sex were very different for this group of young people. Males aged 15–24 were 1.9 times as likely as females to be hospitalised for injury/poisoning. The most common cause of injury/poisoning requiring hospitalisation for females was intentional self-harm (410 per 100 000), which ranked 8th for males (147 per 100 000). Females were 2.8 times as likely to be hospitalised for **self-harm** as males aged 15–24.
	Males were most likely to be hospitalised for **transport accidents** (613 per 100 000). Transport accidents were the third most common reason for hospitalisations for females (276 per 100 000). In 2014, there were 989 **deaths** (32 per 100 000 young people) among young people aged 15–24. Males were 2.2 times as likely as females to die between the ages of 15 and 24. The leading causes of death for young people in 2011–2013 were suicide (11 per 100 000), land transport accidents (9 per 100 000), accidental poisoning (2 per 100 000) and assault (1 per 100 000). In 2015, there were 225 deaths from road traffic accidents (7 per 100 000 young people), significantly less than in 2010.
3 **Children and young people experience lower rates and impact of chronic disease**	In 2014–15, 11% of young people were diagnosed with **asthma**. Rates have remained stable since 2011–12. The most common long-term conditions were allergic rhinitis (**hay fever**) (24%) and **short-sightedness**/myopia (20%). 8.2% had a **food allergy** In 2014, 484 new cases of type 1 diabetes were diagnosed (16 cases per 100 000). Rates remained relatively stable since 2000. Males were 1.8 times as likely to be newly diagnosed.
4 **Children and young people are supported in their mental health needs**	in 2013–14: 14% (245 000) of people aged 12–17 had experienced a mental health disorder in the last 12 months – **anxiety** was most common (7%), followed by Attention Deficit Hyperactivity Disorder (**ADHD**) (6.3%) and major **depressive disorders** (5%). 21% of all 12–17 year olds accessed services for emotional or behavioural problems, and 65% of 12–17 year olds had used these services in the past year. (Young Minds Matter survey)

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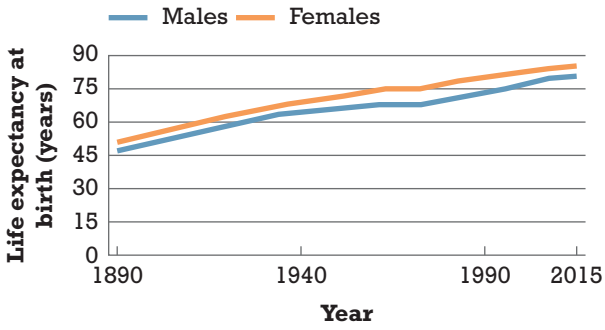
>> 5	**Young people reduce risk behaviours such as smoking, drug and alcohol use**	39% of people aged 15–24 drank **alcohol** at levels that put them at risk of harm (more than four standard drinks on one occasion, at least once a month) – down from 49% in 2001. 27% had never drunk alcohol – up from 16% in 2001. 11% were current, daily **smokers** in 2013. In 2001, 21% were daily smokers. 81% have never smoked. In 2013, 25% had used illicit **drugs** in the past year – significantly less than in 2001 (33%). (2013 National Drug Strategy Household Survey)
6	**Young people make sound choices about their sexual and reproductive health**	In 2013, 43% of sexually active young people (Years 10–12) reported 'always' using **condoms** when they had sex in the previous year; 39% used condoms only 'sometimes' and 13% 'never' used condoms. In 2014, there were more than 50 000 notifications of chlamydia, gonorrhoea and syphilis, a rate of 1812 per 100 000, with **chlamydia** accounting for 89% of notifications. Rates have increased since 2005 (1040 per 100 000 notifications). In 2014 there were about 9200 **births** to teenage mothers. The fertility rate for 15–19 year olds was 13 births per 100 000 (down from 16 births per 100 000 in 2004).

Source: *Healthy, Safe and Thriving*: National Strategic Framework for Child and Youth Health, COAG Health Council, August 2015

The positive health status of young people

Current research on health status suggests that the health of young Australians is continually improving. Overall death rates for young people have decreased significantly since 1998, and 93 per cent of young people rate their health as either excellent, very good or good. Life expectancy at birth in Australia has continued to increase to 80.4 (male) and 84.5 years (female) for those born in 2015, compared to a life expectancy rate for those born in 1890 of 47.2 (male) and 50.8 years (female).

The percentage of people rating their health as 'excellent' or 'very good' decreases as age increases – 63 per cent of 15–24 year olds rated their health as 'excellent' or 'very good', compared with 34 per cent of people aged 75 and over.



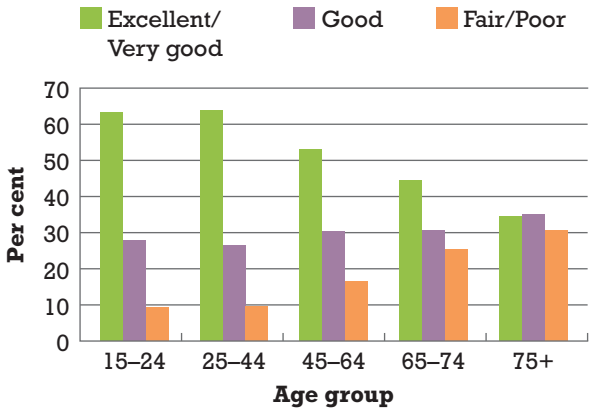
Source: Australian Institute of Health and Welfare

Figure 1.10 Life expectancy in Australia, 1890–2015

Weight control

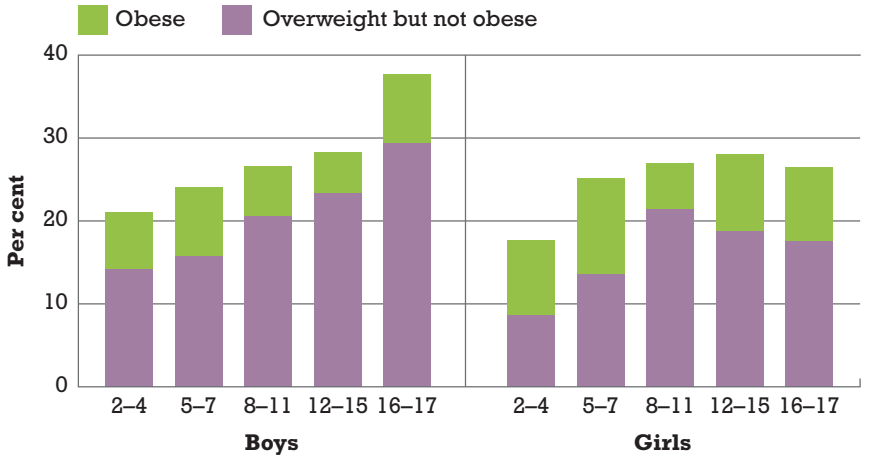
While weight itself is not a behaviour, it is a strong determinant of health resulting from eating and exercise habits. In 2016 approximately 10 per cent of the total burden of disease in Australia could be attributed to dietary risk factors. Weight control is critical to achieving good health, and weight issues are growing in prevalence among young people.

- An estimated one in four young Australians (aged 2–17) were reported as being overweight (18 per cent) or obese (6.9 per cent).
- 65 per cent of adults were reported as being overweight, with 28 per cent reported as obese in the same time period.
- In 2011, 5 per cent of the burden of disease was attributed to overweight and obesity.
- The prevalence of obesity for boys occurs at age 16–17 (8 per cent), and at age 5–7 for girls (12 per cent).
- Young people living in outer regional/remote areas were more likely to be overweight than those living in major cities (up to 1.3 times for boys and 1.5 times for girls).



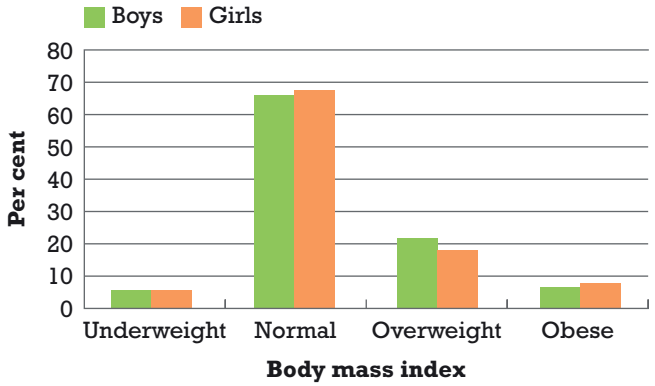
Source: Australian Institute of Health and Welfare

Figure 1.11 Self-assessed health status of Australians by age group, 2014–15



Source: Australian Institute of Health and Welfare

Figure 1.12 Proportion of overweight and obese children and adolescents aged 2–17, by age group (years) and sex, 2014–15



Source: Australian Institute of Health and Welfare

Figure 1.13 Proportion of young people aged 5–17 years who are underweight, overweight or obese, 2014–15

- The proportion of children aged 5–17 years who were overweight or obese increased between 1995 and 2007–08 (20.9 per cent and 24.7 per cent, respectively) and then remained stable to 2011–12 (25.7 per cent).
- Socio-economic status (SES) data indicate that, of young people in the overweight to obese category, 38 per cent of girls and 33 per cent of boys came from the lowset SES ranking, and 24 per cent of girls and 22 per cent of boys came from the highest SES ranking.
- For Aboriginal and Torres Strait Islanders the rate increases to one in three being overweight or obese – 35 per cent of those aged 15–17, compared to 24 per cent for the non-Indigenous population.

If current trends in weight continue in Australia, by the year 2025, about 83 per cent of males and 75 per cent of females aged 20 years or more will be overweight or obese. This will seriously affect the health status of Australians and will significantly affect disease burden and health care costs, mostly due to an increased incidence of illness such as type 2 diabetes. Current trends suggest that type 2 diabetes could account for 9 per cent of the total disease burden in Australia by 2023, rising from about 5 per cent in 2003.

Physical activity

Young people are generally more physically active than adults. However, the Australian Department of Health stresses that nearly nine in ten young people do not move enough, highlighting that approximately 80 per cent of children and young people aged 5–17 do not meet physical activity recommendations on all seven days of the week. Rates of inactivity increase as young people get older, from 64 per cent at age 5–8 to 94 per cents levels of inactivity for those aged 15–17. Less than one-quarter (23 per cent) of Australian children aged 5–14 met the national physical activity recommendations of more than 150 minutes of physical activity over five or more sessions in a week.

Only 33 per cent of children and 10 per cent of young people undertake the recommended 60 minutes of physical activity every day. There is also growing evidence of increased 'screen-based entertainment'. Fewer than 33 per cent of children and young people (5–17 years old) met the 'no more than two hours of screen-based entertainment' every day guideline, according to data. On average, children and young people aged 5–17 years spent 1.5 hours (91 minutes) per day on physical activity and more than two hours per day (136 minutes) engaged in screen-based activity. Trend data suggests that as young people grow older their physical activity decreases and screen-based activity increases.

According to the Department of Health, 44 per cent of all children and young people (2–17 years) had at least one screen-based item, such as a TV, computer or gaming console, in

their bedroom. This increases to 75 per cent for young people aged between 15–17 years. Having a screen-based item in the bedroom is associated with at least an extra two hours per week spent watching or playing, compared with those who do not have screens in their bedroom.

PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR

Physical activity is any activity that gets your body moving, makes your breathing become quicker, and your heart beat faster. You can be physically active in many different ways, at any time of day.

Sedentary behaviour means sitting or lying down (except when you are sleeping). It is common to spend large amounts of time being sedentary when at school or work, when travelling or during leisure time.

2.6 per cent of the total disease burden in Australia can be attributed to physical inactivity.

The seven diseases most closely linked to physical inactivity (in descending order) were

- diabetes
- bowel cancer
- uterine cancer
- dementia
- breast cancer
- coronary heart diseases
- stroke.

The burden of physical inactivity increases with age, and is also higher among people from lower socio-economic groups. People in the lowest socio-economic group experienced rates of disease burden due to physical inactivity at 1.7 times that of the highest socio-economic group. There was a clear pattern of decreasing burden with increasing socio-economic position.

Physical inactivity (low levels of physical activity) is the fourth leading cause of death due to non-communicable disease (NCD) worldwide (heart disease, stroke, diabetes and cancers) – contributing to over three million preventable deaths annually (6% of deaths globally).

If all Australians did an extra 15 minutes of brisk walking for at least five days each week, this would reduce the disease burden due to physical inactivity in the population by approximately 13 per cent. By increasing this to 30 minutes, the burden of disease attributed to physical inactivity could be reduced by 26 per cent.

Source: Australian Government Department of Health, 'Research and Statistics', 21 November 2017

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Figure 1.14 For more information about Australia's Physical Activity and Sedentary Behaviour Guidelines, visit the website of the Australian Department of Health and search for 'Physical activity and sedentary behaviour', or follow the link.

Weblink

Nutrition

A healthy diet and regular physical activity are important factors in maintaining a healthy weight. The Australian Dietary Guidelines recommend a minimum number of serves of fruit and vegetables each day for children, depending on their age and sex, to ensure good nutrition and health. According to the 2014–15 National Health Survey, the vast majority of adults (95 per cent) and children aged 5–14 (98 per cent) do not eat the recommended daily serves of fruit and vegetables. Interestingly, 46 per cent ate the recommended two daily serves of fruit (three serves for 15–17 year olds), but only 4 per cent had five serves of vegetables a day (or four serves for 15–17 year olds). On average, most young people only managed two serves a day.

Shutterstock.com/Alexander Raths

Figure 1.15 Fresh foods, such as fruit and vegetables, are essential for good nutrition.

Weblink

Investigate

For the most recent information, visit the Australian Dietary Guidelines website, or follow the link.

Research has indicated that skipping meals increases the likelihood that young people will become overweight. Skipping meals can make it difficult to meet minimum fruit and vegetable intakes. Breakfast is the most critical meal of the day. Eating breakfast regularly has mental and social benefits, and can have an impact on behaviour and academic performance, as well as sustaining weight control. School-aged children eat breakfast less frequently as they get older.

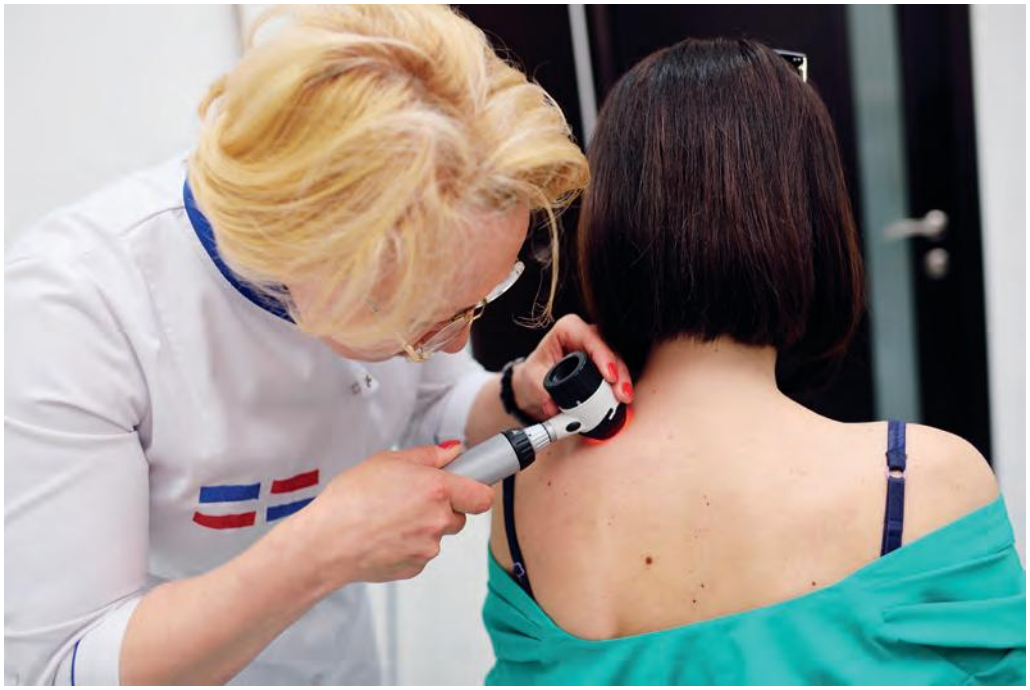
Sun protection

Australia has the highest rate of skin cancer in the world. While many skin cancers are not life threatening, melanoma is highly aggressive and life threatening, and remains one of the most prevalent forms of cancer among 12–24 year olds, despite declining rates. Melanoma skin cancer is the fourth most commonly diagnosed cancer in Australia, and in 2018 it is estimated that 14 320 new cases of melanoma will be diagnosed (8653 males and 5667 females). The strongest determinant of melanoma risk is exposure to UV radiation during childhood and adolescence. People with fair skin are particularly vulnerable.

The Cancer Council's National Sun Protection Survey revealed in 2017 that 16 per cent of young people feel that a suntan is healthy, and that 38 per cent of young Australians aged 12 to 17 indicated that they actively tried to get a suntan. This figure is down from 60 per cent in 2005. Between 20–25 per cent of teenagers get sunburnt on a typical summer weekend – a trend that has not changed in the last ten years. This is most likely to occur during water activities, and the most common sites of sunburn are the face, arms and shoulders.

Young people do understand what is required to protect their skin from the sun, but are less likely than adults to adopt sun protection behaviours. Survey results indicated that adolescents underestimate their skin cancer risk, with one in two rating their chances of developing the disease as 'low'. However, the reality is that two in three Australians will be diagnosed with skin

cancer by the age of 70. Apart from adhering to the long-running and successful 'slip, slop, slap, seek and slide' campaign strategies and staying out of the sun between 10 a.m. and 2 p.m., regular skin checks are a valuable **protective behaviour**. A relatively low number of young people check their skin regularly for changes in moles.



Shutterstock.com/Evgeniy Kalinovskiy

Figure 1.16 Regular skin cancer checks are an important step in reducing the risk of developing melanoma. For more information, go to the Cancer Australia website and search for 'melanoma statistics' (or follow the link).

Weblink

Substance use and alcohol

Adolescence is an age of increasing independence, and a time when experimentation with legal and illegal drugs can become more prevalent. Young people are at particular risk of later harms from substance use. This risk increases with greater levels of use and earlier onset. There is strong evidence to support the association between age of onset of cannabis use and subsequent educational achievement. High levels of cannabis use in late adolescence have been linked to poorer educational outcomes, lower income, greater welfare dependence, unemployment, and lower relationship and life satisfaction in later years. Links have also been established between alcohol abuse or dependence among adolescents and depression in later life.

The 2016 National Drug Strategy Household Survey (NDSHS) revealed that young people were drinking less, starting later and using fewer illicit drugs compared to earlier surveys. Interestingly, however, the survey indicated that drug use had increased in the 45–60 age bracket.

There have been positive changes to drug use by young people, particularly in relation to alcohol. Consumption rates have reduced, and fewer young people (aged 12–17) are reportedly drinking alcohol. Those abstaining from alcohol significantly increased, from 56 per cent in 2007 to 82 per cent in 2016 (72 per cent in 2013).

There has also been a reported delay in the age young people (aged 14–24) start drinking, increasing from 14.4 years in 1998 to 16.1 years in 2016 (this includes an increase to 15.7 years in 2013). In addition, since 2010, young adults (18–24 years) have also reduced their consumption of alcohol, with fewer young adults exceeding the lifetime risk guidelines (from 31 to 18.5 per cent in 2016). This has been driven by both an increase in those abstaining and an increase in those

drinking at levels considered to be at low risk to health over their lifetime (on average, no more than two drinks per day).

The 2016 NDSHS found that there has been a decline in the use of methamphetamine (2.1 to 1.4 per cent), hallucinogens (1.3 to 1.0 per cent) and synthetic cannabinoids (1.2 to 0.03 per cent) between the ages of 12–17 since 2013.

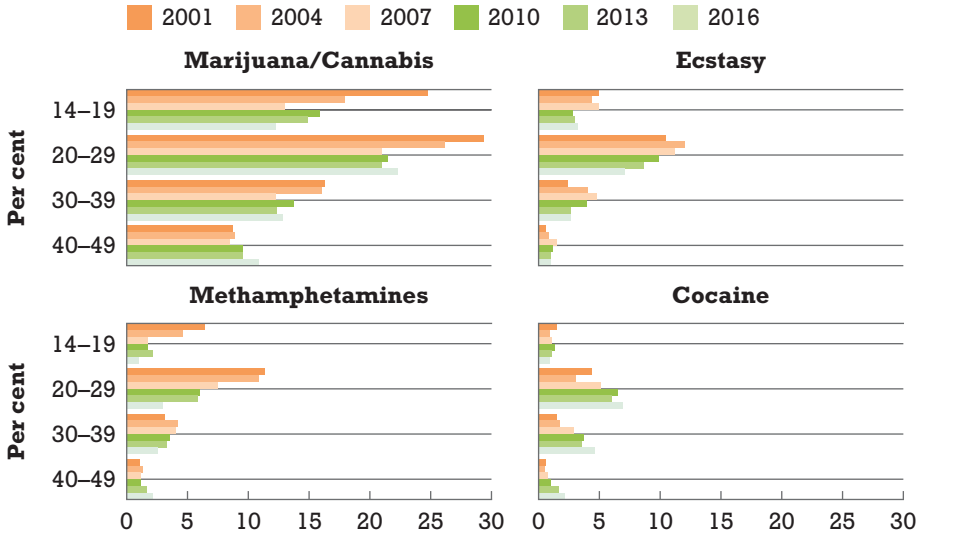
According to the Substance Use and Young People Framework (commissioned by the NSW Ministry of Health), around one in five young people had used an illicit drug (usually cannabis) in the previous 12 months. The framework highlighted that use was more common among males than females, and more highly represented in particular groups, such as those young people who were in custody.

The average age for people to try illicit drugs for the first time has risen from 19.3 years in 2013 to 19.7 years in 2016. This includes cannabis (from 18.5 to 18.7 years), methamphetamines (from 21.6 to 22.1 years) and hallucinogens (from 20.0 to 20.4 years).

Weblink

Investigate

For more information, visit the AIHW website and search for a summary of the NDSHS 2016 key findings (or follow the link).



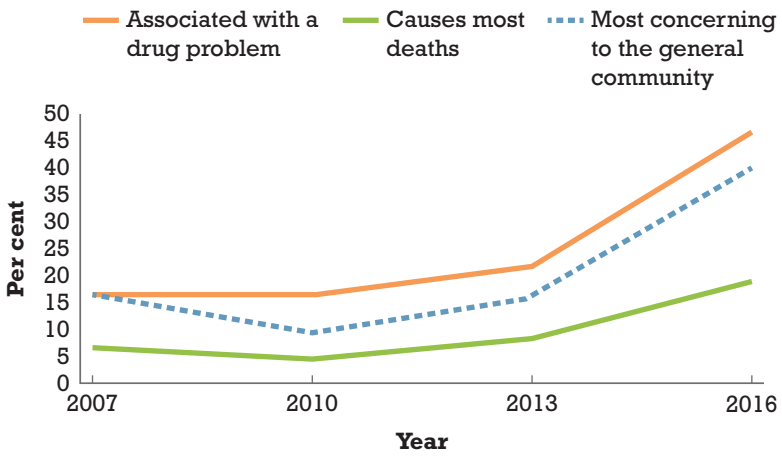
Source: Australian Institute of Health and Welfare

Figure 1.17 Recent use of illicit drugs by age (per cent), 2001–2016

Methamphetamines

Methamphetamines (commonly referred to as ice, base and speed) have been a growing concern to health authorities in Australia for several years. It is estimated that in the year preceding 2016, 1.4 per cent of Australians over the age of 14 had used a methamphetamine, and that 6.4 per cent (approximately 1.3 million) had tried one at some point. For recent users (12 months before the 2016 survey), 57 per cent reported using ice, while 20 per cent reported using speed. Rates of use were higher among people in rural and remote areas, particularly in the 18–24 year age group.

The NDSHS (2016) found that there has been a shift in the general attitude towards methamphetamines, leading to a change in the perception of harm associated with the drug, with the number of people rating the drug as harmful more than doubling since 2013. The survey found that for the first time, more people identified methamphetamine as the drug most likely to be associated with a drug problem, rather than alcohol. The survey also reported that the number of people nominating methamphetamine as the drug that caused the most deaths had doubled. This shift in attitude has been linked to both an increase in media coverage and personal experience.



Source: Australian Institute of Health and Welfare

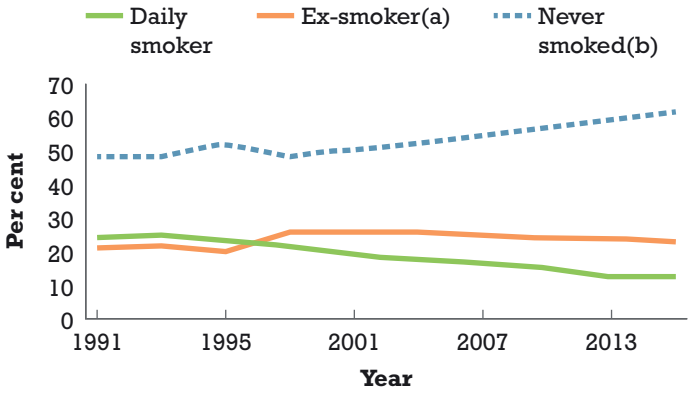
Figure 1.18 Perceptions of the drug methamphetamines by people aged 14 years and older

Tobacco

Smoking rates for young people have been on a continual decline for some time, with the current rate of young people smoking nearly half that of 1991. Between 2013 and 2016, the proportion of people who have never smoked (never smoked 100 cigarettes) increased from 60 per cent to 62 per cent. Across all age groups, males were more likely to smoke daily than females (13.8 per cent of males aged 14 or older smoked daily, compared with 10.7 per cent for females).

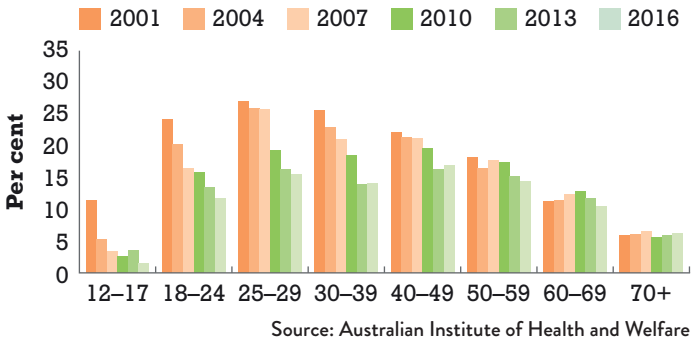
Considerable progress towards a reduction in smoking has been made among young people, with both 12–17 year olds and 18–19 year olds reporting significant declines in daily smoking between 2013 and 2016 (from 3.4 to 1.5 per cent and 10.8 to 4.6 per cent respectively). The daily smoking rate for teenagers has declined by approximately 80 per cent since 2001, and the average age of first-time smokers has increased from 14.3 in 2001 to 16.3 years in 2016 (a further increase from the figure of 15.9 years in 2013). There are a number of possible reasons for this reduction, including increased awareness campaigns, stricter regulation regarding the sale of tobacco and increased pricing and legislation of non-smoking areas and venues.

Illicit (or illegal) drug use covers a wide range of substances and patterns of use. The percentage of the population who use illicit drugs is lower than the percentage of the population who use legal drugs. The most commonly used illegal drug is cannabis, though the rate of cannabis use has been dropping,



Source: Australian Institute of Health and Welfare

Figure 1.19 Tobacco smoking status, people aged 14+ years, 1991–2016



Source: Australian Institute of Health and Welfare

Figure 1.20 Daily tobacco smokers by age, 2001–2016

from 11.3 per cent of people in 2006 to 10.4 per cent in 2016 who had used the drug in the last 12 months. This was the lowest rate for this measure in more than two decades. Following cannabis, the most widely used illicit drugs were ecstasy (2.2 per cent), cocaine (2.5 per cent), methamphetamines (1.4 per cent) and heroin (0.2 per cent).

Weblink

Tobacco and alcohol use

The following questions relate to Chapter 5 of *Australia's health 2016*: 'Health of population groups'.

1 How does the AIHW identify risk of harm in relation to alcohol?
2 Describe the difference between rates of 'never smoked' and 'daily smokers' between 2001 and 2013.
3 Research the latest figures, and draw a graph to represent changes in recent use of tobacco over the past 20 years. Highlight key events that have contributed to any changes you include.
4 Compare the differences in patterns of hospitalisation rates for young people aged 15–24.
   a How do the patterns vary between males and females?
   b Outline reasons that might contribute to these variations.

Mental health

The 2013–14 Young Minds Matter Survey reported that most children and adolescents in Australia have good mental health. However, there is still cause for concern, as the survey results also indicated that one in seven (14 per cent, or 560 000) children and adolescents aged 4–17 identified as having had a mental disorder in the previous 12 months. For males, attention deficit hyperactivity disorder (ADHD) was the most prevalent disorder (more common in the 4–11 years age group than in the 12–17 years age group).

For females, anxiety disorders were the most prevalent disorder group, and were more common in the 12–17 years age group. Additionally, one in 14 (approximately 278 000) of all young people experience some form of anxiety disorder, and one in 35 young people aged between 4 and 17 (approximately 112 000) experience a depressive disorder. In 2015, it was reported that 391 young Australian deaths (under the age of 24) were linked to suicide (the reported number in 2005 was 290). Comparison figures from 2012 show that deaths associated with suicide were more common than car crashes for young people.

Living conditions can be considered influential on young people's mental health. Evidence shows that child and adolescent mental health problems more commonly occur among those living in low-income, step/blended and sole-parent families. Socio-economic status also has an impact: survey results indicated that approximately 20 per cent of young people living in a household with a mean income of less than $580 a week experienced mental health problems, compared to 9 per cent of young people living in a household with an income above $1030 a week.

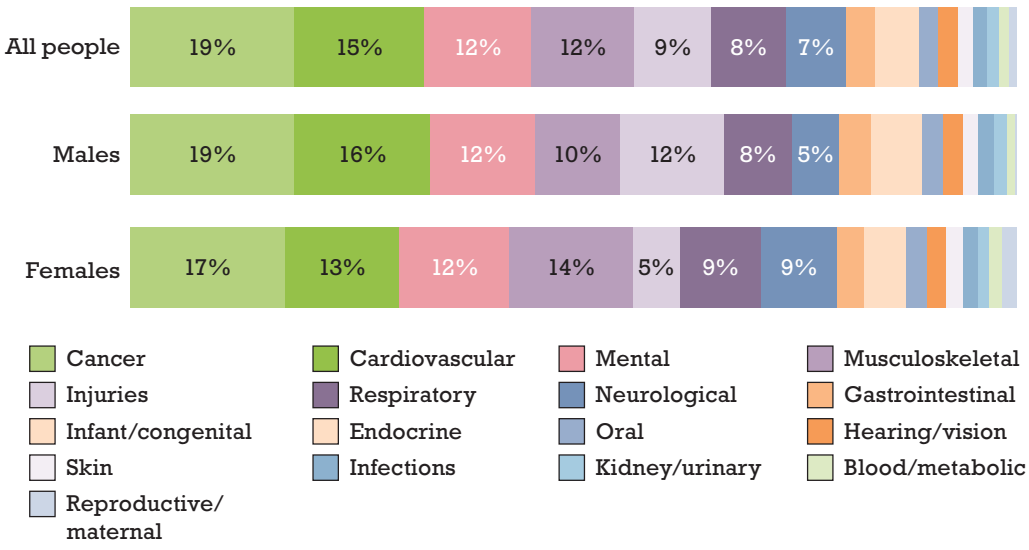
Unfortunately, the survey indicates that currently only one in every four young people with mental health problems had received professional health care. This includes young people with the most severe mental health problems, of whom only half receive the professional help they require. Parents often reported that help was too expensive, that they were unaware where or how to access help, or that they thought they could manage

on their own. Young people identified that family doctors (for younger children 4–12) and school-based counsellors (for older children) were the most frequently accessed health care services. On a positive note, young people experiencing mental health conditions generally indicated that they had been treated positively when they had approached friends, families and loved ones for help.

There are a number of social implications that can affect a young person's health, including discrimination and racism, both of which can negatively impact on health, education and social life. These impacts often carry well into adulthood, with evidence suggesting that half of all lifetime cases of mental health disorders start by age 14, and three quarters by age 24. Currently one in three young Australian adults aged 18–24 years report experiencing racial discrimination because of their skin colour, ethnic origin or religion, while one in four Aboriginal and Torres Strait Islanders aged 15–24 years reported experiencing discrimination based on their Aboriginality.

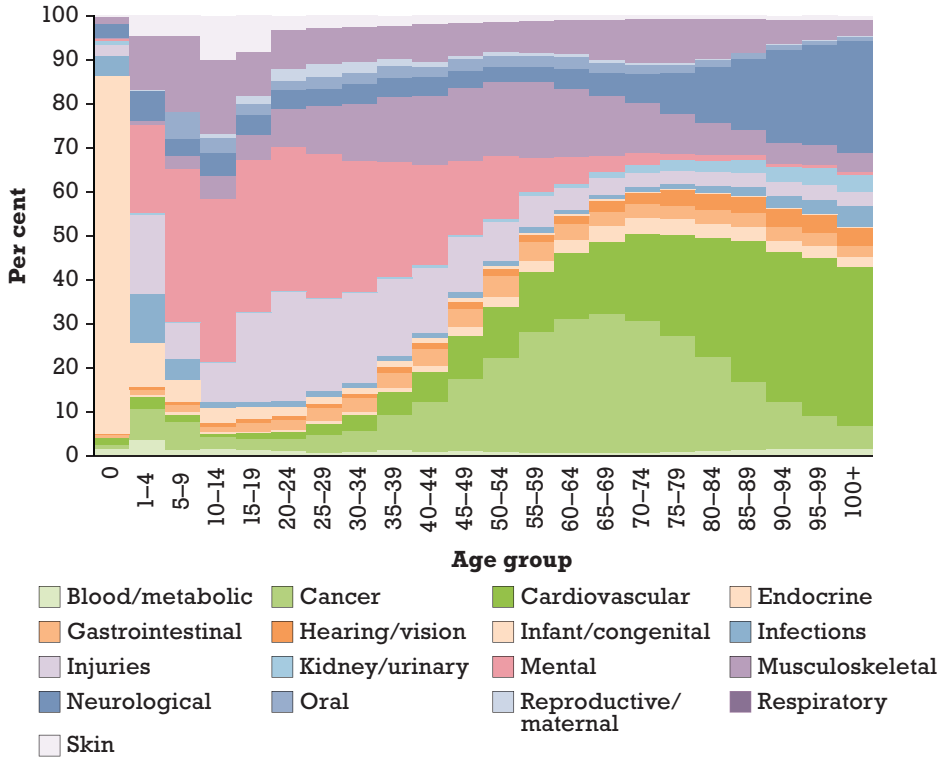
Mental health problems in young people can often be associated with other medical issues. For example, one in four people with type 2 diabetes experience depression, and one in six experience anxiety, while approximately one in four young people aged 13–19 years with type 1 diabetes experience moderate to severe symptoms of depression and anxiety.

Mental and substance use disorders were the main causes of burden in late childhood and adolescence. Asthma was the main cause of burden in boys aged 5–14, followed by anxiety disorders, whereas in girls this order was reversed. Issues associated with mental health contribute significantly to the burden of disease among 15–24 year olds. Suicide and self-inflicted injuries were the main causes of health loss for males (15–44 years), but for females anxiety disorders continued to be the main cause. Mental health is associated with self-harm and premature death rates. Statistically, these death rates have been at their highest rate since 2005, making mental health one of the biggest contributing factors to the death rate of young people, along with motor vehicle accidents. The following tables and graphs show the impact that mental health has on both the general population and on young people.



Source: AIHW 2016, *Australia's health 2016*, Australia's health series no. 15, Cat. no. AUS 199, p. 54, Canberra.

Figure 1.21 Burden of disease in Australia by type



Source: Australian Institute of Health and Welfare 2016, *Australia's health 2016*, Australia's health series no. 15, Cat. no. AUS 199, p. 55, Canberra.

Figure 1.22 Burden of disease in Australia by disease group and age, 2011

Age group

Males

	Under 5	5–14	15–24	25–44	45–64	65–74	75–84	85+
1	Pre-term/lbw complications	Asthma	Suicide/self-inflicted injuries	Suicide/self-inflicted injuries	Coronary heart disease	Coronary heart disease	Coronary heart disease	Coronary heart disease
2	Birth trauma/ asphyxia	Anxiety disorders	Alcohol use disorders	Back pain and problems	Lung cancer	Lung cancer	COPD	Dementia
3	Other disorders of infancy	Autism spectrum disorders	RTI/motor vehicle occupant	Alcohol use disorders	Other musculoskeletal	COPD	Dementia	Stroke
4	SIDS	Conduct disorder	Depressive disorders	Poisoning	Back pain and problems	Diabetes	Stroke	COPD
5	Other congenital conditions	Depressive disorders	Asthma	Depressive disorders	Suicide/self-inflicted injuries	Bowel cancer	Lung cancer	Prostate cancer

Females

	Under 5	5–14	15–24	25–44	45–64	65–74	75–84	85+
1	Birth trauma/ asphyxia	Anxiety disorders	Anxiety disorders	Anxiety disorders	Other musculoskeletal	Coronary heart disease	Coronary heart disease	Dementia
2	Pre-term/lbw complications	Asthma	Depressive disorders	Depressive disorders	Breast cancer	Lung cancer	Dementia	Coronary heart disease
3	Other disorders of infancy	Depressive disorders	Asthma	Back pain and problems	Back pain and problems	COPD	COPD	Stroke
4	SIDS	Dental caries	Suicide/self-inflicted injuries	Other musculoskeletal	Anxiety disorders	Other musculoskeletal	Stroke	COPD
5	Cardiovascular defects	Upper respiratory conditions	Bipolar affective disorder	Asthma	Lung cancer	Breast cancer	Lung cancer	Diabetes

Source: Australian Institute of Health and Welfare 2016, *Australia's health 2016*, Australia's health series no. 15, Cat. no. AUS 199, p. 56, Canberra.

Figure 1.23 Leading causes of total burden of disease in Australia by age and sex, 2011

9780170386593

	Age group					
	Under 1	1–14	15–24	25–44	45–64	65–74
1	Perinatal & congenital	Land transport accidents	Suicide	Suicide	Coronary heart disease	Coronary heart disease
2	SIDS	Perinatal & congenital	Land transport accidents	Accidental poisoning	Lung cancer	Lung cancer
3	Ill-defined causes	Brain cancer	Accidental poisoning	Land transport accidents	Breast cancer	COPD
4	Accidental threats to breathing	Accidental poisoning	Assault	Coronary heart disease	Colorectal cancer	Cerebrovascular disease
5	Selected metabolic disorders	Cerebral palsy & related	Event of undetermined intent	Breast cancer	Suicide	Colorectal cancer

Source: Australian Institute of Health and Welfare 2016, *Australia's health 2016*, Australia's health series no. 15, Cat. no. AUS 199, p. 65, Canberra.

Figure 1.24 Burden of disease in Australia by group and age

Weblink

Investigate

For more information regarding mental health and young people, visit the Beyond Blue website.

Sexual and reproductive health

Adolescence is a time when young people develop sexually and establish their own personal and sexual identity. The vast majority of young people cope well with the challenges associated with adolescence. However, it is important that young people have the necessary information, skills, family support and access to health services in order to safely navigate this period. Young people who participate in unprotected or unwanted sexual behaviours can suffer significant consequences, which may affect their health in the long term. Risks include unwanted or unplanned pregnancy, sexually transmitted infections (STIs) and cervical cancer.

A diverse range of views and values exist about what is appropriate, safe and acceptable regarding sexual behaviour for young people. Family values, cultural beliefs, individual development and religious adherence will all affect each individual's beliefs.

The most recent National Survey of Australian Secondary Students and Sexual Health (2014), which looked at the sexual health of Years 10, 11 and 12 students in government, Catholic and independent schools, provides the following snapshot.

Knowledge

HIV knowledge among Year 10, 11 and 12 students was relatively high. STI knowledge (including knowledge about chlamydia) was considered poor, while knowledge of the possible symptoms of STIs was somewhat better. Hepatitis knowledge also remains relatively poor.

Knowledge about human papillomavirus (HPV) knowledge was poor, and in most cases more than half the students reported being 'unsure' of the correct answers to HPV knowledge questions. Further, only half of young women reported having been vaccinated against HPV. There were few differences in HIV knowledge according to sex, but male students were less knowledgeable than female students in terms of STIs, particularly HPV.

Sexual behaviour, beliefs and perceptions

The survey found that the majority of students (69 per cent) had experienced some form of sexual activity. The proportion of students who had experienced sexual intercourse in the total sample was 34 per cent. Almost one quarter of Year 10 students, one third of Year 11 students and one half of Year 12 students had experienced sexual intercourse. Nearly one in four students who identified as being sexually active had multiple partners.

In terms of safe sexual behaviour, six out of ten students believed that 'most' or 'all' of their peers use a condom when they have sex. This aligns with the 60 per cent of students who

identified as being sexually active reporting condom use the last time they had sex. Condoms were the most commonly used form of contraception (58 per cent), followed by the contraceptive pill (39 per cent), while 13 per cent reported using no contraception and 15 per cent reported using the withdrawal method. The majority of sexually active students report positive feelings after having sex, however, approximately 25 per cent reported an experience of unwanted sex.

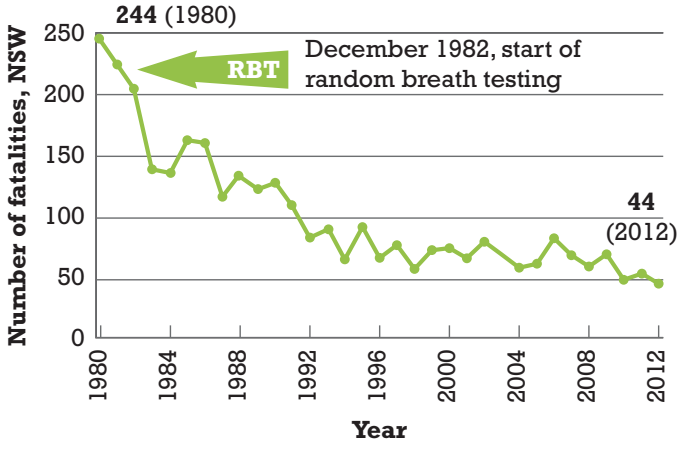
In terms of reported sexual attraction, 83 per cent of males and 76 per cent of females identified that they were only attracted to the opposite sex, 8 per cent of males and 4 per cent of females were attracted to the same sex, and 5 per cent of males and 15 per cent of females identified as being attracted to both sexes. Four per cent of young men and 5 per cent of young women indicated that they were unsure of their sexuality.

The survey also found that half of the students reporting to be non-sexually active felt that they were not ready to have sex, noting that they were proud to say no and mean it, and that they thought it was important to be in love the first time they had sex. Religious or cultural beliefs and parental disapproval were less frequently cited by non-sexually active students as reasons for not having had intercourse. One in five non-sexually active students reported that they felt 'extremely' happy, good and proud that they had not yet had sex, and the majority of these students reported that they did 'not at all' feel guilty, regretful or embarrassed that they were not sexually active.

Internet, technology and social media

The survey indicated that technology played a significant role in the lives of students, and was influential in their attitudes and behaviours regarding sexual activity. Students reported frequent use of both social media and technology, with 93 per cent using social networking sites at least once a week, 91 per cent using instant messaging, 88 per cent using text messaging and 86 per cent mobile phones. On average, social networking sites were used at least once a day by 87 per cent of all students, and Facebook was the most commonly used social networking site (91 per cent of students), while YouTube was regularly used by 82 per cent and Instagram was regularly used by 49 per cent of students.

In terms of risk behaviours, the survey found that more than half of all students reported having received a sexually explicit text message, with more than a quarter of all students reporting that they had sent a sexually explicit photo of themselves. The percentage rose in line with students who indicated that they were sexually active. Of this group, 84 per cent had received and 72 per cent had sent sexually explicit text messages. One in two reported sending a sexually explicit nude or nearly nude photo or video of themselves, while 70 per cent reported receiving such a photo or video.



Source: © State of New South Wales (Transport for NSW).

Figure 1.25 Since the introduction of Random Breath Testing (RBT), there has been a steady decline in road deaths linked to blood alcohol content.

Sexuality and relationship education

In terms of information gathering, the survey revealed that students were most likely to turn to their mother (36 per cent) or a female friend (41 per cent) regarding sex and relationships. Just under half (43 per cent) of students identified their school health program and the internet as sources of information. Around 30 per cent of students identified both doctors and teachers as credible sources of sexual health information. Interestingly, one student in every four identified that they had not received any sex education at school, while three in every four indicated that sex education was covered in Health and Physical Education between years 7–10.

Road safety (injury)

The Transport for NSW Centre for Road Safety (Serious Injury Crash Data Report 2017) indicated that in the

12-month period leading to the report, there had been a reduction in hospitalisation due to serious injury compared to the previous 12 months. However, they also reported that fatalities in the same reporting period had increased by 12 per cent, particularly in regional areas on stretches of road with a speed limit of 80 km/hour. Trend data indicates that alcohol-related incidents were down, as were accidents related to fatigue/seat belt use, all of which have been the focus of specific road safety campaigns during that time frame.

Graduated Licensing Schemes

The introduction of Graduated Licensing Schemes (GLS) across Australia has proven to be an effective way to reduce trauma associated with young people and motor traffic incidents. Utilising an evidence base, the programs target specific areas and skills to support young people, and help reduce the number of young drivers involved in crashes. The schemes provide a staged approach to driver licensing, and have been shown to reduce the impact of risk-taking behaviour associated with younger drivers.

As a direct result of these programs, national road trauma/deaths among the 15 to 24 age group have dropped by 29 per cent over a ten-year period across all states and territories. However, despite this reduction in fatalities, young drivers still remain the most over-represented group of drivers involved in accidents, with more than 1600 young drivers aged from 15 to 24 years dying on Australian roads since 2012. Programs such as the Graduated Licensing Scheme are continually making improvements in order to help young people be safer on the road.

Getty Images/graytln

Figure 1.26 Young people are a high-risk group for car accidents.

© Transport for NSW

Figure 1.27 Graduated Licensing Schemes have helped reduce the impact of risk taking associated with young drivers.

How accurate are perceptions of young people's health behaviour?

If we are to challenge social stereotypes and negative perceptions, it is important that we have an accurate perception of young people's health. Young people are a diverse group encompassing many roles and responsibilities, and they represent 14 per cent of the population. Although more than 90 per cent rate their health as good or better, young people are often portrayed in the media as engaging in negative health behaviours. But when we look at the health report statistics, the reality is that it is often older generations who display more negative behaviours.

Young people are more knowledgeable and aware of health issues than any generation before them. Life expectancy is at its highest rate, and levels of alcohol and tobacco consumption are at their lowest. Rising obesity rates (in line with the rest of the population) and associated problems continue to be a concern, however. Issues around the mental health of young people have become a major concern in relation to their health and wellbeing, and while road-related trauma rates are down, young people are still over represented in this area.

Weblink

Investigate

For more information, visit the following websites: Transport for NSW Centre for Road Safety, and NSW Transport: Roads and Maritime Services.

Road safety

Identify some of the initiatives that have been introduced to improve road safety over the past 25 years.

Investigate one initiative that has helped reduce road injury and deaths for young people.

1 How has your chosen initiative used evidence and statistics to inform the approach used?
2 Suggest reasons why young males are over-represented in fatal crashes.
3 Account for the fact that a large number of crashes occur between the hours of 10 p.m. and 5 a.m.

Media search

1 In small groups, search for recent news articles to gather information on how young people are portrayed in the media.
Put together a one-page report outlining your findings. Include at least five separate articles from a range of sources.
How accurate do you think society's perceptions are of the health behaviours of young people today?
2 Collect information on the death rates of young people in Australia from the 2016 AIHW report 'Young Australians: their health and wellbeing'.
Compare the information given in the graphs and text about the youth of today with the responses from your research.
3 Prepare a written conclusion comparing the two sources (your research and the report), then present your findings to the class.

Obesity

Search for the ABC News article 'One quarter of Australia's teenagers are overweight or obese, new health survey reveals' from 19 February 2015.

Protective behaviours and risk behaviours

Identifying protective and risk behaviours is important in understanding how determinants influence the health of young people. A relatively small number of risk behaviours contribute to much of the burden of disease experienced by young people. The influence that food habits, weight control, physical activity, drug use, mental health, sexual health and road safety have on health is determined by the balance of risk and protective behaviours experienced by an individual. When risk behaviours outweigh protective behaviours, the potential for harm increases. When protective behaviours outweigh risk behaviours, the potential for harm decreases.

Dietary guidelines

There are many variables that can influence young people's dietary choices. The main protective behaviours associated with nutrition are summarised by the Australian 'Dietary guidelines for children and adolescents', developed by the National Health and Medical Research Council (NHMRC). They provide five simple guidelines to help young people develop healthy eating habits. Go to the NHMRC website and search for 'Dietary guidelines'. You may wish to download the summary.

The risk behaviours associated with nutrition include excess fat, sugar, salt and kilojoules in the diet. Information about the food groups and recommended daily servings is given in Table 1.2. The number of serves will vary from individual to individual depending on their age, sex and level of daily physical activity.

Within the guidelines there are five principal recommendations. Each guideline is equally important in terms of public health outcomes.

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 your energy needs

- Children and adolescents should eat sufficient nutritious foods to grow and develop normally. They should be physically active every day and their growth should be checked regularly.
- Older people should eat nutritious foods and keep physically active to help maintain muscle strength and a healthy weight.

Guideline 2

Enjoy a wide variety of nutritious foods from these five groups every day:

- Plenty of vegetables, including different types and colours, and legumes/beans
- Fruit
- Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
- Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans
- Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under the age of 2 years)

And drink plenty of water.

Guideline 3

Limit intake of foods containing saturated fat, added salt, added sugars and alcohol

a Limit intake of foods high in saturated fat such as many biscuits, cakes, pastries, pies, processed meats, commercial burgers, pizza, fried foods, potato chips, crisps and other savoury snacks.

- Replace high fat foods which contain predominantly saturated fats such as butter, cream, cooking margarine, coconut and palm oil with foods which contain predominantly polyunsaturated and monounsaturated fats such as oils, spreads, nut butters/pastes and avocado.
- Low fat diets are not suitable for children under the age of 2 years.

b Limit intake of foods and drinks containing added salt.

- Read labels to choose lower sodium options among similar foods.
- Do not add salt to foods in cooking or at the table.

c Limit intake of foods and drinks containing added sugars such as confectionary, sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks.

d If you choose to drink alcohol, limit intake. For women who are pregnant, planning a pregnancy or breastfeeding, not drinking alcohol is the safest option.

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

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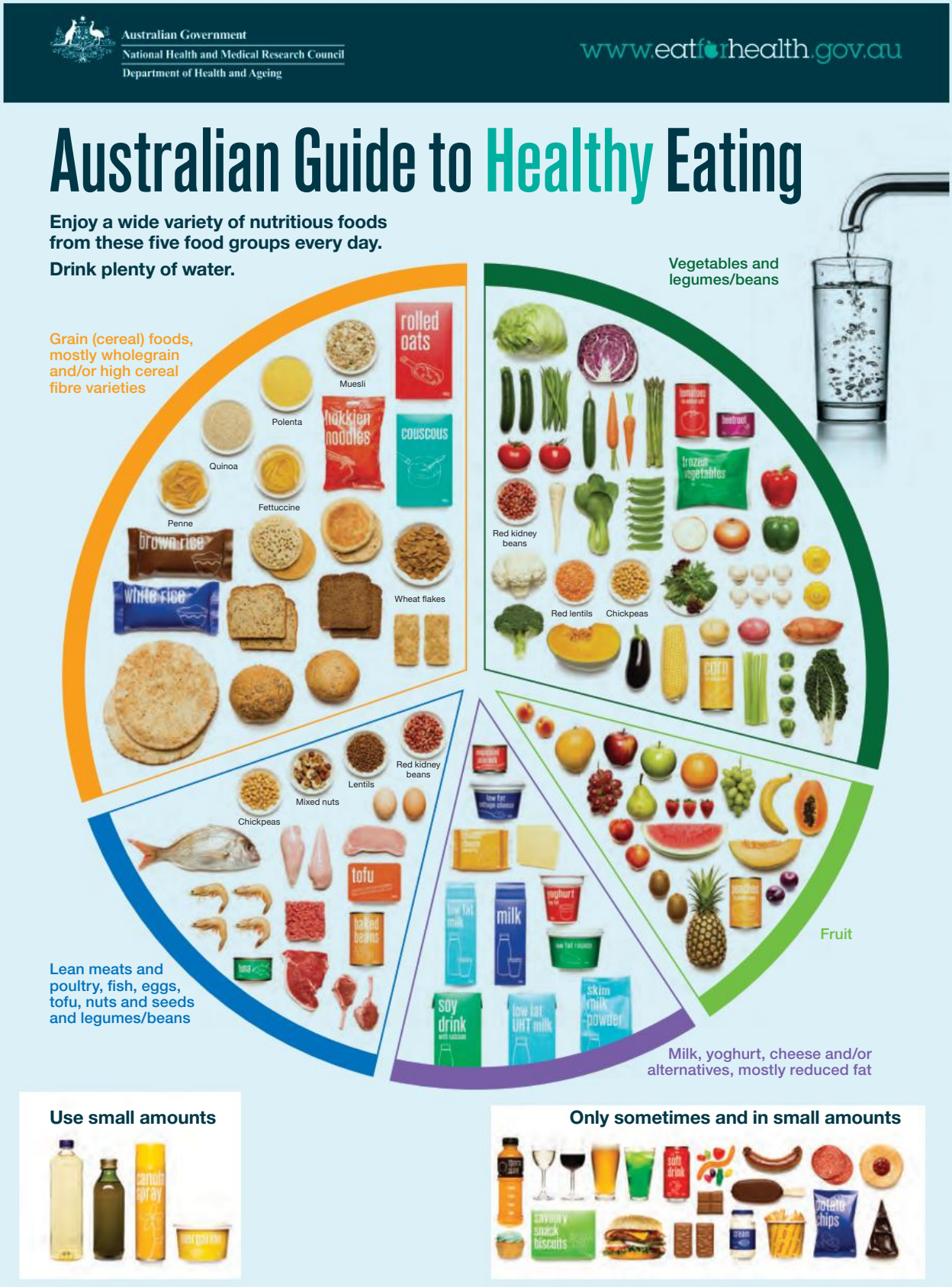


Figure 1.28 The Australian Guide to Healthy Eating recommended daily servings

Table 1.2 Recommended daily serves from five food groups, by age

Age	Vegetables and legumes/beans	Fruit	Grain (cereal) foods, mostly wholegrain	Lean meat and poultry, fish, eggs, nuts and seeds, and legumes/beans	Milk, yoghurt, cheese and/or alternatives (mostly reduced fat)	Approx. number of additional serves* from the five food groups or discretionary choices
1–2	2–3	½	4	1	1–1½	
Boys						
2–3	2½	1	4	1	1½	0–1
4–8	4½	1½	4	1½	2	0–2½
9–11	5	2	5	2½	2½	0–3
12–13	5½	2	6	2½	3½	0–3
14–18	5½	2	7	2½	3½	0–5
Girls						
2–3	2½	1	4	1	1½	0–1
4–8	4½	1½	4	1½	1½	0–1
9–11	5	2	4	2½	3	0–3
12–13	5	2	5	2½	3½	0–2 ½
14–18	5	2	7	2½	3½	0–2 ½
Pregnant women	5	2	8	3½	3½	0–3
Breastfeeding women	5½	2	9	2½	4	0–3

Note: * Discretionary/additional serves may be needed by more active, taller, or older children.

In recent years the greatest concern for health professionals has been the over-consumption of foods, leading to higher levels of obesity and heart disease. It is important for young people to adhere to a level of food consumption that is both healthy and nutritious, as the eating patterns established in these years will significantly impact on their future health.

Weight control and body image

In today's society, many people struggle to maintain a balance between energy intake and energy expenditure, resulting in being either underweight or overweight. Many factors, both physical and emotional, can contribute to this issue.

Risk behaviours for becoming overweight or obese include lack of physical activity and a diet excessively high in kilojoules. Young people who have become overweight need support to overcome the

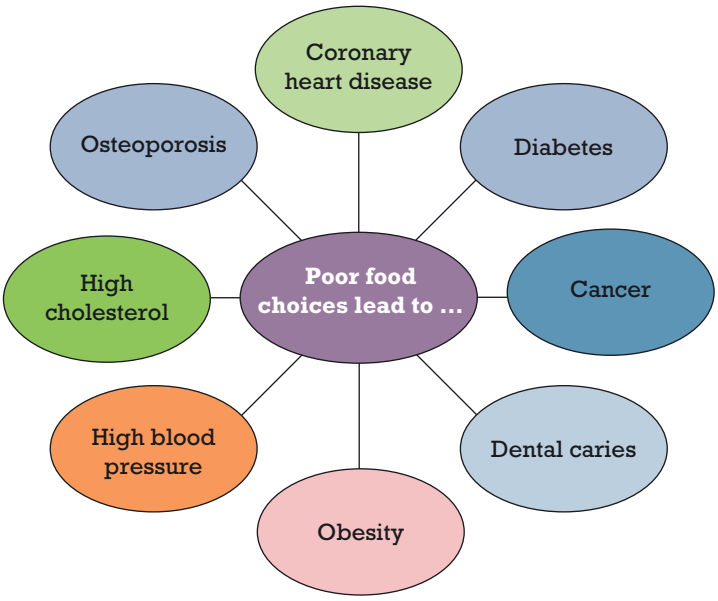


Figure 1.29 Poor food choices can have serious consequences for health.

social and physical barriers that make it increasingly difficult to participate in physical activity. Support comes in many forms, and can include:

- social networks that are sensitive to the needs of these individuals, and that encourage appropriate nutritional habits and increased physical activity
- access to suitable facilities, equipment and leadership
- positive self-esteem and confidence, which are critical to success.

The issue of body image as it relates to eating disorders has a strong link to mental health. People who tend towards 'perfectionism' and high achievement are most vulnerable, though all young people are influenced by media images depicting slim bodies with beautiful skin, hair and facial features. Many young people develop negative images about their bodies, which create unrealistic pressure to lose weight. Risk behaviours include obsessively monitoring one's weight, missing meals, bingeing and purging and compulsive exercise patterns. Supportive or protective behaviours include realistic expectations about personal achievement, self-image, exercise and diet.

Involvement in activities that support self-acceptance, confidence, diversity and strong social networks can help protect young people against eating disorders.

Physical activity

While many young people value physical activity, some lack the desire and motivation to be physically active. Unfortunately, this can lead to a sedentary lifestyle, causing health issues in both the short and long term. Obesity is the most evident health issue, along with the associated risks of heart disease and respiratory diseases. Young people who suffer from overweight or obesity often find it difficult to start participating in physical activity. These people can be plagued by feelings of insecurity and embarrassment. There are some strategies that could assist them to commence and maintain a physical activity program.

Protective behaviours for maintaining physical activity revolve around family attitudes and routines. Young people who have been brought up to value physical activity will continue to view it as important throughout the various stages of life. Skills are also important. Young people who do not have fundamental movement skills may find it more difficult to participate in some activities later in life.

Australia's Physical Activity and Sedentary Behaviour Guidelines

The main protective behaviours for physical activity have been encapsulated in Australia's Physical Activity and Sedentary Behaviour Guidelines, which can be accessed via the Department of Health website.

Guidelines for children (5–12 years)

Physical activity

- For health benefits, children aged 5–12 years should accumulate at least 60 minutes of moderate to vigorous intensity physical activity every day.
- Children's physical activity should include a variety of aerobic activities, including some vigorous intensity activity.
- On at least three days per week, children should engage in activities that strengthen muscle and bone.
- To achieve additional health benefits, children should engage in more activity – up to several hours per day.

Sedentary behaviour

- To reduce health risks, children aged 5–12 years should minimise the time they spend being sedentary every day. To achieve this:
  - Limit use of electronic media for entertainment (e.g. television, seated electronic games and computer use) to no more than two hours a day – lower levels are associated with reduced health risks.
  - Break up long periods of sitting as often as possible.

Guidelines for young people (13–17 years)

Physical activity

- For health benefits, young people aged 13–17 years should accumulate at least 60 minutes of moderate to vigorous intensity physical activity every day.
- Young peoples' physical activity should include a variety of aerobic activities, including some vigorous intensity activity.
- On at least three days per week, young people should engage in activities that strengthen muscle and bone.
- To achieve additional health benefits, young people should engage in more activity – up to several hours per day.

Sedentary behaviour

- To reduce health risks, young people aged 13–17 years should minimise the time they spend being sedentary every day. To achieve this:
  - Limit use of electronic media for entertainment (e.g. television, seated electronic games and computer use) to no more than two hours a day – lower levels are associated with reduced health risks.
  - Break up long periods of sitting as often as possible.

For further information, visit the website of the Australian Department of Health, or follow the link.

Australian Guidelines to Reduce Health Risks from Drinking Alcohol

Guideline 1: *Reducing the risk of alcohol-related harm over a lifetime*
The lifetime risk of harm from drinking alcohol increases with the amount consumed.

- For healthy men and women, drinking no more than two standard drinks on any one day reduces the lifetime risk of harm from alcohol-related disease or injury.

Guideline 2: *Reducing the risk of injury on a single occasion of drinking*
On a single occasion of drinking, the risk of alcohol-related injury increases with the amount consumed.

- For healthy men and women, drinking no more than four standard drinks on a single occasion reduces the risk of alcohol-related injury arising from that occasion.

Guideline 3: *Children and young people under 18 years of age*
For children and young people under 18 years of age, not drinking alcohol is the safest option.

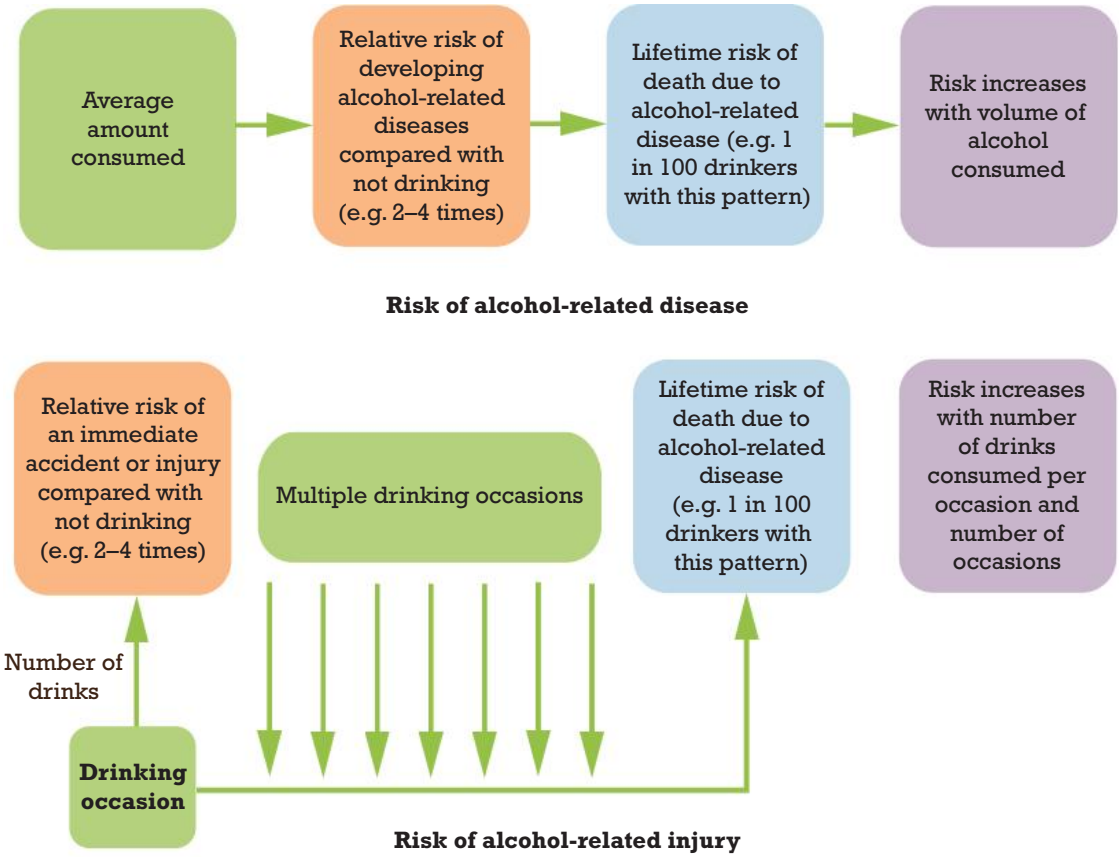
- Parents and carers should be advised that children under 15 years of age are at the greatest risk of harm from drinking and that for this age group, not drinking alcohol is especially important.
- For young people aged 15–17 years, the safest option is to delay the initiation of drinking for as long as possible.

Guideline 4: *Pregnancy and breastfeeding*

Maternal alcohol consumption can harm the developing foetus or breastfeeding baby.

- For women who are pregnant or planning pregnancy, not drinking is the safest option.
- For women who are breastfeeding, not drinking is the safest option.

Source: Adapted from National Health and Medical Research Council, *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*, Commonwealth of Australia, Canberra, 2009.



Source: National Health and Medical research Council, *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*, Figure 4, p. 34, Commonwealth of Australia, Canberra, 2009.

Figure 1.30 Alcohol-related risks for different patterns of drinking

Drug use

The use of legal, illegal, medicinal and social drugs is widespread in our society. All drugs have the potential to be harmful, depending on how they are used, the characteristics of the user and the nature of the using environment.

Regarding alcohol use among teenagers, participating in binge drinking (consuming more than four standard drinks on a single occasion) increases the likelihood of harm to young people.

Risk factors for drug use include parents and siblings who encourage drug use and misuse, lack of supervision and boundaries, availability of drugs and peer influence to use.

Protective factors include a supportive family that sets boundaries, open discussion about responsible drug use, peer influence not to use, restricted availability of drugs, and involvement in other activities, including sport and community activities.

Developing knowledge and skills about drugs can also be important. For example, understanding what constitutes a standard drink can help an individual monitor their alcohol usage levels.

Sparkling wine	Wine	Light beer	Regular beer	Fortified wine	Spirits
113 mL	100 mL	425 mL	285 mL	60 mL	30 mL
11.5% alcohol	12.5% alcohol	2.7% alcohol	4.9% alcohol	20% alcohol	40% alcohol

Figure 1.31 Measures of common drinks equal to one standard drink

Drug	Guidelines for safe use	Low risk High responsibility ← Responsible behaviours →		High risk Low responsibility
Caffeine	Tea, coffee and cold drinks are generally safe. Max 600 mg (6 cups)/day, Max 200 mg (2 cups) if pregnant.	No tea, coffee or cola drinks.	Up to 6 cups per day.	More than 6 cups per day.
		No harm ←		→ **Maximum harm**
Tobacco	No safe levels of use due to effect on HR and BP. Dangerous to unborn child during pregnancy.	No smoking tobacco.	Unavoidable, temporary passive smoking	Any smoking at all. Regular passive smoking.
		No harm ←		→ **Maximum harm**
Alcohol	Males = 2 standard drinks/day. Females = 2 standard drinks/day. Min 2 alcohol free days/week. Max 28 drinks per week.	No alcohol.	Low or moderate levels of drinking within safe guidelines.	Binge drinking, drink driving, drinking while pregnant or in excess of guidelines.
		No harm ←		→ **Maximum harm**
Illicit drugs	No safe usage levels because of unknown dosage/concentration.	No illicit drugs.	Some illicit drugs have legitimate pharmaceutical uses under medical supervision.	Any illicit drug use, needle sharing, using while driving or pregnant, using alone.
		No harm ←		→ **Maximum harm**
Medicinals	Within guidelines stipulated by doctor, prescription or label.	No medicinal drugs.	Using medicines according to doctor's advice.	Using medicine against prescriptions, other people's medicine or self medicating.
		No harm ←		→ **Maximum harm**
Performance enhancing	Within guidelines established by ASADA or governing body of the athlete's sport.	No performance enhancing drugs.	Using substances within medical guidelines and with appropriate permission.	Use of a substance outside ASADA guidelines or without professional advice.
		No harm ←		→ **Maximum harm**

Figure 1.32 Responsible drug use

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Teen drugs

Look online for the article 'Sharp drop in Australian teenagers' use of drugs, alcohol and tobacco' by Naaman Zhou, *The Guardian*, 12 January 2018.

Weblink

1 What is the article saying about teen drug use?
2 How does the article attribute a change in young teen behaviour to parental attitude and influence?
3 Identify and describe one other significant influence that the author suggests contributed to the reduction of alcohol and tobacco rates in teens.
4 If only one of these factors was present, do you think the effect on teen drug use rates would have been so effective?
5 How would the 'party rule' have made parents consider and change their behaviour towards young people and drinking?
6 Why do you think the author included international comparisons at the end of the article?

Mental health

Anxiety and depression are the most common mental conditions experienced by young people. Risk factors such as maternal drug use, early behavioural or emotional problems and early exposure to drug use can increase the likelihood of developing a mental illness. Drug use is the most prevalent factor associated with the development of mental illness. Exposure to violence, family breakdown, neglect or homelessness are other influential factors.

The likelihood of mental illness is increased by family history. The most protective factors include cohesive and supportive family relationships, connectedness with peers and social networks and satisfactory achievement levels at school. Stress management strategies are also valuable protective behaviours.

Weblink

To learn more about these issues, access the websites for Beyond Blue, Youth Beyond Blue and Headspace (or follow the links).

Sexual health

Sexuality will have different meanings for different people. It is important to be aware that everyone may not feel equally at ease talking about sexual matters. Individual views on, and feelings about, sexuality will have been affected by a range of factors, including family, friends, religion and culture. The way young people feel about themselves will ultimately determine the way they express their sexuality. Relationships are most protective when they are based on respect.

Both partners are safest when they can:

- have fun together
- be themselves
- share and express different opinions and interests and listen to each other
- compromise, say sorry and talk arguments out
- spend time alone, or with family and friends.

A good relationship does not have to be a sexual relationship. Sex is meant to be:

- something that both partners decide to do when they are both ready
- something that makes both partners feel good
- something that both partners should be able to interrupt or stop at any time
- completely safe from unwanted pregnancy or sexually transmitted infection.

Sex should not be:

- the only way an individual can show they love someone
- something an individual feels pressured or forced into
- something an individual does because 'everyone else is doing it'
- something that makes a person feel used.

The risks associated with sexual behaviour increase when supervision is reduced. Increased risk is associated with:

- early age of first sexual experience
- number of partners
- perceived peer pressure to be sexually active.

Abstaining from sex, maintaining safe sex practices and using suitable contraceptive methods, including condoms, can reduce the risk of unwanted pregnancy and provide protection against sexually transmitted infections.

Road safety

Risk behaviours in road safety among young people include speeding, not wearing a seatbelt, lack of driver experience, using a mobile phone and driving under the influence of alcohol or drugs. These factors contribute to a significant number of motor vehicle accidents and fatalities among young people. Risk is also increased by some common attitudes to driving, particularly among young males, such as an increased tendency to show off, and reduced sensitivity to risk, which can lead to dangerous road behaviours.

Risk of injury increases significantly at this age because young people are given increased responsibility for making their own decisions. Helping young people develop their decision-making skills is a valuable protective strategy. Other protective behaviours can include good role modelling by parents, such as safe driving, proper planning of events, seeking alternatives to driving when intending to drink and the development of defensive approaches to driving. Limiting the number of passengers, extended driver education, more stringent rules and penalties can also reduce risk.

Further information about young driver safety and crash statistics in New South Wales is available on the Roads and Maritime Services website.

All the food you eat

Conduct an analysis of all the food you eat over a five-day period.

Keep a record of all the foods and fluids you have eaten and record the time of day that each was consumed. Remember, this is just for you – you do not need to share it with anyone.

At the end of your collection period, analyse the foods you have eaten and compare your food intake with the dietary guidelines and suggested food groups for children and adolescents.

1 How does your diet compare?
2 Do you think you meet the guidelines?
3 Did you find that because you were keeping a record you thought more about your food habits?
4 Can you suggest any changes you could make to your dietary habits in the future?
5 Finally, consider why the Australian Dietary Guidelines were modified into a much simpler format than the way they were previously presented?

Depression

Access the Beyond Blue website. Search for 'Learn about depression' and read through the section about depression, including the checklists. Identify:

1 the different types of depression and how a better understanding of the illness can be reached
2 the symptoms for depression
3 strategies for young people to stay well and avoid anxiety and depressive episodes.

CHAPTER SUMMARY

- Definitions of health have changed over time. Health is now recognised as 'a resource for everyday life' and an interaction between social, emotional, mental, spiritual and physical dimensions.
- Health means different things to different people. It is both *relative*, differing from time to time and from person to person, and *dynamic*, as it is constantly changing during different times in a person's life. An individual's circumstances influence their health status.
- Health status can be mapped or measured on a continuum, ranging from optimal health to death. As health improves, it moves up the continuum, and as health deteriorates it moves down the continuum.
- Health is more likely to be perceived positively when the basic requirements for self-esteem and a sense of belonging are being met. perceiving health in a positive and holistic way promotes a positive attitude in the community towards maintaining health.
- Perceptions of health are shaped by an individual's life experiences. The perceptions of the health of others can be influenced by such things as stereotypical views and personal experience of other groups of people.
- The media and peers can have a powerful influence on both an individual's perceptions of health and health behaviours.
- Understanding the impact of risk behaviours helps to identify the determinants of poor health. Individuals who do not understand the impact of these behaviours are most likely to continue to put their own health at risk. Knowledge, attitudes and skills can be developed through increased education.
- Young people in Australia today rate their health status in favourable terms, and levels of alcohol and tobacco use have declined over the past 20 years. However, issues such as obesity and mental health have become prevalent.
- When multiple risk factors interact, the effect on the individual's health is even greater.

CHAPTER REVIEW ACTIVITIES

Extra exam-style questions

Meanings of health

1 Why is it difficult to develop an accurate definition of health? How would you define health?

2 Explain how the dimensions of health interact with one another.

3 Why is health a relative concept? How can you judge your own level of health against someone else? Provide an example.

4 In pairs, discuss why health is considered to be dynamic.

Using the health continuum, provide examples of different experiences in your life that have occurred and explain how you think they would change your health status, either positively or negatively.

5 How can an individual's 'circumstances' impact on their health?

6 Think about the healthiest person you know. Consider why you chose them – what is it that makes them healthy? List the attributes that you feel are the most important when deciding what being healthy means.

Share your answers with a classmate and create a table of similarities and differences. Once you have had a chance to share your answers, consider whether you want to adjust your definition.

Perceptions of health

7 Explain what is meant by the term 'perceptions of health'. Give reasons why one person's perceptions of health can be different to someone else's.

8 How can stereotypes affect people's perceptions of health? In what ways can the media influence a young person's perception of health?

9 What is meant by the term 'social construct'? Why is health considered a social construct?

10 Why is it important to consider health as a holistic concept? Why would the World Health Organization advocate this view?

Health behaviours of young people

11 Are young people healthy? What evidence is available to suggest that young people enjoy good health status? List five pieces of evidence that support your answer.

12 Propose reasons why both alcohol consumption and smoking rates among young people have decreased over the past 20 years.

13 Create a flow chart identifying the relationship between weight control, nutrition, physical activity and the health of young people.

You will need to consider:

- Why is the impact of sun protection behaviours important to the health of young Australians?
- How can a combination of risk factors increase the chances of a young person experiencing poor health?

14 With a partner, identify a condition that can affect the health of young people (i.e. asthma, drug use). Construct a chart detailing a list of both risk and protective behaviours.

Using this information, create a poster aimed at informing young people about the condition and how they can engage in protective behaviours.

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CHAPTER 2
Influences on our health

IN THIS CHAPTER

The determinants of health	**44**
Individual control over health	**57**
Health as a social construct	**62**

THE DETERMINANTS OF HEALTH

In this section you will analyse how your own health is determined by a range of factors.

Health is multi-causal. An individual's level of health status and quality of life are the result of many interacting factors. These factors are referred to as **determinants of health**. The determinants of health include individual factors, sociocultural factors, socio-economic factors and environmental factors.

Some of these factors can be controlled or modified by the individual, such as smoking, while others are non-modifiable, and are outside the individual's control, such as age or heredity. The determinants act in varying degrees. They can have either a negative or positive impact and are referred to as either 'risk' (increasing the chances of poor health) or 'protective' factors (decreasing the risk of poor health). Their effect is usually cumulative, rather than absolute – that is, it increases according to the time and intensity of exposure. The determinants of health interact, and changes in one determinant may impact on the others.

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Figure 2.1 There are many factors that influence the health of young people.

Individual factors

A number of individual factors contribute to health, either by placing it at risk or protecting it. These include knowledge, attitudes, skills and genetics. These factors have a major influence on the health behaviours of the individual. Over the longer term, it is these determinants that help an individual to sustain healthy behaviour and achieve the best possible health. Health promoters are particularly interested in influencing the knowledge, skills and attitudes of people in order to produce long-term improvements in their health behaviour.

Knowledge

Knowledge is one of the most influential factors to determine health. It is important for people to understand how different things affect health, including nutrition and food choices, physical activity and potential risky behaviours such as illicit drug use. People gain knowledge through different sources, such as school-based health education, mass-media campaigns, health professionals and the internet.

These sources have ensured a high degree of general health knowledge among Australian people. However, it is important that individuals can recognise credible and reliable sources of information. Messages about diet, exercise, weight control, drug use, sun safety, driver safety, screening programs, water safety, safe sex and other health issues have been delivered through schools and the media for many years. As a result, we are seeing a drop in harm rates associated with some of these areas among young people.

However, there is also evidence to suggest that, while many of these health messages are reaching the population, some population groups are not effectively receiving knowledge about health issues that affect them. This can be seen in the rising obesity rates among Australian adults, despite a plethora of media campaigns and education programs aimed at raising awareness in this area. It is important to remember that having the necessary knowledge to recognise safe health behaviours is not the same as having the necessary skills and attitudes to consistently carry out those behaviours. For example, many people who know they need to do more exercise simply do not find the time or energy to do so.

The World Health Organization defines **health literacy** as 'the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health. Health literacy means more than being able to read pamphlets and successfully make appointments. By improving people's access to health information and their capacity to use it effectively, health literacy is critical to empowerment.'

Source: Adapted from Labonte, R (1998), 'A community development approach to health promotion: A background paper on practice tensions, strategic models and accountability requirements for work on the broad determinants of health', Health Education Board of Scotland, Research Unit on Health and Behaviour Change, University of Edinburgh, Edinburgh. Reproduced from VicHealth.

Figure 2.2 The factors affecting health and wellbeing

Getty Images/drbimages

Figure 2.3 Sources of health knowledge

Skills

A number of skills relate to an individual's health, including critical inquiry and research skills, along with more practical skills, such as decision-making, communication, problem-solving and movement skills. Many of the personal and interpersonal skills an individual acquires are modelled by family or peers, or taught both directly and indirectly at school through programs such as PDHPE. The capacity to enact these skills and the style in which they are adapted are strongly influenced by the individual's personality and psychological make-up.

Communication skills

Communication skills include the ability to listen actively, empathise with others and express feelings. These skills allow an individual to interact effectively with others, ask questions and establish a sense of worth and belonging. Being assertive means being able to respect the views and needs of others while expressing clear personal views and needs. This is vital for ensuring that an individual's rights are respected and their needs met. A sound level of ICT skills and high levels of literacy (including health literacy) are beneficial in order for an individual to understand complex health information and to efficiently assess and access information from a variety of sources. This is especially the case for personal health and safety.

Getty Images/skynesher

Examples of skills

Communication skills: Expressing feelings to resolve conflict in a relationship
Assertiveness: Asking a doctor for more details about a diagnosis
Literacy: Reading about a variety of alternative therapies to treat a problem
Social skills: Negotiating with a friend to get help with a problem
Decision-making: Weighing up different actions for quitting smoking
Problem-solving: Working out how to increase physical activity levels
Coping and stress management: Managing time to cope with conflicting pressures from work, school and home

Interpersonal skills

The ability to establish and maintain worthwhile relationships plays an important role in developing supportive networks of friends, colleagues and acquaintances. Negotiation, compromise and reasoning skills are all important in effective relationships. Social support is a high-level protective factor for an individual's health.

Decision-making, problem solving and coping strategies

In modern society, consumers are confronted with almost unlimited choices in all areas of life. The ability to identify options, research and weigh up alternatives, calculate consequences, act, and then evaluate can help an individual make sound health decisions. Having the skills to identify or recognise a problem, think laterally to consider possible solutions, seek help, plan and produce a strategy can be of great value when addressing personal health issues. For young people, stress and anxiety can combine to accelerate the negative effects of other risk factors for health. Developing skills such as positive self-talk, meditation and time management can help counter the effects of stress and protect health status.

Attitudes

Attitudes have a major influence on health behaviour. The attitudes of young people are important, because health status is linked to the cumulative effects of behaviours, starting at a young age. An individual's attitude can have either a positive or negative effect on their health. Individuals who place a high value on their health often display attributes such as resilience, determination and high levels of self-belief. These attributes allow individuals to make health a priority, and directly influence their decision-making, meaning they are more likely to engage in protective behaviours than risk behaviours.

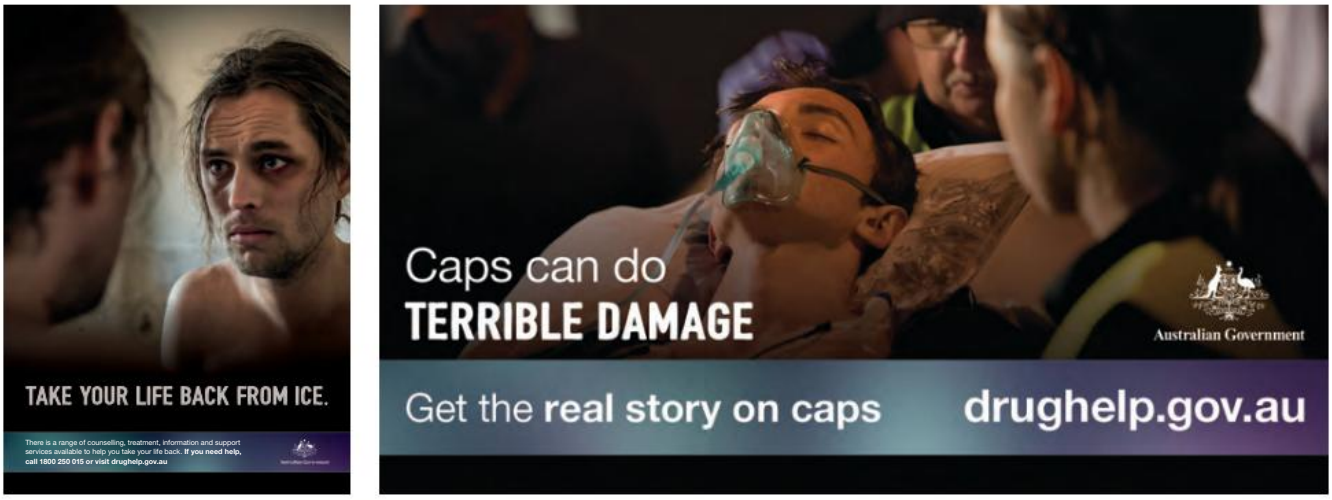

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Figure 2.4 Some health campaigns use graphic images and information to influence attitudes, and have helped reduce alcohol consumption rates in young people in Australia and change public attitudes towards drugs such as ice.

Genetics

Genetics refers to our heredity – the genes that are passed on to us by our parents. Our genetic make-up can predispose us to certain diseases, such as some types of cancer and type 1 diabetes, and as such is considered a non-modifiable risk factor. The risk varies according to how close

the biological relationship is as well as the number of relatives who developed the disease. In some cases, these diseases and others can be passed directly via a genetic mutation. However, it is important to note that most people who develop these diseases have no family history of the disease. While having a family history increases the risk of developing some diseases, it also provides the individual with an early warning. Having this information means the individual can make the necessary lifestyle adjustments and access appropriate health services to counter the increased risk. In extreme cases, where heredity has led to a strong pattern of disease, genetic screening can identify whether an individual is carrying a mutated gene that is known to cause a disease. In these cases, surgery or other therapies may be used to reduce or remove the risk entirely.

Skills

Analyse how the development of a skill could help a young person address a personal health issue.

Attitude

1 Complete a personal attitude audit. Select five health issues that are important to you. For each one, write a paragraph explaining your attitude to this issue.
2 Examine the differences in your attitude to each issue, and identify any patterns that exist between your attitudes and behaviours. Compare your findings with those of a classmate.

Unhealthy behaviours

1 As a class, identify a variety of attitudes that contribute to specific unhealthy behaviours. Consider whether these attitudes are prevalent in specific groups or across the whole population.
2 In pairs, design health promotion strategies to counter the negative or risky attitudes you have identified.

Sociocultural factors

Sociocultural factors can include family and peers, the media, religion and culture. These factors interact in a way that means every individual has a unique set of experiences, values and attitudes. Consequently, each person responds differently to the environment, resulting in unique health behaviours and outcomes. Health inequities are defined as differences in health status between different populations (social groups).

Family

Families are the main source of education and role modelling for young people, particularly in the early years. Fundamental values, beliefs and habits are often well established before an individual has much exposure to influences from outside the family unit.

Families shape young people's approaches to communication and relationships – for example, their attitudes to gender. Families have particular attitudes about diet, exercise, drug use, sexuality, the law, risk taking, other families, politics and education. They also create the socio-economic environment in which young people grow up.

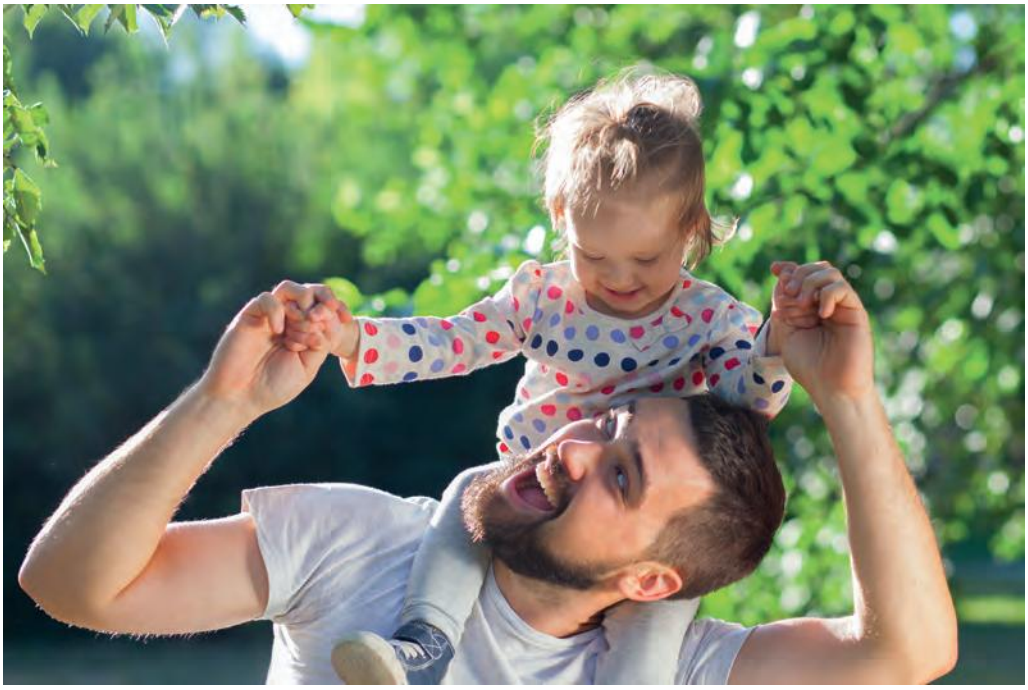

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Figure 2.5 **Children absorb experiences, values and attitudes from a young age, when immediate family plays a primary influence**

By shaping values and beliefs, families have a profound influence on individual health behaviours. Depending on the behaviours supported by the family, the characteristics of families may lead to greater degrees of risk or protection. These characteristics include:

- family cohesion
- parental health and disability
- child protection
- established sources of social support
- assault and neglect
- homelessness
- participation and engagement with the local community.

Peers

For most individuals, it is important to be socially accepted. Outside of the family structure, the peer group has its greatest influence during childhood and adolescent stages of life. Attitudes to behaviours such as drug use and risk taking can be influenced, positively or negatively, by the attitudes of a person's peer group.

Research findings describe two ways in which young people come to make decisions about protective or risky behaviours: behavioural intentions and behavioural willingness.

Behavioural intentions

Behavioural intentions refer to a person's perceived likelihood that they will engage in a particular behaviour. They are based on such things as personal values, parental expectations and on what the individual thinks others are accepting or doing.

Behavioural willingness

Behavioural willingness refers to an individual's openness to risk behaviour in certain situations. This can predict what course of action the individual ultimately takes.

The tolerance or intolerance of both the peer group and the individual to different levels of risk combine to create a social environment that may tend more towards protection or more towards risk. Supportive and protective peer groups can play a vital role in maintaining the health of their members.

Media

The influence of the media in our society is powerful and sophisticated. The media can have a significant impact on people's health decisions. Advertising of products and services, the coverage of health issues on television shows and in movies, delivery of public health promotion campaigns and the nature of images used in the media all combine to send a complex array of messages that people constantly have to process and respond to. Learning the skills to interpret and evaluate media messages is critical to good decision-making in modern society.

Alamy Stock Photo/Ashley Cooper

Figure 2.6 Being critical about the 'health' messages on the foods we buy is an important skill to learn.

Table 2.1 Media messages

Positive media messages	Negative media messages
Acceptance of diversity in TV shows	Alcohol advertising
Physical activity and weight control campaigns	Product placement, e.g. cigarettes in movies
Road safety campaigns	Junk food advertising on children's TV
Advertising of products like nicotine patches and fresh fruit and vegetables	Violence and graphic sex in movies, games and websites
Reporting that raises awareness of health issues	Use of images featuring underweight and over-tanned bodies

Religion

Religion plays a role in the lives of many Australians. Its most obvious effect on health is the development of spiritual awareness. Most religions teach acceptance of a greater power and the contribution an individual can make by committing to the greater good. However, there have also been times when religion has been used to vindicate hatred, violence or exclusion. Many churches create a sense of belonging and fellowship through worship, youth groups, community activities, support groups, outreach programs and other activities. The strong sense of 'giving' promoted by religious groups encourages social connectedness, leadership and a sense of contributing to the wellbeing of the community. These are some of the strongest protective factors for health among young people.

Culture

Culture can be simply described as 'patterns of human activity including the values and knowledge shared by a society'. Australia is often described as a multicultural society due to the diverse ethnic and cultural backgrounds of its population. Different cultural groups practise different

eating patterns, daily rituals, religions, patterns of physical activity, gender roles, patterns of employment, ways of communicating, family structures, attitudes to health and medicine and approaches to life. For every different approach there is a different interaction with health determinants, including risk and protective factors, resulting in a different pattern of health.

It is important to understand that each group also contributes to a unique 'Australian culture'. Different groups in society grow together culturally, retaining their uniqueness, but sharing many common lifestyle and cultural characteristics, too. For example, people with a specific cultural heritage might prepare foods specific to their culture, but they buy much of the produce from the same shops as other groups. People from different groups might approach medicine and health in different ways, but they share the same healthcare system. People from different backgrounds might be equipped with different skills, but they bring those skills to the same workplaces. In this way, Australians from different cultural backgrounds share many similar cultural experiences. Culture can have both positive and negative influences on health.

Sharing a strong cultural identity can be a protective factor for an individual's health, because this supports a sense of connectedness and contributes to **social capital**.

Getty Images/Carol Wiley

Figure 2.7 Culture can have a strong influence on an individual's health behaviours.

Create a game

1 Create a game based on the various social influences on health. You can either create your game from scratch or adapt an existing game, such as snakes and ladders.

The game should be aimed at engaging and informing young people about how the determinants of health can impact on their health status.

Incorporate aspects such as family, peers, media, religion and culture, and a range of health issues that impact on young people, such as sexuality, driving, obesity and drug use.

2 Test out your games in class. If possible, have students from younger years play the games.

Socio-economic factors

Socio-economic factors are those aspects of life that relate to wealth, level of education, job status and social standing. More than any other factor, low socio-economic status (low SES) has a detrimental influence on health. It often exists in combination with other determinants, leading to long-term and complex health problems that are difficult to address and overcome. Those who experience social and economic disadvantage are more inclined to have poor health.

The relationship between socio-economic status and health is complex. While low SES increases the likelihood of poor health or disability, it is also true that poor health or disability increases the likelihood of low SES by affecting education and employment opportunities. Education, employment and income are closely interrelated, and it is difficult to separate them when examining their impact on health and wellbeing. Higher education levels usually lead to higher income. Higher income increases access to health services, information and further education opportunities, leading to even higher income, thus starting a cyclic process.

Employment

An individual's pattern of employment, including unemployment, has a significant influence on health behaviour, quality of life and health status. Occupations can be compared and categorised in many different ways. Figure 2.8 shows how different patterns of employment might generally relate to socio-economic status.

Figure 2.8 Employment patterns and socio-economic status

Of all the socio-economic factors, unemployment is the most critical determinant of health. It limits the money available for an individual to buy health services and products, such as private health insurance, and it also has harmful psychological and social effects that impact on an individual's mental health. Unemployment is associated with higher levels of morbidity, mortality and disability.

Any pattern of employment that limits income, conditions and security, such as casual or unskilled work, also has the potential to restrict access to health services. People working in manual jobs such as construction, or low-skilled jobs such as labouring or cleaning, suffer poorer health due to exposure to physical hazards, including chemicals or accidents, and to the emotional effects of having less control over their own job.

Education

Higher levels of education contribute to better health status for individuals and their families. Higher education levels are generally related to higher income and better employment opportunities. Education also provides people with greater knowledge and skills for accessing health services and maintaining a healthy lifestyle, and decreases the likelihood of engaging in potentially risky behaviours. Those who are both educated and employed are more likely to invest in their health for long-term benefits, contributing to improved health status.

Income

As highlighted, income is very closely related to education and occupation. Higher income provides access to better-quality goods and services. These include better housing, food, health services and preventive health measures. Apart from these material advantages, financial security can also lead to a greater sense of control over work and life, which contributes to higher self-esteem and emotional wellbeing.

Income

Draw a continuum ranging from very high to very low income.

Against the continuum, list the goods and services that might be accessible, inaccessible or based on an individual's choice or decision at each level of income.

Decide what to include and where by looking at what is available in the community. This could include things such as gym and sports memberships and specialist medical and orthodontist services.

Environmental factors

The natural and human-made environments in which we live have a broad influence on our health and wellbeing and can impact in both positive and negative ways. Air and water quality are essential to good health, and climate and weather patterns determine the types of physical activities people do. Industry, roads and infrastructure affect communication, travel, and access to services, work patterns and general living conditions.

Geographic location

Geographic location can significantly affect people's health and wellbeing. People living in rural communities are likely to experience more varied access to health services and products, and lower socio-economic status. This disadvantage increases with greater isolation. Death from injury is far more prevalent in rural communities, due to motor vehicle accidents, long driving distances on open roads, and occupational hazards such as farm and mining machinery. Social isolation can also be an issue in small communities, along with increased social pressures, particularly for young males.

Positively, those living in rural areas have access to better air and water quality, less noise pollution and reduced traffic congestion.

More than two-thirds of Australia's population live in major cities. People living in urban communities generally experience better access to health services such as hospitals and doctors, and better job opportunities. Living in metropolitan areas is associated with higher levels of socio-economic status. Nevertheless, cities present challenges to health, including traffic congestion, poorer air quality, and exposure to many types of pollution. In some metropolitan areas, high-density housing can also contribute to social dislocation and poorer living standards.

Access to health services

Access to health services is a major health determinant. Widespread access differentiates across communities and social groups. Access means the ability to 'get' or 'reach' something. It can be affected by a range of factors.

Availability

The availability of a service is crucial to access. Some services are not made available to particular population groups. For example, younger women cannot usually access breast screening services unless they have a high-risk profile.

Proximity

If a service is not available in a particular location, then access for families in that location is greatly reduced. Many smaller communities have health services provided only on specific days. The alternative is to travel long distances to bigger centres where services are available. This can be expensive, inconvenient and unsettling.

Affordability

Many health services are expensive, especially when specialist doctors, modern technologies, accommodation or expensive medicines are required. Medicare and the Pharmaceutical Benefits Scheme (PBS) are specifically designed to help with such costs, but they cannot pay for everything. People with higher levels of private health insurance are generally able to pay for more services, and often have access to services that people without such insurance find difficult to afford. Some examples include 'elective' surgery, treatments provided in private hospitals, services for conditions that are not life threatening, and drugs not covered by the PBS.

Shutterstock.com/little star

Figure 2.9 Patients who are disabled, elderly or from non-English speaking backgrounds can often be vulnerable within the health system.

Awareness and understanding

An individual who is unaware of a service, or does not understand how that service can help them, does not have adequate access. Language and communication barriers can lead to reduced access for some individuals or groups. It is very important that health services target their most critical clients, and that they advertise in community languages and in settings where they are most likely to be seen. Patients who are disabled, elderly or from non-English speaking backgrounds can be vulnerable to lack of awareness or understanding.

Appropriateness

People of different gender, culture, age and disability all have varying needs. The gender of a doctor, the cultural sensitivity of a nurse, the location or the physical access could all influence whether the service is appropriate or not. Patients whose needs are not met by one service will rely on the availability of an alternative service.

Technology

The latest technologies are used extensively in the health system. Examples include screening technologies, such as MRI machines and ultrasound devices, which are used in early detection and screening for a wide range of conditions and symptoms. Advanced micro and robotic technologies are used to improve surgical techniques and to reduce the level of invasiveness for most operations. This dramatically reduces the duration and intensity of recovery for patients and the need for expensive accommodation.

Databases and online tools are used to manage large amounts of data, to improve diagnosis and treatment, to make data immediately available and to access and update patient files. Databases contribute to efficient transfer of information between different departments, health professionals and services across a very large system.

Communication technologies are being used to improve access in isolated communities, and to enhance communication and networks throughout the healthcare system. Health professionals have access to clinics, seminars, treatments, surgery and other events via the internet, sharing knowledge and experience to overcome many of the issues associated with distance. For families in remote communities, increased access to technology can reduce the burden associated with distance and the lack of access to health services that can increase the risk to both physical and mental health.

Factors acting together

Health is determined by interactions between individual, sociocultural, socio-economic and environmental factors. A change or a variation in one of these determinants will result in a variation to the individual's health outcomes. The determinants create a web of influence, so they are able to influence health both directly and by influencing other determinants.

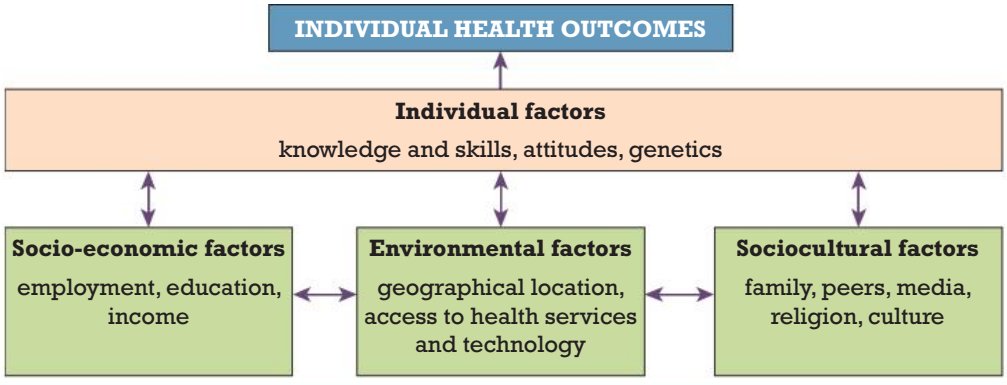


Figure 2.10 The interaction of health determinants

We can analyse the effect of different interactions between the determinants by changing one variable at a time and examining the likely health effects. Using Figure 2.10 as a guide, it is possible to see how a change in one determinant might influence other determinants and the health of the individual.

Example 1

An improvement in an individual factor such as education might lead to better knowledge and skills. Better skills lead to higher employment status, which can improve access to health services. Further, cultural differences such as having a non-English speaking background could have a detrimental influence on education or access.

Example 2

Sociocultural factors such as diet or a sense of connectedness could have a positive influence on health, while geographic location could limit access to essential health services.

Discussion builder

Step 1: In three small groups, produce four scenario cards to describe categories of determinants. Mark the back of each card as either individual, sociocultural, socio-economic or environmental. There should be 12 cards in total. For example:

Card 1: Individual	**Card 2: Sociocultural**	**Card 3: Socio-economic**	**Card 4: Environmental**
back: Individual	back: Sociocultural	back: Socio-economic	back: Environmental
front: Has a university education	front: Shares home with a large family	front: Has limited access to a regular source of income	front: Has advanced technological skills

Step 2: Swap all your cards with another group. Place the cards in category piles, with the scenario face-down.

Step 3: Start by turning over one scenario card from each pile. Discuss how the four determinants would interact to influence an individual's health.

Step 4: Pick just one pile and turn over the next card. Predict how this change in one determinant could influence the health of the individual.

Step 5: Continue to turn over one card from a different pile. Each time a new card is turned over, discuss how a change in one determinant affects the interaction between all the determinants.

INDIVIDUAL CONTROL OVER HEALTH

Modifiable and non-modifiable determinants

By understanding the determinants, it is possible to assess the degree of control that individuals have over their health.

Some factors that are influential on health can be changed, while other factors cannot. Risk factors that can be changed are known as modifiable determinants, while those that cannot be changed are known as non-modifiable determinants. The extent to which a health determinant is modifiable can vary greatly according to the circumstances of the individual, the family and

the community. For an individual, non-modifiable health determinants include age, gender and family history of disease, ethnicity and cultural background. These factors cannot be changed or altered by the individual.

Other determinants of health, such as peace, political conditions, provision of health services and the general social structure of a society, can have a profound influence on individual health and are modifiable over time, but are outside an individual's immediate control.

Some determinants of health are modifiable, but very difficult for an individual to consciously change. Factors such as housing conditions, parenting, education and socio-economic status have been shown to influence health significantly, yet there are great variations in an individual's capacity to change or manipulate them. The more readily modifiable determinants include behaviours relating to diet, exercise, drug use (including alcohol and tobacco), use of preventive health services and management of stress.

Table 2.2 18 determinants of health

	More difficult to modify		
Non-modifiable	Broader focus	Narrower focus	Highly modifiable
age	peace	housing	diet
gender	health services	education	exercise
ethnicity	social structure	family influence	tobacco use
family history	political conditions	socio-economic status	drug use
cultural heritage			stress management

Getty Images/Marc Piasecki

Figure 2.11 Angelina Jolie undertook genetic screening and subsequent surgery to reduce her chances of developing breast cancer

Modifying the determinants that are difficult to control

Though non-modifiable determinants of health such as age, gender and family history cannot be changed, they can act as early warning systems about increased risk of disease. An individual can counter this risk by acting on modifiable risk factors or determinants.

The actions we could take in these circumstances include:

- self-monitoring
- screening programs
- early intervention
- behaviour modification
- developing new skills
- education and increased knowledge
- seeking support from established or new networks
- medical intervention.

For example, a person with a family history of skin cancer who works outdoors could modify work hours, change jobs or wear protective clothing. A person with a family history of premature heart disease could undertake a healthy diet and exercise program. A woman with a family history of breast cancer could self-monitor and seek mammograms at a younger age than is normally recommended. Some women in very high-risk family groups have taken the step of having their breasts removed prior to a cancer diagnosis.

Genetic screening can be used to identify specific mutated genes in the unborn children of families who are known to carry such a gene.

Age and gender signify increased risk of some conditions, but usually only when combined with other determinants. For example, health risk is dramatically increased for males with a waist measurement of more than 94 centimetres. Being male is non-modifiable, but controlling waist size can help reduce the risk of heart disease or diabetes.

The changing influence of determinants

The influence of health determinants varies throughout the different stages of life.

Parents and babies

Social support and income have a major influence on the health of parents and their babies. A parent leaving work to nurture and care for a baby results in reduced income for most families, limiting their capacity to provide appropriate food, clothing, shelter and health products. Social support is also an important protective factor against harmful stress and anxiety for parents.

Access to health services is also a critical determinant. Greater access to appropriate and targeted health services results in better health outcomes for both parents and babies. Early screening and vaccinations can contribute positively to a baby's long-term health. The use of drugs, alcohol or tobacco during pregnancy have detrimental effects on both mother and baby, including reduced birth weight, developmental problems and specific drug-related issues, all of which can significantly harm a newborn baby and may have long-term implications.

Appropriate diet and exercise, including dietary supplementation, are strong protective factors for both mother and baby during pregnancy. After birth, breastfeeding can be an important protective factor for a baby. Babies are obviously unable to modify their behaviours or determine their exposure to health risks. The degree of control over the determinants can also be very low for mothers who lack adequate social and financial support. Lower socio-economic status can be further linked to disadvantage later in life, such as higher failure rates at school, disadvantage in the workforce and increased risk of poor health.

Children and young people

In recent decades, increasing patterns of poor diet, low physical activity levels and excess body weight have been observed among Australian children and young people. These determinants are contributing to increased incidence of diabetes and obesity. Social determinants such as family stability and connectedness may also be contributing to increasing incidence of mental health problems among children.

Health behaviours developed during childhood can influence future health considerably by establishing either risky or protective habits. The way families model nutrition, exercise, drug use and relationships have long-term effects on children's health attitudes and behaviours. As children grow into young adults, they become more independent. While many of the determinants remain the same, increased exposure to drug use, sexual activity and driving motor vehicles presents new risks. Binge drinking dramatically increases the risk of harm when combined with other determinants.

Getty Images/kali9

Figure 2.12 Poor patterns of diet and physical activity established in childhood can lead to problems in later life.

The transition from childhood to young adulthood can be a time of increasing experimentation and self-determination. Young people enjoy high levels of health literacy, but can also feel a sense of impunity from harm. This is also a time when individuals are establishing their own tolerance for risk, so behaviours that compromise health are more common. Many of the determinants of health have a cumulative effect, so young people often don't feel any sense of urgency to avoid them. The risks of developing cancer or heart disease seem a long way off, for example. At this age, attitudes to nutrition and exercise are influenced more by body image and social pressures.

The degree of control over the determinants is quite low among children, who have limited autonomy and income. It is much higher for young adults, with their increased right to self-determination, higher levels of education and growing income.

Working-age adults

Following school and study, people enter the working-age life stage. This is generally between the ages of 25 and 64. A wide variety of health conditions can emerge during this stage, and the foundations for health in older age are established.

Patterns of employment are the focus in this stage of life. An individual's job influences income, access, available time and social status. Changing or maintaining a career path during this stage can have a profound influence on health status. Other health determinants that are equally important relate to parenting and family roles. The influence of family on mental health, partnership, wealth and wellbeing can be highly protective or harmful. The interaction between work and family will be highly influential on quality of life.

During this life stage, diet can have a significant influence on health. As many as 80 per cent of people in this age group do not eat the recommended servings of vegetables, more than 63 per cent are overweight or obese, and 30 per cent report being physically inactive or sedentary. Determinants such as these contribute to increasing levels of high blood pressure and blood cholesterol.

Getty Images/ChesireCat

Adult health statistics

The key findings of the Australian Bureau of Statistics' National Health Survey 2014–2015 included the following:

- 56.2 per cent of all Australians aged 15 years and over considered themselves to be in excellent or very **good health**, while 14.8 per cent rated their health as fair or poor.
- 11.7 per cent of adults experienced high or very high levels of psychological distress.
- Rates of daily **smoking** have continued to drop, to 14.5 per cent of adults smoking in 2014–15, down from 16.1 per cent in 2011–12 and 22.4 per cent in 2001. More men smoke daily than women.
- Smoking rates for young adults (18–44 years) decreased to 16.3 per cent in 2014–15 from 28.2 per cent in 2001.
- More than 63 per cent of Australian adults (11.2 million people) were overweight or obese.
- Less than 18 per cent of adults consumed more than the recommended two standard drinks per day on average (exceeding the National Health and Medical Research Council lifetime risk guidelines), down from 19.5 per cent in 2011–12.
- 25.8 per cent of men and 9.3 per cent of women exceeded the lifetime risk guidelines.
- Of all adults, 23 per cent had high blood pressure (systolic or diastolic blood pressure equal to or greater than 140/90 mmHg).
- More than 50 per cent of adults did not meet the Australian Dietary Guidelines for recommended daily serves of fruit, while less than 10 per cent met the guidelines for serves of vegetables. Only 5 per cent of adults met both guidelines.

Lifestyle factors

Lifestyle factors are the main determinants (risk and protective factors) of health during this life stage. Lifestyle habits and routines can become well established and difficult to change during this stage, often leading to changes in health status. Sustainable dietary and exercise habits and not smoking are especially protective behaviours for this age group, and help to establish good health in old age. The risk of developing a chronic disease increases in line with the number of risk factors present.

Money

For many, financial stability and access to services are at their highest levels in this stage of life. The relatively high socio-economic status that characterises this age group leads to increased use of health services and preventive strategies. This increases the capacity to control health determinants – perhaps more than at any other stage.

Older people

During older age the influence of determinants that have been accumulating for years becomes evident. Longer-term tobacco use, excess weight, high blood pressure and high blood cholesterol increase the risk of developing chronic diseases, which are prevalent at this stage.

The benefits of long-term protective factors can lead to healthier and more productive quality of life. Healthy weight, regular physical activity, a balanced diet, social networks, not smoking and access to healthcare services all contribute to good health in older age. These determinants reduce the risk of chronic disease, improve mobility, reduce disability and facilitate higher levels of participation in community and family activities.

Control over the determinants begins to decline during this stage of life, with reduced income and increased levels of disability and dependence. The degree to which older Australians can exert control over the determinants is greatly influenced by what they have done in previous stages of life, and the level of social support available to them.

Risk factors

1 For each stage of life, draw up a flowchart or write a paragraph listing a range of modifiable and non-modifiable risk factors that influence an individual's health status.
2 For each stage, analyse the level of control that the individual might have over these factors.

My health

Create a web diagram to demonstrate how your own health can be viewed as a 'social construct'. Try to include as much detail as possible to help you understand the way you think about and perceive health.

Once you have completed your diagram, consider how different it might look if you grew up in a completely different environment, such as a remote tribal village or a war-torn nation.

HEALTH AS A SOCIAL CONSTRUCT

In this section we will investigate how the determinants of health explain why some individuals and groups have better or worse health than others.

Health is a word used so frequently in everyday life that its meaning seems self-evident. This is far from the truth, however. Studies have shown that even when a patient sits with a doctor, the two parties often hold very different views about what health is. Different people interpret health in different ways, resulting in as many meanings for health as there are people.

This can best be explained by understanding that health is a social construct, and varies from society to society. Groups of people make up views of the world that reflect their own interests and beliefs. Different experiences of age, gender, culture, biology, environment, family, employment and so on provide individuals with different realities about what health is and what health means to them (remembering that this will probably change over time for individuals as well).

Social structures (including law, religion and social class) have developed and will continue to change over time. These structures have been formed and influenced by economic, social, political, environmental, biological and technological influences. Health can be viewed in exactly the same way. As such, health is a social construct that has developed due to the influence of a multitude of social determinants.

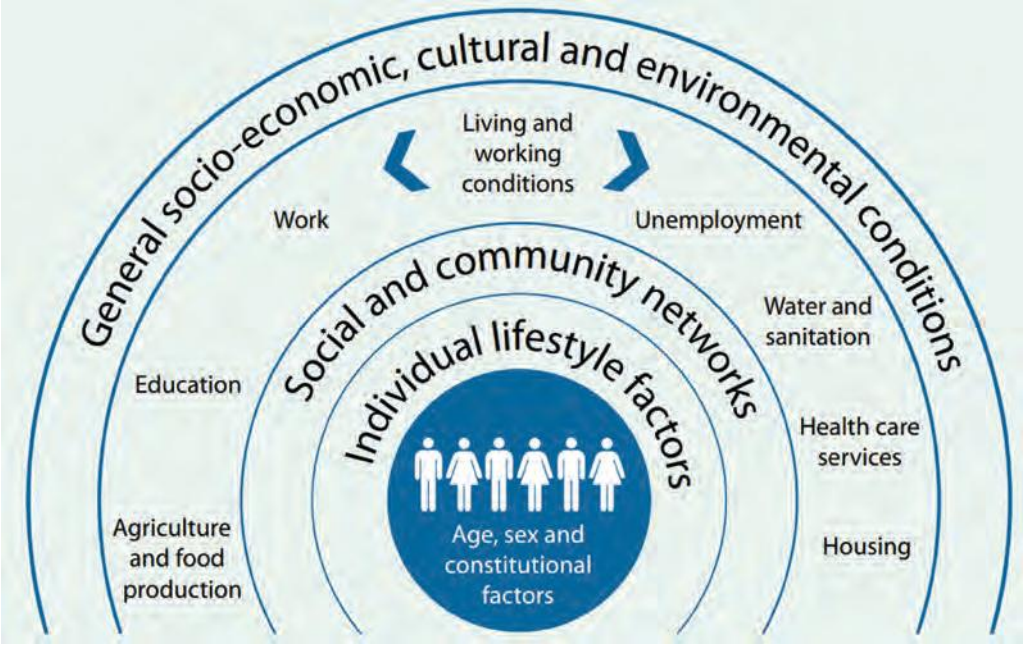
Determinants are interrelated

There are numerous factors that affect the health of individuals and communities. According to the World Health Organization, the environment and a person's circumstances play a significant role in determining whether people are healthy or not. Some factors, such as where we live, our relationships, education, income and genetics, can have a greater impact than others, such as access to services.

The determinants fall under three broad categories:

- the social and economic environment
- the physical environment
- the person's individual characteristics and behaviours.

It is important to remember that there are factors beyond an individual's control, and it can be inappropriate to blame an individual for poor health, or to give them credit for good health. For example, higher income and social status are linked to better health, and the greater the gap between the richest and poorest people, the greater the differences in health. Lower education levels are linked with poor health and lower self-confidence.



Source: Dahlgren G & Whitehead M 1991. Policies and strategies to promote social equity in health. Background document to WHO - strategy paper for Europe. Stockholm, Sweden: Institute for Future Studies, in Australia's health 2016, Australian Institute of Health and Welfare, p. 129.

Figure 2.13 A framework for the determinants of health

Individual and socio-economic determinants

Low socio-economic status limits the individual's ability to buy healthy products and services, and influences diet and exercise patterns. Low socio-economic status can lead to reduced educational opportunities, creating a combined effect that is harmful to health status. High socio-economic status could potentially have the opposite effect.

Individual and environmental determinants

Environmental factors are often background factors that are difficult for the individual to manage. A lack of social networks due to geographic isolation could be overcome by developing skills in information and communication technology in order to increase access to health and support services. In an increasingly sophisticated society, a lower level of literacy almost always equates to poorer access to health information.

Individual and sociocultural determinants

Many life skills are learnt from the family. Cooking skills and interpersonal skills are examples of individual factors that are shaped by sociocultural influences. Personal identity is also closely linked to cultural identity. The way an individual interprets and responds to cultural background can have a protective or harmful influence on their mental health and self-esteem. Many health behaviours are the direct result of what is accepted as 'normal' within the prevailing culture. For example, tobacco use is more accepted among some groups than others, while attitudes to sex can differ widely among different cultural groups.

Environmental and socio-economic determinants

The most common way of measuring and reporting socio-economic status (SES) is to attribute the same SES to groups in similar geographic locations. Income and wealth have a significant influence on where a person lives, and groups who share common environments often share common socio-economic characteristics. People who live in rural or outer-suburban areas are confronted by reduced access to health services, often due to limited transport and facilities. Geographic location has a profound effect on lifestyle and employment patterns, both of which influence health directly. In particular, a political or social environment that contributes to the increased likelihood of unemployment will influence socio-economic conditions.

AAP Photo/Kristen Gelineau

Figure 2.14 People living in remote locations often have limited access to public transport.

Environmental and sociocultural determinants

Environmental factors, including access to health services, are influenced by sociocultural factors such as language skills. Individuals who speak English as a second language are more likely to have reduced access to information.

Different cultural groups interact with the natural environment in different ways. For example, many Australians enjoy outdoor activities around waterways in a warm climate. This can contribute to increased physical activity, but also to increased risk of skin cancer and injuries.

Family relationships are often influenced by geographic location. Young people from rural communities often leave their families to pursue educational and career opportunities. Moving away from the family home can have a range of influences on lifestyle and health outcomes.

Sociocultural and socio-economic determinants

Different cultural groups have different attitudes to family structure. This includes how families choose to live, such as the way family members share homes and living spaces. There can be obvious financial advantages to having more family members in the one house, but there may also be other health impacts relating to stress and relationships.

Close relationships often exist between immigration and socio-economic status. Most migrants to Australian are selected on the basis of being financially secure, however, some groups born overseas, including refugees, may experience low SES. The combination of low SES and adapting to a new lifestyle and unfamiliar surroundings can have a significant influence on health status.

Other complex interrelationships

The health determinants create a complex web of influence that is multi-dimensional and can be difficult to measure. In 2011, risk factors were responsible for 31 per cent of the total burden of disease and injury in Australia. The AIHW attributed 29 risk factors to the total burden of disease in Australia. (Risk factors that were social determinants, such as income, employment and education, were not included.) All the risk factors combined contributed greatly to the burden for endocrine disorders (96 per cent), cardiovascular diseases (69 per cent), injuries (30 per cent), kidney and urinary diseases (42 per cent) and cancer (44 per cent).

Statistical data can indicate the likelihood of smoking, poor diet, age, gender or geographic location contributing to the risk of developing a chronic disease, because these are easily identified determinants. However, the influence of determinants such as political stability, the natural environment or buildings might be more difficult to identify.

The broader physical, social and political conditions set the foundations for socio-economic and social structures to be established. These broad characteristics of a society affect an individual's exposure to risk factors. The individual responds to that level of exposure based on personal characteristics, such as psychology, skills and attitudes, biological and genetic factors.

Ultimately, the complex interrelationship between so many social determinants, each unique to the individual, supports the notion of health as a social construct.

Health is not just an individual responsibility

The question of who is responsible for an individual's health is very important in deciding how to provide support and resources for improving health status. In the 1970s and 1980s, attempts at promoting health in Australia were based on the assumption that individuals were able to improve their own health simply by improving their knowledge and behaviour. Historically, it has been common for people to view health as solely an individual responsibility, creating a 'blame mentality'. Attributing blame for poor health can create negative attitudes to the sufferers of disease, fostering a narrow view of health and improvement that focuses predominantly on treatment of poor health.

> No one is in charge of what goes into my mouth except me. No one is in charge of what goes into kids' mouths except their parents. It is up to parents more than anyone else to take this matter in hand … if their parents are foolish enough to feed their kids on a diet of Coca-Cola and lollies, well they should lift their game and lift it urgently.
>
> Tony Abbott, then Federal Health Minister, December 2005, discussing childhood obesity on the ABC's *4 Corners* TV program.

Based on the view of health presented by former prime minister Tony Abbott, the only way to address the problem of childhood obesity would be to blame children and parents for their behaviours. The only option for addressing the issue would be to treat the illness and repeatedly focus on raising awareness and imploring parents and children to change their habits.

Tony Abbott's view ignores the fact that other determinants, including advertising, marketing, taxation, parental working patterns, exercise facilities and time constraints, play a role in this particular health problem. Adopting a more social view of health (as a social construct) takes into account the influence of many different health determinants, and recognises that the risks associated with health cannot solely sit with the individual. Importantly, this view does not ignore individual responsibility, but it opens up other options for addressing the problem. These may include regulations to restrict junk food advertising, or increased taxes on cigarettes and alcohol.

Socio-economic disadvantage is a prime example of how a social view provides a broader focus. Without social and financial support, safer environments, and policies that empower individuals to make healthy decisions, people may continue to make poor health choices because there are too many barriers to overcome. Table 2.3 shows how people with fewer resources and greater inequities are less likely to change their health behaviours.

Table 2.3 Health is …?

If health is an individual responsibility …	If health is a social construct …
Focuses on individual behaviours	Focuses on policies and environments
Addresses downstream determinants	Addresses upstream determinants
Only one option for health promotion action	Multiple options for health promotion action
Action in health sector only	Action across sectors
Responsive to awareness and information	Responsive to education, laws, taxes, policy, environments, social support
Leaves the social determinants the same	Works to exploit the social determinants
Repeatedly informs each new generation	Embeds health in public policy
Threatens equity	Reduces inequity
Leaves each individual and family to its own resources	Reduces the gap between the most advantaged and the most disadvantaged
Deregulated environment	More regulated environment

TOBACCO USE among young people has plummeted due to the influence of heavy regulation, taxation, control of environments, packaging laws, sales legislation, etc. The social determinants have been addressed by governments over an extended period of time.

OBESITY, especially among young people, has increased dramatically as a result of a less regulated junk food environment in which marketing is less regulated and the social determinants have not been effectively addressed.

Alamy Stock Photo/Jake Lyell

Fig 2.15 Without access to appropriate health care, resources and support, individuals can find it difficult to engage in healthy behaviour.

Health decisions are not made in isolation. Many factors interact to influence the decisions people make about their health. Although individuals do have a level of accountability for their health behaviours, it must be recognised that sociocultural influences play a large role in either supporting or reducing the health of an individual. Social institutions and governments have a responsibility to help individuals achieve good health.

When governments (from the top down) and individuals (from the bottom up) share the responsibility for health there is a far more positive influence on health outcomes. An important step in achieving the best possible health outcomes is to acknowledge the influence of the health determinants and to address them across all sectors.

High-risk behaviour

1 Select a high-risk health behaviour, such as tobacco use, unsafe sex, binge drinking, dangerous driving, illegal drug use or physical inactivity. Identify a variety of determinants that interact to contribute to this problem.
2 Design a multi-faceted approach to this health problem by describing at least one strategy to address each of the determinants you have identified.

CHAPTER SUMMARY

- Health is the result of many factors combining and interacting. Some of these factors can be controlled or modified (such as lifestyle), while others are non-modifiable (such as age and genetics). Genetic factors can contribute to increased risk of developing certain conditions, but knowing about family history can provide an early warning, allowing the individual to undertake protective lifestyle behaviours.
- The determinants of health include sociocultural, socio-economic, environmental and individual factors.
- The determinants of health interact in many ways to bring about different health outcomes for each individual.
- Individual health behaviours result from the interaction of personal knowledge, skills and attitudes.
- Cultural diversity results in many different approaches to achieving good health. Sociocultural factors that can influence health include the media, peers, family, culture and religion.
- Socio-economic status (employment, education and income) is one of the most influential health determinants. Socio-economic disadvantage and poor health are very closely related, and contribute to each other.
- Environmental factors such as geographic location and access to health services have a strong influence on health. Technology is being used in many applications to overcome a range of health inequities.
- Health determinants can be broad, such as political stability or the global environment, or specific, such as diet, drug use and exercise.
- Health is a social construct. Individuals attribute meaning and value to their own health, based on their own experiences and judgements.

CHAPTER REVIEW ACTIVITIES

Extra exam-style questions

Determinants of health

1 What is the difference between a 'risk' and a 'protective' factor in relation to health? Provide an example of each.
2 What are five skills that an individual can use to improve their health?
3 Why is the development of skills and attitudes important for individuals who are trying to develop or maintain good health behaviours?
4 Explain why the 'peer group' can be such a powerful influence on the health behaviours of young people.
5 How can technology be utilised to improve health, both at an individual and a population level? Provide an example for each level.

Control of personal health

6 What is the difference between a modifiable and non-modifiable determinant of health? Provide an example of each.
7 Outline five modifiable determinants that account for chronic disease in Australia. Link each determinant to a condition or range of conditions.
8 Recommend three actions an individual with a family history of a chronic illness could take to protect themselves and reduce the risk of developing this condition.
9 Outline the relationship that exists between the levels of control individuals have over the health determinants and the four main stages of life.
10 Critically analyse the extent to which young people are able to exert control over their own health.

Health as a social construct

11 Why is it important that health is viewed as a social construct?
12 Demonstrate how the determinants of health are interrelated.
13 Using a mind map or flow chart, interpret the interrelationship between the various determinants of health.
14 Explain why the question of who is responsible for health is such an important one.
15 Why can it be problematic to attribute the responsibility for health solely to individuals? Assess the value of challenging the notion that health is solely an individual's responsibility.

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CHAPTER 3
Strategies to promote the health of individuals

IN THIS CHAPTER

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WHAT IS HEALTH PROMOTION?

Health promotion is about achieving the best possible health for everyone. It is concerned with empowering people in order to help them take control of their health and make improvements. The World Health Organization defines the process of health promotion as 'enabling people to increase control over, and to improve, their health'. Health promotion occurs at many different levels in society, focusing on a range of activities that prevent poor health from occurring or recurring, rather than treating poor health after it has occurred. It requires sustained changes, both in individual behaviour and social change.

Shutterstock.com/Monkey Business Images

Figure 3.1 Contemporary health promotion is complex and involves many factors

RESPONSIBILITY FOR HEALTH PROMOTION

There are various health promotion roles and responsibilities held by individuals, groups and governments.

Responsibility for health promotion is not independent at each level, and is not solely the responsibility of the health sector. Successful health promotion requires cooperative action between individuals, schools, community groups, all levels of government, non-government organisations, the media and the private sector. Collaborating at different levels to plan and deliver health promotion initiatives can provide a range of benefits, including:

- sharing energy and resources
- sharing roles, responsibilities and expertise
- gaining ownership and credibility by being involved
- ensuring clear messages are communicated to all sectors
- achieving common goals and directions for all stakeholders through shared understanding
- addressing a wider range of health determinants at different levels
- establishing more sustainable programs
- increasing the likelihood of improving health outcomes.

Individuals

Despite the influence of the many determinants on health, individual behaviour change is a critical aspect of the health promotion process. Individuals have responsibilities to themselves and those around them to take action to protect and support good health. Individual and community health can improve if individuals:

- keep well informed about new developments in health and health services. Many people suffer poor health as a result of misinformation or ignorance about the impact of lifestyle behaviour
- are active participants in their own health education. Health education is mandatory in all Australian schools, where students have a responsibility to engage and develop their knowledge and skills
- behave in a safe and healthy way by following appropriate rules and guidelines, avoiding practices that can be risky and harmful to themselves, and acting in a way that also protects the health of others

- are active promoters of health among their families and peers. Parents and older siblings in particular must take responsibility for modelling and promoting healthy behaviours for their children and younger siblings
- participate in and advocate for actions that create supportive environments and are protective of health in workplaces, neighbourhoods and natural settings
- participate in debates about health and in community health promotion activities and events.

Fairfax Syndication/Jay Cronan

Figure 3.2 Volunteers from the local community can make an important contribution to health initiatives

Schools and community groups

Schools and community groups play an important role in health promotion, often supporting individuals and communities at a local level. Health professionals, planners, teachers and leaders are in an ideal position to enhance and promote community health. When local authorities understand the characteristics and needs of their residents, they can support them by making appropriate services available. The right focus on health services and education at the local level, combined with the ability to participate in local health planning and decisions, can empower individuals to take control of their own health.

Health education in schools is integral to the process of developing health literacy. Schools are also a critical source of attitude and skill development for young people.

Health status improves when schools and communities:

- accurately identify the priorities and values of the community
- initiate and support community activities and services that give residents more control over their own decisions, living conditions and behaviours
- provide access to knowledge, resources and skills that will promote sustainable changes in healthy environments and behaviours
- work proactively to encourage and promote community action
- develop partnerships to access skills and resources that might not be available locally.

Non-government organisations

Non-government organisations (NGOs) include lobby groups, special interest groups and political pressure groups. In the area of health promotion, they include groups such as Asthma Australia, the Cancer Council, the National Heart Foundation, Mental Health Council of Australia, NRMA and Diabetes Australia, with each focusing on a particular health problem. These groups have

been established in order to influence governments and other significant decision-makers at local, national and international levels. In Australia, these organisations typically have a national body that oversees state and territory branches. Their responsibilities include:

- collecting information and data through research projects and surveys
- advising governments and health authorities about independent findings
- providing consumers and members with information, services and support
- lobbying governments about critical issues and trends that require new legislation, funding or other responses
- initiating and supporting community action to raise awareness and promote involvement by the public and other organisations.

NGOs also play an important role in research and knowledge production. Universities and research institutes play a similar role to non-government organisations. They often rely on governments for funding, but have varying degrees of autonomy, allowing them to research areas of health they identify as important without having to depend on a government-led agenda.

These organisations work in partnership with government agencies like NSW Health and other stakeholders, such as health practitioners and the private sector, to provide education and clinical teaching programs, and to undertake research and development aimed at supporting the population's health and health system priorities. For example, the University of NSW partners with the Black Dog Institute to provide a platform for increased awareness and support for mental health.

Investigate

Go to the Black Dog Institute website to read and watch short video clips about Headstrong 2.0 school resources.

Government

Australia has three tiers of government: local, state and federal. Each has responsibilities for different aspects of health promotion. It is important that the three levels work together in order to make the most efficient use of available resources, and to maximise the benefits of health promotion initiatives.

Federal government

The federal government has a steering and coordinating role. It responds to directions and policies generated by the WHO, such as the Ottawa Charter, by designing national campaigns and strategies that are then implemented at state and local levels. The federal government's main responsibilities include:

- formulating national health policies based on data, trends and evidence
- responding to international bodies and information
- designing and implementing health promotion initiatives, strategies and campaigns at a national level
- working cooperatively with state governments to integrate policies
- supporting research and monitoring programs
- providing ongoing funding for the states, and special funding via grants for health-promoting groups and projects
- strengthening a national move towards preventive health actions and attitudes.

Examples of national health promotion campaigns and strategies include:

- National Drug Strategy
- Eat for Health (Australian Dietary Guidelines)
- Physical Activity and Sedentary Behaviour Guidelines
- Cancer screening (BreastScreen Australia/ National Bowel Cancer Screening Program/ National Cervical Screening Program)

- National Mental Health Strategy
- Drinking Nightmare
- National Chronic Disease Strategy
- National Skin Cancer Awareness
- Quitnow – National Tobacco Campaign
- Australian Immunisation Register (Immunise Australia Program)
- Fourth National Hepatitis C Strategy (2014–2017)
- A Healthy and Active Australia
- National Road Safety Strategy (2011–2020) .

(left) Newspix/Waide Maguire; (right) AAP Image/QUITLINE

Figure 3.3 (Left) BreastScreen NSW provides free screening mammograms for women between 50 and 74 in New South Wales. (Right) Each state and territory funds its own Quitline service to provide information, advice and support to people who wish to stop smoking.

State governments

State governments are responsible for the delivery of primary health services through hospitals and clinics. Complementing this responsibility is the implementation of health promotion campaigns and initiatives. NSW Health is the government department in charge of health service delivery and health promotion in New South Wales.

NSW Health is divided into regional areas, and each Area Health Service has a public health unit that engages in health promotion and preventive health strategies. Some examples of health promotion strategies delivered at a state level include tobacco, alcohol, and lifestyle and obesity campaigns. Many primary health services deliberately take a preventive approach in the role of service delivery.

Another important feature of health promotion at the state level is campaigns that are delivered through schools and local community agencies. State governments can develop partnerships with education departments and local councils to make this happen. The Healthy Kids: Eat Well, Get Active strategy (encompassing Munch & Move, Make Healthy Normal and Jump Rope for Heart) demonstrates how a partnership can work to promote health. This partnership is between NSW Health, the Department of Education and external organisations such as the Heart Foundation.

The NSW State Government has a significant influence on the syllabus content and delivery in New South Wales schools. The decision to make PDHPE a mandatory subject, combined with the content included in the syllabus, allows the state government to shape health promotion through schools. The Department of Education has also supported the Health Promoting Schools framework in New South Wales. Health promotion campaigns at a state level are often translated from national campaigns in order to meet the needs of that particular state or territory.

Local councils and governments

There are three key areas of local community health and wellbeing that NSW local government focuses on:

1 promoting the profile of public health
2 building councils' capacity in this area
3 encouraging the consideration of health impacts in order to improve NSW communities' quality of life.

Local councils/governments are responsible for many roles that relate to the promotion of public health. These include:

- providing food services
- providing sporting and recreational facilities and open space
- providing sun protection through shade provision
- providing water fluoridation
- providing mental health promotion
- providing physical activity promotion
- addressing overweight and obesity
- promoting safety and preventing injury
- preventing harm associated with alcohol and other drugs.

Local councils carry out a range of day-to-day tasks that promote the health of the community, including on-site sewage management, water quality, and garbage removal and collection. The Local Government and Shires Association of NSW reported that its members identified the following responsibilities regarding public health:

- inspection programs of council swimming pools, private pool fencing and water quality in cooling towers
- injury prevention and safety promotion, including road safety, crime prevention through environmental design, falls prevention for the aged and disabled, and recreational water safety
- urban planning that facilitates physical activity, ensures access to affordable, healthy food, and encourages less reliance on cars. Urban planning and social and physical infrastructure can also have an impact on sun protection and injury prevention in public spaces.
- cancer protection, especially regarding protection from sun exposure and tobacco. Local healthy eating and physical activity programs.
- consultation with Area Health Services about the role of local community health centres
- consultation with the Department of Ageing, Disability and Homecare, including individual Home and Community Care Services
- consultation with non-government organisations, churches, consumer groups and residents to clarify needs and issues.

Collaboration across all sectors of government can help to reduce duplication and to ensure that services and strategies are delivered in the most relevant settings. In this way, governments can achieve excellent returns for health promotion expenditure.

Investigate

For more information, visit the Local Government NSW website and search for the Health page.

Getty Images/fstop123

Figure 3.4 Provision of children's play areas should be taken into account by urban planners.

International organisations

World Health Organization (WHO)

The World Health Organization (WHO) describes itself as the directing and coordinating authority for health within the United Nations system. It has 194 member states and is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries, and monitoring and assessing health trends. In an increasingly complex global environment, the WHO has identified six major objectives:

- Two health objectives: promoting development and fostering health security.
- Two strategic needs: strengthening health systems and harnessing research, information and evidence.
- Two operational approaches: enhancing partnerships and improving performance.

Its projects are diverse, and include global data collection and analysis, establishing health guidelines, initiating health infrastructure projects and lobbying governments. The WHO is a global entity with a diverse range of interests, including inequities associated with poverty in Africa, and women's health.

Its policies and initiatives are relevant to all of its members, though there are vast differences between the conditions in developing and developed nations. The capacity of governments in developing African nations to respond to WHO policy may be vastly different to the capacity of governments in highly developed OECD nations.

Take responsibility!

As a class, prepare and debate the following statement: 'Individuals need to take more responsibility for their own health.'

NGOs

Access the website of the US National Institutes of Health Fogarty International Center and search for 'NGOs working in global health research'.

Select an organisation from the list of global NGOs. Review and outline the work they do to promote health.

Live life well

Access the NSW Healthy Kids website and look for 'Live Life Well @ school'. Search for 'programs for secondary schools'. Briefly outline the initiatives available for secondary schools.

WHO programs

1 Access the WHO website. Navigate to the programs page – you will see a comprehensive list of the projects and programs provided by the WHO.
2 Investigate two different strategic areas from the list.
3 Write a brief report on each, and compare the circumstances that contribute to the need for each project, including the countries that are involved.

HEALTH PROMOTION APPROACHES AND STRATEGIES

In this section we will determine the effectiveness of a range of health promotion strategies that are relevant to young people, and propose other actions that may improve the health of young people.

Approaches to health promotion have changed over time, from a heavily medical and biological focus in the early 20th century (medical interventions) to a focus on lifestyle diseases in the late 20th century. This change occurred as a result of epidemiologists identifying links between lifestyle behaviours (such as smoking) and disease (lung cancer). In response to this new understanding of health, governments adopted the 'lifestyle/behavioural' approach to health promotion, focusing on specific disease, illness and injury prevention. In the 21st century, health promotion acknowledged the significance of underlying social determinants of health, leading to an increased focus on 'public health' and the adoption of a range of strategies to address the many factors that determine the health of individuals and populations.

Lifestyle/behavioural approaches

The lifestyle/behavioural approach to health promotion is based on the belief that giving people knowledge and skills regarding healthy lifestyles will improve their health. The premise of this approach is that individual lifestyle behaviours are the major determinants of poor health, and that providing individuals with information about health will change their attitudes and health behaviours. A drawback of the approach is that it assumes that individuals in completely different environments have equal capacity to control their own health. This approach relies heavily on health education and public health messages.

GREEN YOUR MENU WITH EVERYDAY IDEAS

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USE THESE MENU IDEAS TO ADD MORE GRAINS

Wholegrain Bread for Sandwiches/Rolls/Wraps

Wholegrain Crackers with Dip or Cheese

Breakfast Cereal Cups with Milk

Pizza with Everyday Toppings

Plain Popcorn Snack Packs

Pasta/Rice Salads or Hot Dishes

Fruit Buns/ English Muffins/ Bread

USE THESE MENU IDEAS TO ADD MORE VEGETABLES, BEANS & LEGUMES

Salad in Sandwiches/ Rolls/Wraps

Vegetable/Bean Toasties/Jaffles

Vegetable Soup

Salad Boxes

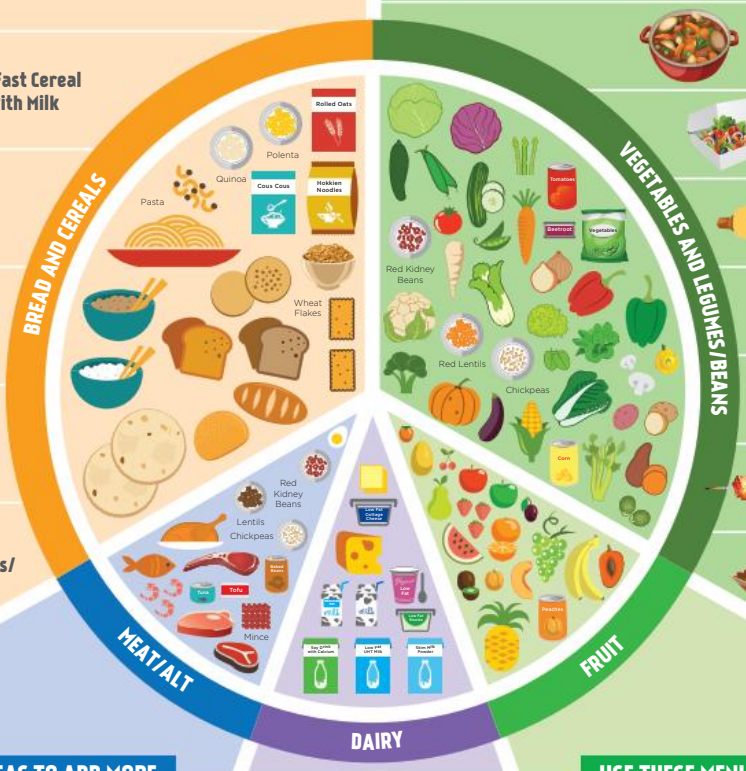
BBQ Corn Cobs

Salad on Burgers & BBQ Sandwiches

Vegetable Dips with Vegetable Sticks

BBQ Kebabs

Mexican Bean Bowl with Flat Bread



USE THESE MENU IDEAS TO ADD MORE LEAN MEAT/FISH/POULTRY/ALT

Egg and Tomato Breakfast Rolls

Bean and Minestrone Soup

Lean Roast Meat Rolls

Lean Beef Burgers

Wraps/Sandwich/ Roll Fillings

USE THESE MENU IDEAS TO ADD MORE DAIRY

Yoghurt Tubs

Smoothies/Milkshakes

Reduced-Fat Cheese to Salads or Sandwiches/ Toasties

Reduced-Fat Hot Chocolate Cups

Reduced-Fat Plain/Flavoured Milk Drinks

USE THESE MENU IDEAS TO ADD MORE FRUIT

Fresh Whole Fruit

Fruit Tubs in Natural Juice

Frozen Pieces

Diced Fresh Fruit Cups

Fruit-based Sweet Toastie Fillings

Aim to use healthier versions of Everyday Foods, such as wholegrain bread, wholemeal pasta, brown rice, high-fibre breakfast cereals, and reduced-fat milk and yoghurt.

Health education

Raising awareness of specific health issues is a common feature of the behavioural approach. The focus is on improving lifestyle behaviours such as substance abuse (including tobacco and alcohol use), poor nutrition, sun exposure and physical inactivity.

Health promotion interventions using the lifestyle/behavioural approach can focus on individuals, groups or whole populations. Thus, the 'education' process can take place in a range of different settings. These can include healthcare settings such as hospitals and medical centres, local communities, workplaces and schools, and public settings such as shopping centres, media outlets and public spaces.

Wide-reaching media campaigns employ the practice of social marketing, and public campaigns are often supported by information regarding self-help, advice about self-care and public policies to support healthy lifestyles.

Health promotion programs that have had some success within this model include:

- exercise and physical activity programs for overweight adults
- healthy eating programs for primary-school-aged children
- quit smoking campaigns and strategies
- sun-safe programs for secondary-school-aged children
- school-based road safety programs.

However, the effect of such programs has often been short term, with influence reducing over time. The main weakness of the lifestyle/behavioural approach is that it focuses on the individual, without addressing the impact of other social and environmental factors. An approach that only works at the individual level has limited capacity for making sustainable changes to health, because the individual remains surrounded by the same environment that contributed to their original behaviour.

Preventive medical approaches

Preventive medical approaches reflect the traditional view of health as the absence of disease, and fall within the domain of the health sector. They work by treating and preventing disease at the biological level. In developed nations where the necessary reach, wealth and technology exist, they have become increasingly popular and highly effective means of improving health status.

An example in Australia was the introduction of a vaccine for the human papillomavirus (HPV), employed to reduce cervical cancer cases by eliminating HPV. In less-developed nations, the effect of preventive medical approaches can be limited by the degree of access health professionals have to the entire population, and by the level of compliance.

Health promotion actions can be described according to the health status of the groups that they target, and occur in three stages: primary, secondary and tertiary.

Primary prevention

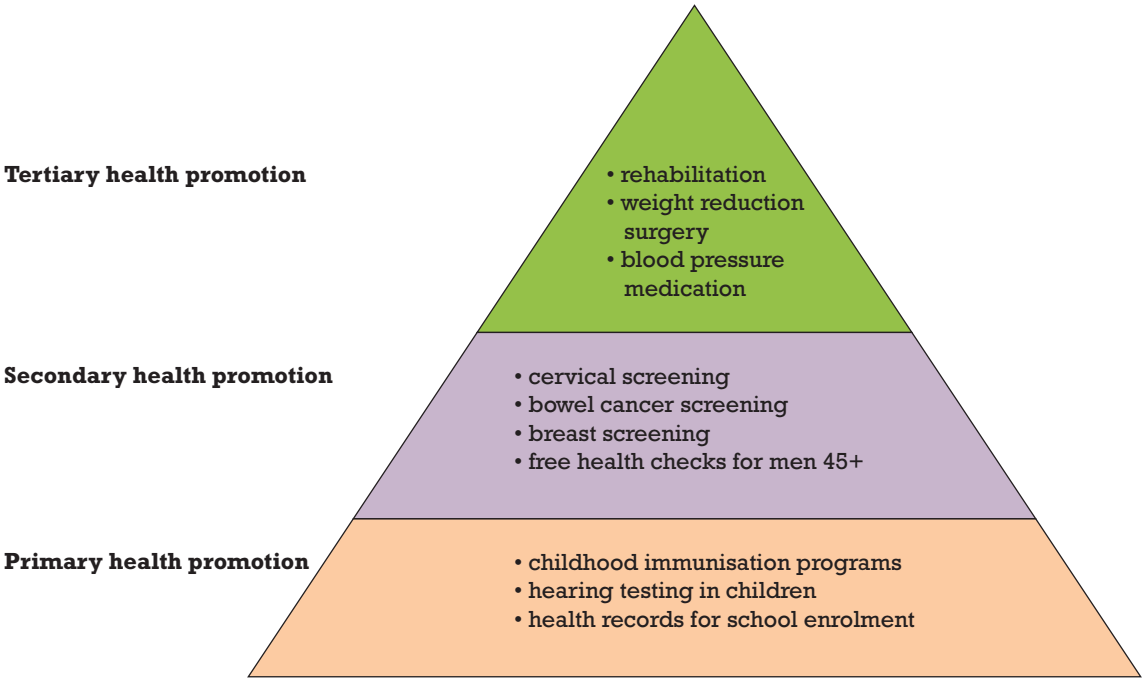
Primary prevention refers to actions that target whole populations with no obvious risk factors. For example, immunisation for childhood diseases.

Secondary prevention

Secondary prevention refers to actions that target groups who exhibit risk factors, or who are known to have increased levels of risk. For example, cancer screening programs for groups with an increased risk profile such as age, gender or family history.

Tertiary prevention

Tertiary prevention refers to actions that target people who have already developed a disease and are trying to prevent a recurrence or a chronic illness developing. For example, medications to reduce high blood pressure.



Source: Based on Leavell and Clark's Three Levels of Prevention

Figure 3.5 Three levels of health promotion

Public health approaches

The public health approach to health promotion is more integrated than the lifestyle/behavioural or preventive medical approaches, and aims to engage and benefit as many people as possible. It includes behavioural, economic, environmental, political and social interventions, generated from both within and outside the health sector.

Health is determined by factors outside the immediate health system and beyond the control of the individual. As a result, lifestyle/behavioural and preventive medical approaches have limited scope for promoting health when applied in isolation. The public health approach promotes health by addressing the social determinants of health – for example, access to food, housing, income, employment, social isolation, early life, transport, addiction and education – as well as by creating healthy environments. This approach aims to generate social and structural changes in communities and populations.

A number of features characterise this approach. The more of these features that are incorporated into a health promotion strategy, the greater the likelihood of its long-term success. These features include:

- creating physical and social environments that support health
- empowering individuals by encouraging participation
- working with communities to increase skills and capacity for health action
- establishing collaborative partnerships across sectors to develop strategies that work
- using political means to advocate for public policy
- addressing the social determinants of health
- actions that are based on data and evidence.

Examples of school and workplace health promotion programs that work within this model are discussed in the following pages.

Health Promoting Schools

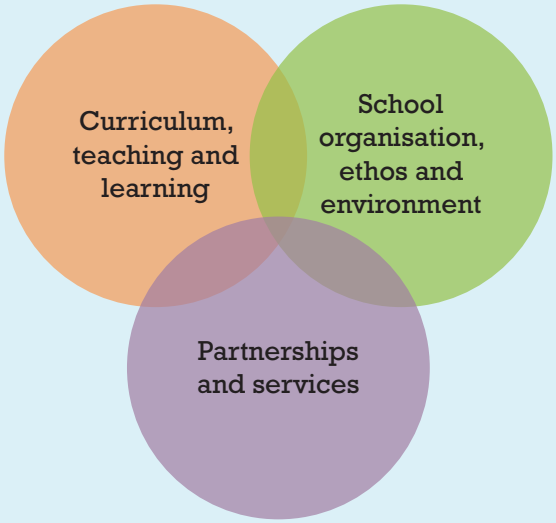
Schools contribute significantly to the health of their students and the community. The Health Promoting School (HPS) is an internationally accepted approach to addressing school health, and is based on a tripartite (three parties or parts) model (see Figure 3.6) incorporating curriculum (teaching and learning), school organisation (ethos and environment) and partnerships/services. The inclusion of health in the curriculum, the way the school is organised and conducted, and the way students are treated, including various out-of-class activities that schools undertake, are all influential.

Evidence has emerged to inform schools, teachers, parents and students about the benefits of effective school health programs. Strategies that are mainly information-based and are implemented only in the classroom are not as effective as strategies that are integrated, holistic and that actively involve multiple stakeholders, such as students, staff and parents.

HEALTH PROMOTING SCHOOLS FRAMEWORK

The Health Promoting School is based on the principles of the Ottawa Charter for Health Promotion and has a number of essential components. These include healthy school policies enacted in documents or in accepted practices. The policies promote health and wellbeing, enabling such things as healthy food practices to occur at school, increasing physical activity and discouraging bullying. The concept of Health Promoting Schools takes into account a number of key elements:

- **The physical environment** refers to the buildings, grounds, play space and equipment in and surrounding the school. It also refers to basic amenities such as sanitation, water availability and air cleanliness.
- **The social environment** of the school is a combination of the quality of the relationships among staff and students. It is influenced by the relationships with parents and the wider community.
- **Individual health skills and action competencies**, which refers to both the formal and informal curriculum, and to associated activities where students gain age-related knowledge and understandings and experiences. These enable them to build competencies in taking action to improve the health and wellbeing of themselves and others in their community and beyond.



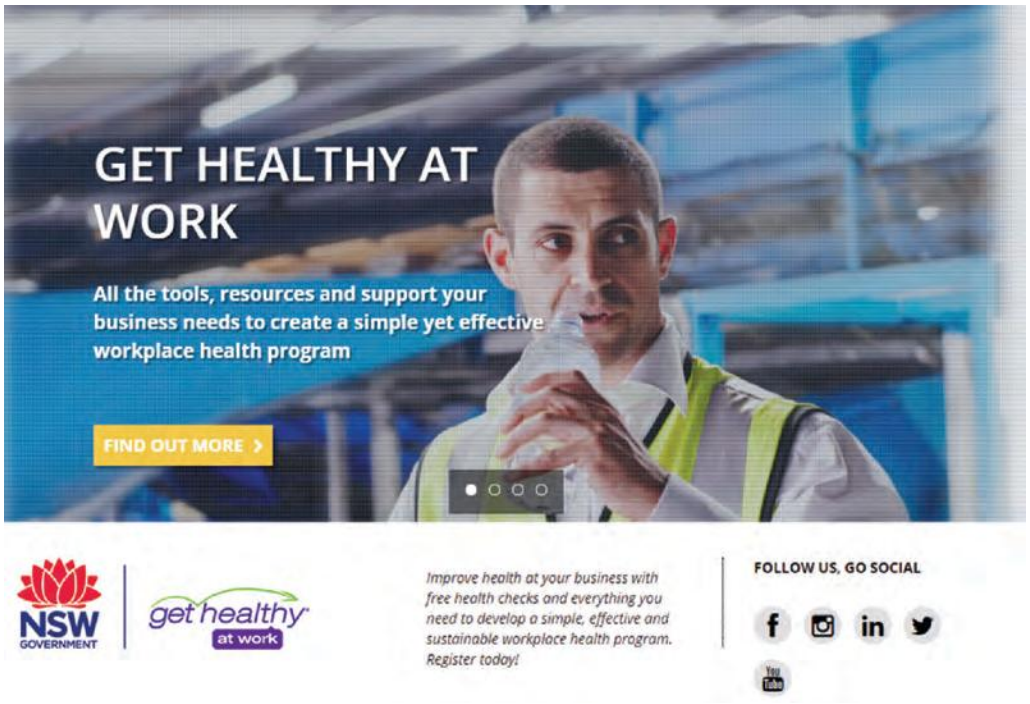
Source: Based on Health Promoting Schools Framework diagram (World Health Organisation, 1986).

Figure 3.6 Essential elements of health

- **Community links** are the connections between the school and the students' families, plus the connection between key local groups and individuals. Appropriate consultation and participation with these stakeholders enhances the HPS and provides students with a context and support for their actions.
- **Local and regional health services**, which have a responsibility for child and adolescent health care and promotion through the provision of direct services to schools and in partnership with schools.

Health promoting workplaces

Like schools, the workplace is a critical and influential environment in people's lives, and so provides an important setting for health promotion. The workplace directly influences the health and wellbeing of workers (physical, mental, economic and social) and those around them, including their family, peers and community.



Used with permission of SafeWork NSW, 2018.

Figure 3.7 NSW Health manages a number of health-promoting projects.

Shutterstock.com/Stuart Miles

Workplace health promotion includes a variety of approaches, including occupational (or workplace) health and safety programs, issues linked to the organisational environment, the promotion of healthy lifestyles, and non-occupational factors in the general environment, such as family welfare, home and commuting conditions, and community factors that affect workers' health.

Health promotion using the public health approach does not appear like a traditional mass media campaign, a module of work in a PDHPE class or a medical intervention. It does not necessarily apply to a specific health problem, nor to a specific set of behaviours. Health promotion based on this approach becomes part of the fabric of a community or society. It manipulates environments, appears in a variety of settings and may target a range of population groups. It may result in new policies, leading to changed laws or regulations. Its influence is not restricted to the health sector. It is likely to include education, and to involve community members in some way. Most importantly, while the public health approach to health promotion can address illness and disease, it is equally appropriate for improving general living and working conditions, or for establishing better partnerships for improving health. The public health approach has led to an understanding of health as a resource for engaging in life.

Table 3.1 Benefits of health promotion in the workplace

Benefits to the organisation	Benefits to the employee
a well-managed health and safety program	a safe and healthy work environment
a positive and caring image	enhanced self-esteem
improved staff morale	reduced stress
reduced staff turnover	improved morale
reduced absenteeism	increased job satisfaction
increased productivity	increased skills for health protection
reduced health care/insurance costs	improved health
reduced risk of fines and litigation	improved sense of wellbeing

Dangerous driving

1 Make a list of all the strategies that have been used to control dangerous driving behaviours. Include campaigns, laws, political and financial strategies, social strategies and educational programs.

2 Access the NSW Centre for Road Safety website. Investigate the latest health promotion campaigns relating to dangerous driving.

3 Give each strategy in your list a rating from 5 (most effective) to 1 (least effective), and provide a brief explanation for each rating. Follow the example provided below.

Health promotion strategies	5	4	3	2	1	Brief reason for rating
Towards Zero			x			

4 When you have completed your rating table, consider the overall impact of health promotion strategies on safe driving behaviour.

5 Write a one-page article evaluating the effectiveness of a range of strategies.
Note: you can also complete this activity focusing on any other health issue relating to young people.

Issues

Choose one of the health issues from the list below.

1 Design a health promotion campaign to address your chosen issue, aimed at a particular age group of your choosing.

2 Use a variety of strategies, covering a range of different approaches and levels of responsibility.

3 Briefly explain why you are proposing each strategy and how the strategies interrelate to support each other.

body image	getting a job	weight control	family harmony
sexuality	tobacco use	disordered eating	illicit drug use
binge drinking	physical activity	violence	

Schools

Use the Health Promoting Schools framework to analyse your own school environment. Include the three interactive key elements:

a curriculum learning and teaching
b school organisation ethos
c environment, partnerships and services

What school programs are in place that reflect the HPS approach, and how do these programs include the various stakeholders who make up the school community, such as students, staff and parents?

Workplaces

In small groups, identify a range of working environments that you have experienced (for example, at part-time jobs and during work experience). Discuss the level of attention paid to health promotion in these workplaces. Compare the level of health promotion at different workplaces and consider the impact. Create a list identifying potential protective and risk factors.

THE OTTAWA CHARTER AS AN EFFECTIVE HEALTH-PROMOTION FRAMEWORK

In this section we will describe the historical significance of the Ottawa Charter for Health Promotion.

The Declaration of Alma-Ata (1978) highlighted a range of global health inequalities that are linked to a range of political, economic and socio cultural factors. The declaration advocated for widespread international action to address these inequalities. Following the groundbreaking work laid by the Alma-Ata, in 1986 the inaugural International Conference on Health Promotion was held in Ottawa, Canada. The conference attendees pledged to:

- move into the area of healthy public policy
- counteract the pressures towards harmful products, resource depletion, unhealthy living conditions and environments, and bad nutrition
- respond to the health gap within and between societies
- acknowledge people as the main health resource
- reorient health services and their resources towards the promotion of health
- recognise health and its maintenance as a major social investment and challenge.

From this conference, the Ottawa Charter for Health Promotion was developed. The charter acknowledged the importance of the social determinants of health, identifying 'the fundamental conditions and resources for health are: peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity'. The charter provided the blueprint for a new approach to worldwide health promotion, and a framework built around five specific health promotion areas.

The Ottawa Charter is characterised by:

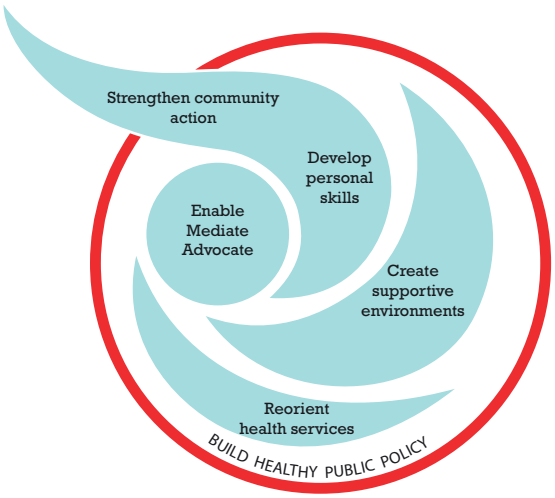
- the view that health results from the interaction of many social determinants
- the identification of a set of prerequisites for health
- a requirement for individuals, groups and communities to be empowered

- a preference for preventive action rather than treatment of illness
- an inter-sectoral approach to health promotion, based on mediation between all relevant groups, including the non-health sectors
- the belief that health is a resource for living, not an objective of living
- a focus on achieving equality of opportunity, resources, genders and cultures
- adaptation of health promotion strategies to meet local needs
- the need to take into account differing social, cultural and economic systems
- the WHO logo of the five interactive areas of the Ottawa Charter for health promotion action.

The Ottawa Charter's five strategic areas for health promotion action are:

1 Develop personal skills
2 Create supportive environments
3 Strengthen community action
4 Reorient health services
5 Build healthy public policy

These actions should be taken by communities or societies to '[create] conditions that allow the attainment of health by all of its members'.



Reprinted with permission of the World Health Organization (WHO), http://www.who.int/healthpromotion/conferences/previous/ottawa/en/index4.html, accessed on 06/06/2018.

Figure 3.8 The Ottawa Charter logo was created for the First International Conference on Health Promotion, held in 1986.

1 Developing personal skills

What does this mean?

Developing personal skills means supporting the personal and social development of the individual.

What is the aim?

The aim is to educate, provide health information and to improve decision-making, communication and life skills.

What does it involve?

It involves modifying personal behaviours to enable people to learn throughout life, in order to prepare them for its stages and help them cope with chronic illness and injuries. For example, developing the assertiveness and time-management skills required to reduce stress in order to quit smoking, by accessing information and support. Another example is the provision of programs that address literacy, language and cultural barriers to increase access to education and information.

Who is responsible?

This should be facilitated in school, home, work and community settings. Action is required through educational, professional, commercial and voluntary bodies.

2 Creating supportive environments

What does this mean?

Creating supportive environments means making the places people live, work and play – for example, workplaces, families, support groups, schools – a source of good health.

What is the aim?

The aim is to take care of each other, our communities and our environment, in order to conserve our natural and built environments and to organise our work and social environments in a way that makes them safe, satisfying, stimulating and enjoyable. This in turn provides the support necessary to help people make and carry out health-enhancing decisions and behaviours.

Getty Images/Highwaystarz-Photography

Figure 3.9 Taking part in courses to improve English language skills increases access to information.

What does it involve?

It involves support networks and community services, for example, emotional or financial support from family or a community support group such as AA. It also includes environmental influences on health, for example, programs that respond to the impact of changing technology, work, energy production and urbanisation and act to ensure positive health benefits for the public.

Who is responsible?

This is a global responsibility that needs to be undertaken by governments, communities, employers, unions and families.

3 Strengthening community action

What does this mean?

Strengthening community action means giving communities the power to identify their own health priorities and then act, in partnership with other agencies, to address them.

What is the aim?

The aim is for communities to establish 'ownership' of the health problems specific to their own populations and then work in partnership with others to solve them.

What does it involve?

It involves empowering communities to act. For example, giving communities the opportunity to lobby, lines of communication to express their concerns, representation at all levels of government, learning opportunities for health, the tools for planning and the information required to access funding.

Who is responsible?

Community and local agencies, including schools, state and local government, interest groups, clubs and planning bodies.

4 Reorienting health services

What does this mean?

Reorienting health services means moving away from the 'clinical and curative services' approach and towards a more 'preventive' approach, including a stronger focus on research and professional training.

What is the aim?

The aim is to establish a more holistic attitude in health professionals, taking the wellbeing of the whole person into account.

What does it involve?

It involves:

a **identifying the range of services available**. For example, primary healthcare services are widespread, with many clients/visitors, including hospitals, community health centres and nursing homes. They are ideal as health promotion sites.

b **gaining access to services**. For example, Medicare provides Australians with financial access to basic services. Also, the establishment of appropriate health services in geographically accessible locations for targeted groups. Access varies widely.

c **moving from cure to prevention**. For example, doctors discussing holistic health-enhancing behaviours with their patients, providing literature and information to patients, or giving lifestyle prescriptions rather than medicinal ones.

Who is responsible?

The responsibility for health promotion in health services is shared among individuals, community groups, health professionals, health service institutions and governments.

5 Building healthy public policy

What does this mean?

Building healthy public policy means ensuring that decisions at all levels of government and organisations are made so that they work towards health improvement.

What is the aim?

The aim is to put health on the agenda of policy makers in all sectors, at all levels, to ensure that legislation, policies, taxation, fiscal and organisational change are all undertaken with their impact on the health of the population in mind.

What does it involve?

It involves:

a **identifying the influence of policies on health**. For example, compulsory health policies, legislation and monitoring by police and media campaigns have combined to impact positively on public health.

b **identifying and removing obstacles to the adoption of healthy policy**. For example, demonstrating the long-term advantages of energy-efficient house design to governments which are drafting planning laws.

c **influencing policy**. For example, lobbying by community bodies such as the NRMA to advocate for better engineering of roads/cars to improve motor vehicle safety.

Who is responsible?

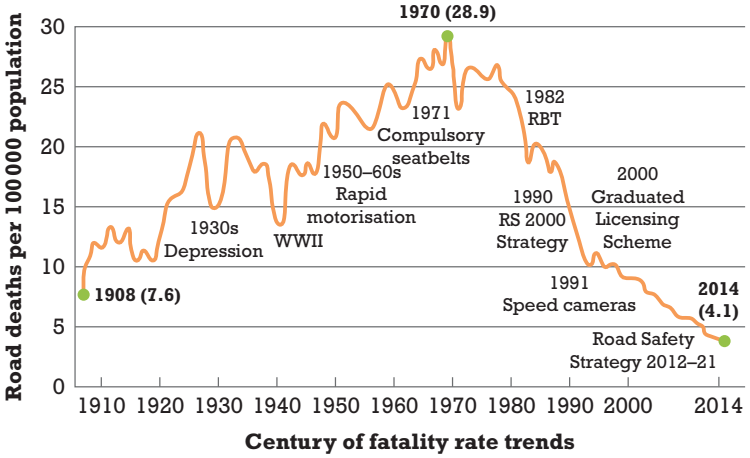
Governments, public servants, commercial enterprises, lobby groups, unions, non-government organisations and peak bodies can take joint action to improve the health outcomes resulting from public policy.

Practical effects in Australia

Health promotion based on the action areas of the Ottawa Charter has contributed to many positive health outcomes, such as fewer road injuries and a reduction in tobacco use.

Fewer road injuries

Australia has had great success in reducing the death and injury rates for motor vehicle accidents, with a consistent downward trend.



Source: © State of New South Wales (Transport for NSW).

Figure 3.10 Road deaths per 100 000 population in NSW dropped from 28.9 in 1970 to 4.99 in 2017, with a low of 4.1 in 2014.

But road injuries are still a major cause of death and serious injury for young people. Australian governments have employed a broad inter-sectoral approach to address issues around road safety. Strategies and campaigns have focused on different aspects of prevention, but have consistently targeted younger drivers, who are most at risk. New laws and regulations have been supported by extensive media campaigns, school education programs and resources. More recent campaigns have used evidence/data to target high-risk groups, especially attitudes and issues that contribute to risk behaviour. More funding has also been directed towards improving roads and the driving environment.

Road safety campaigns save an estimated 1000 lives and 5000 hospital admissions each year. The overall success of the strategies demonstrates how application of the Ottawa Charter action areas have contributed to positive health outcomes in relation to road injuries.

Table 3.2 Evaluation of successful preventive strategies using the Ottawa Charter

Action areas	Examples of successful preventive strategies
Developing personal skills	New L- and P-plate laws with longer qualification period and logged driving hours as part of the Graduated Licensing Scheme. Road safety campaigns including 'Towards Zero', 'Slow Down', 'Ride to live'.
Creating supportive environments	40 km/h school zones around schools Improved local traffic speed regulators Limited passengers for P-plate drivers Better engineering standards for roads and cars
Strengthening community action	Parents and community members employed as 'lollipop people' at crossings, flashing school zone signs and increased presence of mobile speed cameras. 'Stop, Revive, Survive' campaign employing local service groups on public holiday weekends.
Reorienting health services	Visits by emergency workers to schools for driver education courses First-aid and emergency care training.
Building healthy public policy	Random breath testing Demerit points

Weblink

Investigate

You can find out about the latest road safety campaigns and statistics on the Transport for NSW website.

Reduced tobacco use

It is well known that tobacco smoking increases the risk of numerous health issues, such as cardiovascular disease, respiratory diseases and other chronic health problems. Medical conditions associated with tobacco smoking are some of the largest preventable causes of death and disease in Australia. The AIHW estimates that 80 per cent of the lung cancer burden in Australia and 75 per cent of the chronic obstructive pulmonary disease burden were directly attributable to tobacco smoking. The AIHW Australian Burden of Disease study further reported that smoking was responsible for more than one in every eight deaths in 2011.

Weblink

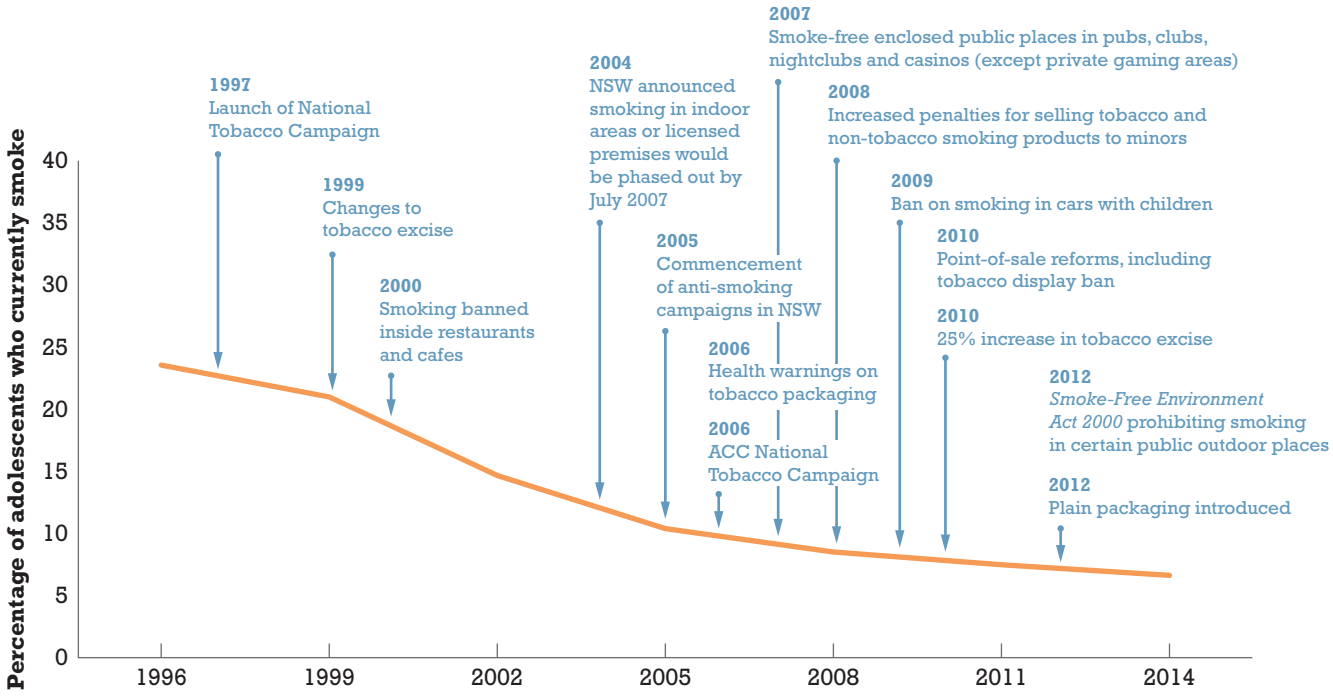
FYI

For up-to-date figures, there is also a Global Burden of Disease study, which is published each year.

There have been positive efforts to actively reduce smoking rates in Australia in order to reduce the level of harm associated with tobacco usage. Since the 1950s, when an estimated 70 per cent of males and 30 per cent of females smoked, Australians have consistently reduced levels of tobacco smoking. By 2016 those numbers had dropped to just 16 per cent of males and 12 per cent of females.

In 2015 the Australian Bureau of Statistics reported that rates of daily smoking had decreased considerably among younger adults (18–44 year olds), from 28.2 per cent in 2001 to 16.3 per cent in 2015. More people have stopped smoking, and increasingly, young people are not taking up smoking – approximately 60 per cent of young adults in 2015 had never smoked. The ABS reports that people living in outer regional/remote areas of Australia had higher rates of daily smoking (20.9 per cent) than people in inner regional areas (16.7 per cent) or major cities (13 per cent). The ABS also reports that rates of smoking are noticeably higher among people living in the most socio-economically disadvantaged areas of Australia. For example, in 2015, just over 21 per cent of people living in areas of the greatest disadvantage smoked daily, compared to 8 per cent of people living in areas of the least disadvantage.

However, it should be noted that rates of smoking have decreased over the past decade in all SES levels. In most age groups men are more likely to smoke tobacco daily than women, except in the young adult (18–24) years, where rates are similar for both men and women.



ACCC = Australian Competition and Consumer Commission

Source: Dessaix A, Maag A, McKenzie J, Currow DC, 'Factors influencing reductions in smoking among Australian adolescents', *Public Health Res Pract*, 2016; 26(1), e2611605, Figure 1.

Figure 3.11 Factors affecting declines in youth smoking, 1996–2014

As Figure 3.11 shows, there has been a consistent reduction in both adolescent (12–17 years) and young adult (18–24 years) rates of smoking since the 1990s. More young people have never smoked and only 3.4 per cent of people aged 12–17 years identify as smoking daily. In addition, the average age of first full cigarette smoked has increased, from 14.2 years in the mid-1990s to 15.9 years in 2013. New South Wales statistics indicate the proportion of adolescents reporting current smoking was 6.7 per cent in 2014, down from 23.5 per cent in 1996.

But smoking is still responsible for a large percentage of the burden of disease attributed to modifiable health behaviours in Australia. The downward trends that have been achieved are the result of a comprehensive 'whole of government' approach that was formally launched in 1997

Weblink

Investigate

Access further information about smoking in Australia at the Tobacco in Australia website, the ABS National Health survey: First results, 2014–15, and Quitline.

(see Figure 3.11) under the umbrella of the National Tobacco Campaign. The campaign was originally coordinated at a national level and included state and territory QUIT organisations specifically targeting 18–40 year olds.

The National Tobacco Campaign continues to oversee a combination of strict regulations and legislative changes, education programs and media campaigns. These strategies have prompted changes in social attitudes to smoking that have had a strong cumulative effect on tobacco use over time. The broad approach to policy employed by the Australian Government reflects the multi-faceted approach advocated by the Ottawa Charter. Recent data indicate that reductions in smoking at current rates have saved an estimated 700 lives per year.

Table 3.3 Evaluation of tobacco reduction promotions using the Ottawa Charter

Action areas	Examples of successful preventive strategies
Developing personal skills	Anti-smoking programs run through PDHPE programs at ALL schools QUIT programs run through hospitals and medical practitioners Anti-smoking media campaigns, e.g. 'Every cigarette is doing you damage'
Creating supportive environments	QUIT Line, online counselling and advice service Smoke-free zones including public buildings, spaces and public transport Laws restricting young people's access to tobacco products
Strengthening community action	Adherence to point-of-sale regulations to restrict minors' access to cigarettes School-based cessation programs World No Tobacco Day activities in local communities and schools
Reorienting health services	GP interventions and promotion of QUIT programs to patients Research into tobacco and its effects on users
Building healthy public policy	Multiple regulations about advertising, point of sale, packaging High taxation on tobacco products

PRINCIPLES OF SOCIAL JUSTICE

In this section we will identify strategies where the principles of social justice have been applied to promote the health of individuals.

The principles of social justice are critical to the success of any health initiative. They ensure that there is equal opportunity for both individuals and populations to achieve the best possible health outcomes. Countries and population groups with the widest gap between high SES and low SES experience the poorest overall health status. There are benefits for everyone when resources are spread as fairly as possible to reduce this gap. Equality does not mean providing everybody with exactly the same resources, but rather, ensuring that each group receives what they need to achieve the best possible health outcomes.

Social justice is a specific set of values that targets the most disadvantaged or marginalised groups in society. Understanding social justice means understanding that discrimination and past disadvantage have a significant influence on health. For instance, groups who have suffered racial discrimination continue to suffer social dislocation and defensive attitudes as a result. Understanding social justice means being aware of political and historical barriers to equality, and acknowledging the impact of a range of other social determinants on health. For example, a group with lower levels of representation in political parties and in decision-making processes has less capacity to plan and control the future.

Disadvantage is a major contributor to poor health, and disadvantaged groups and individuals often do not have the power, resources or control required to overcome it. The premise behind social justice is that everybody, regardless of who they are or where they come from, should have access to employment and health. There are three key elements that inform the principles of social justice: equity, diversity and supportive environments.

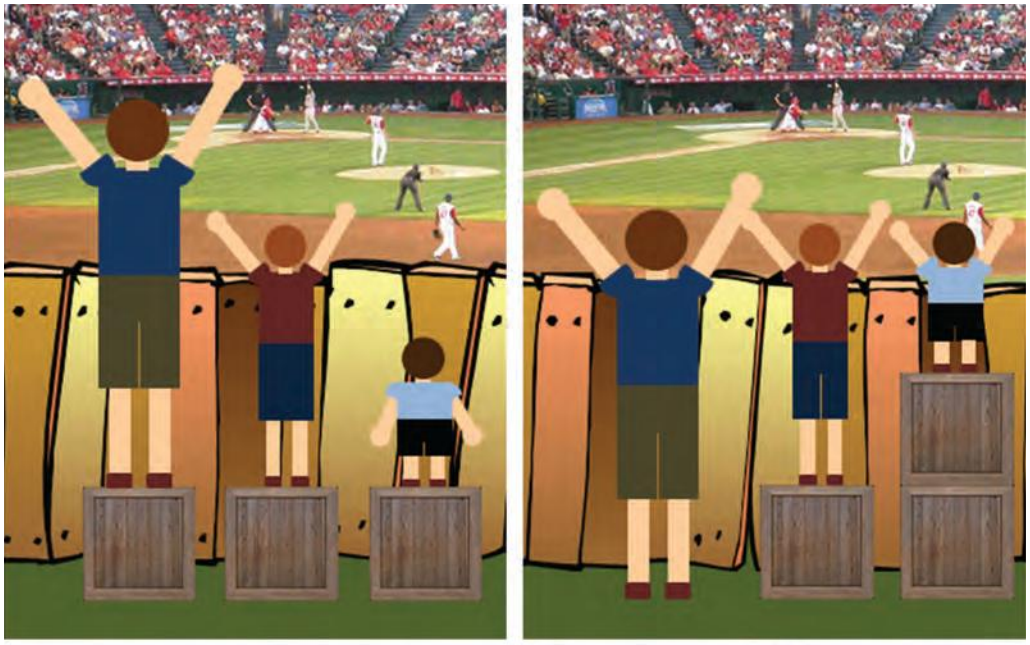


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Figure 3.12 The difference between equality and equity

Equity

Equity is the principle of distributing resources in a way that is fair and without discrimination. The differences in people's health status are closely linked to factors such as where they live, their income and their levels of education. The aim of equity is to bring health outcomes for disadvantaged groups closer to the outcomes for the most advantaged. The types of resources that might be distributed can include funding, education, staffing, training, services and facilities. In terms of health, equity refers to the provision of both services and support to those who require it, when they require it and in a way that they can access it.

Applying the principle of equity

Any strategies that provide financial support and improve access to health services for disadvantaged Australians are addressing the principle of equity. This is most evident when the needs of low SES, Indigenous, disabled and elderly Australians are met.

Medicare

The Australian Government has established policies to improve equity in health by ensuring that the most disadvantaged have universal access to basic health services. Medicare, including the Medicare Safety Net, is an initiative that helps people with limited resources and low incomes to afford basic health services.

The Pharmaceutical Benefits Scheme (PBS)

The Pharmaceutical Benefits Scheme (PBS) ensures that medicines are made more affordable for all Australians. Healthcare cards make health services more affordable for pensioners, the elderly and low-income earners.

Close the Gap

The Close the Gap program is an initiative aimed at increasing Indigenous health and reducing the gap in life expectancy and educational outcomes between Indigenous and non-Indigenous Australians. It is supported by more than 40 organisations with committed funding of $3.6 billion from national, state and territory governments to run Indigenous health programs over a four-year period.

Alamy Stock Photo/Richard Milnes

Figure 3.13 Close the Gap has become an important health program in Australia.

Stronger Together

The Stronger Together: A new direction for disabilities services in NSW 2006–2016 initiative aims to improve equity for disabled people in New South Wales. Among its many objectives is the aim of improving transport services for the disabled in order to provide better access to health services.

Rural communities

Many programs and initiatives are run by governments and universities to improve training and placement of health professionals in rural communities. These programs are designed to address equity for people living in these communities, who have poorer access to health services.

Alamy Stock Photo/Helene Rogers

Figure 3.14 Access to education improves outcomes for all children.

Diversity

Diversity is about difference and acceptance. Australian society includes many groups and people with unique characteristics. Diversity can be based on differences in race, ethnicity, language, religion, values and belief systems, disability, class, sexuality, gender, age and educational background. For a society, acceptance of diversity requires mutual respect based on understanding and acceptance. This involves the recognition of cultural and social differences within the community in any decision-making process, and an understanding of how these may impact an individual's beliefs, attitudes, values and behaviours. Health-promotion initiatives are more likely to be successful when they accept diversity as an asset in the community. A healthcare system that incorporates diversity in its health services, its staff, its programs and its partnerships will be better equipped to address the diverse range of health issues.

Applying the principle of diversity

Language and cultural differences often make it difficult for people from culturally diverse groups to understand health information and access preventive services. Strategies that are aimed at putting social justice into practice focus on improving understanding and access to health services, and on providing appropriate services for culturally and linguistically diverse (CALD) groups, the elderly, the disabled and other diverse groups in society.

Strategies that apply the principle of diversity include:

- The NSW Multicultural Health Communication Service provides information and services to help health professionals communicate with non-English speaking communities throughout New South Wales. There are more than 450 translation services and publications available in community languages for CALD groups to improve understanding of health information.
- Home visit programs and community nursing partnerships in Indigenous communities improve access to primary health services.
- Services such as the Northcott Society provide accessibility solutions such as wheelchairs and safety devices for people with physical disabilities.
- The AIDS Action Council (ACT) provides services to the community, aimed at eliminating further transmission of HIV and minimising the personal and social impacts of HIV and AIDS.
- Social networking and education services are provided by the Council on the Ageing (COTA) for elderly people in the community.

Supportive environments

The physical, social, economic and political conditions in which people live or work influence the decisions they make about their health. Therefore, it is important that these environments are supportive of good health, rather than detrimental. Maintaining safe and enjoyable living and working conditions makes it easier for people to make good health decisions. For instance, the provision of accessible and safe open spaces makes it easier for people to choose to be more physically active.

Both the natural and the built environments can deteriorate and become influences for poor health if they are not well maintained. Clean water and air are examples of components of the natural environment that need to be protected. It is important that planning processes and policies take into account the conservation of natural resources and provide opportunities to support health (including access and facilities).

Social networks and community services also contribute to supportive environments. With appropriate access to health services and resources such as childcare, helplines and counselling support, people are empowered to act in a way that improves their own health and the health of others, including their family.

Applying the principle of supportive environments

A supportive environment exists when the natural, built and social conditions make it easier for people to make good health decisions.

Strategies that apply the principle of supportive environments include strategies such as air-quality monitoring, heavy penalties for polluting waterways, research into clean fuel technologies and education about resource management. These strategies all encourage and strengthen the conservation of the natural environment. The Tasmanian Air Quality Strategy is an example of this in action.

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Strategies that improve general quality of life also apply the principle of supportive environments. The 'Healthy Cities' strategy, advocated by the WHO, is one of the best-known approaches to promoting and creating a health-supportive environment, assisting people to achieve a good quality of life, providing sanitation and hygiene needs and ensuring access to healthcare.

Other examples at a local level include support of housing standards, local planning regulations, transport strategies, cycle paths and maintenance of parks and open spaces. These are all examples of strategies that make the built environment safer and more enjoyable.

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Figure 3.15 It makes a huge difference to children if a playground is well maintained or poorly maintained.

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Strategies that help families and neighbourhoods work together, helplines such as Kids Helpline and other counselling services, the Quitline, peer support and mentoring programs in schools, workplace health and safety laws, and support groups for people suffering from cancer, diabetes and other chronic diseases all provide social support for people who need it.

Five initiatives

1. In pairs, identify five current Australian health promotion initiatives, each aligned with one action area of the Ottawa Charter. (For example, one initiative that aligns with building healthy public policy, one that aligns with developing personal skills, and so on.)
2. Once you have identified all five initiatives and aligned each to a particular action area, justify why you have chosen to link each particular initiative to that action area.
3. Could the initiative overlap with any other action areas?
4. How is the initiative reflective of an inter-sectoral approach?

WHO health promotion

1 Access the WHO website and navigate to the Health Promotion page.
2 Define the concept of health promotion in your own words.
3 Outline the prerequisites needed for health as outlined by the WHO.
4 How does the WHO suggest that health promotion should be advocated, enabled and mediated?

Tobacco strategy

1 Access the NSW Health website and read the report 'NSW Tobacco Strategy 2012–2017'.
2 Create a two-page report detailing how the strategy has positively impacted the health of Australians.
3 Include details regarding the level of progress that has been made to address smoking-related issues, and identify key elements of the program, including strategies to target particular population groups. Draw links between the strategy, the Ottawa Charter and the principles of social justice.

How governments can help

Create a table to demonstrate how councils and governments can improve social justice for a particular population group (such as refugees, the socio-economically disadvantaged, the elderly, young people).

CHAPTER SUMMARY

- Health promotion involves changing health behaviours by changing social conditions and environments, and requires cooperative action between individuals, schools, community groups, all levels of government, non-government organisations, the media and the private sector.
- Health is a shared responsibility between individuals, communities, governments, non-government organisations, health professionals and institutions.
- International organisations such as the World Health Organization (WHO) provide policy and direction at a global level for member nations.
- A range of health promotion approaches have been utilised. These include the lifestyle/behavioural approach, the preventive medical approach and the public health approach.
- The Ottawa Charter provides a set of guidelines for the public health approach to health promotion. It establishes a set of conditions prerequisite to health, and uses a framework based on five key action areas. The five actions areas of the Ottawa Charter are:
  1 Developing personal skills
  2 Creating supportive environments
  3 Strengthening community action
  4 Reorienting health services
  5 Building healthy public policy
- Significant improvements have been made in the areas of tobacco use and road safety. These improvements have occurred as a result of addressing the social determinants that have contributed to their growth as health issues in Australia.
- The principles of social justice include equity, diversity and supportive environments. These principles are important in the effort to overcome disadvantage and help people with fewer resources achieve positive health outcomes.

CHAPTER REVIEW ACTIVITIES

WS
Assessment tasks
Extra exam-style questions

Responsibility for health promotion

1 Explain how social factors can influence individual behaviour.
2 Define health promotion. What is the of role of the World Health Organization in promoting health?
3 Identify types of interventions used in contemporary health promotion. Give examples.
4 Describe three benefits of working in collaboration to improve health outcomes.
5 Explain why teachers and community leaders can influence health in their local communities. Provide examples to support your answer.
6 Outline the relationship between the three levels of government in planning and delivering health-promotion programs.
7 What role can local councils play in developing health-based improvement initiatives? Find an example from your own local community.

Health promotion strategies and approaches

8 Clarify the three different approaches to health promotion. Outline the strengths of each approach.
9 Identify a potential weakness of the lifestyle/behavioural approach to health promotion. Justify why you would consider this to be a weakness.
10 Justify the use of preventive medical approaches to health promotion. What does this approach not provide?
11 Compare the importance of two of the features of the public health approach to health promotion.
12 Analyse the statement, 'The public health approach has led to an understanding of health as a resource for engaging in life.' Why is it important that health be treated as a resource?

The Ottawa Charter framework for health promotion

13 Why is it important that young people develop health literacy? How can this impact on their health status as they get older?
14 Recall the five action areas of the Ottawa Charter and, in your own words, describe what each area encompasses, linking each to a current health campaign.
15 Analyse the graphs and statistics presented in this text describing the influence of mental health issues on the health status of Australians. Suggest reasons why mental

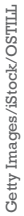
health has become a growing concern issue in today's society and describe two initiatives that have been established to provide mental health support to young Australians.

16 Describe the relationship between the introduction of a particular piece of road safety legislation and the impact on hospital admissions. How is this an example of the principles of the Ottawa Charter in action?

17 What percentage of the burden of disease can be attributed to modifiable risk factors such as smoking?

18 Summarise the main features of the national Graduated Licensing Scheme. Why was this scheme introduced?

19 What is the difference between 'equity' and 'equality'? Provide examples to support your answer.



CORE 2: THE BODY IN MOTION

CRITICAL QUESTIONS

How do the musculoskeletal and cardiorespiratory systems of the body influence and respond to movement? 99

What is the relationship between physical fitness, training and movement efficiency? 120

How do biomechanical principles influence movement? 146

Source: Personal Development, Health and Physical Education Stage 6 Syllabus
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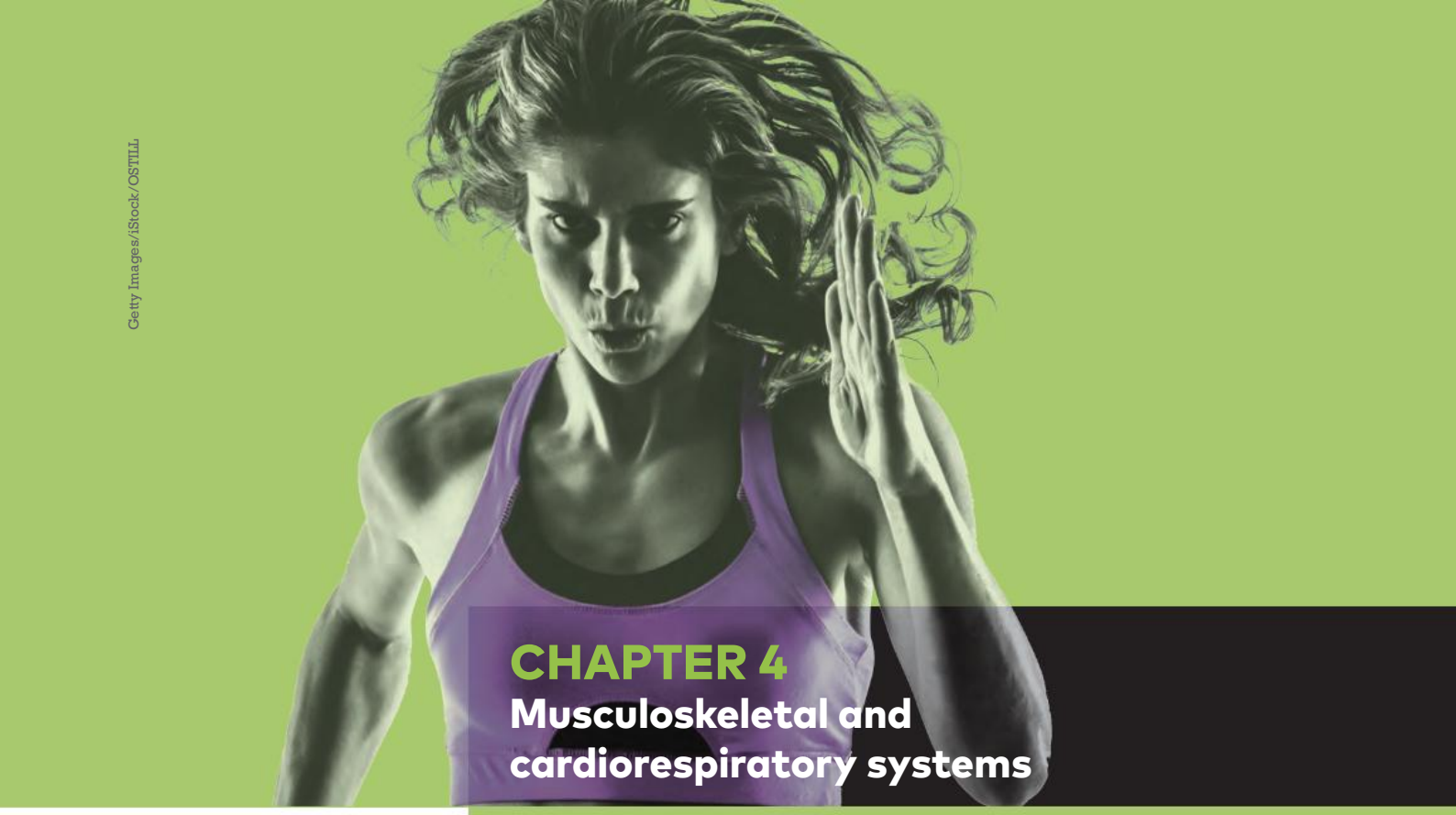
OUTCOMES

When you have finished this section you should be able to:

- explain how body systems influence the way the body moves
- describe the health and skill-related components of physical fitness and how they are monitored
- describe biomechanical factors that influence the efficiency of the moving body
- plan to participate in physical activity to satisfy their individual requirements
- assess and monitor physical fitness levels and patterns of physical activity
- use other sources to analyse health and physical activity concepts
- analyse factors influencing movement and participation in physical activity.

KEY TERMS

abduction
adduction
agonist
antagonist
aorta
arteries
capillaries
circumduction
concentric muscle contraction
condyloid joint
diastolic blood pressure
dorsiflexion
eccentric muscle contraction
eversion
extension
flexion
gliding joint
inversion
isometric contraction
ligament
pivot joint
plantarflexion
plasma
pronation
pulmonary artery
pulmonary vein
saddle joint
supination
synovial joint
systolic blood pressure



Getty Images/iStock/OSTILL

CHAPTER 4
Musculoskeletal and cardiorespiratory systems

IN THIS CHAPTER:

The skeletal system	99
Our muscles	108
The respiratory system	112
The circulatory system	116

THE SKELETAL SYSTEM

Major bones involved in movement

Human movement is the result of a complex interaction between the various systems of the human body. Even the finest movements require interaction between the nervous system, muscular system, respiratory system, bones and joints. In the human body there are 206 bones, more than 650 muscles and more than 200 joints or articulations.

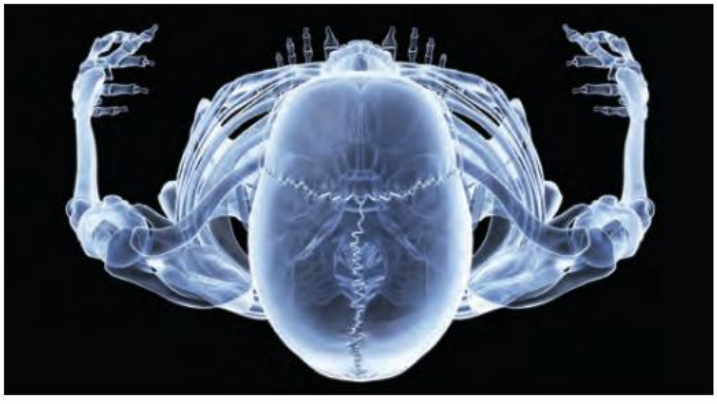


Figure 4.1 X-ray-style drawing of a human skeleton

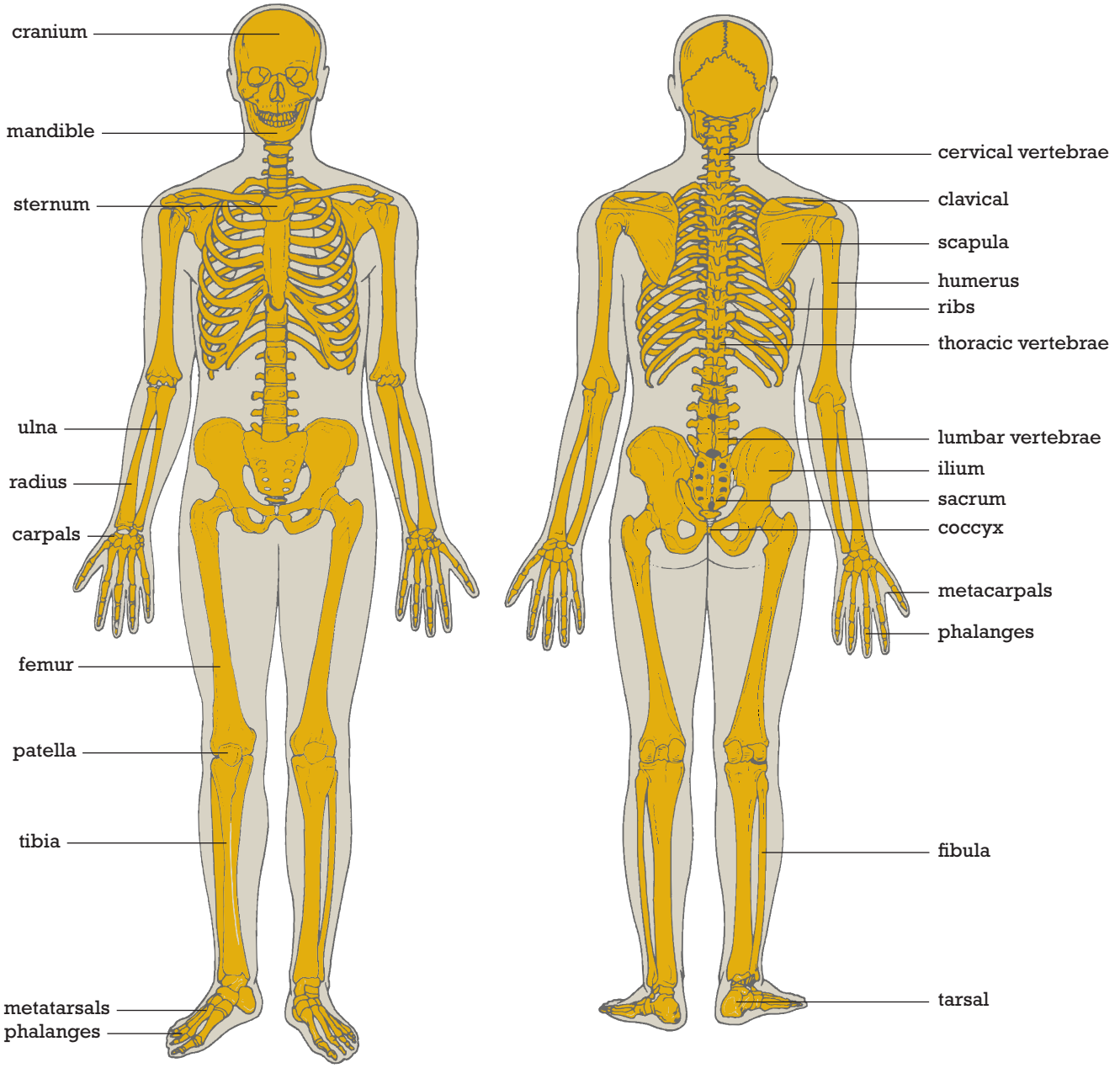


Figure 4.2 Human skeleton with major bones

FYI

The axial skeleton has 80 bones and the appendicular skeleton has 126 bones.

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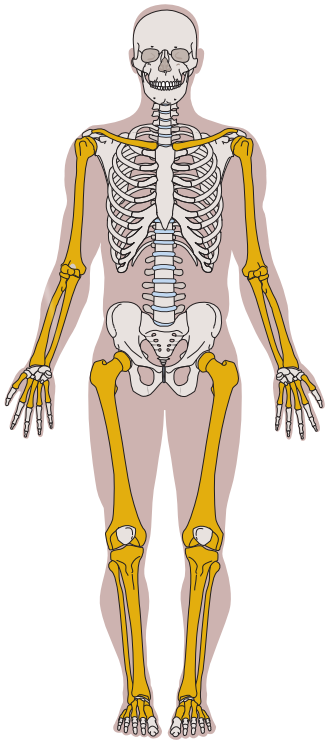


Figure 4.3 Long bones of the body

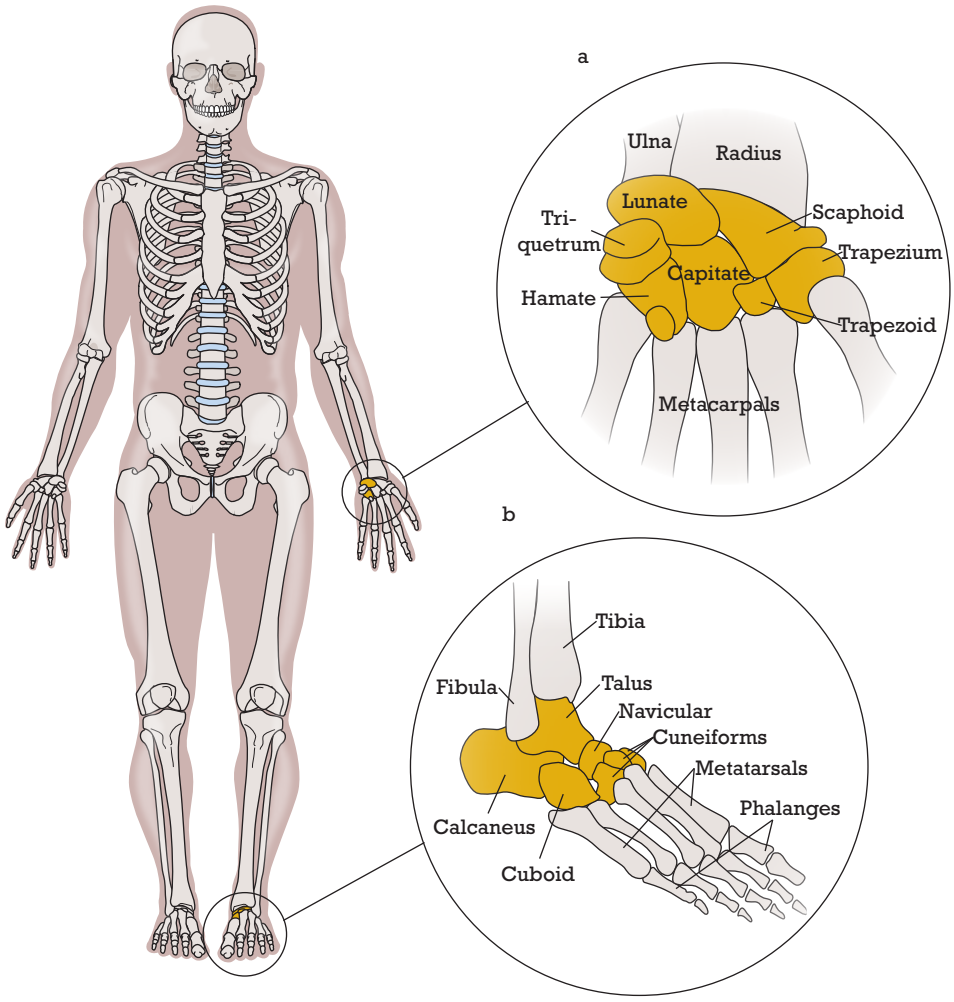


Figure 4.4 Short bones (a) in the wrist (b) in the foot

The bones (or skeletal system) form a rigid framework, to which muscles and other organs attach. The shape and length of the bone, how it joins to other bones and its location in the human body will all influence what movement that bone is capable of. There are four main types of bones: long bones, short bones, flat bones and irregular bones.

Long bones are longer than they are wide, and tend to work in a hinge arrangement with other bones. Some examples of long bones include those found along the length of the arms and legs, such as the humerus, radius, ulna, femur, tibia and fibula, metacarpals and metatarsals (see Figure 4.3).

Short bones tend to be box-shaped and include bones found in the wrists and ankles, such as the carpals, scaphoid and capitate in the wrist (see Figure 4.4a) and the cuboid, talus and calcaneus in the foot (see Figure 4.4b).

Flat (or broad) bones have a broad surface and play a protective role in the body. They typically only have a limited movement range. Some examples of broad bones include the ribs, the bones that form the protective cover over the brain (see Figure 4.5b), and the scapula in the shoulder girdle (see Figure 4.5a).

Irregular bones are those bones that do not fit into the other three categories, such as the vertebra that make up the human spine (see Figure 4.6).

Scientists and exercise physiologists use common anatomical terms when describing the location of muscles and bones in the body. These terms are outlined in Table 4.1 on page 103.

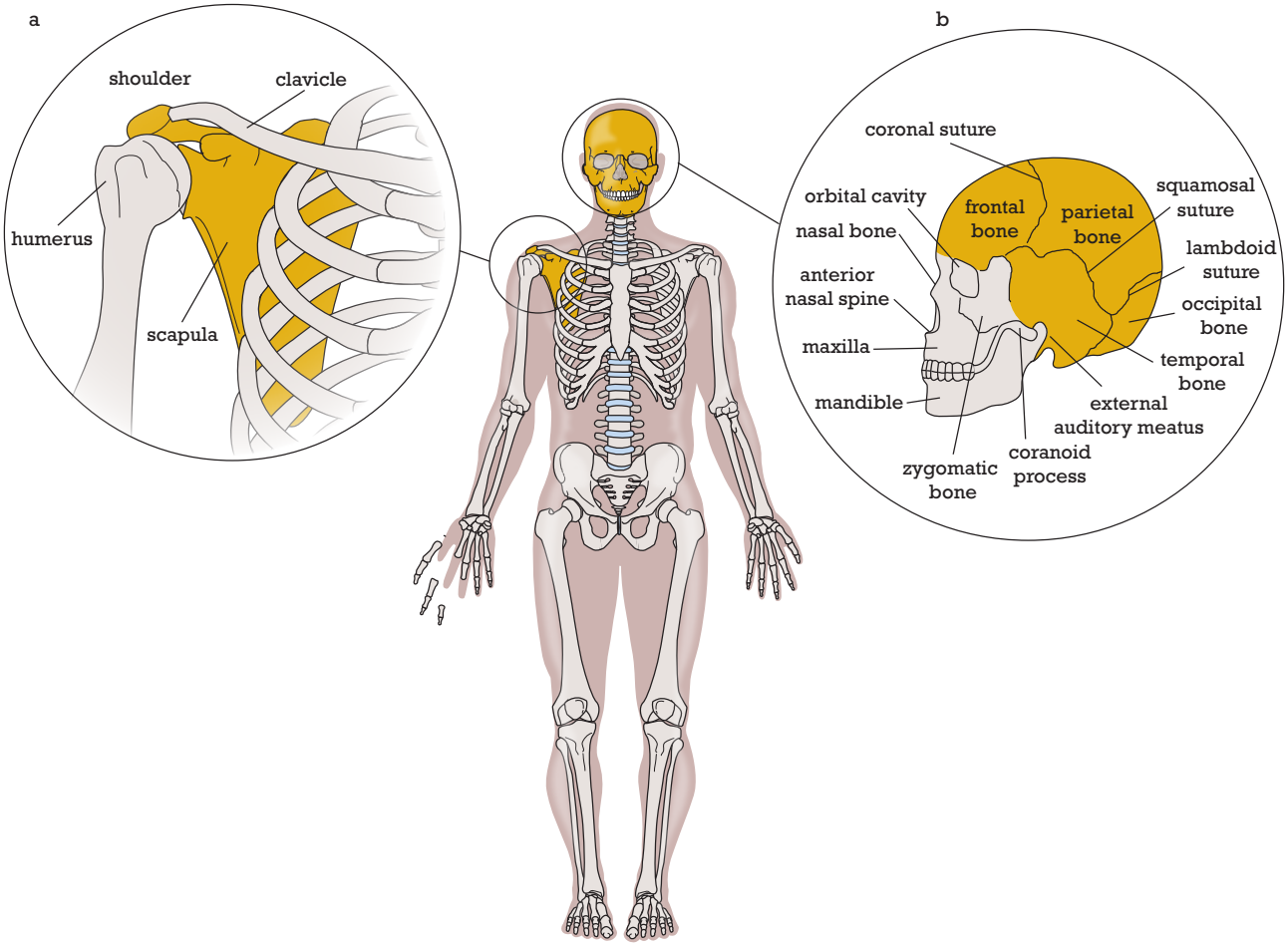


Figure 4.5 Flat bones of (a) the shoulder (b) the skull

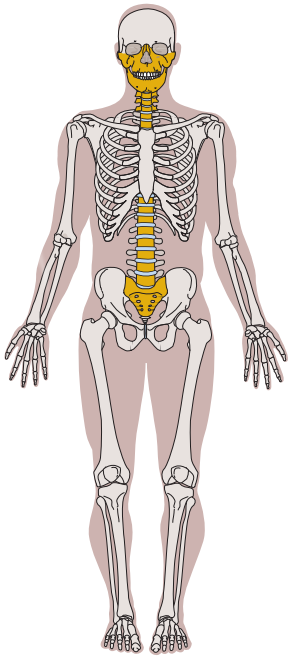


Figure 4.6 Irregular bones and their locations

Ligaments are bundles of strong fibrous bands that connect bone to bone. They are relatively inelastic, and tighten to prevent excess movement when the joint is under pressure. Muscles and **tendons** also extend across joints.

Tendons are inelastic cords of connective tissue. They attach muscle to bone and assist the ligaments by holding the joints closed and acting as secondary joint stabilisers.

The interface between two bones – that is, the joint – has a significant role in human movement. Across the human body this interface differs significantly, and can impact on the range of movements possible at that joint. Both the ligament and the tendon also play a significant role in movement.

Joints

There are three broad categories of joints in the human body.

The first type is the immoveable, or fibrous, joint. These are generally found between flat bones whose main function is to protect vital organs. An example is the eight bones that are fused together by fibrous sutures to form the cranium or skull (see Figure 4.5b).

The second type is the slightly movable or cartilaginous joint. An example of this joint is the cartilage discs that lie between each of the vertebrae in the human spine. They offer some protection in absorbing shock, but also allow a limited range of movement.

The third type of joint is the freely movable or **synovial joint**. These joints are capable of a wide range of movement, and are critical in the movement patterns adopted in sports and activities such as gymnastics, dance, swimming and game playing.

Table 4.1 Anatomical terms

Anatomical term	Definition	Example
Anterior	To the front	The sternum is anterior to the cervical vertebrae
Posterior	To the back	The scapula is posterior to the clavicle
Superior	Towards the top or above	The cranium is superior to the clavicle
Inferior	Towards the bottom or below	The tarsals are inferior to the patella
Medial	Towards the inside or midline of the body	The big toes (in the anatomical position) are medial to the rest of the toes
Lateral	To the outside or away from the midline of the body	The thumbs (in the anatomical position) are lateral to the index fingers
Proximal	Nearer the trunk or body mass	The pelvis is at the proximal end of the femur
Distal	Away from the trunk or body mass	The fingers are distal to the wrist

Structure and function of synovial joints

All synovial joints have some common features that aid the efficiency of movement that they provide.

Structure of synovial joints

The ends of the bones in a synovial joint are covered with a thin layer of hyaline cartilage, called articular cartilage. This cartilage absorbs shocks and minimises friction, so that the bone ends can easily glide across each other during movement. The part of the bone beneath the cartilage also absorbs shock, which helps protect the bone.

The joint capsule also plays a role in holding the bones of a synovial joint together. This capsule consists of an outer and inner layer. The outer layer is composed of dense connective tissue and completely encloses the other parts of the joint. The inner layer consists of a lining of loose connective tissue called the synovial membrane. The synovial membrane covers all the surfaces within the joint capsule except those already covered by the articular cartilage.

The synovial membrane secretes synovial fluid into the joint. This fluid acts as a lubricant to reduce friction, and also provides nourishment to the joint. Very little fluid is actually secreted; just enough to cover the articulating surfaces with a thin film. There is normally only 0.5 mL or less fluid in the knee.

There are six types of synovial joints in the human body. The ball and socket joints at the hip and shoulder and the hinged joints at the elbow and knee combine with the bones of the upper and lower limbs to produce the body's greatest range and speed of movement. Other synovial joints – **gliding**, **condyloid**, **saddle** and **pivot joints** – combine with these to produce a vast range of refined and dexterous movements (see Figure 4.8).

Some synovial joints contain additional structures. For example, the knee joint contains menisci, which are fibrous discs of cartilage that sit within the joint capital between the femur and the tibia and fibula. Their function is to help cushion shock and distribute body weight. Bursae are fluid-filled sacs associated with certain synovial joints. Each bursa has an inner lining of synovial membrane and contains synovial fluid. Bursae are located between the skin and bony prominences. They cushion ligaments and tendons to protect them against friction and general wear and tear (see Figure 4.9).

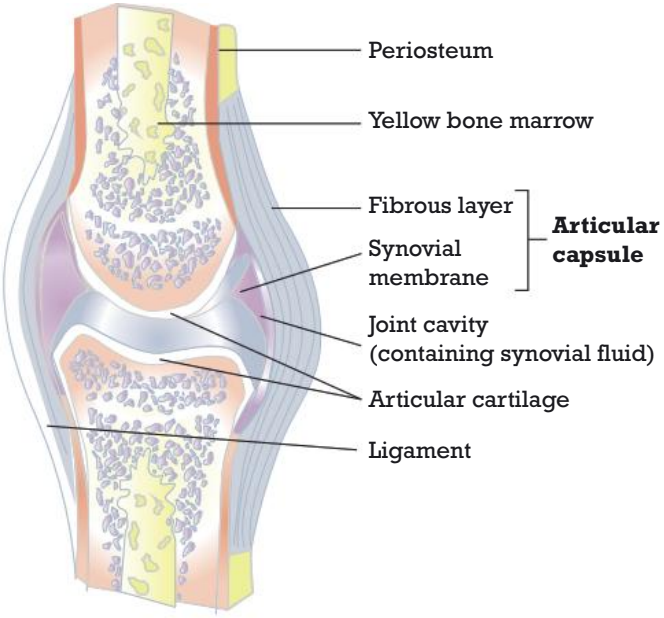


Figure 4.7 Structure of a typical synovial joint

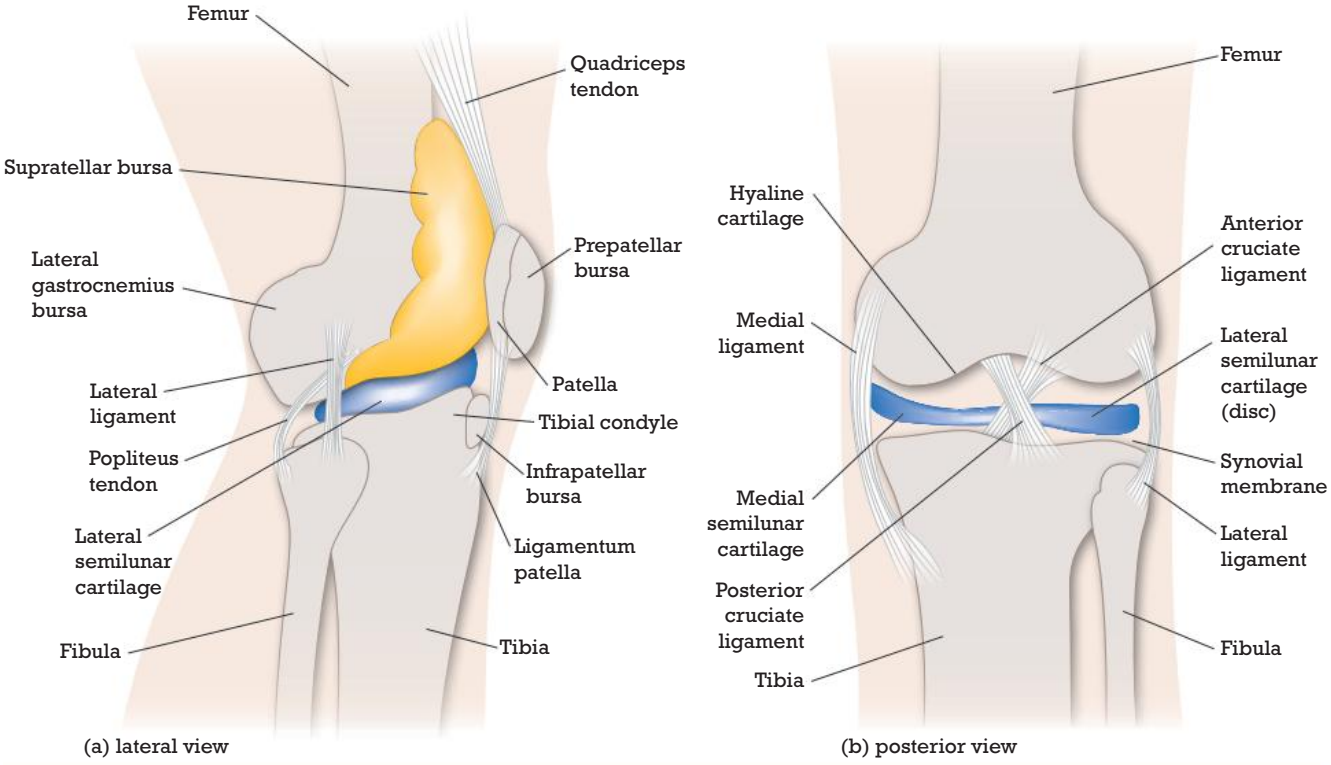


Figure 4.8 Two views of the right knee: (a) the lateral view, and (b) the posterior view.

Functions of synovial joints

Some synovial joints exist to provide stability, others act to provide mobility. Generally, the lower limbs and the vertebral column need to be more stable and have extra joint structures because of the need to absorb shock and carry the weight of the body. The joints in the upper limbs, such as the ball and socket joints in the shoulder, are not as stable as their counterparts in the hip, but have a much greater range of movement.

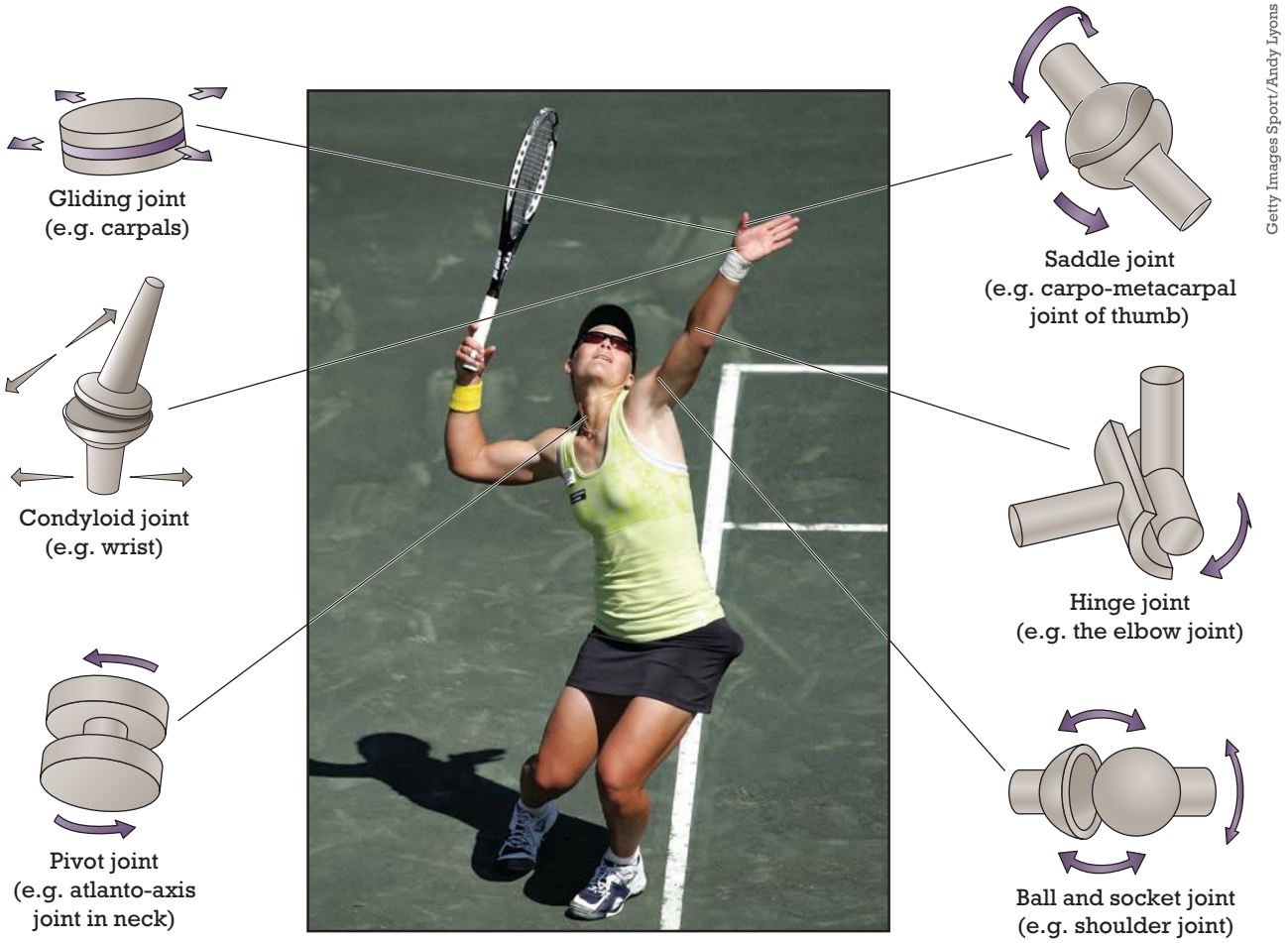


Figure 4.9 Movement of the joints during a tennis serve

Joint actions

When the muscles exert force on bones, the structure of the joints allows a diverse range of movement. Each type of movement can be described using anatomical terminology. Some of the key terms are outlined below. They are organised in pairs, as each pair reflects a movement and its reverse action.

Flexion and extension

Flexion is the bending movement that decreases the angle between the bones at the joint. Bending the leg at the knee and performing the upward phase of a biceps curl are examples of flexion. **Extension** is the straightening movement that increases the angle between the bones at the joint. Straightening the leg at the knee and performing the downward phase of a biceps curl are examples of extension.

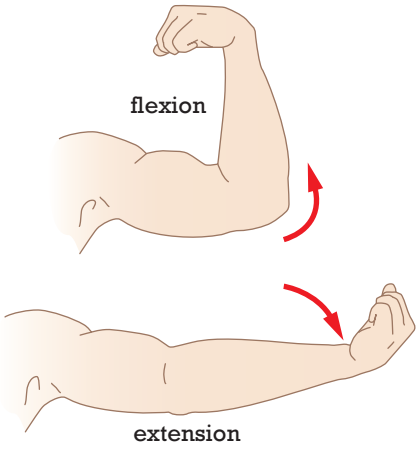


Figure 4.10 Flexion and extension

Abduction and adduction

Abduction involves moving the body part in the lateral plane away from the midline of the body. An example of abduction is the first half of a star jump, where a person starts with their legs together and arms by their sides and then extends their arms and legs so that they are apart in their finishing position. **Adduction** involves moving the body part in the lateral plane back towards the midline of the body. An example of abduction is the second half of a star jump, starting with the arms and legs in the apart position and moving to the finishing position of arms by the sides and legs together.

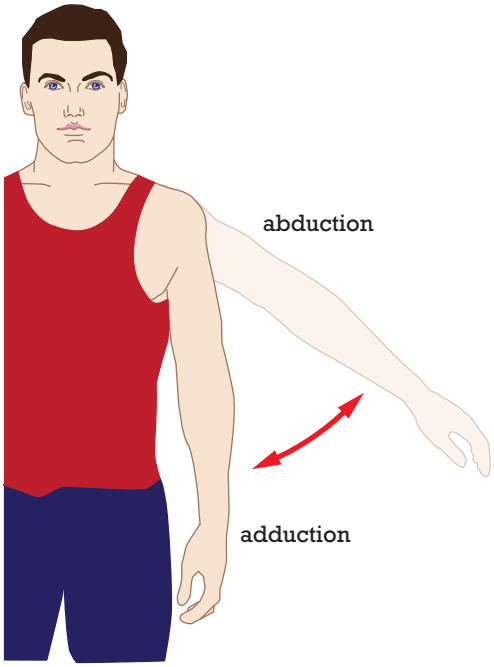


Figure 4.11 Abduction and adduction

Inversion and eversion

Inversion is the **rotation** of the foot so that the sole turns inwards. **Eversion** is the rotation of the foot so that the sole turns outwards.

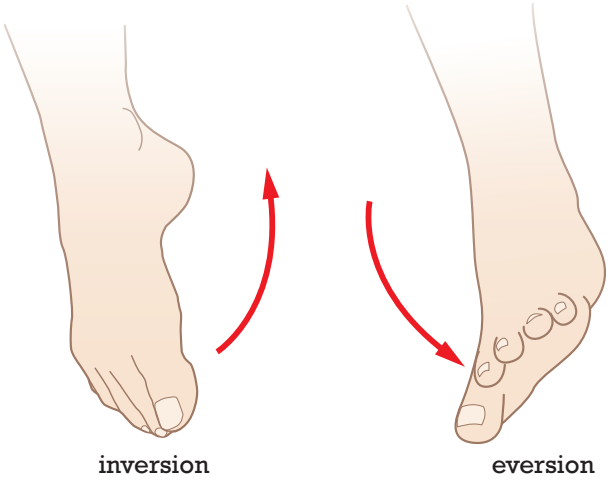


Figure 4.12 Inversion and eversion

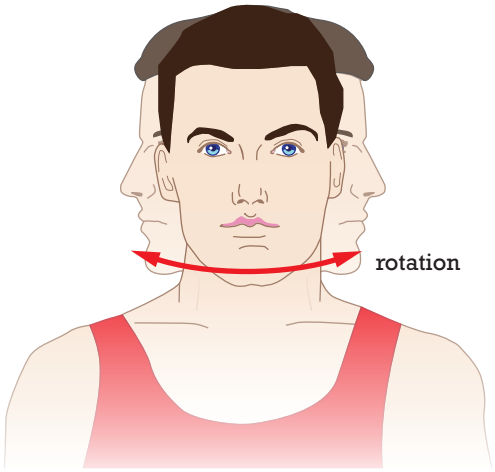


Figure 4.13 Rotation

Rotation

Rotation is the movement of a bone turning on a central **axis**. A full rotation is usually not possible, because there are ligaments and muscles that restrict the movement. An example of rotation is the neck turning from one side to the other.

Circumduction

Circumduction is a combination of other movements that results in a circular or cone-like pattern. Performing arm circles, or a softball pitcher's wind-up and release are examples of circumduction.

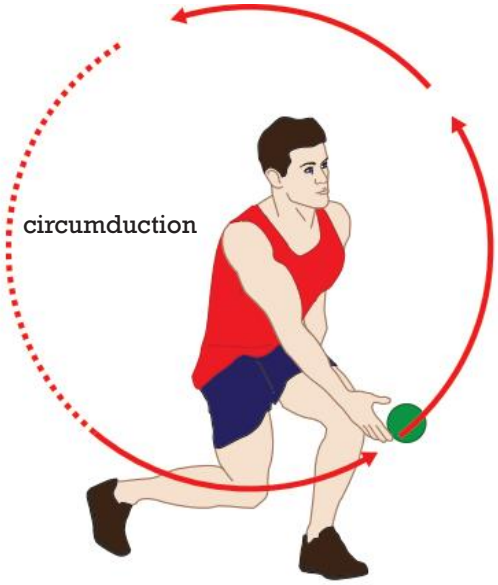


Figure 4.14 Circumduction

Pronation and supination

Pronation is the movement that occurs when the radius rotates around the ulna (the thinner, longer bone of the forearm), so that the hand is facing with the palm downwards. **Supination** is the movement that occurs when the radius rotates around the ulna, so that the palm faces upwards. Putting the hand out to receive some loose change is an example of supination.

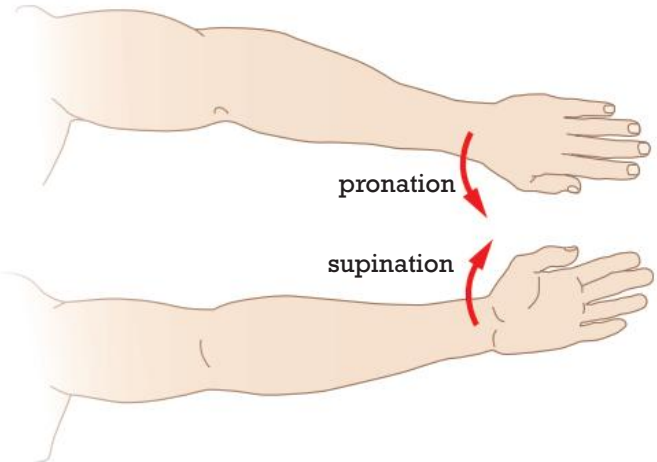


Figure 4.15 Pronation and supination

Dorsiflexion and plantarflexion

Dorsiflexion is simply the flexion of the ankle. Pulling the toes back towards the shin when stretching the hamstring muscles is an example of dorsiflexion at the ankle. **Plantarflexion** is actually the extension of the foot at the ankle joint, and is the opposite of dorsiflexion. A dancer standing up on their toes during a dance routine is an example of plantarflexion.

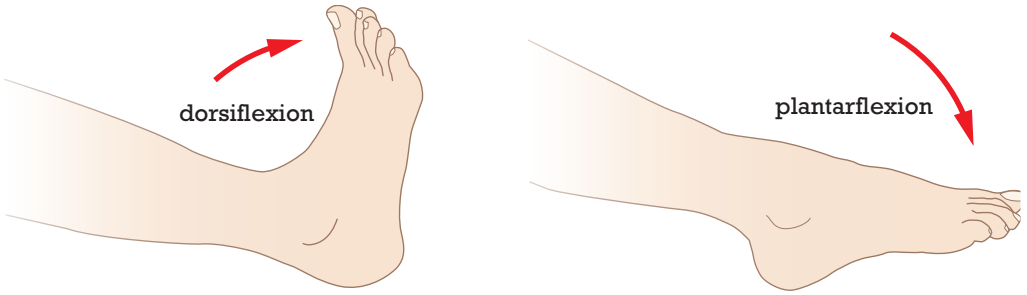


Figure 4.16 Dorsiflexion and plantarflexion

Weblink

Watch

The animation 'Anatomical terms of movement' by Mark Barwell (2011) describes simply the range of movement of parts of the body.

Identifying joint movements

Go online and find photos showing athletes, dancers, gymnasts or swimmers performing movement tasks. For each movement, use your understanding of bones and joints to:

a identify the key bones and joints used in the movement
b identify the type of joint involved
c describe the movements at the joint.

An example is shown in this photo for a bowler (cricket):

left leg: flexion at knee (hinge joint)
left hip: flexion (ball and socket joint)
right shoulder: rotation of ball and socket joint
right elbow: extension

Alamy Stock Photo/TGSPHOTO

OUR MUSCLES

Major muscles involved in movement

The basis of all human movement is muscle action. Muscle consists of cells with contractile filaments that move past each other to change the size of the cell. There are three types of muscles in the human body: skeletal, smooth and cardiac. Smooth and cardiac muscles are voluntary muscles that determine movement over which the human body has no control – for example, a heartbeat, or the movement of food through the digestive system.

Skeletal muscle is responsible for producing human movement, and groups of muscles in the human body work together to control movement patterns. Figure 4.17 identifies the main muscles in the body. These muscles are further explained in Table 4.2.

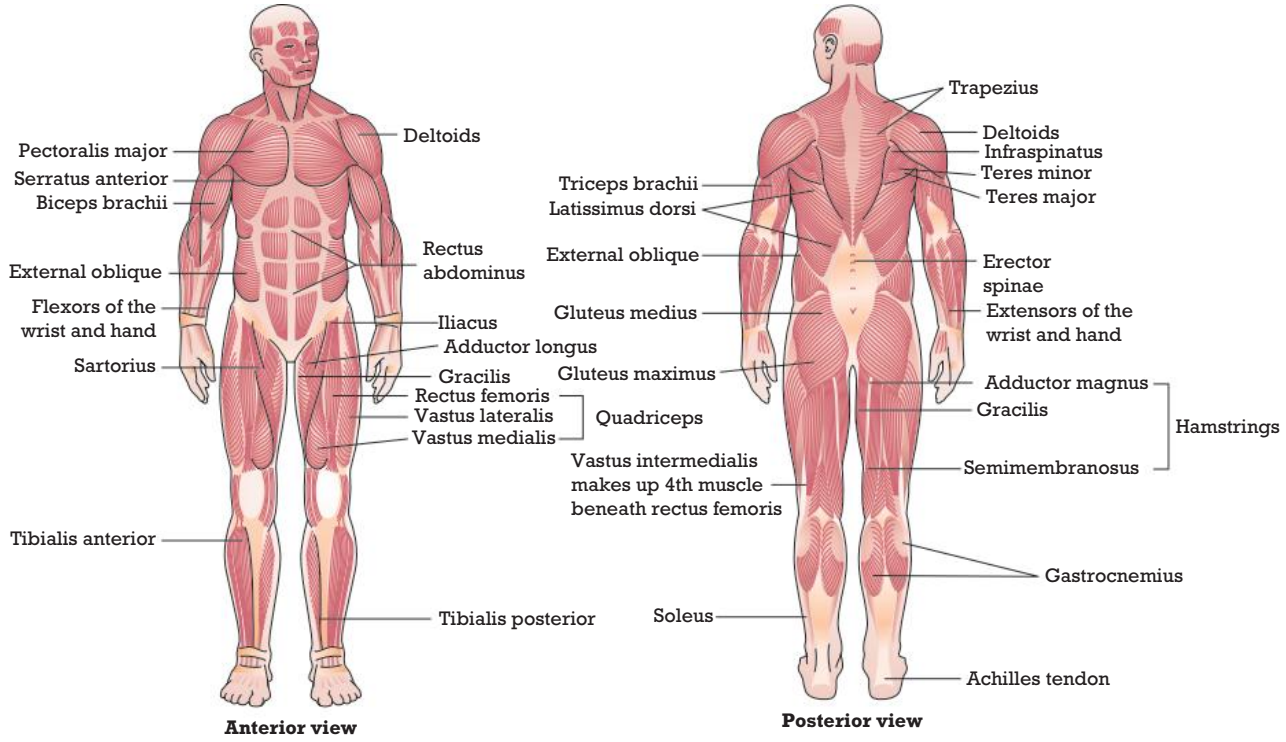
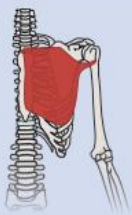
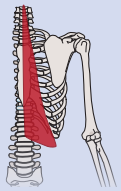
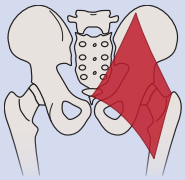
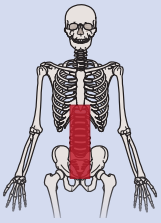
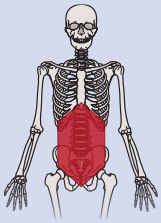


Figure 4.17 Front and rear view of the main muscles in the human body

Table 4.2 Major muscles of the body

Deltoid	**Biceps brachii**	**Triceps brachii**
Location: Anterior and posterior shoulder **Joint actions:** Abducts arm, anterior muscle flexes and medially rotates arm. Posterior muscles extend and laterally rotate upper arm.	**Location:** Anterior upper arm **Joint actions:** Flexes the elbow, supinates the forearm and assists in flexing the shoulder.	**Location:** Posterior upper arm **Joint actions:** Extends the elbow. Also stabilises the shoulder joint and retracts the capsule of the elbow joint on extension.
Latissimus Dorsi	**Trapezius**	**Pectorals**
		
Location: Posterior sub scapula **Joint actions:** Extends, adducts and medially rotates the arm. The attachments at the ribs help with deep inspiration and forced expiration.	**Location:** Posterior scapular, cervical vertebrae **Joint actions:** Laterally rotates, elevates and retracts the scapula. Also extends and flexes the neck.	**Location:** Anterior thoracic cage **Joint actions:** Flexes and adducts the arm. Also assists in the medial rotation of the arm. Assists with inspiration.

>>

>> Erector Spinae (Sacrospinalis)	Gluteus maximus	Hamstrings (three muscles)
		
Location: Anterior sacrum to base of skull **Joint actions:** Flexion and lateral flexion of spine.	**Location:** Posterior pelvic girdle **Joint actions:** Extends and laterally rotates the hip. Assists in maintaining knee extension.	**Location:** Posterior upper leg **Joint actions:** The three muscles in this group all flex the knee and extend the hip. The main muscle laterally rotates the knee and the other muscles medially do this.
Quadriceps (four muscles)	**Gastrocnemius**	**Soleus**
Location: Anterior upper leg **Joint actions:** This group of four muscles extends the leg at the knee and flexes the thigh at the hip. Also stabilises the patella.	**Location:** Posterior lower leg **Joint actions:** Plantar flexes the foot and also flexes the knee.	**Location:** Posterior lower leg **Joint actions:** Plantar flexes the foot and aids in the venous return of blood.
Tibialis anterior	**Rectus abdominus**	**External oblique**
		
Location: Anterior lower leg **Joint actions:** Extends (dorsiflexion) and inverts the foot at the ankle.	**Location:** Anterior lower thoracic cage **Joint actions:** Flexes the trunk. Also assists in forced breathing out.	**Location:** Anterior lateral lower thoracic cage **Joint actions:** Abducts and rotates the trunk. Also supports the abdominal wall.

Weblink

Watch

You can watch a short video explaining agonist and antagonist muscle movement, by Medical Cosmos (2015), or a short presentation by London Leisure College (2013) about how muscles work.

Muscle relationships

Muscles work by generating tension that causes change within a cell. The tension created causes a muscle to shorten, lengthen or remain the same length. This is known as muscle contraction. Where this tension results in movement, repeated contraction shortens the muscle's length. The tendons of the shortened muscle pull on the bones in the direction of the contraction and this produces movement. For example, elbow flexion (see Figure 4.10 on page 105) is caused by the shortening contraction of the biceps. The biceps are attached to the scapula at the origin or fixed end, and to the radius at the insertion or movable end. As the biceps contracts, it exerts pressure on the movable end and results in the movement of the forearm towards the upper arm.

Agonists and antagonists

Muscles usually work in paired groups known as the **agonist** and **antagonist**. The muscle that is responsible for the shortening action is called the agonist. As the agonist contracts, the other muscle in a pair relaxes and lengthens. This muscle is called the antagonist. This process occurs in elbow flexion and extension. When the elbow flexes, the agonist muscle is the biceps and the antagonist muscle is the triceps, because the triceps relaxes and lengthens at the same time as the biceps contracts. The opposite occurs when the elbow extends. The triceps contracts and straightens the ulna. The triceps becomes the agonist and the biceps, which relaxes, becomes the antagonist.

Stabilisers are muscles that assist agonists and antagonists in producing particular movements at a joint. For movement to be effective there must be stability in the joint. Stabilising muscles will often contract statically to hold still other parts of the body, around the joint. For example, the radialis and brachioradialis muscles of the forearm assist the biceps in elbow flexion.

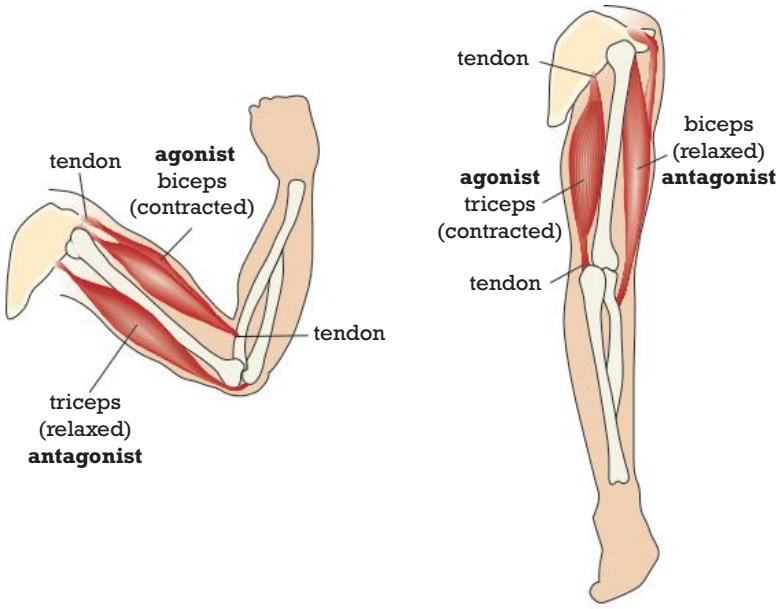


Figure 4.18 The agonist and antagonist relationship in the arm, as an elbow is flexed (left) and extended (right)

Types of muscle contraction

Body movement occurs when there is a shortening of a muscle with the agonist lengthening at the same time. In this case both the agonist and antagonist will be contracting or creating tension. Where the muscle is shortening, the contraction is classified as a **concentric contraction**. The antagonist will be lengthening, but will still be creating tension to control the movement. This contraction while extending is known as an **eccentric contraction**.

Concentric contraction

Concentric contraction involves the muscle length shortening during a contraction. An example of this is when the biceps contracts while performing the upward phase (flexion) of a biceps curl.

Eccentric contraction

Eccentric contraction involves the muscle lengthening during a contraction. Eccentric contractions often involve movements where a resistance is being lowered. An example of this is when the biceps relaxes while performing the downward phase (extension) of a biceps curl.

Isometric contraction

Muscles can also be working or creating tension without a change in muscle length or body movement. These **isometric contractions** occur where the muscle generates force against a fixed resistance that does not move. There is no significant change in the muscle length. An example of this would be doing a calf stretch against a

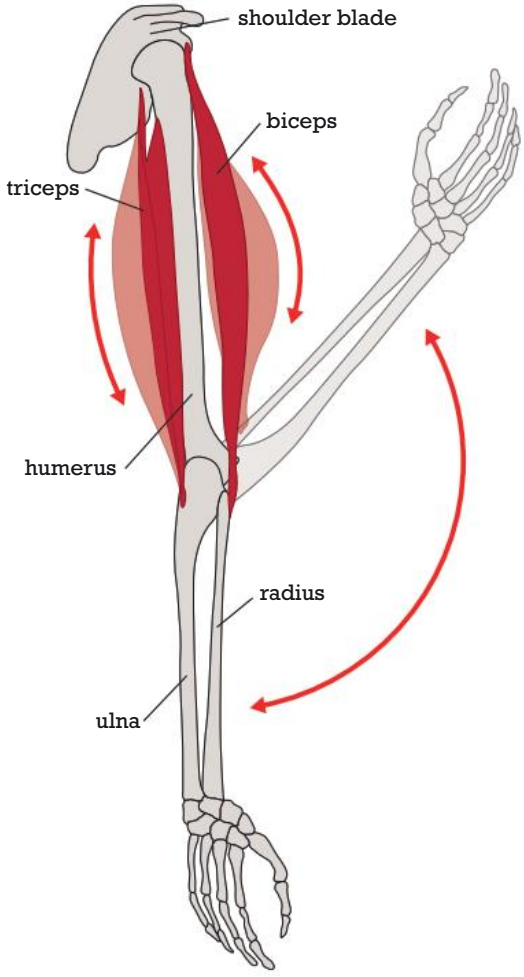


Figure 4.19 Muscle contraction

wall. Other sporting examples include an athlete performing a crouch start before a sprint, with muscles tensed waiting for the starter's gun. Rock climbers will often perform isometric muscle contractions as they keep parts of their bodies still while searching for a new handhold or foothold.

Which muscles?

1 Using the same photos you chose in the activity on page 108, add information about the muscles that may be involved in those movements.

2 Perform:

a a vertical jump
b a push-up
c a shot-put throw
d a football kick.

Work in pairs, so that one person can film the other. From the videos, analyse the bones, joints and muscles involved in each of these four movements.

THE RESPIRATORY SYSTEM

Lung structure and function

The human respiratory system plays a significant role in human movement. Whether it is short, sharp movements over a limited time span or repeated movements over a long period, the lungs will have a role to play.

The respiratory system supplies the blood with oxygen through the process of breathing. When humans breathe, oxygen is inhaled and carbon dioxide is exhaled. This exchange of gases is how the respiratory system gets oxygen to the blood.

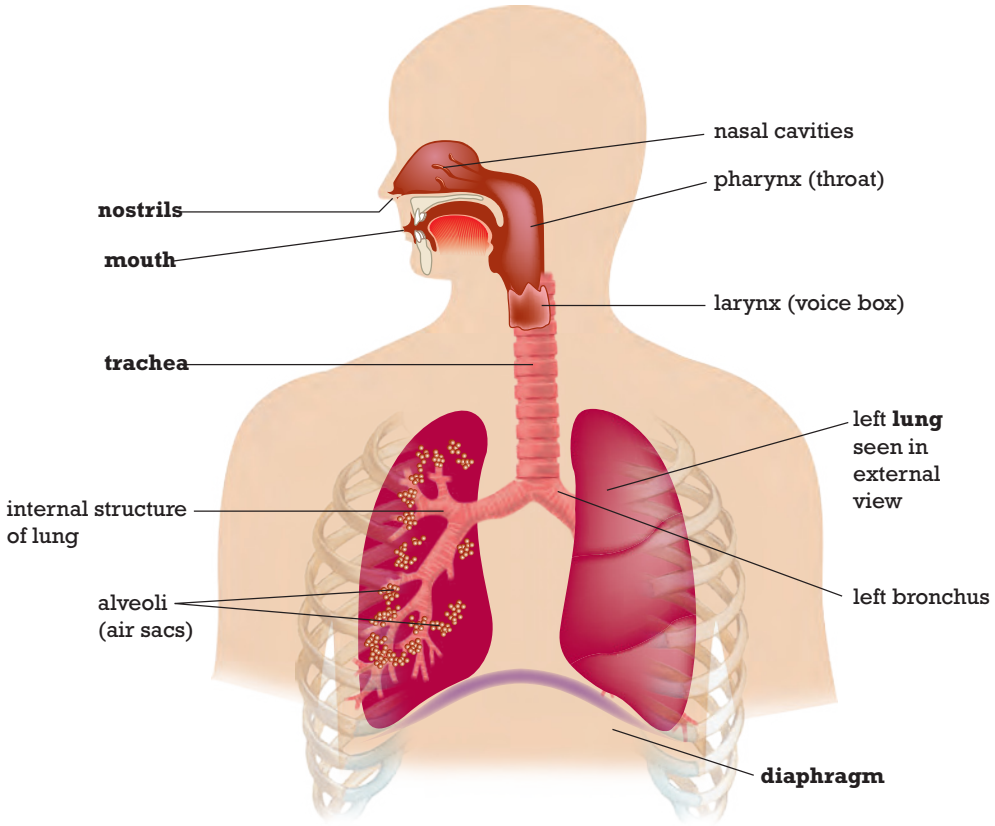


Figure 4.20 The human respiratory system

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When we breathe in (inhale), oxygen enters the respiratory system through the mouth and the nose. The inhaled breath then passes through the larynx (where speech sounds are produced) and the trachea, which is the main tube entering the chest cavity. In the chest cavity, the trachea splits into two smaller tubes called the **bronchi**. Each bronchus then divides again, forming the bronchial tubes. The bronchial tubes further divide into many smaller tubes (bronchioles), which connect to tiny air sacs called alveoli. There are more than 600 million of these sponge-like alveoli in a healthy human lung. The walls of the alveoli are very thin, and it is here that oxygen exchange takes place. Oxygen inhaled into the lungs passes through the thin wall of the alveoli and into the bloodstream. At the same time, poisonous carbon dioxide passes back into the lungs through the wall of the alveoli.

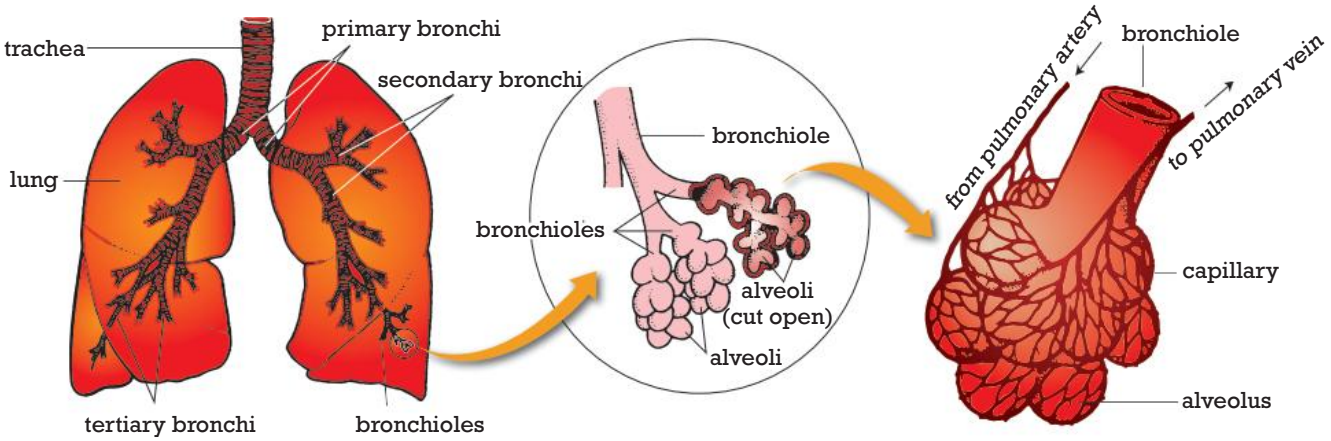

Figure 4.21 Structure of the lungs

The muscular **diaphragm**, which lies across the bottom of the chest cavity, controls breathing. The diaphragm's job is to help pump the carbon dioxide out of the lungs, creating space for oxygen to flow into the lungs. When the diaphragm contracts, oxygen is drawn into the lungs (inhale). When the diaphragm relaxes, carbon dioxide is pushed out of the lungs (exhale).

The ability to make use of atmospheric oxygen and remove carbon dioxide from the body keeps us alive, and it can help us to move efficiently. Poor lung efficiency can contribute to muscle fatigue and the build-up of lactic acid, and can inhibit movement.

The efficiency of the respiratory system has a big impact on human performance. Athletes with highly efficient lung function will often perform well in endurance sports such as triathlons, marathon running and ocean swimming.

Lung function and structure

Lung function can be determined in several ways. These can vary from simple analysis of how 'puffed' an athlete feels after performing a set amount of work, through to sophisticated scientific measures of lung capacity and **gas exchange**.

Spirometry

Lung-function testing can determine a range of measures of lung function. They include:

Total lung capacity (TLC)

This measures the amount of air in the lungs after a person has inhaled as deeply as possible.

Forced vital capacity (FVC)

This measures the amount of air a person can exhale with force after they have inhaled as deeply as possible.

Forced expiratory volume (FEV)

This measures the amount of air a person can exhale with force in one breath. The amount of air a person exhales may be measured at 1 second (FEV1), 2 seconds (FEV2) or 3 seconds (FEV3). FEV1 divided by FVC can also be determined – this is the ratio of FEV1 to FVC and is essentially the proportion of the lung volume that can be expired in one second.

Alamy Stock Photo/Phanie

Figure 4.22 Measuring lung function using a spirometer

Peak expiratory flow (PEF)

This measures how quickly a person can exhale. It is usually measured at the same time as the person's forced vital capacity (FVC).

Maximum voluntary ventilation (MVV)

This measures the greatest amount of air a person can breathe in and out during one minute.

Expiratory reserve volume (ERV)

This measures the difference between the amount of air in a person's lungs after a normal exhale (FRC) and the amount after a person has exhaled with force (RV).

Inspiration and expiration

Simply, **inspiration** is breathing in, and **expiration** is breathing out. During exercise the frequency and depth of breathing increases, so more oxygen is supplied to working muscles. Figure 4.23 shows the movement of our diaphragm and of our lungs as we inhale (left) and exhale (right).

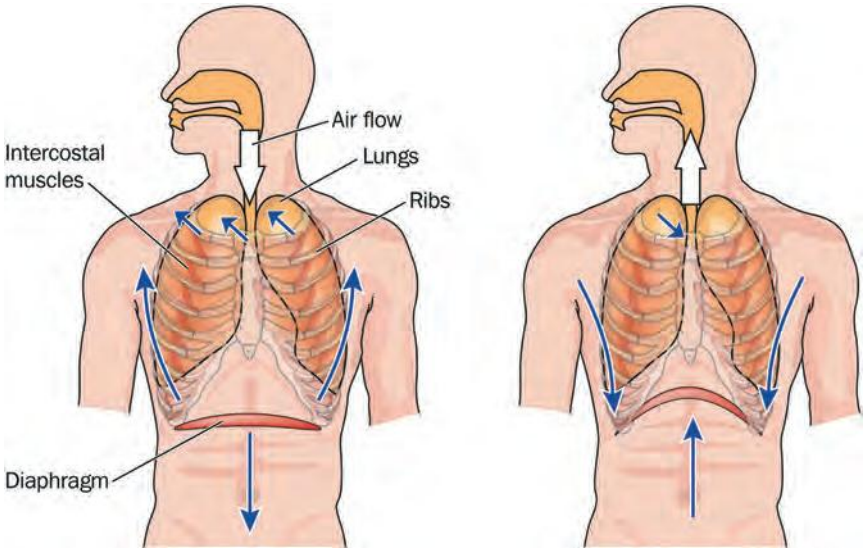

Figure 4.23 As we breathe in (left), the diaphragm flattens to give the lungs maximum capacity. Air flows into the enlarged lungs. As we breathe out, the diaphragm rises (relaxes) and forces the lungs to become smaller, which helps carbon dioxide to be exhaled.

Gas exchange

The gas exchange in the lungs is called pulmonary diffusion. It has two main functions:

- to oxygenate our blood, which then flows to muscles and other cells
- to remove carbon dioxide (CO_2) from blood returning from the muscles and other body cells.

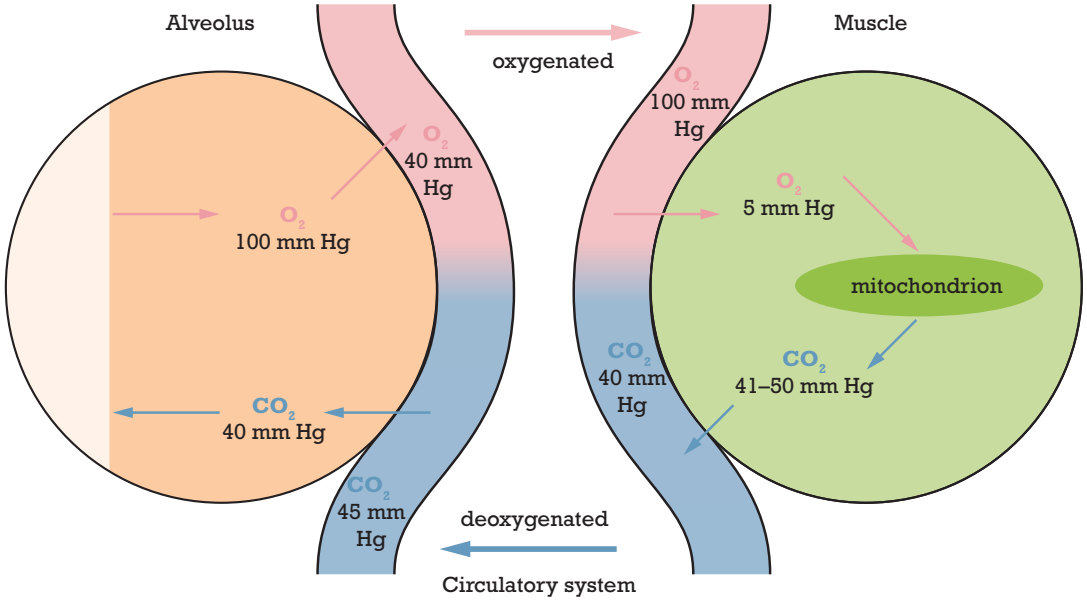

Figure 4.24 Simplified diagram of gas exchange in the lungs and muscles. Oxygen and CO_2 move from high pressure to lower pressure, in opposite directions, creating an exchange of gases.

Breathing faster

1 Perform the following tasks. Record how you feel, and describe how your lungs are functioning during and after each activity:
   a sprinting 20 metres
   b sprinting 100 metres
   c running up one flight of stairs.
2 Measure how many breaths you take each minute after each activity.
3 Measure your rate of breaths per minute when at rest.
4 Explain your data and discuss what other class members have recorded when doing the same activities.
5 Why is there variation between individuals?
6 What can you do to improve performance of the lungs?
7 Predict how each of the lung function measures may vary between a highly trained triathlete and a person of average fitness.

Weblink

Watch

There are several videos/animations online that provide simple explanations of the respiratory system and control of breathing.

Weblink

Watch

Watch the short YouTube clip 'What is blood?' from America's Blood Centers.

Investigate

Look online at some recent discussions about the effectiveness of simulated altitude training.

As a class, discuss which sports you feel could most benefit from altitude training.

In your opinion, is simulated altitude training worth the time and expense?

THE CIRCULATORY SYSTEM

Components of blood

The circulatory system plays a critical role in human movement. It is through the circulatory system that oxygen and nutrients are transported to muscle, and waste products are carried away. The circulatory system consists of the heart and blood vessels that transport blood around the body.

The blood has a vital role in human health and wellbeing, and it is often through blood tests that medical practitioners determine health problems.

Blood is a fluid tissue. The material between the cells of the blood is called **plasma**, which makes up about 55 per cent of the blood volume; the other 45 per cent of cellular component contains **red blood cells**, **white blood cells** and **platelets**. Red blood cells carry the protein haemoglobin, which gives blood its colour and can combine with oxygen. Red blood cells transport oxygen from the lungs to the tissues. White blood cells protect the body against bacteria. Platelets are tiny cell fragments that help to clot blood in the event of a cut or injury.

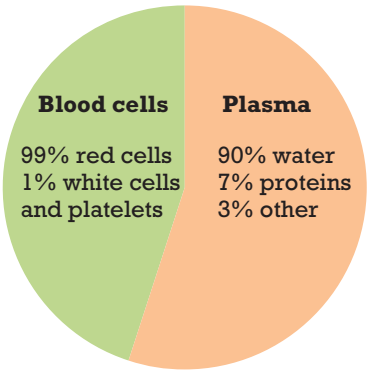

Figure 4.25 Composition of blood

The heart, blood and circulation

The heart is a complex muscular organ that regulates life by controlling the flow of blood around the body. Figure 4.26 shows the key features of the human heart.

The circulatory system is the way in which blood is circulated around the body. Figure 4.27 shows how this trip around the body takes place. The heart muscle contracts and forces blood to the lungs through the **pulmonary artery**. The blood offloads carbon dioxide in the lungs and becomes enriched with oxygen. It then returns to the heart through the **pulmonary vein**.

From here, the oxygen-rich blood travels to the **aorta** and out to the rest of the body though a complex series of **arteries** and smaller **capillaries**. It is along these capillaries that nutrients pass to body cells and waste products are returned to the blood. The blood then returns to the heart through a series of larger vessels called veins.

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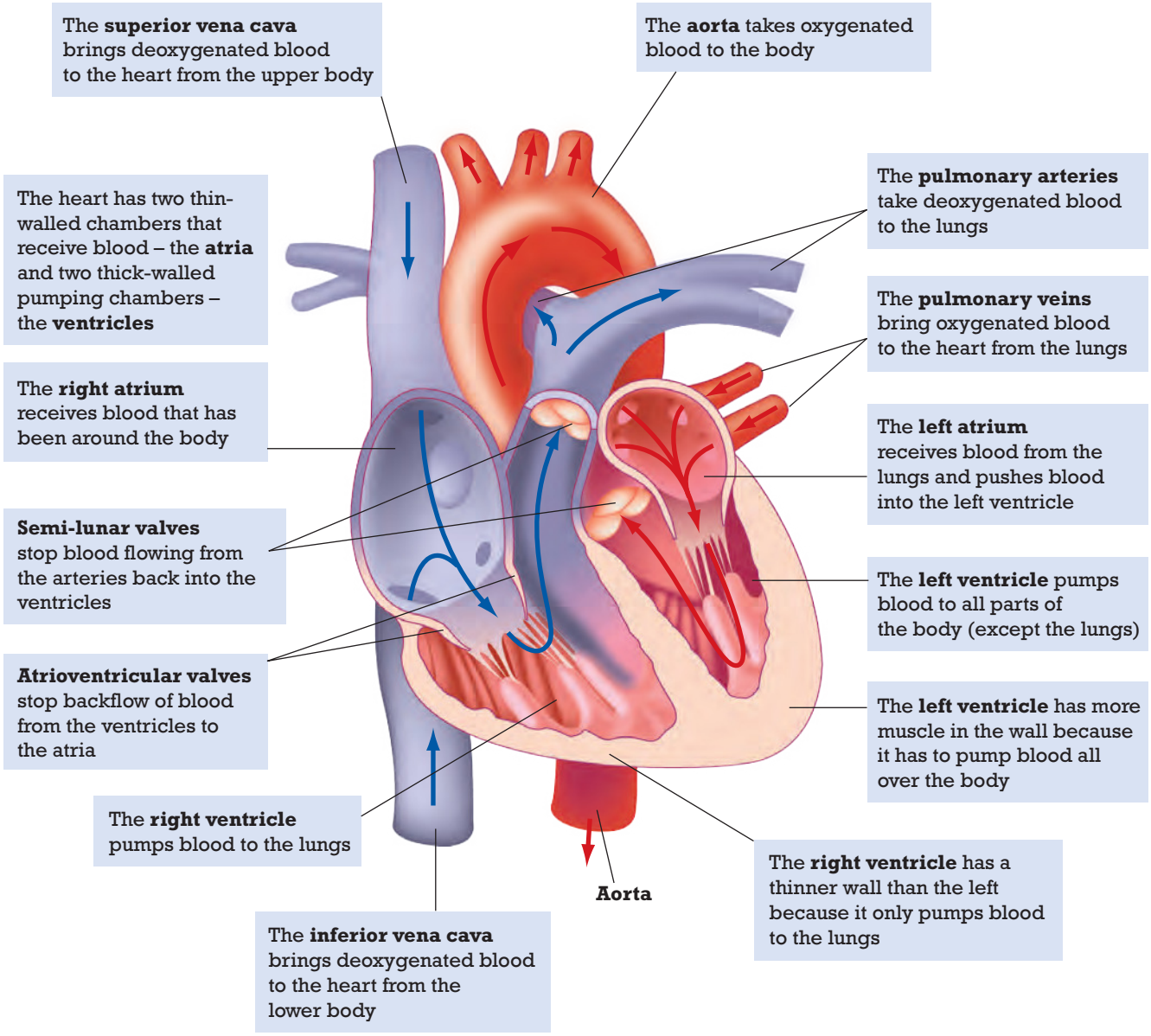
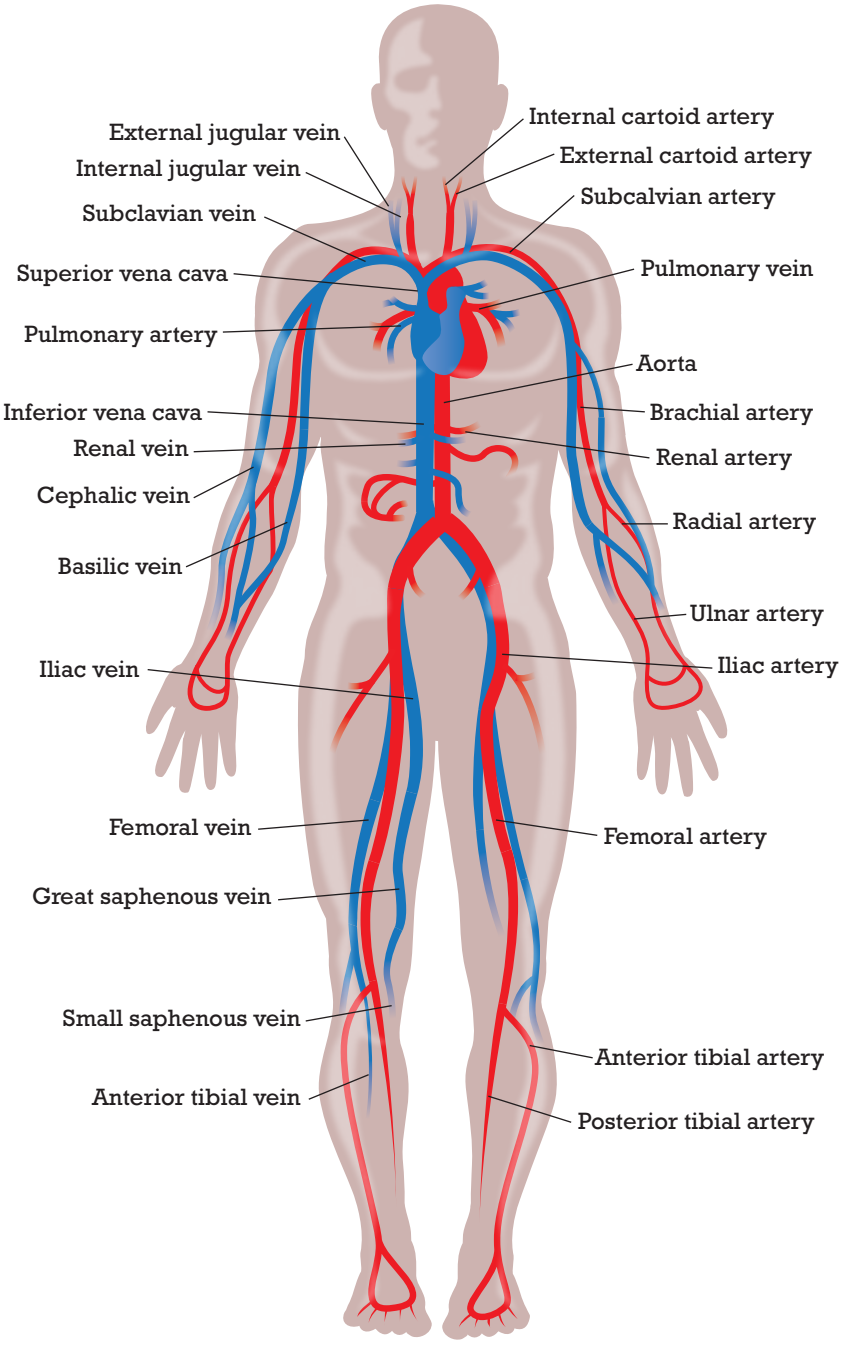


Figure 4.26 The structure of the heart

Blood pressure

The circulation of the blood is controlled by the regular contractions of the heart muscle. An efficient heart may beat at 60–65 beats per minute while at rest. When a person exercises or comes under strain, the heart responds by beating faster to circulate oxygen and nutrients and remove waste products. Each time the heart contracts or beats, the pressure of the blood against the walls of the arteries and veins increases. This blood pressure can be measured using simple pressure gauges, which measure the pressure of blood against the walls of an artery at two points. The highest reading is the pressure of blood against the artery walls when the heart contracts. The lowest reading is the pressure when the contraction is completed and the blood flow is at its weakest; for example, 120/80 millimetres of mercury (mmHg). The high reading is known as the **systolic blood pressure** and the low measure is the **diastolic blood pressure**.



The arteries carry oxygen-rich blood from the heart to the organs of the body and the veins carry waste products back to the lungs.

Figure 4.27 The key arteries and veins of the circulatory system

Blood

1 Identify the key components of blood and describe how they contribute to human movement.
2 What role do the arteries and veins play in circulation?

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CHAPTER SUMMARY

- Human movement results from the complex interaction of the skeletal, muscular, nervous and cardiorespiratory systems.
- The shape and length of bones and how they join other bones influences the movements those bones can make.
- Bones can be classified as long, flat, short or irregular.
- The interface between bones (the joints) plays a significant role in human movement.
- There are three categories of joints: immoveable, cartilaginous and synovial joints.
- Synovial joints have common features that influence their efficiency of movement; these include hyaline cartilage, synovial membranes, joint capsules and synovial fluid.
- There are six types of synovial joints in the body: ball and socket, hinge, condyloid, saddle, gliding and pivot.
- There are three types of muscles in the human body: concentric, eccentric and isometric muscles.
- Muscles usually work in pairs known as the agonist and the antagonist.
- The respiratory system controls oxygen input and carbon dioxide output from the human body.
- The key components of the respiratory system are the nose, mouth, trachea, bronchial tubes and alveoli.
- Gas exchange through the walls of the alveoli determines oxygen and carbon dioxide levels in the blood.
- The efficiency of the respiratory system can be measured by simple field observations or complex scientific analysis.
- Total lung capacity (TLC), forced vital capacity (FVC) and forced expiratory volume (FEV) are important measures of respiratory capacity.
- The heart is a complex organ that regulates blood flow around the body.

CHAPTER REVIEW ACTIVITIES

1 Identify the bones that form each of the following joints. In a table, identify the movements each joint can perform, and explain how the bones and joint type influence those movements:
   a hip joint
   b shoulder joint
   c elbow joint.

2 Identify one simple skill required in each of the following physical activities and describe the movements required to perform that skill:
   a football
   b netball
   c ballet
   d modern dance
   e gymnastics
   f swimming.

3 Identify the agonist and antagonist in each of the following actions, and draw a labelled diagram to show them:
   a extension of the elbow
   b rotation of the shoulder
   c flexion of the hip
   d hyperextension of the hip
   e rotation of the neck

4 Explain the different types of contraction that muscles are able to perform.

5 Identify some sport-based movements that require isometric contractions.

6 Draw a simple diagram identifying the flow of blood around the human body and the main organs and vessels involved.

7 Explain how blood pressure is measured and what the final reading means.

8 Describe how an inefficient cardiorespiratory system can influence human movement.

9 **a** Explain the key measures of lung function.
   b Describe how lung function can impact on human movement.

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CHAPTER 5
Fitness, training and movement efficiency

IN THIS CHAPTER

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HEALTH-RELATED COMPONENTS OF PHYSICAL FITNESS

In this section we will analyse the relationship between **physical fitness** and movement efficiency.

Physical fitness has different meanings for different people. What physical fitness means for a professional athlete may be quite different from how the average person would view it. One way of looking at the components of fitness is from look at those that relate to health and those that have a skill component.

The five health-related components of fitness are all important to a person's general level of health. They are:

- cardiorespiratory endurance
- muscular strength
- muscular endurance
- **flexibility**
- body composition.

Cardiorespiratory endurance

Cardiorespiratory endurance or aerobic endurance is a measure of the ability of a person's lungs, heart and blood vessels to supply oxygen to the working muscles of the body. It also refers to the ability of the working muscles and other organs to utilise this oxygen. Cardiorespiratory endurance can have a significant impact on daily living: without it, a person will feel tired and fatigued.

Activities that require cardiorespiratory endurance

Activities such as distance running, road cycling and other activities that require continuous movement for extended periods of time all require cardiorespiratory endurance. Team sports such as football, basketball, netball and hockey also require a strong aerobic base.

Muscular strength

Muscular strength is the ability of muscles to apply force to an object; it enables a person to live normally without feelings of muscular tiredness and fatigue.

Activities that require muscular strength

Many daily tasks, such as lifting groceries, carrying a school bag or walking up stairs, require muscular strength.

Muscular strength is significant in team games such as rugby league. It can be applied in a variety of ways, depending on the sport or even the specific game situation. For example, a basketball player may need to apply their core strength to block out an opponent in a rebounding contest, and then may need to apply strength in a different way to pass the ball or sprint the length of the court in another part of the game.

Strength is also a major component of power.

Alamy Stock Photo/Bruce Leighty - Sports Images

Figure 5.1 Core strength is vital for contesting rebounds.

Muscular endurance

Muscular endurance is the ability of muscles to perform repeated contractions against a load or resistance. In any day, some muscles may contract countless numbers of times in activities such as walking. The ability to keep going without muscle fatigue is important to overall health.

The level of resistance that muscles have to work against is an important feature in determining muscular endurance. A person who continually walks up hills or trains muscles using lots of repetitions with light weights may build up high levels of muscular endurance.

Activities that require muscular endurance

Middle- to long-distance running, swimming, rowing, canoeing and cycling all require muscular endurance.

Team sports in which athletes have to play for extended periods, such as 4 × 15-minute quarters, or 2 × 30-minute halves, require a high level of muscular endurance to ensure athletes are able to continually move and create space. Tennis and squash require specific muscular endurance in legs, wrists, forearms and the upper body to compete in long rallies and games.

Flexibility

Flexibility refers to the range of motion around a joint. Stiffness and tightness in joints can limit freedom of movement and contribute to injury of bones, tendons and muscles. The tendons, ligaments and muscles encapsulating the joint can restrict the normal range of movement and limit effectiveness of movements.

Flexibility decreases with age, but can be maintained with regular exercise and stretching routines. Good flexibility assists with mobility and helps reduce the chances of muscle fibre tears and ligament strains.

Activities that require flexibility

Flexibility has particular significance in competitive gymnastics and dancing. These require high levels of flexibility so that the performer can undertake the required movement patterns. Many movements can also be enhanced by high flexibility. For instance, a tennis player with good shoulder flexibility would be able to take the racquet back further and generate more speed in their serve; an athlete with good hip flexibility would have a longer stride length when running; and a spin bowler with good wrist flexibility would be able to produce more spin on the cricket ball.

Getty Images/JOSEP LAGO

Figure 5.2 Serving in tennis requires flexibility as well as good technique.

Body composition

The body is composed of bones, muscles, fat and other essential internal organs such as the brain, heart, kidneys and liver, and they all have specific functions. The balance between fat, muscle and other components is important for health and wellbeing. We need a certain level of fat for metabolism and energy storage, but if a person has too much fat (or adipose tissue) this can impair their fitness levels and affect their overall health status.

There are genetic differences in the body composition of males and females. Females with more than 20 per cent body fat and males with more than 10 per cent body fat are at significant health risk. Poor body composition has been linked to heart disease, stroke, diabetes and cancer.

How can fitness predict performance?

There is a common perception that fitness automatically equates to good health and good performance in physical activity. However, fitness has a number of components, each of which can affect performance in a positive or negative way.

Physical performance in elite sport, dance, gymnastics or aquatics relies on high levels of specific fitness. Elite performers in a specialist domain may struggle to perform well in another sport. For example, some elite gymnasts find participation in team games a significant challenge, and some endurance athletes struggle physically in short sprint events. Fitness can be quite specific to an event, and may not apply as well to another event.

The skill component of any task also needs to be considered when analysing movement performance. Specific areas of fitness such as muscular endurance and flexibility would be very valuable to a dancer or gymnast, but may inhibit performance in a strength-related activity such as power lifting.

Health-related components of fitness

1 Predict which health-related components of fitness could benefit each of the following:
   a tiredness and fatigue during the day
   b playing in a social tennis competition
   c a feeling of stiffness and tiredness in the joints
   d dancing at a concert
   e weekend bushwalking
   f surfing
   g kite surfing.

SKILL-RELATED COMPONENTS OF PHYSICAL FITNESS

In this section you will learn to measure and analyse health-related and skill-related components of physical fitness, and to think critically about why we test physical fitness, and the benefits of testing.

These skill-related components of fitness can be seen as an extension of the health-related components, because they tend to be more related to human performance than to the everyday health needs of an individual. The skill-related components of fitness are:

- power
- speed
- agility
- coordination
- balance
- reaction time.

Power

Muscular power is the ability to exert maximum force in the shortest possible time – it is the combination of strength and speed.

Activities that require power

Power is a significant part of throwing events, such as discus, shot-put and javelin. Team sports such as volleyball, basketball and Australian Rules football require powerful jumping movements at regular intervals throughout the game. Even in endurance events, athletes may need to use power when sprinting up a hill or to the finish line.

Speed

Speed is the ability of the muscles to contract quickly. This translates into fast movement of body parts. An individual's speed is often determined by the muscle fibre they are born with. We all have a combination of fast-twitch muscle fibres and slow-twitch muscle fibres.

There is a strong genetic influence on an athlete's speed. An athlete who was born with a high percentage of fast-twitch muscle fibres has the genetic potential to be faster than an athlete who has a high percentage of slow-twitch muscle fibres.

Speed can be improved with training to improve technique and skill, which in turn improves muscle memory. Better results and times are often misinterpreted as increases in speed, when it is actually increased strength gains that are making the athlete more powerful.

Getty Images/PA Images

Figure 5.3 Hurdlers need speed, power and agility.

Agility

Agility is the ability to change direction or body position quickly while still maintaining balance. Agility comprises a number of skill-related components, including power, speed, balance, coordination and reaction time.

Activities that require agility

Most team sports that focus on space and possession require athletes to be agile. Individual sports that require agility include snow skiing, gymnastics, tennis, dancing and ice skating.

A range of contact sports, such as boxing, wrestling and martial arts, also require high levels of agility.

Coordination

Coordination is the result of the interaction between the body's sense of perception and its central nervous system. With a good level of coordination, movements appear to be smooth and flowing. Movements can be practised so that the neural pathways between the brain and body parts are established, leading to learnt movement memory patterns (autonomous learning). When these movement patterns have been established, an athlete can concentrate on putting together other areas of the skill or movement.

Activities that require coordination

Different sports and activities require different types of coordination. For example, passing and catching in rugby, netball and basketball require high levels of hand–eye coordination. Soccer, Australian Rules football and recreational games such as 'hacky sack' require high levels of foot–eye coordination. Dance and aerobics need good levels of coordination between body parts, so movements appear smooth and aesthetically pleasing.

Balance

Balance is the body's ability to maintain its equilibrium. Equilibrium is lost when a person falls over or loses control of their body momentarily. Balance is an important component of both agility and coordination.

Getty Images Premium Access/Reniw-Imagery

Figure 5.4 Surfers need good balance to respond to the changing environment of the surf.

Balance can be static or dynamic. Static balance is when the body's equilibrium is held in a fixed or stationary position. Some examples of static balance are a handstand in gymnastics, and the 'set' position at the start of a 100-metre sprint. Dynamic balance is when an athlete can maintain their equilibrium while moving. In its simplest form, running is an example of dynamic balance.

Activities that require balance

Balance is significant in activities that are performed in unpredictable environments. For example, dynamic balance is required in surfing, water skiing and when running with the ball in football.

Reaction time

Reaction time is the time it takes to react to an external stimulus such as a starting gun or whistle, or a ball pitched or bowled at a batter in softball, cricket or baseball. The start of a swimming race is a good example of gauging different reaction times, because there is a time lag between the sound of the starting gun and swimmers' entry into the water. Skilled athletes develop good reaction times and may also have some inherent skill in this area. A combination of factors such as speed and perceptual ability contribute to strong reaction times.

Measuring the components of physical fitness

As sport science has developed, new ways of measuring fitness, skill and performance have evolved. The most accurate measures are done under controlled conditions, using specialist scientific equipment that can provide extremely accurate data about an individual's performance. There is also a range of field tests that can provide strong predictions of fitness levels for individual athletes. Table 5.1 contains some of these field tests. The tests in red are in this book; those with asterisks are on your student website.

Table 5.1 Field tests used to measure fitness

Health-related components of fitness	Some common fitness tests
Cardiorespiratory endurance	VO_2max 20-m shuttle run (beep) test Cooper's 12-minute run* 1.6-km run* Yo-yo intermittent recovery* Cambridge, Harvard step tests PWC bicycle ergometer test
Muscular strength	Dominant hand grip dynamometer test 1-RM bench press test* 1-RM leg press test* 7-stage abdominal strength test*
Muscular endurance	Partial curl-ups* Timed sit-ups* Timed push-ups Pull-up & modified pull-up tests* Flexed-arm hang test 30-second endurance jump* Multistage hurdle jump

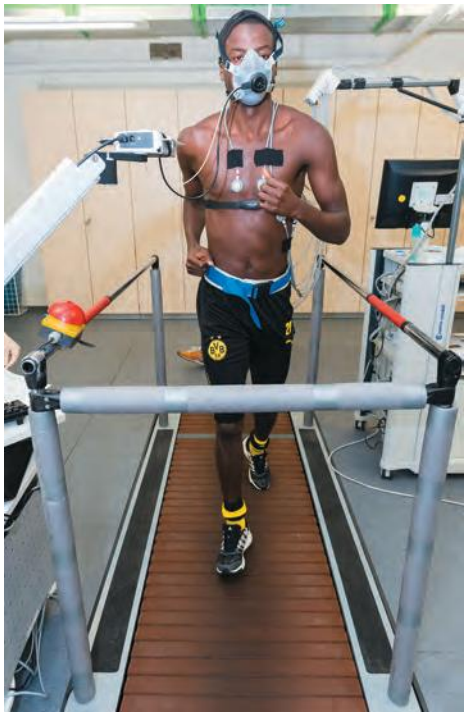
>>

>> Flexibility	Sit and reach test Shoulder and wrist elevation test* Trunk and neck extension test* Ankle extension test* Shoulder rotation test* Ankle (dorsi) flexion test* Groin flexibility test*
Body composition	Body mass index (BMI) Waist circumference* Sum of skin folds* Percentage body fat
Skill-related components of fitness	
Power	Standing broad jump test* Standing long-jump test* Standing vertical jump test Seated basketball throw* Kneeling power ball chest launch*
Speed	35-m sprint test* 50-m sprint test
Agility	Illinois agility run SEMO agility test* Agility T-test*
Coordination	Alternate hand wall toss Soft drink can
Balance	Stork stand Standing balance
Reaction time	Ruler drop test

Measuring cardiorespiratory endurance

The most accurate measure of cardiorespiratory endurance is maximal oxygen uptake, or VO_2max. In a laboratory, an athlete can be hooked up to a heart rate monitor and respiratory analysis equipment while they ride, run or swim at various workloads. The workload is progressively increased until it is too intense for the athlete to continue. This is known as a maximal test. Data about the different levels of carbon dioxide and oxygen the athlete breathed out can be used to predict the maximum amount of oxygen that the athlete is able to process. The result is usually expressed in millilitres of oxygen consumed per kilogram of the athlete's body weight per minute, or mL/kg/min. Highly trained athletes, such as elite triathletes, can achieve levels well above 50 mL/kg/min for women, and 60 mL/kg/min for men.

Maximal VO_2 laboratory tests are expensive, require trained operators, and are best as individual tests. However, some field tests can accurately predict cardiorespiratory endurance without expensive equipment, and can test large numbers at one time. The results from these tests – which usually measure distance travelled or heart rate at the end of the test – are then compared to standardised normative tables to indicate levels of cardiorespiratory endurance. These tables still give relatively accurate readings of cardiorespiratory fitness. They sometimes indicate a category of fitness using descriptions such as excellent, very good, good, average, below average and poor, instead of a mL/kg/min measurement.



Getty Images/Alexandre Simoes

Science Photo Library/ARNO MASSEE

Figure 5.5 Athletes undergoing VO_2max testing

20-m shuttle run (beep) test

Resources: witches' hats or markers, 20-m measuring tape, CD or mp3 player, multi-stage fitness test CD or mp3 audio file, flat surface suitable for running

Background and procedure: The beep test is a progressive shuttle run between two lines spaced 20 metres apart. Subjects must complete each 20-metre shuttle run by staying in time with the beep from the audio track. At each beep, the level and stage is also broadcast. Each level continues for 1 minute. The first level is quite slow (8.5 km/h) and is equivalent to a slow jogging pace. There are seven stages in the first level. The interval between beeps at each level decreases, which means that the subject has to run faster to maintain pace with the beeps.

Each progression in levels equates to an increase in running speed of 0.5 km/h: level 2 has 8 stages, level 4 has 9 stages, level 6 has 10 stages, level 8 has 11 stages, level 11 has 12 stages, level 14 has 13 stages and level 16 has 14 stages.

© Gerrit Fokkema

Figure 5.6 Students participating in a beep test

When the subject drops out, the result (level and stage) of their last successful shuttle run is recorded. Results can then be compared to tables to obtain an indication of VO_2max.

You can find beep test result calculators online, which will allow you to determine your VO_2max and provide the absolute value of oxygen consumed by your body each minute.

Table 5.2 Ratings and VO_2max comparisons for 16–17-year-old males and females

	Males		Females	
Rating	**Beep test result**	**VO_2max (mL/kg/min)**	**Beep test result**	**VO_2max (mL/kg/min)**
Excellent	> 13.7	> 63.0	> 11.1	> 54.0
Very good	11.4–13.7	53.1–63.0	9.8–11.1	49.1–54.0
Good	9.10–11.3	52.1–53.0	8.5–9.7	44.1–49.0
Average	8.3–9.9	45.1–52.0	7.2–8.4	38.1–44.0
Fair	6.9–8.2	39.1–45.0	5.7–7.1	33.1–38.0
Poor	5.1–6.8	33.1–39.0	4.2–5.6	27.1–33.0
Very poor	**< 5.1**	**< 33.0**	< 4.2	< 27.0

Source: Courtesy of Topend Sports, www.topendsports.com

Measuring muscular strength

Strength can be measured accurately using complex weight machines designed specifically for the purpose. A simpler field test is outlined below.

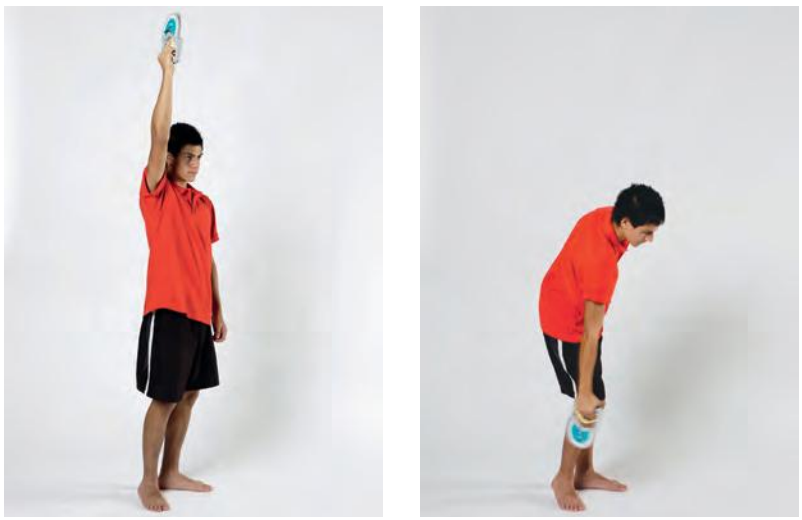
Dominant hand grip dynamometer test

Resources: hand grip dynamometer

Procedure: Make sure that the dynamometer needle has been returned to zero.

Grip the dynamometer with the testing hand and stand up straight with the feet shoulder-width apart.

Extend the testing hand up vertically, directly above the head. Keeping the arms straight, lower the arm to the side of the thigh, squeezing the handle as tightly as possible while doing so. Record the scores and compare to the norm table below to obtain the subject rating.



(Left and right) © Gerrit Fokkema

Figure 5.7 Start and finish position of test, measuring hand grip strength with your dominant hand.

Table 5.3 Norms for hand grip dynamometer test

Dynamometer reading (kg)					
	Excellent	**Good**	**Average**	**Fair**	**Poor**
Male (adult)	> 64	52–64	48–51	40–47	< 40
Female (adult)	> 38	30–38	26–29	20–25	< 20

Source: Courtesy of Topend Sports, www.topendsports.com

Measuring muscular endurance

Timed push-up test

This test assesses upper-body muscular strength and endurance.

Resources: stopwatch and chalk

Procedure: The person being tested assumes the standard push-up position: legs together and hands pointing forward, shoulder-width apart, positioned directly under the shoulders (see Figure 5.8).

A partner places a fist on the floor directly under the person's chest.

The person being tested lowers themselves until their chest touches the fist, keeping their body straight and rigid, and then pushes themselves back up to the starting position. This counts as one repetition.

The toes are the pivotal point. Rest is allowed in the up position only. The score is the total number of push-ups completed in 60 seconds.

(Left and right) Shutterstock.com/ Mihai Blanaru

Figure 5.8 Correct push-up technique

Table 5.4 Norms for maximal push-ups in 60 seconds for youth aged 17–19

	Males	**Females**
Excellent	> 56	> 35
Good	35–56	21–35
Average	19–34	11–20
Fair	11–18	6–10
Needs improvement	< 10	< 5

Adapted from Golding et al., 1986, *The Y's way to physical fitness*, 3rd edn, on http://www.topendsports.com/testing/tests/home-pushup.htm

Measuring flexibility

Sit and reach test

This test measures hip and trunk flexibility.

Resources: sit and reach testing box or box with measuring tape or ruler attached

Procedure: Ensure that the subjects have had an adequate warm-up, including hamstring and lower back stretches.

Place the measuring box against a brick wall for stability.

The subject removes their shoes and sits on the floor with the soles of their feet pressed against the front face of the blocks.

Keeping their knees straight, subject bends forward from the trunk and gently slides the indicator as far forward as they can.

For a successful attempt to be recorded, the indicator must be pushed with the fingers of both hands, level with each other and held for a count of approximately 2–3 seconds.

Another person may use their hands to apply light pressure on the knees of the subject to discourage the knees from bending.

Results are recorded in centimetres and can then be compared to the norm tables below to obtain an overall rating.

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Figure 5.9 The subject's knees are held flat during the sit and reach test.

Table 5.5 Norms for sit and reach test

Maximum reach (cm)					
	Excellent	**Very good**	**Good**	**Fair**	**Poor**
Male 20–29	>14	8–13	4–7	-1–+3	<-2
Female 20–29	>15	11–14	7–10	2–6	<1

Adapted from *ACSM's Guidelines for Exercise Testing and Prescription*, 2018, 10th edn, Wolters Kluwer, p. 105, Table 4.13

Measuring body composition

Body mass index (BMI)

Body composition can be measured using sophisticated computer imaging. However, a simpler estimate that is widely used is measuring body mass index (BMI). This measure has come under some criticism, but is commonly used to compare obesity and overweight levels across population groups. Body mass index is calculated by dividing the weight of a person (in kilograms) by their height (in metres) squared, that is:

$$\text{BMI} = \text{weight} / (\text{height})^2.$$

This result can be compared to a normative table that uses the following rating:

Table 5.6 Measuring body mass index (BMI)

BMI	
<18.5	underweight
18.6–25	healthy weight
25–30	overweight
30+	obese

Adapted from ACSM, 2018, p. 70, Table 4.1

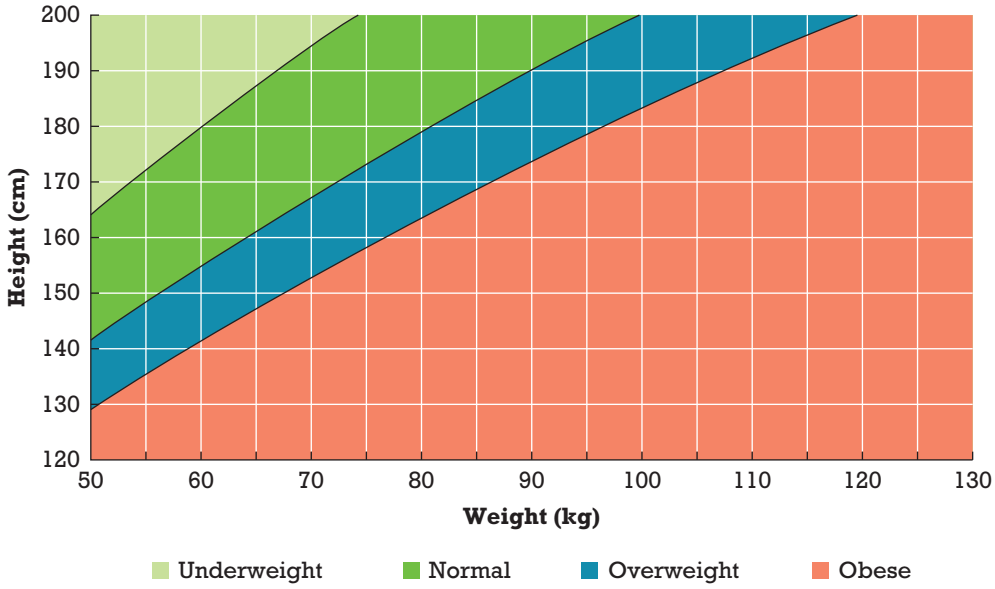

Figure 5.10 BMI chart

Hydrostatic or underwater weighing can provide an accurate prediction of body composition, but it is not time-efficient, and is very expensive.

Another accurate measure of body fat percentage can be determined by collecting accurate skinfold measurements using skinfold calipers. Skinfold calipers measure the size of subcutaneous fat deposits under the skin. A common skinfold test requires measurements of skinfolds from four body sites. These measurements are then added and the total is compared to normative tables, which give a reading for the percentage of body fat that the person is carrying.

At an elite level, athletes may be subjected to skinfold measurements from up to nine body sites to provide more accurate data. The rationale behind this is that measuring more skinfold sites will give a more comprehensive overview of total body fat percentages. See details of the skinfold test on your student website.

Measuring power

Standing vertical jump test

Resources: measuring tape or ruler fixed on wall, chalk or chalk powder, wall and surrounding area that is flat, level and free of obstacles

Procedure: The subject faces the wall with both arms fully extended overhead.

The point at which the tips of the middle fingers touch the wall is measured and recorded as the starting point.

The subject then turns side on, bends their knees to perform a squat, and jumps.

At the highest point of the jump the subject touches the measuring tape with the hand closest to the wall.

The starting point measurement is subtracted from the jump height to obtain a result.

Coordination and timing can impact significantly on the results of these tests, so the subject should be given three trials and their best score taken. This result is then recorded and compared to a norms table to obtain a rating.

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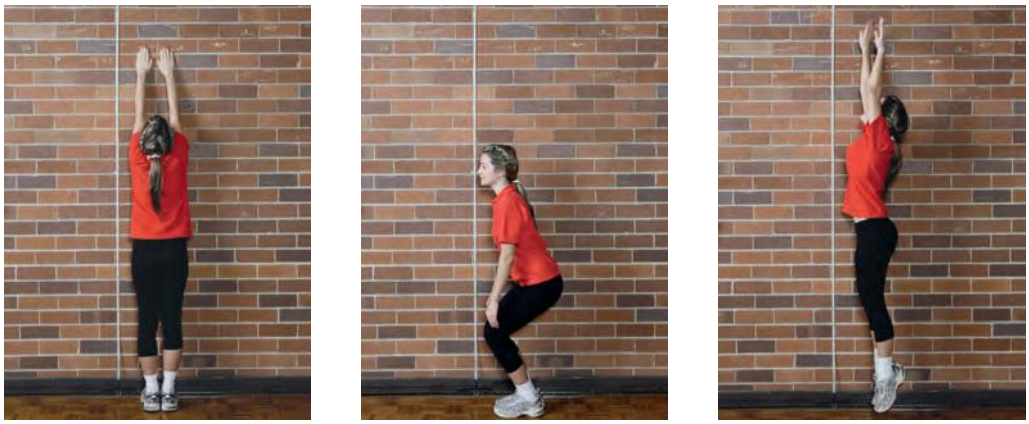


Figure 5.11 Measuring set-up, starting jump and jump for the standing vertical jump test

Table 5.7 Norms for standing vertical jump test

Difference in height (cm)					
	Excellent	**Good**	**Average**	**Fair**	**Poor**
Male	> 70	51–69	41–50	22–40	< 21
Female	> 60	41–59	31–40	12–30	< 11

Source: Courtesy of Topend Sports, www.topendsports.com

Measuring speed

Most elite sporting programs estimate speed by using light gates or stopwatches to measure the time taken to cover a short distance. This could be a sprint (with standing start) over 20 metres, a 50-metre pass through light gates or a 25-metre swim sprint. The following example measures a 50-metre sprint, and may be relevant to a sport such as Australian football.

50-metre sprint test

Resources: stopwatche, 50-m measuring tape, marker cones

Procedure: After a comprehensive warm-up, time the subject running at speed over a 50-metre course from a standing start. Round times to the nearest tenth of a second.

Results are then compared to the norms table below to obtain an overall speed rating.

Table 5.8 Norms for 50-m sprint test

Time (seconds)					
	Excellent	**Good**	**Average**	**Fair**	**Poor**
Male	< 7.6	7.6–7.9	8.0–8.4	8.5–8.8	> 8.8
Female	< 8.1	8.1–8.6	8.7–8.9	9.0–9.4	> 9.4

Measuring agility

Illinois agility run

Resources: measuring tape, stopwatch, four standard classroom chairs, two marker cones
Procedure: The subject starts in a lying down position, facing forward with arms flexed and hands just behind the start line.

Start the stopwatch on the start command.

The subject jumps to their feet and sprints to the end line around marker cone A, and then sprints back around chair 1.

The subject continues to weave between chairs 2, 3 and 4.

When they reach chair 4, the subject runs around chair 4 and repeats the process in reverse, weaving between chairs 3, 2 and 1.

When the subject has completed the up and back weaving between chairs they sprint around marker cone B and sprint back to the finish line.

Their time is recorded as they cross the finish line.

Results are then compared to the norms table below to obtain an overall agility rating.

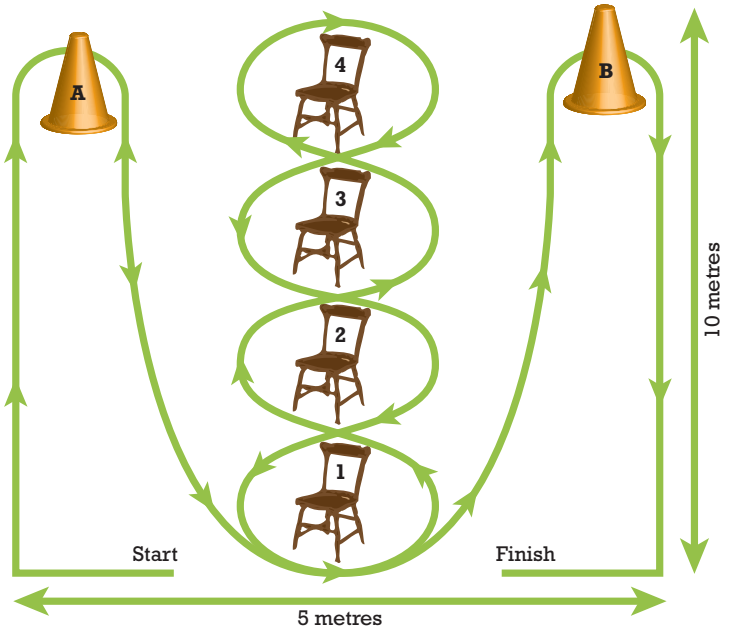


Figure 5.12 Illinois agility run set-up

Table 5.9 Norms for Illinois agility run test

Time (seconds)					
	Excellent	**Good**	**Average**	**Fair**	**Poor**
Male	< 16.7	16.8–17.3	17.4–17.9	18.0–18.5	> 18.5
Female	< 19.0	19.1–20.4	20.5–21.7	21.8–23.0	> 23.0

Measuring coordination

Alternate hand wall toss

Resources: one tennis ball per subject, brick wall, marker cones or chalk, measuring tape
Procedure: Using chalk or marker cones, measure a line 2 metres away from the brick wall.

When directed to start, the subject begins with the ball in one hand, throws it underhand at the wall and catches it on the full with their opposite hand.

The process is repeated as many times as possible in the allotted 30 seconds. It may be advisable to have some tennis balls on standby to replace any that roll away.

Results are compared to the norms table below to obtain an overall coordination rating.

Table 5.10 Norms for alternate hand wall toss test

Number of successful catches					
	Excellent	**Good**	**Average**	**Fair**	**Poor**
Male	> 33	30–32	26–29	23–25	< 23
Female	> 24	20–23	17–19	14–16	< 14

Measuring reaction time

Ruler drop test

Resources: 1-metre ruler with centimetre markings, a flat and level student desk and a chair
Procedure: The subject requires a partner, who aligns and drops the ruler.

The subject sits at the desk, leans forward and rests their forearms on the desk, with their hands past the edge of the desk.

Their index finger and thumb are placed in the 'pinch' position approximately 3 centimetres apart, ready to catch the ruler.

Their partner stands beside the subject's hands and aligns the ruler so that the bottom of the ruler with the 0 cm marking is level with the thumb and index finger.

When the subject is ready, the partner lets go of the ruler.

The subject attempts to catch the ruler and the score is read at the point in centimetres where the ruler was caught by the pinching action of the thumb and index finger.

Allow three attempts with each hand and record the best result. Results are then compared to the norms table below to obtain an overall reaction time rating.

Table 5.11 Norms for ruler drop test

	Excellent	**Good**	**Average**	**Fair**	**Poor**
cm	< 7.5	7.5–15.9	15.9–20.4	20.4–28.0	> 28

Measuring balance

Stork stand

Resources: stopwatch and a flat, level surface
Procedure: The subject stands upright and places both hands on their hips.

The subject then lifts one leg and bends the knee so that the sole of that foot is resting on the supporting leg near the knee.

On the start command, the subject lifts the heel of the supporting leg off the ground so that they are now balanced only on the toes of the supporting leg.

The timekeeper calls out the seconds as they pass.

The balance is over when the hands break contact with the hips, when the sole of the bent leg lifts off the supporting leg, when the heel touches the ground or when the subject hops on the supporting leg.

When balance is lost, the subject notes the time elapsed in seconds and this becomes their score.

Results are then compared to the norms table below to obtain an overall static balance rating.

Table 5.12 Norms for stork stand test

Time (s)					
	Excellent	**Good**	**Average**	**Fair**	**Poor**
Seconds	> 50	40–50	25–39	10–24	< 10

Why test physical fitness?

Over time, a wide variety of tests have been developed to measure aspects of fitness and human performance. The information gained from such testing can provide valuable guidance to coaches and athletes about levels of fitness, standard of fitness against other population groups and improvements in performance over time. Some can also provide indicators for overall health status. However, test results can sometimes be misused or applied incorrectly.

Some of the variables that will determine the value of fitness testing are:

- purpose of the test
- validity and reliability of the test
- age of candidates being tested
- use of results
- analysis of the results.

Purpose of the test

When used appropriately, fitness tests can provide valuable information about general health and wellbeing or readiness for performance in games and sport. Well-designed and well-measured tests can give information about general heart and lung health, strength and flexibility, and the ability to get through daily life without fatigue. The information can also give very clear data about an athlete's capabilities, particularly in sports where specific components are vital to performance, such as endurance in Australian Rules football, speed in 100-metre sprinting and strength in weight lifting. Good tests can also be very informative in picking up information about injury – for example, testing the muscle strength of agonist and antagonist muscles to determine joint stability.

Fitness testing can also have negative outcomes, particularly if used to embarrass or scare people into action. Simple tests such as measuring weight or skinfolds can impact negatively if done in a public place, humiliating the person being tested.

Validity and reliability

Many fitness tests provide information about a specific component of fitness, and these results cannot be transferred to broad statements about overall physical fitness. Some field tests only provide broad observations, rather than scientific data. To be of value, a test must really measure what it says it is measuring (validity) and produce consistent results when testing the same person at the same point in time (reliability). For example, a beep test using an old stretched audiotape would not be considered a valid or reliable test for cardiorespiratory endurance.

Age of testing

Testing techniques such as gas analysis and the beep test have great value to elite athletes in providing information about readiness for play, capability to play in certain positions and fitness level for elite performance. But information gathered for elite performance does not always apply to young children, and the testing methods are not always appropriate for use with young children. Testing can often become a source of embarrassment or a 'turn off' factor for young people.

Use of results

If testing results are used appropriately they can inform and guide improvement in performance and wellness. If the results are over-emphasised and used as a source of public embarrassment or to threaten people, testing can have a significant negative impact. The average person will not react to test results in the same way as an elite athlete, and so interpretation and sharing of results need to be considered carefully.

Getty Images/Bloomberg

Figure 5.13 Elite athletes use sophisticated forms of fitness testing such as muscle reaction tests.

Analysis of results

It is important to take care when making conclusions about test results. Drawing incorrect conclusions or using the data inappropriately can be misleading. As with all scientific data, there are limitations to what any set of data means.

Cardiorespiratory endurance

Critically analyse tests used to measure cardiorespiratory endurance.

AEROBIC AND ANAEROBIC TRAINING

Aerobic fitness is a key component of good overall health and plays a significant part in many sports and physical activities. For athletes such as marathon runners and triathletes, aerobic conditioning will be the basis of most of their training.

Aerobic training

Energy is derived aerobically when oxygen is used to contribute to the production of energy. Events that require high levels of endurance rely heavily on aerobic energy. Aerobic training targets an athlete's endurance capacity by targeting improvement in delivery of oxygen to working cells. Athletes who require high levels of endurance will train 4–6 days a week. Some examples of aerobic activities include walking, jogging, running, non-sprint cycling, swimming and cross-country skiing.

The critical feature of aerobic training is continuous activity over a medium to long period of time. Most training involves many repetitions of similar movements. For example, marathon runners will do most of their training as running. Cross training by doing swimming or cycling will provide some benefit, but specific running endurance training is needed to get improvement.

Getty Images/microgen

Figure 5.14 Swimming is an example of aerobic training

Anaerobic training

Anaerobic training helps to overcome insufficient oxygen being delivered to working muscles. This training tends to be shorter and more intense, and usually puts the body under greater stress. This enables improvement in anaerobic capacity. Activities such as sprint repetitions, wind sprints and lots of short, sharp bursts of activity with brief rest spells in between are typical of anaerobic training. This type of training does not allow for full recovery between bouts of work. Athletes involved in strength and power activities, such as football, basketball, volleyball, running events under 800 metres and swimming events under 100 metres utilise anaerobic energy sources to supply most of their energy.

Shutterstock.com/Peter Bernik

Figure 5.15 Sprinting is an example of anaerobic training

FITT principle

In this section we will discuss how to design an aerobic training session based on the **FITT principle**.

The FITT principle provides a useful framework for developing physical training programs, particularly when aiming to improve aerobic fitness. The key determinants of success or improvement in fitness are:

F: frequency of training
I: intensity of training
T: type of training
T: time of training.

Frequency

For changes in fitness to take place, training must be more than just a one-off event. The body needs to undergo some stress or overload.

Guidelines for improving aerobic fitness (cardiorespiratory training) are a minimum of three sessions per week of moderate physical activity, but ideally five or six sessions per week. Little or no benefit is gained by training less than this. For improvements in strength or muscle flexibility, training needs to be regular, with each muscle group exercised at least every couple of days to get improvement.

Intensity

Intensity refers to how hard an athlete is working in any one session. For example, some athletes train every day, but will concentrate on different muscle groups in each session to allow recovery and rest. There needs to be a balance between finding enough intensity to overload the body without overloading it so much that it causes overtraining. When doing aerobic training, the heart rate is often used as the determinant of training intensity. A heart rate known as the aerobic threshold can be determined for individuals, and this signifies the rate the heart needs to work at or above to get improvements in aerobic fitness. This threshold varies greatly from person to person depending on their age, level of fitness and other factors.

Many gyms provide broad ranges of heart rate that will suit athletes of certain ages. For most people, a target heart rate zone of 50–70 per cent of their maximum heart rate is a good place to start. Maximum heart rate (beats per minute) is usually estimated as: 220 − age.

For resistance training, workload is the primary measure of intensity.

Workload can have three components:

1 The amount of weight lifted during an exercise.
2 The number of repetitions completed for a particular exercise.
3 The length of time to complete all exercises in a set or total training session.

An individual can increase their workload by lifting heavier weights, or they could increase the number of repetitions with the same weight. Finally, they could lift the same weight for the same number of repetitions, but decrease the rest time between sets.

Type

The type of training refers to the method used to improve fitness. For aerobic fitness, the types of training activities usually referred to are walking, running, cycling, swimming and rowing. For resistance training, training types such as free weights, weight machines, resistance bands and bodyweight can be used.

Time

The final component in the FITT principle of training concerns how long an individual should exercise for. To improve aerobic fitness, individuals with lower fitness levels should aim to maintain their heart rate within the target heart rate zone for a minimum of 20–30 minutes. This can increase to as much as 45–60 minutes as fitness levels improve. In terms of the duration of the program as a whole, research suggests it takes a minimum of six weeks to see noticeable improvement, and as much as a year or more before a peak in fitness is reached.

For resistance training, sessions of no longer than 45–60 minutes are often recommended, but shorter, harder sessions can also be effective.

Aerobic versus anaerobic training

Any exercise or physical activity is usually a combination of aerobic and anaerobic activity. For example, in a gentle jog the body will work anaerobically or without sufficient oxygen until the body systems adjust to the increased workload. However, it is possible to determine the dominant energy system in most sports or physical activity and thus focus training on that aspect of performance.

Getty Images/AFP/PETER PARKS

Figure 5.16 AFL requires a combination of aerobic and anaerobic training.

Generally, there is a need for aerobic training in most sport or physical activity because aerobic fitness provides a general feeling of wellbeing and gets the body working efficiently without excess fatigue. Even for explosive activities such as shot-put and javelin, a reasonable level of aerobic fitness is required. Aerobic fitness will delay fatigue and contribute to the increased concentration and focus needed for these events.

In other activities there will be a need for a combination of training, such as in a field team game such as soccer, hockey or Australian Rules football. These players will need high levels of aerobic training, particularly at the start of the season, to get a base of overall fitness. Players will also require a range of anaerobic training to allow effective participation in the game. Components such as strength for jumping and sprinting, speed for effective game movement and flexibility to manage a wide range of movements will also be required.

Overall, aerobic training benefits cardiorespiratory function, decreases body fat and allows an individual to engage in moderate activity for extended periods of time. This is valuable

for many sports. Anaerobic activity can also benefit cardiorespiratory function and decrease body fat, but anaerobic activity is also able to produce big improvements in power, speed, strength and muscle mass. Anaerobic conditioning allows us to exert tremendous forces over a very brief time.

Basketball, football, gymnastics, boxing, track and field events under 1500 metres, soccer, swimming events under 400 metres, volleyball, wrestling and weightlifting are all sports that require most training time spent in anaerobic activity. Long-distance and ultra-endurance running, cross-country skiing and 1500+ metres swimming are all sports that require aerobic training at much higher levels than individuals concerned with total conditioning or optimal health.

Aerobic versus anaerobic training

For each sport listed below, identify whether aerobic or anaerobic training would be the most significant, and describe circumstances where aerobic and anaerobic training might benefit performance.

a football
b tennis
c gymnastics floor routine
d trampolining
e race walking
f marathon swimming
g triathlon
h road cycling.

Design a training session

Design your own training session based on the FITT principle. The session should take no more than 20 minutes.

IMMEDIATE PHYSIOLOGICAL RESPONSES TO TRAINING

In this section we will look at the reasons respiration and heart rate change during and after submaximal physical activity.

Heart rate

The key changes in heart rate and ventilation rate during training are usually easily noticed by an athlete. These changes occur because of the demands that training places on muscles and other cells. During exercise, the individual's sympathetic and parasympathetic nervous systems gradually change the heart rate through the release of hormones and other chemical messengers. As muscles demand more energy, the sympathetic nervous system increases heart rate, blood pressure and breathing. After exercise, or during a rest period, the parasympathetic nervous system gently applies the brakes and brings the heart rate back down to a resting rate.

Heart rate can be monitored during a game situation or during physical activity to inform us of the intensity at which we are working at any moment. Intensity can refer to the level of exertion or how hard the body is working at any point, measured by heart rate. The data collected by heart-rate monitoring can inform us of the training zones that we should be working within during training sessions, which in turn ensures that the relevant energy systems and fitness components are being developed during training. This is a direct application of the 'specificity' training principle.

For example, you may have completed an activity analysis of a centre player in netball. This player may frequently move at high intensity over short distances during their game, and heart-rate data would reveal an elevation of heart rate during these efforts. In situations where efforts are exceptionally short, the time for heart rate to increase significantly may not allow this to be recorded. In this case, a GPS monitor would accurately record speed (this can be expressed as a percentage of maximum).

Ventilation rate

When exercise begins, increases in respiratory rate and tidal volume increase ventilation dramatically. This in turn increases the volume of oxygen in the lungs, which can then be transported to the working muscles. Any combination of changes to tidal volume and respiratory rate can be selected to increase the available oxygen, but athletes choose a combination that seems natural to them. (Instructing athletes to deliberately alter their breathing rhythm does not appear to improve performance, and the best combination is that which is automatically selected by the body.)

At submaximal exercise intensities, ventilation increases rapidly at the start of exercise and then more slowly until it reaches a plateau. This occurs about four to five minutes into exercise. During light to moderate exercise, the relationship between ventilation and oxygen consumption is linear. At low exercise intensities, tidal volume and respiratory rate increase proportionally, to increase ventilation.

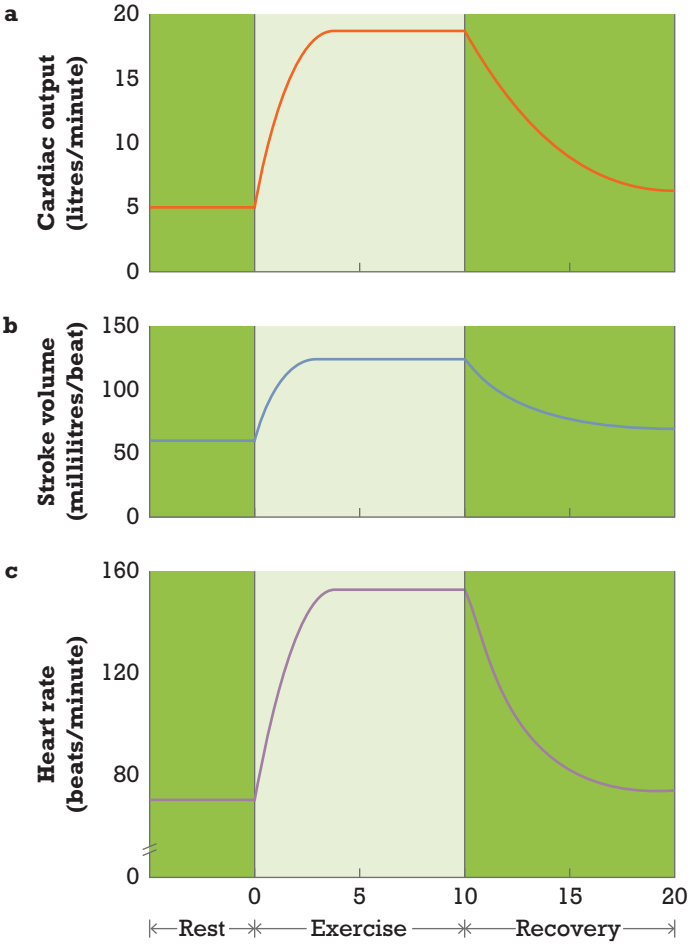
Cardiac output and stroke volume

Cardiac output (Q) is the product of stroke volume (SV), the amount of blood pumped out of the left ventricle of the heart per beat, and heart rate (HR).

$$Q\ (L/min) = HR\ (beats/min) \times SV\ (L/beat)$$

Cardiac output increases with work rate to increase the amount of oxygen delivered to the working muscles. When the body begins to exercise, both stroke volume and heart rate rise to increase the cardiac output of the heart. At rest, the heart will eject only about 40–50 per cent of the blood in the left ventricle. During exercise, a stronger ventricular contraction causes greater amounts of blood to be ejected, leading to an increase in stroke volume. Stroke volume increases to a maximum during submaximal workloads; any further increase in cardiac output is a result of an increase in heart rate.

Heart rate is the most important factor in increasing cardiac output during exercise. During submaximal exercise, heart rate will increase until the oxygen demands of the activity have been met. It will then level off, as the body has reached a steady state where oxygen supply equals oxygen demand.



Adapted from Fox, Bowers & Foss, 1993, *The physiological basis for exercise and sport*, Brown & Benchmark

Figure 5.17 Changes in a) cardiac output b) stroke volume and c) heart rate during short-term, submaximal exercise

Lactate levels

Lactate is produced at rest and during exercise but remains relatively stable during submaximal exercise. At these intensities, the body can remove the lactate by oxidising it for energy production or converting it to glucose or glycogen in the liver at a similar rate to which it is being produced. Lactate levels increase exponentially once the exercise intensity exceeds the individual's lactate inflection point (LIP). The lactate inflection point (LIP) is the last point where lactate entry into the blood and removal from the blood are balanced. An individual's LIP varies depending on their level of training; in endurance-trained individuals, LIP occurs at higher absolute exercise intensities.

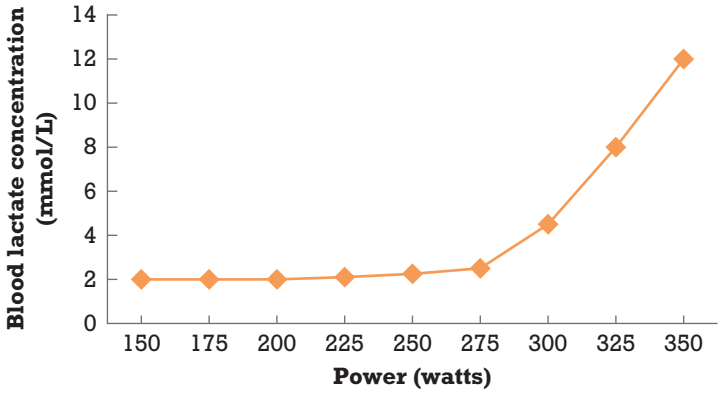


Figure 5.18 Blood lactate concentration remains stable until LIP is exceeded

Table 5.13 Summary of the acute respiratory, cardiovascular and muscular responses to submaximal exercise

Respiratory	Cardiovascular	Muscular
↑ Ventilation (non-linear increase beyond 65% VO_2max)	↑ Heart rate	↑ Motor unit recruitment
↑ Tidal volume	↑ Stroke volume (maximal at submaximal levels)	↑ Blood flow to working muscles
↑ Respiratory rate	↑ Cardiac output	↑ Body temperature
↑ Diffusion	Blood pressure: ↑ Systolic Diastolic (no change at submaximal intensities)	↓ Intramuscular substrate levels: ATP, CP Glycogen, triglycerides (greater decrease at submaximal intensity
	↑ Venous return	↑ Lactate production
	↓ Blood volume (plasma)	
	↑ a-vO_2 difference	
	↑ Oxygen consumption	

Recovery

Recovery aims to return the body to pre-exercise conditions and, in doing so, reverse the effects of fatigue. Efficient recovery strategies will enhance adaptations to exercise loads, as well as preparing the performer for subsequent training or competition. Insufficient recovery will delay the removal of fatiguing factors and any possible adaptations, as well as taking performers into the dangerous area of overtraining, associated overuse injuries and immunodeficiency-related illnesses.

Most coaches stress the importance of an active cool-down following training and competition, but in some cases this actually delays, rather than aids, the recovery process. It is important to match the recovery strategy (active or passive, refuelling) to the most likely causes of fatigue.

CHAPTER SUMMARY

- The health-related components of physical fitness make a significant contribution to overall health and wellbeing.
- The skill-related components of physical fitness have greater application to fitness for performance.
- Cardiorespiratory endurance or aerobic endurance is a measure of the ability of the heart and lungs to supply working cells with oxygen.
- Muscular strength is the ability of a muscle to apply a force.
- Muscular endurance is the ability of a muscle to work repeatedly.
- Flexibility refers to the range of movement in a joint.
- Body composition refers to the fat, muscle and other organs in the body.
- Physical fitness does not always predict performance.
- Muscular power is a combination of speed and strength.
- An individual's speed capacity is limited by their percentage of fast-twitch muscle fibres.
- Agility is the ability to change direction quickly.
- Balance is a significant component in sporting performance. Static balance is balance while standing still. Dynamic balance is balance while moving.
- Components of fitness can be measured by complex scientific processes or simple field tests.
- When measuring fitness, it is important to consider the purpose of the test, the reliability and validity of the test, the age of the candidates being tested and how the results will be analysed and used.
- Aerobic training focuses on the development of the body's ability to get oxygen to working muscles.
- Anaerobic training focuses on working the body at higher intensity.
- The FITT principle can be used to set up effective training programs. The key variables are frequency, intensity type and time of training.
- In the short term, the body reacts to physical activity in a number of ways. These include increased heart rate, increased ventilation, increased cardiac output, increased blood pressure, and in some circumstances increased lactate levels.

CHAPTER REVIEW ACTIVITIES

1. Describe the components of physical fitness. Outline how each component may influence human movement.
2. Evaluate the use of skinfold testing and weight measurement for use in a primary school fitness program.
3. Explain the difference between aerobic and anaerobic training and outline the benefits athletes may get from each type of training. List examples of activities that provide aerobic exercise and activities that provide anaerobic exercise.
4. Describe the role anaerobic training could play in improving the fitness components required for a decathlon or heptathlon event.
5. What is the recommended heart rate range during exercise?
6. How much exercise does your body need each week for good cardiovascular health?

Extra exam-style questions

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CHAPTER 6
Biomechanical principles and movement

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Biomechanics is the science that studies living things from a mechanical perspective. Using the principles of physics associated with motion and forces, biomechanics can help develop and refine human movement. Biomechanics helps us understand why golfers use a longer club to drive the ball and a shorter one to chip it, how an Olympic sprinter can run so fast, and how a baseball pitcher can make the ball curve. It also enables us to refine movement to improve performance. Biomechanics looks at the structure and design of equipment used in sport, movement techniques, the causes of overuse injuries, impaired mobility in the elderly, maintaining bone density in space, and improving movement in people with disabilities such as cerebral palsy and lower-limb amputations.

It is important for all physical education teachers, personal trainers and coaches to understand basic biomechanical principles. Elite athletes use biomechanical analysis to improve their performance, equipment and technique, but the correct application of biomechanical principles can lead to improved performance, greater efficiency and accuracy at all levels of sport and physical activity.

This chapter is best approached through a series of simple movement workshops to analyse the effect technique has on **linear motion**, speed, velocity, acceleration and **momentum**, which your teacher will take you through.

9780170386593

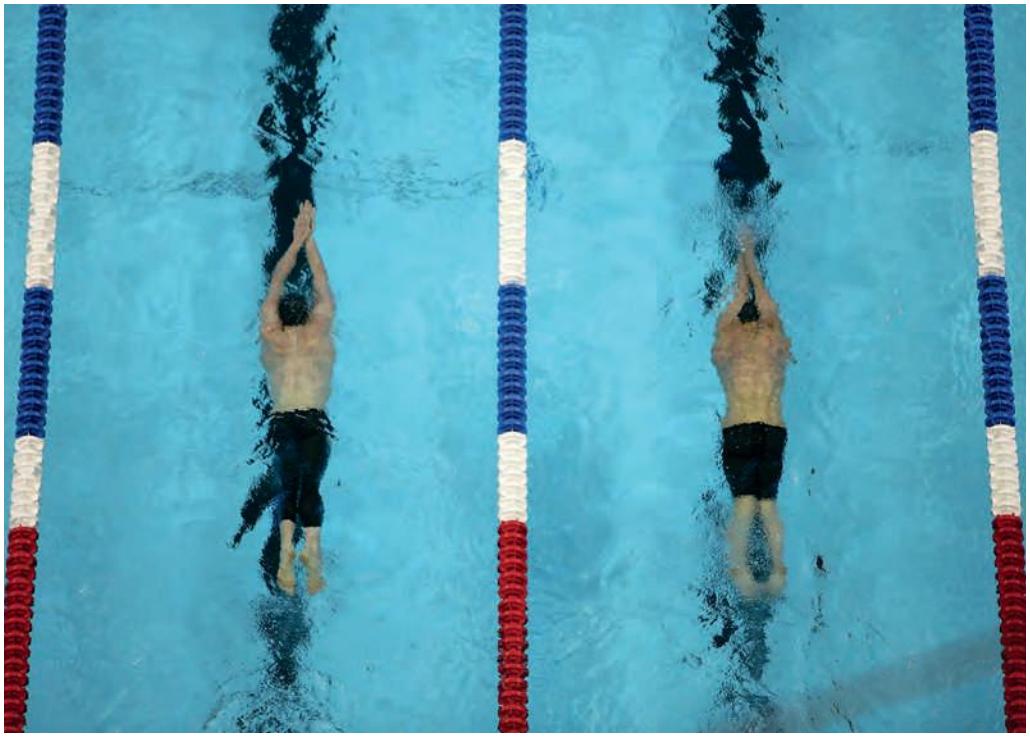
MOTION

In this section we briefly discuss linear motion, velocity, speed, acceleration and momentum and look at them in movement and performance contexts.

Linear and projectile motion

Linear motion takes place in a straight line. A 'glide' off the wall in swimming, where there is no change in travel direction, is an example of linear motion.

Projectile motion is the path of any object moving through the air under its own influence, without any kind of propulsion system. Some examples of this motion include a figure skater or aerial skier jumping, and a thrown object such as a javelin or ball.



Getty Images/Stringer/Donald Miralle

Figure 6.1 A swimmer gliding in a straight line, body extended, is an example of linear motion

Speed and velocity

Speed and velocity describe the rate at which an object moves from one location to another. Speed and velocity are not the same. To determine the average speed of a body, the distance is divided by the time taken. The average velocity is calculated by dividing the displacement (distance travelled) by the time taken:

speed and velocity = distance travelled ÷ time taken

For example, a swimmer in a 100-metre race in a 50-metre length pool completes the race in 80 seconds: the distance is 100 metres and displacement is zero, because the swimmer is back where they started.

Therefore:

speed is calculated as: 100 m ÷ 80 sec = 1.25 m/s

and their velocity is 0 m ÷ 80 sec = 0 m/s

Acceleration and inertia

Acceleration is the rate at which velocity changes over time:

Average acceleration = (final velocity – initial velocity) ÷ elapsed time

From Newton's second law:

Force = mass × acceleration

Acceleration = force ÷ mass

If the mass of a sprinter is 70 kilograms and the force exerted on the starting blocks is 700 N, then acceleration = 700 ÷ 70 = 10 m/sec^2.

Acceleration due to gravity: while a body is in the air it is subject to a downward acceleration, as a result of gravity, of approximately 9.81 m/s^2.

Inertia is the resistance to acceleration or the unwillingness of a body to change whatever it is doing.

Momentum

Momentum is the product of mass and velocity:

momentum = mass (kg) × velocity (m/s)

A person can increase their momentum by increasing either of these elements – for example, using a heavier bat or racquet, or increasing running or hand speed.

In golf, momentum is transferred from the golf club to the golf ball. Momentum is the product of the mass and its acceleration, so the heavier the golf club and the faster it is swung, the greater the velocity the golf ball will be when it is hit. Of course, there is no guarantee of the ball travelling straight. So another consideration for the golfer is speed versus accuracy.

Getty Images/Gregory Shamus

Figure 6.2 Australian golfer Minjee Lee driving the ball

Angular momentum is determined by the angular velocity × moment of inertia. The angular momentum of a system remains constant throughout a movement provided nothing outside the system acts with a turning moment on it.

For example, a figure skater starts a spin by pulling in their arms to reduce their moment of inertia. According to the 'conservation of momentum' principle, the angular speed must then

increase. To come out of the spin, the skater simply extends their arms to increase angular momentum and decrease angular velocity.

In a closed system, such as when two objects collide, the total momentum remains the same, though some may transfer from one object to the other. Momentum is always conserved in a closed system, but most sporting situations are not closed systems. For example, when a tennis racquet hits the ball, the ball will be squashed to a certain degree. After a few milliseconds, the ball rebounds back. This contraction and rebound action causes the release of heat energy and some momentum is lost, or transferred elsewhere.

Performance in running technique

Improvements in running form may not reduce energy expenditure, but they will make better use of the runner's energy. The expected benefit is an improvement in performance time by expanding on the abilities that the runner already possesses. The technique for running focuses on two areas: the arm and leg movements.

Arm movement is the forward movement of one arm and the backward movement of the other, which creates a force that rotates the upper body around a vertical axis in a given direction. The legs move to create a force on the lower body around a vertical axis, in the opposite direction of the upper body, thus creating angular momentum.

Runners with poor running form may swing their arms in to create more upper-body angular momentum than the lower body produces. This results in the body rotating and turning in between each stride. The runner must then spend unnecessary energy working to keep facing forward.

One of the runner's objectives is to move the arms so there is enough angular momentum in the upper body to cancel out the angular momentum of the lower body, thus ensuring that the total body angular momentum is zero.

Compare stride lengths

1 Compare stride lengths by lining up and taking ten normal steps.
2 Discuss the differences in distance covered and consider what impact these differences may have on an event such as a marathon.
3 Explore what a person with shorter strides could do to ensure they are running at the same speed.

Golf clubs

Use a range of golf clubs (such as a driver, 4 iron, 7 iron or wedge) to determine how momentum can apply to hitting a golf ball. Fast and slow swings should be applied to each club. Compare how the different club sizes affect the actions and final result.

Running

Analyse a classmate's running technique to determine their level of efficiency and effectiveness in terms of angular velocity and momentum.

BALANCE AND STABILITY

In this section your teacher will help you apply the principles of balance and stability to enhance performance through practical workshops.

There are two types of balance. In static balance a person stays over a fairly fixed base. In dynamic balance the person is moving around.

Stability describes the degree to which a body resists being upset or moved.

The major factors that affect a person's stability are the:

- area of the base of support
- relation of the line of gravity to the edge of the base
- height of the centre of gravity
- mass of the person.

Centre of gravity

The centre of gravity is the point where all the body weight is concentrated or the point about which it is evenly distributed. The body's centre of gravity shifts with each body movement.

External loads may alter the position of the centre of gravity. The greater the external load, the further the combined centre of gravity will be from the person's centre of gravity.

The person's weight may be distributed in such a way that the centre of gravity falls outside the body. An athlete who performs a pike position in diving would have their centre of gravity falling outside the body.

Shutterstock.com/Shahjehan

Figure 6.3 In this position, the diver's centre of gravity is outside their body.

Line of gravity

The line of gravity represents the direction of pull or force. Gravity acts perpendicular to the earth's surface, through the body's centre of gravity, which moves according to how the person is standing/sitting.

For an object to be balanced, the line of gravity must pass within the base of support. For example:

- A rugby player who knows they will be pushed from the front should shift their line of gravity forward (lean forward) to reduce the chance of losing their balance.
- A person in a tug-of-war will lean backwards (move the line of gravity back) to absorb a strong forward pull from their opponent.
- A tennis player will keep their line of gravity centred, so that their centre of gravity can be shifted quickly in any direction without losing their balance.

Base of support

The larger the base of support, the greater stability an individual has. A person is more stable when standing on two feet than when standing on one. Stability can be improved by:

- widening the base of support
- lowering the centre of mass
- increasing the mass of the body.

The greater the friction between the playing surface and the body, the more stable the body will be.

For example, softball players wear cleats (studs) to aid running and to provide stability for actions that require quick and forceful movements.

However, there is a trade off between stability and movement time. The more stable a person is, the less agile they will be. For example, in a sport such as basketball, which requires speed, the player may need to give up some level of stability, otherwise they may be too slow to respond to the opposition's movements.

Getty Images/Stringer/Michael Dodge

Figure 6.4 Basketball players require speed, agility and balance.

Practical activity

The baseball catching position requires a combination of balance and stability. The catcher needs to be quick on their feet, have extremely fast hands, good arm strength and good balance and stability. The catcher spends most of their time on the field in the crouch position. Their weight is on their heels and their knees are bent. In this position, their bottom is near the back of their heels. The catcher's head is held high and their gloved hand is held out. This crouch position (and the ability to catch pitches) relies heavily on the catcher's balance and stability.

In pairs, wear the appropriate safety equipment to practise the technique of softball/baseball catcher and determine the level of balance and stability required to catch effectively.

FLUID MECHANICS

In this section, your teacher will show you how to apply the principles of fluid mechanics to enhance your performance in practical workshops.

A fluid is a substance (liquid or gas) that moves and changes continuously as a result of an applied pressure. Fluid mechanics involve the study of fluid statics, fluids in motion and the effects of fluids on boundaries.

Flotation, centre of buoyancy

How is it that a person with their body stretched out flat in a pool is able to float, yet if they wrap their arms around their legs and curl up into a ball they will sink?

This has to do with how much water is pushing against the body – a principle known as buoyancy or flotation. When the body is stretched out flat it has a greater surface area, meaning more water can push against it than if it is curled up in a ball.

The person's body must make room for its own volume by pushing aside, or **displacing**, an equal volume of liquid. The body is applying a downward force on the water and so the water is applying an upward force on the body.

This principle is called buoyancy. Buoyancy is the loss in weight that an object seems to undergo when placed in a liquid, as compared to its weight in air. Archimedes' principle states that an object fully or partially immersed in a liquid is buoyed upward by a force equal to the weight of the liquid displaced by that object. From this principle, Archimedes concluded that a floating object displaces an amount of liquid equal to its own weight.

Any change in the density of the surrounding liquid affects the level at which an object floats. Fresh water is less dense than salt water, so a boat will float lower in fresh water than it does in salt water. Warm water is less dense than cold water, so a boat will float lower in warmer water than in cold water.

The centre of buoyancy is the centre of the gravity of the volume of liquid that the person or object displaces.

When upright, the centre of gravity and centre of buoyancy are on the same vertical line, and are considered stable.

When the object tilts, its centre of gravity remains in the same position, but the centre of buoyancy moves to fit a new centre of gravity of the volume of water replaced. If the object is tilted too much, the centre of buoyancy moves to a position where the object may roll over.

Each person varies in the amount of air in their lungs and the percentage of bone, muscle and fat. Both bone and muscle are heavier than fat, so a lean, muscular body or one with a heavy bone structure would not float very well.

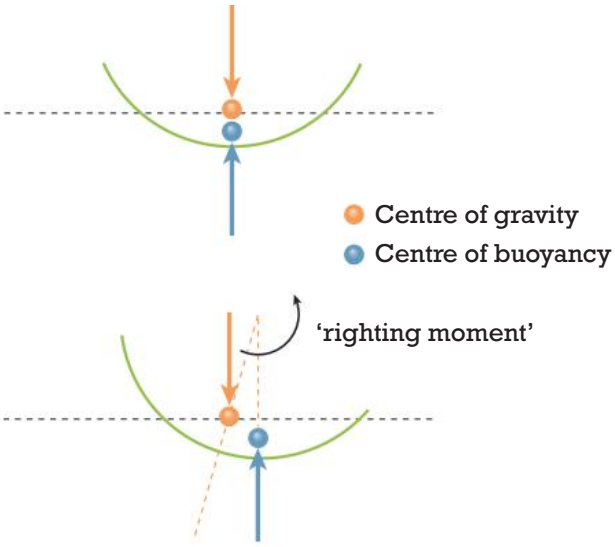


Figure 6.5 Centre of buoyancy

Fluid resistance

Fluid resistance is the force applied by a gas or liquid that is resisting the motion of a body through it.

Applying fluid resistance to freestyle swimming

Natural forces affect the movement of swimmers in water. Coaches need to understand these forces in order to analyse swimming skills.

A range of forces act on a swimmer:

- Vertically, the swimmer's weight is counteracted by their buoyancy. When they press down on the water with their arm stroke or kick, an equal and opposite reaction occurs that lifts the swimmer higher in the water.
- Horizontally, the swimmer is affected by the thrust and drag forces.

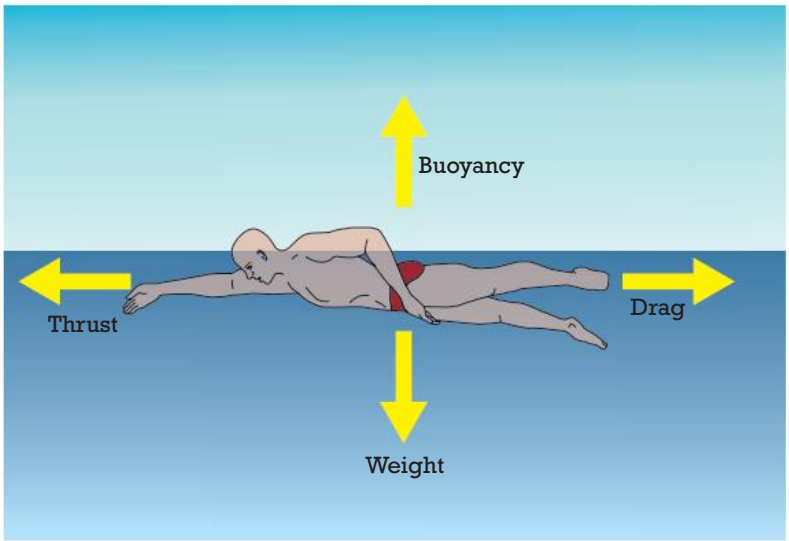


Figure 6.6 Forces that impact on a swimmer in the water

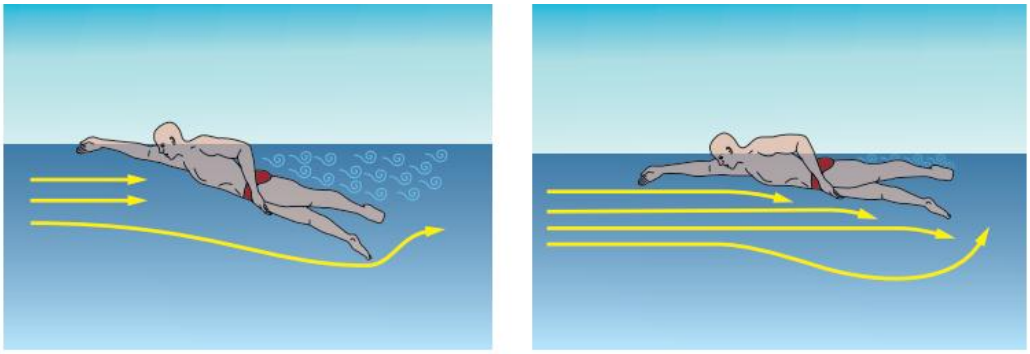


Figure 6.7 (left) A swimmer producing a lot of drag, and (right) a streamlined swimmer

Drag

Drag can be divided into pressure drag and skin friction drag. Pressure drag comes from the front of the body being exposed to the water and the separation that occurs behind the swimmer. A swimmer must streamline their body to reduce the amount of separation, as shown in Figure 6.7.

Skin or frictional drag is when, in freestyle swimming, resistance occurs due to 'new' water rubbing against the swimmer's body. One way this resistance could be reduced would be if the swimmer's body could carry on its surface a very thin layer of surface water. This naturally occurs with underwater animals such as dolphins and sharks.

To improve resistance, freestyle swimmers can try to make their bodies as smooth as possible. They wear close-fitting swimwear or shave their body and head.

In freestyle swimming, the amount of surface friction is determined by the:

- speed of water relative to the swimmer's speed
- surface area of the body
- smoothness of the body
- qualities of the water.

Lift

When swimming freestyle, the arm stroke produces most of the drive required to lift the body. The best swimmers achieve drive not only by pushing back on the water, but also by moving their hands and arms like an aeroplane's propeller blade.

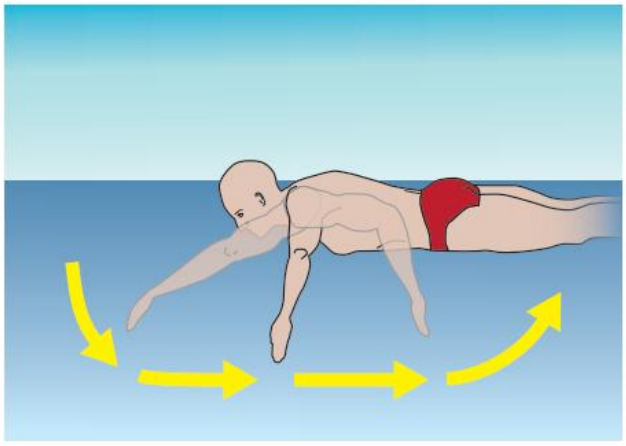


Figure 6.8 Moving through water for lift

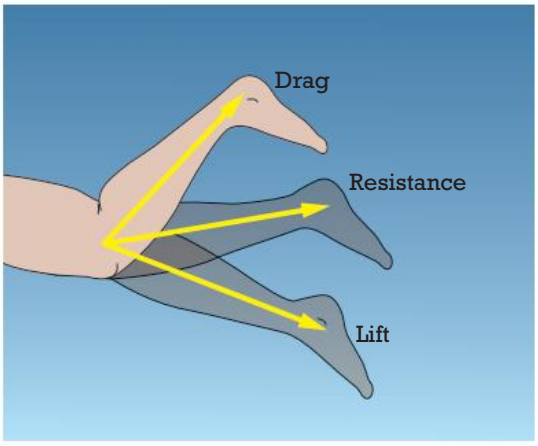


Figure 6.9 Kicking for stabilisation

Optimum efficiency in the water is achieved by pushing a large amount of water a short distance rather than by pushing a small amount of water a large distance.

The most efficient arm stroke is to move the arm along a curvilinear path. This means the swimmer is always pushing back on still water, which has more resistance than moving water.

For this lift force to be produced, the hand must continue to move perpendicular to the direction of forward movement.

Lift force is also generated while treading water. A person sculls their hands back and forth while treading water; this produces lift, which keeps the swimmer's head above water.

Stabilising

The kick stabilises a swimmer, as well as propelling them. Most swimmers only get a small amount of propulsive force from their kick. The first way to improve the kick is to keep the feet in the water. The best swimmers go further by moving their feet during the kick to produce the same lift force achieved by their hands. An effective kick helps keep the body streamlined and reduces drag.

The Magnus Effect

The Magnus Effect describes the action of a spinning ball through the air. As a ball spins, it creates an outer layer of air that sticks to the ball and rotates with it.

On the side of the ball where this outer layer of air collides with the air flowing past the ball, it decelerates the ball and produces a high-pressure zone.

On the opposite side, the spinning ball moves in the same direction as the air flowing past it, which accelerates the ball and creates a low-pressure area. As a result, the ball curves in the direction of the low pressure.

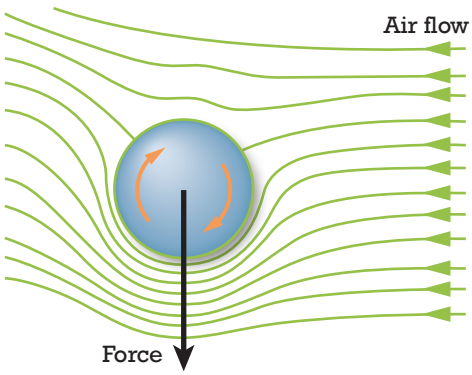


Figure 6.10 The Magnus Effect

Applying the Magnus Effect to tennis

To generate lift, a player creates spin on the tennis ball. When the ball rotates, the fluid (air) that is in contact with the surface rotates with the ball.

When the ball is in top-spin mode, the top of the ball spins forward (top to bottom) into the oncoming air. There is greater movement of the air towards the bottom surface. More fluid needs to pass through the same space on the underside of the ball, which means that the flow of air is compressed on the lower side of the ball.

On the top side of the ball a lower velocity creates a higher pressure, and at the bottom the higher velocity creates a lower pressure (known as 'Bernoulli's principle'). This in turn leads to an imbalance in the forces on the ball. Therefore, when playing a top-spin shot, the higher pressure on the top curves the ball downward from its straight line path.

What's new?

Choose two different sports and for each, research how clothing and equipment have changed, and sporting techniques modified over the last ten years to improve movement and performance.

FORCE

How the body applies force

Force can be defined as a pushing or pulling action that causes a change of state of a body. In biomechanics, any force exerted by one part of the body on another is known as an internal force, whereas all other forces are external.

Force = mass × acceleration

A person wishing to increase their degree of force will need to increase the weight of the person or object applying the force, increase the speed of the person or object, or a combination of both.

Achieving the balance is very important, as increasing one factor may reduce the other. For example, a person increasing their mass may then decrease their ability for speed.

Newton's laws of motion

Sir Isaac Newton created three biomechanical theories that are used to describe the relationship between force and motion.

First law

The first law states that every body continues in its state of rest (inertia) or motion in a straight line unless compelled to change that state by external forces exerted upon it. This applies to any sport – for example, where a ball is at rest and does not move until an external force such as a bat or club is applied to.

Second law

The second law states that the rate of change of momentum of a body is proportional to the force causing it, and the change takes place in the direction in which the force acts. An example would be in rugby when a player is running with momentum, until a defender tackles him, which changes the direction and motion of the attacker.

Third law

To every action there is an equal and opposite reaction. An example of how this applies in sport is bouncing a basketball. The force applied onto the ball when it hits the court surface is equal to the force the court applies back onto the ball.

Applying force during take-off in long jump

The long jumper prepares for take-off by initially sinking their hips and then raising their hips into the take-off phase. This usually results in the second-last stride being longer than normal and the final stride being up to 20 centimetres shorter than their usual running stride. At take-off, the athlete would look to ensure that their hips are slightly forward of their shoulders.

When the take-off foot is placed on the board, it is slightly ahead of the jumper's hips and should strike the board on the midline.

The final two-foot supports in the take-off should be flat contacts. Vertical height is achieved by the upward explosive acceleration of the arms and the non take-off leg.

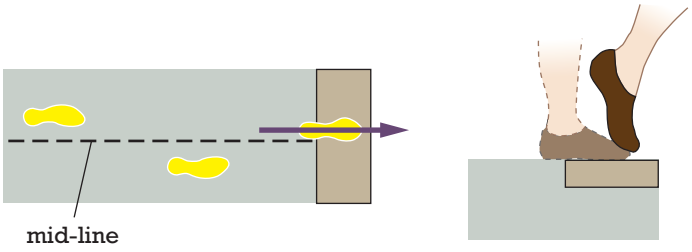


Figure 6.11 A long-jumper taking off from a board

How the body absorbs force

Following are a few important points to remember when learning how to land on your feet in sport:

- The initial contact with the floor should be on the balls of the feet, followed by bending of the ankles, knees and hips.
- The feet should be about shoulder width apart when making contact with the floor.
- The heels should not spring back up but should remain on the floor, and the arms should be held horizontally out in front of the body for balance.

Absorbing force in gymnastics

Landing forces in gymnastics are created when completing a jump or some form of aerial skill. Gymnastics landings are usually performed from either a height above the floor, as in the dismount from equipment such as the beam or bars, or as the closing part of a floor routine. The ability of the athlete to efficiently control the landing forces will translate directly into both improved scoring and physical safety.

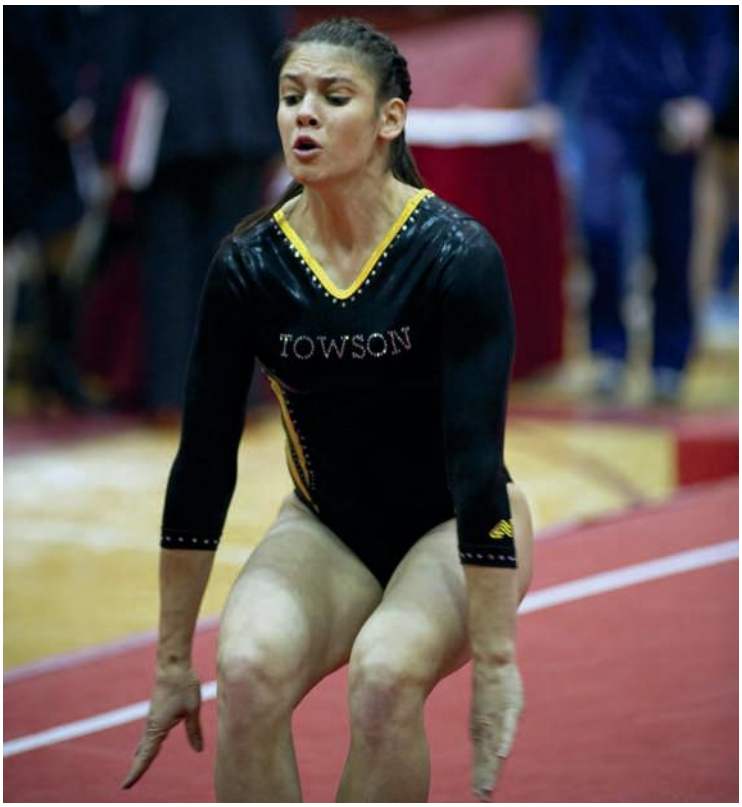


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Figure 6.12 When landing, a gymnast has to control the forces acting on their body.

Controlling the landing depends on the athlete being able to restrict their body's momentum at landing and their ability to spread the forces impacting on their body. Many landings in gymnastics also include some form of angular movement, such as a twist. Using the abovementioned method of landing will allow the gymnast to achieve immediate spread of the force at landing, starting from the feet, through the flexed legs, into the hips and through the upper body.

Absorbing force when catching a ball

The following points will help when learning how to catch a ball:

- Knees should be flexed (bent) with both feet roughly shoulder width apart.
- Weight should be evenly distributed.
- Hands should be together with fingers pointing down.
- Keep the head steady with eyes level. Watch the ball into the hands.
- When the ball is caught, the hands should 'give' or be brought into the body for cushioning.

'Catching with soft hands' means that when a person catches the ball they should allow their hands to draw back towards their body to ensure a smooth and secure catch. This is a safer way to catch a hard ball, and much less painful than catching the ball with no give.

Applying force to an object

Applying force using a tennis serve

Force generation is initiated with the extension of the legs and the downward acceleration of the tossing arm. Using Newton's third law, to get into the air a player must apply an explosive thrust with the legs against the ground to exert a force that exceeds their own body weight. The ground pushes back up against the athlete and the athlete becomes airborne. Dropping the tossing arm serves to initiate a force and increases the angular momentum of the racquet arm.

The power that a tennis player can achieve in their serve is largely a result of their flexibility and the range of motion in their hips, torso, shoulder and back. This movement combination forms a 'whip' action, which increases the speed of the racquet head and applies a large force to the ball.

The ball is contacted though the centre of the racquet and the tennis player may create top spin by flexing their wrist over the ball; this produces a low pressure below the ball, resulting in a ball of high velocity that still 'drops' down and into the service box.

A tennis player may also choose to cut the ball to the side. This action creates spin on the ball, creating the Magnus Effect, which causes the ball to arc well outside the service box after it bounces.

Long jump

Practise long jumping, with one person observing (or videoing) and making recommendations as to how to improve technique and apply optimum force.

Soft hands, hard hands

Using 'hard' and 'soft' hands techniques, practise catching a hard ball such as a cricket ball, and then with a softer ball such as a SofCrosse ball. Compare results and discuss how this information may be transferred to effectively absorbing force in other sports.

Tennis

Practise tennis serving and top-spin forehands. Once the serve has been sufficiently mastered, attempt to create top- and side-spin serves.

A partner may be used to assist in technique correction and analysis.

Partners then practise ground strokes, focusing on creating top-spin forehand shots.

As a class, discuss the difficulties that arose, how a tennis player may overcome these issues and what the opposing player would be looking for in a game to assist them in reading a serve or top-spin shot.

CHAPTER SUMMARY

- Linear motion is the motion that takes place in a straight line.
- Speed and velocity describe the rate at which a body moves from one location to another.
- Acceleration is the rate at which velocity changes with respect to time.
- Momentum = mass (kg) × velocity (m/s).
- Angular momentum is determined by the angular velocity × moment of inertia.
- There are two types of balance: static balance and dynamic balance.
- Stability is the degree to which a body resists being upset or moved.
- Centre of gravity, line of gravity and the base of support all contribute to stability.
- Fluid mechanics involves the study of fluid statics, fluids in motion and the effects of fluids on boundaries.
- Buoyancy is the loss in weight an object seems to undergo when placed in a liquid, as compared to its weight in air.
- Fluid resistance is defined as the force applied by a gas or liquid resisting the motion of a body through it. It involves drag, lift and the application of the Magnus Effect.
- Force involves a pushing or pulling action that causes a change of state of a body.
- Force includes the body applying and absorbing force, and applying force to an object.

CHAPTER REVIEW ACTIVITIES

WS

Extra exam-style questions

Assessment tasks

1. Outline the key points associated with the biomechanical principles influencing movement.
2. **Describe** the difference between speed and velocity.
3. **Explain** the application of acceleration and momentum in relation to swinging a baseball bat.
4. **Examine** the use of angular momentum in relation to figure skating.
5. Identify the major factors affecting stability.
6. Describe how the centre and line of gravity can impact on performance.
7. What are fluid mechanics? Explain how flotation and buoyancy are linked.
8. **Analyse** the impact drag and lift have on performance.
9. Apply the Magnus Effect to the sport of table tennis.
10. Investigate how the body applies and absorbs force.

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OPTION 1: FIRST AID

CRITICAL QUESTIONS

What are the main priorities for assessment and management of first aid patients? 162

How should the major types of injuries and medical conditions be managed in first aid situations? 177

What does the individual need to consider in administering first aid? 195

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

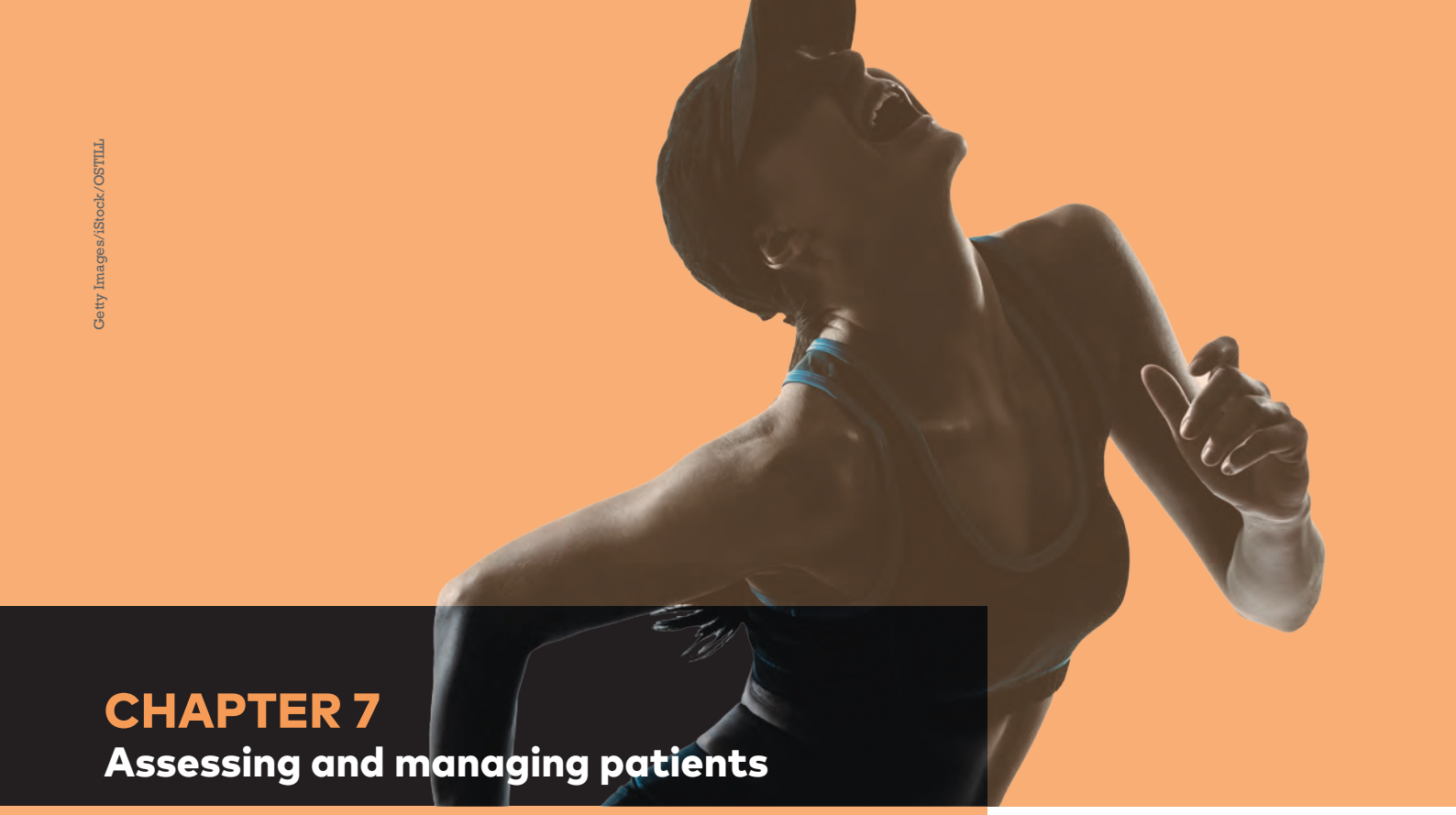
OUTCOMES

When you have finished this option you should be able to:

- understand how to maintain health
- use relevant information about health-promoting actions
- understand injuries and conditions that require first aid, and demonstrate practical application to management
- understand the causes and symptoms of injuries and medical conditions.

KEY TERMS

anaphylaxis
blood-borne
conduction
CPR
defibrillation
DRSABCD
hyperglycaemia
hyperthermia
hypoglycaemia
hypothermia
immobilise
laceration
resuscitation
stroke



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CHAPTER 7
Assessing and managing patients

IN THIS CHAPTER

Setting priorities for managing a first-aid situation and assessing the casualty 162

Crisis management 170

SETTING PRIORITIES FOR MANAGING A FIRST-AID SITUATION AND ASSESSING THE CASUALTY

First aid is emergency care given to someone who has become sick or is injured, until full medical treatment is accessible. Everyone can administer first aid to their level of training. In an emergency situation, accident or sporting injury, the use of basic first-aid skills before medical treatment is available can be life-saving, and can reduce the severity of the injury. It is essential for a first aider to assess the situation and determine the priority and order of treatment to ensure a safe environment, preserve life and prevent further injury and illness to themselves, bystanders and the casualty.

Situational analysis

To make the emergency scene safe for the first aider, bystanders and the injured person, the situation must be assessed and any immediate danger removed, and further dangers prevented from occurring. This should always be performed in a calm and controlled manner to ensure that the emergency is handled quickly, effectively and efficiently. The first aider is of no use if they panic, as this will only increase the injured person's anxiety and contribute to an unstable situation.

Making an analysis of the situation should involve:

- assess the situation quickly
- identify the cause of the injury and any obvious surrounding dangers
- assess the location of the injured person and whether this will place the first aider in serious danger
- identify the nature of the injury or illness as far as possible
- identify the resources available to deal with the emergency, notifying emergency services
- identify immediate first-aid equipment available for use
- take precautions to prevent transmitting blood or bodily fluids from the injured person to the first aider.

The first aider should be aware that the injured person may feel uncertain about a stranger approaching them, and this could add an unknown concern to the situation. The injured person may at first behave a little aggressively and be uncooperative – this may be the result of alcohol or other drug use – so it is important for the first aider to attempt to establish a rapport with the patient by introducing themselves and asking the patient their name. Reassuring the injured person that someone is there to help them will instil a sense of trust and reassurance.

Priority assessment procedures

It is essential to ensure that the casualty most in need is treated first in an emergency situation. A first aider's first priority is to assess the environment to ensure the safety of themselves, bystanders and the casualties in that order. This can include observing the surroundings for possible dangers, identifying the incident that has occurred and how many people are involved, and checking if there are bystanders who can assist. A first aider is of no assistance if they put themselves into a harmful or dangerous environment. It is also important to control bystanders around the emergency to ensure they are not in harm's way.

When the initial observation is complete, the first aider needs to assess each casualty to ensure that the casualty with the most life-threatening injury is attended to first. The casualties should be prioritised according to level of consciousness and whether they are breathing. Any casualty who is not breathing or is unconscious should be the first priority. If all casualties are breathing and conscious, bleeding, burns and **fractures** become the next level of management as these injuries can lead to shock, which can in some cases cause a casualty to lose consciousness.

DRSABCD

DRSABCD is a simple emergency action plan for first aiders to follow. It allows individuals to successfully assess an emergency situation and manage it correctly.

The acronym stands for:

D DANGER
R RESPONSE
S SEND
A AIRWAY
B BREATHING
C CPR
D DEFIBRILLATION

Danger

In an emergency situation, the first aider must first ensure the safety of themselves, the bystanders and the casualty.

Investigate

You can find up-to-date information and simple flow charts on the Australian Resuscitation Council website. Go direct, or follow the link.

There is always a degree of risk or danger involved in any emergency situation. The first aider must identify any possible risks or dangers and remove these hazards to ensure safety to all before proceeding with first aid. This is done by taking the time to conduct a primary survey of the scene, checking for anything that may threaten the safety of those on or around the scene. In a traffic accident, passing traffic, aggressive bystanders, bodily fluids or flammable materials can all present a danger. It is essential to eliminate dangers from the environment, as the casualty should not be moved unless they are in immediate or life-threatening danger. If this cannot be done, the first aider should ensure that they do not endanger themselves or others by assisting the casualty.

Response

The first aider needs to assess the responsiveness or consciousness of the casualty through talk and touch. To check for a response from the injured person, the first aider should speak to them using a loud voice and ask them to squeeze their hand. If there is no response, the first-aid provider should squeeze the casualty's shoulders and loudly ask responsive questions, such as 'Are you all right? Can you hear me?' It is important not to shake a casualty, especially if there is a suspected neck injury.

If the injured person does not respond they should be considered unconscious. If there is a response and the person appears to be conscious, leave them in the area in which they were found (provided they are not at further risk), reassure them, check for any further injuries and place them in the recovery position. Ensure that the casualty is reassessed regularly and further medical assistance is sought. If the injured person is not responding, the first aider needs to continue with DRSABCD.

Figure 7.1 Checking for a response

Send for help

Sending for help can mean calling out to a bystander for assistance while you contact emergency services, asking them to contact emergency services and return immediately or, if you are alone and have access to a phone, you calling emergency services. To call an ambulance in Australia

dial 000, or 112 from a mobile phone. When calling emergency services ensure you remain calm. You will be asked to provide the following details:

- location of the situation
- the nature of the emergency
- how many people need assistance
- the types of injuries and the degree of the injuries
- estimated age of the casualty
- what first aid you have provided
- any other requested information.

Airway

Before administering CPR it is essential to ensure that the casualty's airway is open. The airway is the passage from the nose and mouth to the lungs. If the airways are blocked, breathing will stop. Most unconscious casualties should be placed on their back, but victims of drowning should initially be placed on their side in the recovery position, to help drain liquid from the mouth.

Putting a casualty in the recovery position

- Prepare the casualty by checking and removing anything from their pockets.
- Kneel beside the casualty and ensure both their legs are straight.
- Place the casualty's arm that is furthest from you out at a right angle to their body.
- Bring the arm nearest to you across the casualty's chest, with their fingers close to their shoulder.
- Bend the leg nearest you up at a right angle to the body.
- Holding the shoulder and the hip nearest to you, gently roll the casualty onto their side, supporting the movement at all times.
- Rest the casualty's top leg on the ground and the bent arm across the elbow of the straight arm.

Figure 7.2 Putting a casualty into the recovery position

Once the casualty is lying on their back, the assessment can begin. The first aider should tilt the casualty's head with a chin lift, using the following steps:

- Place hand on the forehead.
- Place fingertips tips under the point of the casualty's chin.
- Gently tilt the head back and lift the chin to open the airway.

If there is an obstruction, gently roll the casualty onto their side to clear it. Use fingers to gently and carefully remove any obstructions. Do not remove false teeth if they have not become dislodged. Do not use excessive force, in case there is an injury to the neck. If there is no obstruction, roll the casualty onto their back and continue DRSABCD.

Breathing

Breathing failure can be caused by medical conditions, including cardiac arrest or asthma, airway obstructions or trauma. Complete airway obstruction is silent, while a partial obstruction is noisy as the air tries to force itself through a narrowed airway. It is essential to keep the casualty's airway open and check to see if they are breathing. Signs of life include responsiveness and normal, regular breathing, not gasping. The first aider needs to assess the casualty's breathing by looking to see if their chest is rising and falling, listening at the mouth for sounds of normal breathing, and feeling for expired air against their cheek for no longer than 10 seconds.

If the casualty is breathing, roll them into the recovery position, check their condition and send for help if required. Continue to observe the casualty, and reassess them for regular breathing.

If the casualty is not breathing or if there is any doubt that the casualty is breathing normally, treat the person as if they are not breathing. If an automated external defibrillator (AED) is available, immediately begin chest compressions rather than the initial rescue breaths.

Figure 7.3 Checking for fall in the chest between rescue breaths

Compressions

If a casualty is unresponsive and is not breathing normally, it is likely that their heart has stopped beating effectively. If the injured person shows no signs of life – that is, they are unconscious, unresponsive, not moving and not breathing normally, begin **cardiopulmonary resuscitation (CPR)** of 30 chest compressions followed by two breaths. When the heart stops beating, the circulation of oxygenated blood stops. The aim of CPR is to provide artificial circulation until medical assistance arrives. This is vital. If the brain is without oxygen for 4-6 minutes, brain cells will begin to die.

When performing compressions:

- Kneel by the side of the casualty.
- Place both hands (if the casualty is an adult), one or two hands (if the casualty is a child), or two fingers (if the casualty is an infant), in the middle of the casualty's chest.
- Press down on the sternum 100 times per minute – roughly two compressions per second. The depth of compression should be one-third of the chest depth, and the chest should be allowed to recoil completely between each compression.
- Give two rescue breaths (see below).
- Quickly return your hands to the centre of the chest and continue with compressions.
- If there is more than one rescuer present, change roles every two minutes to prevent fatigue.
- Only stop to re-check the casualty if they start breathing normally, otherwise do not interrupt resuscitation.

When performing rescue breaths:

- Open the airway with head tilt and chin lift.
- Pinch the casualty's nose closed.
- Maintain chin lift, and use the pistol grip to open the casualty's mouth (see Figure 7.3).
- Form a seal around the casualty's mouth with your lips and exhale for approximately 1 second.
- Watch for the chest rise peripherally.
- While maintaining head tilt, take your mouth away and turn to watch the chest fall.
- Repeat for second breath.

Note: if for any reason rescue breaths cannot be given, continuously perform chest compressions at the rate of 100 per minute.

If the casualty begins vomiting or regurgitation, quickly turn them onto their side to ensure the stomach content does not enter the airways. If normal breathing resumes, place the casualty into the recovery position and monitor until medical assistance arrives. If the casualty does not respond to CPR, then an automated external defibrillator (AED) device needs to be applied, if one is available.

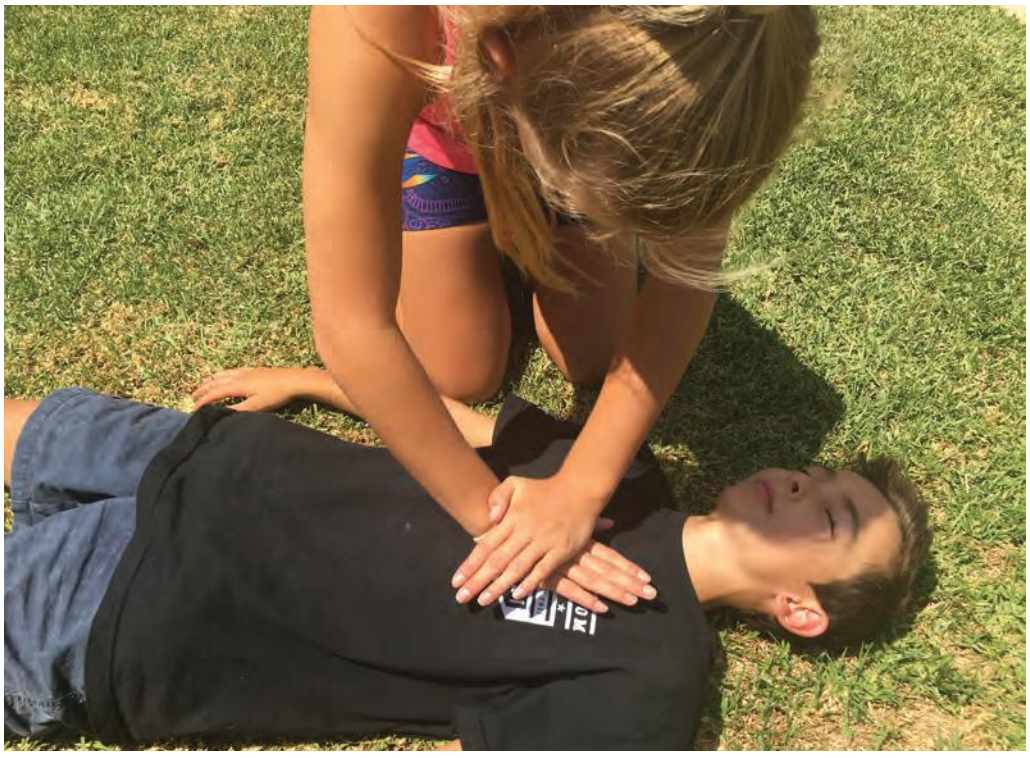

Figure 7.4 Compressions

Defibrillation

Defibrillation is the emergency procedure in which an electronic device called an automated external defibrillator (AED) is applied to the chest of a person in cardiac arrest. The AED delivers a controlled electric shock to the casualty's heart. The device can be used by anyone, as long as they carefully follow the step-by-step instructions. Many of these devices provide a voice instruction as the device is being operated, but the basic instructions are:

- Ensure safety to the injured person and those around.
- Turn on the AED.
- Attach the electrode pads to the assigned areas of the casualty's body.
- If there is more than one rescuer present, continue CPR while the pads are being attached.
- Follow the voice/visual prompts of the AED.
- Ensure that no one touches the casualty while the AED is analysing the heart rhythm.
- Fully automatic AEDs will deliver the shock automatically. If the casualty starts breathing, place them in the recovery position.
- Continue compression if the casualty does not start breathing.

STOP

STOP is a sequence used for injury management for a conscious person with a less severe and non-life threatening injury. In most cases, these are sporting injuries.

The acronym stands for:

S Stop
T Talk
O Observe
P Prevent further injury

Stop

Stop the injured person from participating or moving and, if necessary (in a sporting situation), stop the game. The casualty should either stand still, be seated or lie in a comfortable position to prevent any further injury.

Talk

To understand the nature of the injury, it is important to talk to the casualty. Ask the injured person what happened, how it happened, and what they felt when it happened. For example: 'Did you hear a snap or crack when you fell? Where does it hurt? Does it hurt anywhere else? Have you had a previous injury to this area?'

Observe

While talking to the injured person, observe if they appear to be distressed or are lying in an unusual position. Check the injured area for signs of deformity, swelling, redness or **dislocation**. Compare the injured site with the opposite side and ask the casualty if they can move the injured area. Assess whether their range of movement is restricted compared to normal movement/the corresponding limb on the other side of their body, including the casualty's ability to bear weight, stand or run on the injured limb.

Prevent further injury

Prevent any further injury by completing a more detailed assessment, treating the injury as required, or directing the casualty to seek medical assistance.

EVERYONE CAN BE A LIFESAVER!

A GUIDE TO CPR

Royal Life Saving

ROYAL LIFE SAVING SOCIETY OF AUSTRALIA NSW BRANCH royalnsw.com.au

D

CHECK FOR **DANGER**

To yourself, bystanders and the casualty.

R

CHECK FOR **RESPONSE**

Squeeze their shoulders and hands, ask the casualty questions.

S

SEND FOR HELP

Call Triple Zero (**000**).

A

OPEN THE **AIRWAY**

First, check the airway is clear of obstructions. Clear if required.
Then open the airway by tilting head. No head tilt for infants.

B

BREATHING NORMALLY?

NO - START CPR (If Yes – Place casualty on their side).

C

START **CPR**

30 COMPRESSIONS AND 2 BREATHS

COMPRESSION POINT
2 hands on the centre of the chest.
Compress 1/3 of chest depth.

COMPRESSION RATE
Compress at a rate of
100-120 compressions per minute.

BREATHS
Tilt head, lift chin & give breaths.
Look for the rise & fall of the chest in between breaths.

CONTINUE CPR UNTIL RESPONSIVENESS OR NORMAL BREATHING RETURNS. IF NORMAL BREATHING RETURNS, PLACE THE CASUALTY ON THEIR SIDE AND MAINTAIN AN OPEN AIRWAY. CLOSELY MONITOR THE CASUALTY.

D

ATTACH **DEFIBRILLATOR**

AS SOON AS AVAILABLE, FOLLOW PROMPTS.

Rescuers providing assistance to infants, children & adult casualties should follow the same sequence of DRSABCD and make the following alterations:

AGE	HEAD TILT	TECHNIQUE	COMPRESSION DEPTH	RATE OF COMPRESSION
INFANTS 0–12 MONTHS	None	2 fingers	1/3 of chest depth	100-120 compressions per minute
CHILD & ADULT	Slight to Full	2 hands		

The information contained in this poster is recommended for an emergency response, it is no substitute for formal instruction provided by Royal Life Saving Society NSW. ©2016

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Emergency at work

Imagine your worksite has collapsed and you are nearest to a person who has had a hard blow to the back of her head and is unconscious. Your worksite is unstable. What would you do? Demonstrate in order of priority, with a partner (the victim), the safety procedures you would use to keep her safe.

Three scenarios

In pairs, discuss and outline the appropriate assessment procedure and management plan for each of the following scenarios:

1 While bushwalking with a friend, you hear someone calling from a ditch where two bike riders have gone off the road. One rider is semi-conscious and is bleeding from the lower leg. The other rider is conscious, but has a lump on the side of their forearm and is complaining that it is very painful.
2 You are playing football in the park when your friend Tom lands on Jack's knee. Jack is clutching his knee and appears to be in a lot of pain.
3 Your seven-year-old brother has fallen out of a tree in the backyard and is lying on the ground. He appears to be unconscious.

CRISIS MANAGEMENT

It is important that the first aider knows how to promote a safe environment, preserve life, prevent any further injury or illness, promote recovery and provide comfort to the ill or injured. Remaining calm and confident in a crisis will help the first aider to assess and manage the situation.

Cardiopulmonary resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) is a combination of expired air resuscitation (EAR), where the first aider is breathing for the injured person by artificially ventilating the lungs, and external cardiac compressions (ECC) or chest compressions. CPR is used when there are no signs of life – that is, when the injured person is not breathing or moving, and giving no response. See pages 166–67 for further information about performing compressions.

CPR should continue until either the scene becomes unsafe, medical assistance or an individual who is more qualified arrives and takes over, signs of life return or you become physically unable to continue. Only an authorised person can pronounce life extinct and stop CPR.

CPR

Scaffold

Fill out the blanks in the following CPR table:

Age group	Head tilt	Pressure required	Depth of compression
Infant	No head tilt		one-third of chest
Child	Half head tilt	1 or 2 hands	
Adult			

Bleeding

It is essential that the body has enough blood circulating to supply organs with oxygen and keep the body functioning. Blood consists of red blood cells, white blood cells, plasma and platelets, and is pumped around the body by pressure provided by the heart. Bleeding is a common cause of death in accidents, as the volume and pressure of the blood decreases. The first aider must reduce blood loss in order to preserve life.

Bleeding can be either external, from the body's arteries, veins or capillaries, or internal, which may not be easily recognised. External bleeding comes from a wound that is caused when the body tissue is torn or cut.

Table 7.1 Sources of external bleeding

Source	Signs
Arteries	The blood will be oxygen-rich, bright red in colour and tends to spurt out from the wound. Arterial bleeding is the hardest to control.
Veins	The blood will tend to be dark red in colour and will flow more evenly from the body, due to less pressure.
Capillaries	Small blood vessels are ruptured. Blood will ooze from the wound, and tends to clot quickly. If vessels are ruptured under the skin's surface, blood escapes into the surrounding tissue and causes bruising.

Signs and symptoms of external bleeding and major bleeding in the casualty include:

- faint or dizzy
- restless
- sweaty
- nauseous
- thirsty
- progressively losing consciousness
- a weak and rapid pulse
- skin being cold and clammy
- visible swelling of the abdomen.

Managing severe bleeding

To manage severe or life-threatening bleeding in a casualty:

- Call 000, or 112 on a mobile phone.
- Put disposable gloves on if available, to reduce the risk of infection.
- Remove or cut clothing to expose the wound and check for foreign bodies.
- Apply direct pressure to the wound using a sterile dressing or pad, if available. If the casualty is able to, they can apply direct pressure to the wound themselves.
- Lay the casualty down and raise and support the injured area above heart level if possible.
- Apply a dressing and bandage to hold the dressing or pad in place, and check circulation every 30 minutes.
- If bleeding continues through the dressing, add another dressing. Do not remove the original dressing.
- Stay with the casualty, reassuring them, and watch for any signs of shock or unconsciousness.

Managing bleeding from a wound

- Put on disposable gloves, if available.
- Check the wound for foreign bodies.
- Apply direct pressure to the wound using a sterile dressing or pad, if available. If the casualty is able to, they can apply direct pressure to the wound themselves to stop any bleeding.
- Bring the sides of the wound together.
- Where there is only minor bleeding, wash the wound in water or a saline solution, then cover with a sterile or non-stick dressing before bandaging.

Shock

Shock occurs when the circulatory system is not functioning properly, in response to a trauma. It can be life threatening. The blood is not circulating through the body as usual, therefore oxygen is not being carried to tissues and vital organs such as the brain, heart and lungs. Shock can be caused by loss of blood, witnessing a distressing event, heart attack, poisoning, burns, loss of body fluids or heat exhaustion.

Signs and symptoms of shock

- rapid and weak pulse
- cold and clammy skin
- rapid and shallow breathing
- nausea or vomiting
- faintness and dizziness
- pale face, fingernails and lips
- collapse or unconsciousness.

Managing a casualty in shock

- call 000 for an ambulance, or 112 from a mobile device
- put disposable gloves on, if available
- calm the casualty and lay them down, then elevate the legs and bend at the knees (to protect them from the cold ground)
- control any bleeding
- dress any wounds or burns
- immobilise any fractures or dislocations
- keep the casualty warm, but make sure they do not overheat
- do not administer anything to eat or drink; moisten their lips if they are thirsty
- loosen any tight clothing around the neck, chest or waist
- monitor the casualty's breathing and pulse
- reassure the casualty and continue to observe and maintain clear airways
- if they are unconscious, place the casualty in the recovery position.

Neck and spinal injury

Neck and spinal injuries can result from sporting accidents, motor vehicle accidents, a direct blow to the spine, a penetrating injury such as a knife or gunshot wound, or diving into pools or waterways. Any suspected neck or spinal injury is classified as serious, as it could lead to paralysis if not managed correctly. If the spinal cord is damaged, the area below injured part will not be able to send or receive messages to and from the brain.

The first person at the accident site will play a major role in minimising any further injury to the spinal cord. If a person is unconscious as the result of a head injury, the first aider should always suspect a spinal injury.

Signs and symptoms of spinal injuries

- tingling or numbness in the hands or feet
- pain at, near or below the site of the injury
- unnatural posture
- inability to move limbs, or weakness when doing so
- tenderness over the site of the injury.

Management

The initial management of the injury and careful assessment of the history of the injury will benefit the first aider and the casualty.

- Call 000 for an ambulance, or 112 on a mobile phone.

- Follow the DRSABCD action plan, taking extreme care in the initial assessment.
- Always maintain the casualty's head in line with their shoulders, immobilising movement. Do not move the casualty unless they are in life-threatening danger.
- Reassure and calm the casualty, if they are conscious.
- Treat for shock.
- Note: only remove helmets if you need to perform CPR, and only apply a cervical collar if trained to do so.

Moving the casualty

An injured person should never be moved unless they are in immediate danger from a collapsing structure, fire, poisonous fumes or if they pose a traffic hazard. Unnecessary movement can cause further injury to the person. If the casualty has to be moved, this should be done by the quickest means available, informing the casualty of what is happening to make sure they feel secure.

If the first aider has to lift a casualty, it is important to bend at the knees, keeping the back straight and head up. Keep in a balanced position, holding the weight of the casualty close to the body, and move with small steps. If others are available to help, work as a team.

Table 7.2 Emergency lifts and moves

Movement	Description
Clothes drag	This is used when someone is suspected of having a head or spinal injury. The head is cradled by the first aider using the back of the person's collar and the first aider's hands.
Human crutch	This is used when a casualty has an injured foot or leg, but is able to walk with assistance after the injury is immobilised.
Four-handed seat	This can be used by TWO first aiders to carry the casualty. Hold each other's wrist firmly (left to right; right to left). Squat down and allow the casualty to sit on the joined hands. Lift and move together.
Two-handed seat	TWO first aiders each use one arm to hold each other's wrist and lift the casualty while each supporting the casualty's back with their free arm.
Stretcher	A stretcher is best for any injured person, if one is available and there is enough help to carry the casualty in a secure manner to reduce any further injury.

Medical referral

In most injury situations it is important to get medical assistance as quickly as possible. In an emergency situation, calling 000 or 112 is the first step in medical referral. It is important to remain with the casualty at all times, so if possible, send someone else for help and continue to follow the DRSABCD method. It is important that the emergency services are told the accident location, the nature of the injury to the casualty, the management of the injury thus far, and the name and contact number of the person calling.

If the accident is not an emergency situation, it is still important to seek medical advice for an injury in order to prevent any further injury and to enhance treatment and rehabilitation. For example, burns need medical attention to prevent infections, **lacerations** may require stitches, sports injuries may require X-rays to diagnose injuries and recommended treatment.

Getty Images/PETER PARKS

Figure 7.5 Spain's Carla Suarez Navarro is treated by a physiotherapist for an injury during her women's singles match against Australia's Daria Gavrilova during the 2016 Australian Open tennis tournament in Melbourne.

Care of the unconscious casualty

After the first aider has completed the DRSABCD method, the casualty may be breathing, but they may still be unconscious. It is important to ensure the utmost care is continued by the first aider until help arrives, or until the casualty can be moved to receive medical attention.

When caring for the unconscious casualty:

- Roll the casualty into the recovery position, being aware of supported movement in case of neck or spinal injury. Any unconscious casualty who remains on their back is at risk of obstructed airways. (Refer to page 165 for putting a casualty in the recovery position.)
- While waiting for assistance, monitor the casualty's airways, breathing, pulse and level of consciousness.
- Treat other injuries, such as bleeding, burns, breaks, fractures or dislocations.
- Loosen any tight clothing to make the casualty more comfortable.
- Protect the casualty from the environment.
- If the casualty regains consciousness, do not move or leave them; reassure them until assistance arrives.

CPR

In pairs, demonstrate CPR on a manikin. Use the DRSABCD checklist below to assess each other's rescue procedures.

DRSABCD checklist	Yes	No
DANGER. Have you:		
checked for potential dangers? Give examples.		
RESPONSE. Have you:		
squeezed and shouted at the patient to find out if they are conscious?		
rolled the patient into the recovery position?		
SEND FOR HELP. Have you:		
called 000 for help?		
AIRWAY. Have you:		
cleared the patient's airway?		
tilted the patient's head to open the airway?		
BREATHING. Have you:		
looked, listened and felt to see if the patient is breathing?		
IF THE PATIENT IS BREATHING. Have you:		
continued to check and monitor the patient's breathing while he or she is in the recovery position?		
IF THE PATIENT IS NOT BREATHING. Have you:		
rolled the patient onto their back?		
maintained the head tilt and the correct grip on the patient's mouth (the pistol grip)?		
given two quick, full breaths?		
observed the patient's chest rise and fall after each breath?		
IF THE PATIENT IS STILL NOT BREATHING. Have you:		
placed your hand in the correct position on the sternum and used the correct action?		
given 30 compressions (3 × 2 breaths and 30 compressions per minute)		
counted out loud?		
used practice AED if available (or substitute equipment)?		
RECOVERY. Have you:		
placed the patient in the recovery position after restoring his or her breathing?		
continued to monitor the breathing and pulse of the patient while they are in the recovery position?		

Scenario

Your worksite has collapsed. You are the closest person to an injured person who has received a hard blow to the back of the head and is unconscious.

The area is still unstable.

Demonstrate the safety procedures for moving the casualty to safety.

CHAPTER SUMMARY

- First aid is the initial help given to a casualty, based on the first aider's knowledge, experience and skills.
- It is essential to evaluate the situation and the priority of treatment to ensure further danger can be prevented.
- Using a DRSABCD plan can mean the difference between life and death in any medical condition or accident situation.
- Cardiopulmonary resuscitation (CPR) is a combination of external air resuscitation (EAR) and external cardiac compressions (EEC).
- In the case of less life-threatening accidents, the STOP plan should be followed for assessment and treatment.
- It is important to prioritise life-threatening injuries at the scene of an accident.
- Crisis management is vital in treating and managing injuries and conditions such as bleeding, shock, and neck and spinal injury.

CHAPTER REVIEW ACTIVITIES

1 **Explain** the priorities for managing a first-aid situation.
2 **Describe** the purpose of the head tilt and jaw lift.
3 Construct a flow chart outlining the procedures of DRSABCD.
4 **Identify** the steps for controlling external bleeding.
5 **Justify** the importance of calling for emergency services.
6 **Explain** the necessity of monitoring an injured casualty.

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CHAPTER 8
Management of injuries and medical conditions

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Managing medical conditions 185

MANAGING INJURIES

As a first aider it is important to know the signs, symptoms and management procedures of a variety of injuries. No matter how experienced a first aider may be, they should never assume that an injury is minor, and should refer all injuries to a medical practitioner.

Cuts and lacerations

Cuts and lacerations are wounds that are open and involve bleeding. Lacerations are jagged-edged cuts to the skin, and involve tissue loss – for example, a wrist cut by a piece of glass.

Management

Management of cuts and lacerations is similar. In all cases, any bleeding needs to be stopped, and the wound should then be treated. Open wounds may become infected, so it is important that the first aider's skin is intact, or that gloves are worn.

Figure 8.1 Laceration caused by glass

Table 8.1 Managing cuts, lacerations and punctures

Injury	Management	Signs and symptoms
Lacerations	Conduct a primary survey: DRSABCD. Call 000, or 112 on a mobile phone. Use disposable gloves, if available, to reduce the risk of infection. Remove or cut clothing to expose the wound and check for foreign bodies. Apply direct pressure to the wound using a sterile dressing or pad, if available. If the casualty is able to, they can apply direct pressure to the wound themselves. Lay the casualty down, and raise and support the injured area above heart level if possible. Apply a dressing and bandage to hold the dressing or pad in place, and check circulation every 30 minutes. If bleeding continues through dressing, add another dressing – do not remove the original dressing.	Bleeding Pain Swelling Shock Loss of sensation
Cuts	DRSABCD If needed, apply pressure to stop the bleeding. Clean the wound thoroughly with saline or cool boiled water. Apply a non-adherent dressing and seek medical advice if necessary.	Bleeding Pain Swelling
Punctures	Conduct a primary survey: DRSABCD. Call 000, or 112 on a mobile phone. Use disposable gloves, if available, to reduce the risk of infection. Apply pressure if needed. Medical aid should be sought, as there is a danger that internal organs have been damaged.	External bleeding may be minimal Shock Pain Swelling

Fractures

A fracture is a break to a bone. Fractures can be single and clean breaks, or there may be multiple breaks. Fractures are defined as open, closed or complicated. Open fractures occur where there is an open wound at the fracture site, which can come from the bone itself protruding through the skin. In closed fractures, the overlaying skin remains unbroken. A complicated fracture is where the broken bone has caused damage to blood vessels, organs such as the lungs, or major nerves. These fractures can cause internal bleeding.

Fractures are usually caused by either direct or indirect force to the bone, and are classified according to the type and extent of the damage. A bone may break when it receives a direct blow from contact with another person, an obstacle or the ground. This blow can also cause an indirect break in another bone; for example, a heavy landing on a hard surface can send a blow through the arm and cause the collarbone to crack. An indirect fracture is generally caused by a muscle pulling violently on a bone, which may separate a bone fragment.

Signs and symptoms

When identifying a fracture, a first aider needs to look for the following signs and symptoms:

- pain at or near the fracture site
- the patient is unable or finds it difficult to move the injured area
- swelling
- deformity
- tenderness
- shock
- the casualty noticed a cracking noise when the injury occurred.

Management

The management procedures for a conscious casualty with a fracture include:

- DRSABCD
- immobilisation of the injured area to reduce movement and any further injury
- the use of splints or bandages to ensure the casualty is in a comfortable position. See Figures 8.3–8.5 for types of slings.

Figure 8.2 Closed fracture

Figure 8.3 Elevation sling for a collar bone injury

Figure 8.4 Arm sling for a forearm or wrist injury

Figure 8.5 Collar and cuff sling for an elbow or upper-arm injury

Figure 8.6 Immobilisation guard for a dislocated thumb

Figure 8.7 Head injury

Dislocations

Dislocations occur at various joints in the body.
A dislocation occurs when the ligaments that connect the bones together are stretched and damaged by some form of force and the bones are displaced at the joint.

Signs and symptoms

The major sign of a dislocation is deformity, as the bone will not be sitting in the correct position. Other signs and symptoms include:

- pain
- swelling and bruising
- inability to move the joint.

Management

Management of a dislocation includes:

- DRSABCD
- immobilise the joint in the position it was found
- do not try to relocate the dislocated bone, as this can cause further injury to the bone or surrounding tissues
- apply an ice pack and elevate if possible
- seek medical assistance.

Head injuries and concussions

Head injuries include damage to any part of the skull or brain. As the brain is the controlling organ of the whole body, a head injury is potentially dangerous and should be managed with extreme seriousness and care.

Signs and symptoms

- possible unconsciousness
- headache
- blurred vision

- nausea or vomiting
- discharge from ears, nose or mouth
- bleeding.

Management

Management of a head injury includes:

- DRSABCD
- be cautious of possible spinal injury
- keep the casualty still and reassured
- monitor consciousness and breathing
- seek medical assistance.

Eye injuries

Eye injuries may be caused by foreign bodies, such as dust or pollen, a direct force, burns, chemicals or a penetrating object. It is important not to remove any embedded object, as this can cause more damage and loss of sight if the object is not removed correctly.

Signs and symptoms

- pain or irritation
- redness
- watery eyes
- blurred vision
- closure or swelling
- light sensitivity
- bleeding.

Management

- DRSABCD
- for minor injuries, attempt to flush the foreign object from the eye
- keep the casualty still and comfortable
- avoid rubbing the eye
- place a sterile pad over the eye
- seek medical assistance.

Nasal injuries

The most common causes of nasal injuries are a force to the nose causing a nose bleed or broken nose, or a foreign object in the nose, which is more common in small children.

Signs and symptoms

- bleeding
- swelling
- pain
- deformity
- bruising.

Management

- DRSABCD
- ask the casualty to squeeze the nose just below the bony part

Figure 8.8 Nose bleed from direct force

- keep the casualty's head upright and slightly forward
- apply an ice pack to the back of the neck or forehead
- encourage the casualty to breathe through their mouth to ensure no blood is swallowed, which can lead to nausea or vomiting
- seek medical assistance if the nose continues to bleed for longer than 10 minutes.

Burn injuries

A burn is a soft-tissue injury. Burns can be extremely painful, and because the outer layer of skin is damaged, there is a high risk of infection. Burn injuries may be caused by extreme cold, heat, chemicals, corrosive substances, electricity, friction and radiation (sunburn). Scalds are burns caused by hot liquid or steam.

Burns can be described as either:

- superficial, where only the top layer (epidermis) is involved
- partial thickness, where the epidermis and the next layer (dermis) have been damaged
- full thickness, where both the epidermis and dermis have been damaged and there is also the possibility of damage to the underlying layer, called the subcutaneous layer.

The severity of the burn depends on the extent of the burn or the surface area damaged, which parts of the body are damaged, the depth of the burn, the age and condition of the casualty and any other associated injuries the casualty may have. Burns can cause damage to nerves, fat, muscles and blood vessels.

Figure 8.9 Partial burn to the chest from boiling water

Signs and symptoms

- severe pain
- shock
- redness
- blistering
- raw skin
- white or charred coloured flesh (for full thickness burns).

Management

The management of a burn aims to stop the burning process by cooling the burn to provide relief from pain. Management of burns includes:

- DRSABCD
- seek medical assistance
- gently cool the burnt area with cold running water for at least 20 minutes
- reassure the casualty and treat for shock
- elevate the burn if possible
- cover the burn with loose, non-stick dressing.

DO NOT

- peel off or remove clothing that is stuck to the burn
- prick blisters
- apply lotion or cream
- apply ice to the area.

Tooth injuries

Any injuries to teeth should be referred for dental advice immediately. If a tooth can be put back into place, less treatment will be required in the future and there is a greater chance that the tooth will successfully replace in the gum. Teeth can become dislodged, or knocked out, broken or fractured by a force to the face or jaw. Many sporting associations require participants to wear a mouthguard to prevent injuries to the mouth.

Signs and symptoms

- pain
- bleeding from the mouth
- dislodged tooth.

Management

Management of tooth injuries depends on whether the tooth is loose, or if it has been completely dislodged. If the tooth is loose:

- straighten the tooth, splint it with foil (covering the injured tooth and the tooth either side), and seek dental advice immediately.

  If the tooth has been dislodged:
- clean the tooth with milk or the casualty's saliva, holding the tooth by the crown edge, not the roots
- seek dental advice immediately
- if medical assistance is some distance away, try to replace the tooth correctly in the socket
- splint the tooth or ask the casualty to hold it in place
- if the tooth cannot be replaced, keep it moist in milk, saline or the casualty's saliva and give the casualty gauze to bite down on.

Electrocution

Electrocution occurs when an electric current touches or runs through the body. Faulty electrical appliances in the home or workplace are a common cause of electrocution. A minor electric shock may cause a tingling sensation; a severe shock can cause death. When treating someone who has suffered an electric shock, always be aware of the danger area and ensure the area is safe before touching the casualty.

Signs and symptoms

- pins-and-needles sensation in limbs
- difficulty breathing
- burns
- casualty may not be conscious
- breathing and heartbeat may be irregular or stopped
- casualty may have burns and will be in shock.

Management

- immediately turn off the current at the supply
- if the situation involves high-voltage electricity, stay clear and call for medical assistance
- DRSABCD
- treat burns with cool water and seek medical advice
- place the casualty in the recovery position
- seek medical assistance
- reassure the casualty and monitor for shock.

Chest injuries

Chest injuries can be severe, as vital organs are contained within the chest. Injuries to the chest area can be caused by a blunt or penetrating force. Common injuries to the chest involve fractured ribs. It is important to be aware of associated damage that may have occurred to the lungs or heart, which may be life threatening.

Signs and symptoms

- pain at the site of injury and tenderness when touched
- deformity
- bruising
- difficulty breathing; gasping for breath
- cramping in the ribcage
- blood in the mouth, which is coming from the lungs.

Management

- DRSABCD
- call for medical assistance immediately
- help the casualty into a comfortable position, where it is easiest for them to breathe
- encourage shallow breathing
- pad the injured area, ensuring bandages are tied on the uninjured side, and seek urgent medical advice.

Abdominal injuries

Unlike the chest area, there are no bones protecting the organs within the abdominal area. Injury to the abdomen, particularly from a force, requires prompt medical attention, as the injured person may be suffering from internal bleeding or damaged organs. Motor vehicle accidents, falls onto hard surfaces or someone being crushed are common causes of abdominal injuries.

Signs and symptoms

- pain
- grunting breathing
- nausea and/or vomiting
- bruising and tenderness at the injury site
- blood in the urine or escaping from the genitals or anus
- shock.

Management

- DRSABCD
- loosen clothing and lay the casualty on their back with their head and shoulders slightly raised and a rolled-up towel or blanket under their knees
- DO NOT allow the casualty to eat or drink; if they are thirsty, moisten their lips
- seek urgent medical advice.

Injuries

In your workbooks, outline the appropriate first aid management for the following injuries, and then work in pairs to demonstrate this:

1 Steve's front tooth has been knocked out in a football tackle.
2 Marina's glass broke, leaving a cut across the palm of her hand (the glass is still embedded in her hand).
3 Jessica's shoulders are sunburnt.
4 Luke's nose is bleeding after an accidental head clash during his soccer game.
5 Rachael has sand in her left eye.
6 Damien has a bleeding wound on his head, and blood is coming out of his left ear.
7 Craig was winded during a football tackle.

More severe injuries

In your workbooks, outline the appropriate first aid management for the following injuries, and then work in pairs to demonstrate this:

1 Tony has an open fracture to his ulna.
2 Darren has a dislocated middle finger.
3 Rochelle has a closed fracture of her big toe.
4 Mahli has a sprained wrist.
5 Lisa has a broken collarbone.

MANAGING MEDICAL CONDITIONS

Accidents and problems with associated medical conditions can arise at any time and in the most unexpected places. A medical incident can vary from a minor injury to a life-threatening situation. It is often difficult for a first aider to determine the severity of the condition; however, it is always better to play it safe and call for an ambulance, particularly if the injured person's medical history is uncertain. Some casualties may wear medical alerts or treatment items as a form of assistance and notification. These are usually in the form of a wristband, bracelet, necklace or tattoo.

Heart attack

A heart attack occurs when a blockage in a blood vessel prevents blood from reaching the heart. This may damage the heart muscle tissue, causing poor heart function.

Signs and symptoms

After identifying the early signs of heart attack, take immediate action to restore blood flow and prevent permanent damage. Signs and symptoms of a heart attack include:

- Pain or discomfort (tightness) in the chest; the pain may also spread to the shoulder, arm, throat and jaw.

- The casualty may seem distressed and anxious, with shortness of breath.
- The casualty's skin may appear cold, clammy and perspiring.
- An irregular pulse may be present, and the casualty may develop shock and even collapse.

Management

- DRSABCD, and call '000'
- If the casualty is conscious, loosen clothing and offer reassurance.
- Place the casualty in the recovery position and monitor closely until help arrives.
- DO NOT leave the casualty.

Stroke

A **stroke** is caused by a sudden disruption of the blood supply to parts of the brain. Oxygen supply to some areas of the brain may be cut off, or a blood vessel may have burst (haemorrhage). As a result, the areas of the brain that control bodily functions will be affected.

Signs and symptoms

When looking for the signs and symptoms of a stroke, the quickest and easiest way is to use the acronym FAST.

F Facial weakness
A Arm weakness
S Speech problems
T Time to act – call 000

Other symptoms to look for include:

- headache
- nausea or vomiting
- blurred vision
- unequal pupils
- casualty is unconscious.
- partial paralysis and slurred speech
- warning signs: sudden blurred or decreased vision, numbness in either face, arms or legs, dizziness, headache, and difficulty swallowing.

Management

- If the casualty displays any of the FAST symptoms, call 000.
- DRSABCD
- If the casualty is conscious, loosen clothing and offer reassurance.
- Place the casualty in the recovery position or a comfortable position and monitor them closely until help arrives.
- DO NOT leave the casualty.

Diabetes

Diabetes is a condition in which the body is unable to properly regulate blood sugar (glucose). Insulin is a hormone made in the pancreas. Insulin circulates in the blood to help glucose into the body's cells to produce energy to function – just like the heart muscle that makes the heart beat.

Without insulin, the glucose cannot enter the body's cells. If too much glucose is produced it builds up and passes into the person's urine, causing frequent urination and thirst from dehydration. Complications from diabetes can include blindness, kidney failure, heart disease, stroke and limb amputation.

Low blood sugar

During a **hypoglycemic** (low blood glucose) blood sugar attack, tissues can be starved of blood sugar. This can be brought on by:

- skipping or delaying meals and snacks
- not eating enough carbohydrate (starchy) food
- too much insulin or diabetes medication
- drinking alcohol without food
- extra physical activity without eating extra food.

Signs and symptoms of low blood sugar

- shaking, dizziness, hunger, fast heartbeat, tingling around the mouth and lips, feeling tired or weak, sweating and a headache
- if not treated, the casualty may become confused, have slurred speech, behave as if drunk, and suffer drowsiness, which may lead to unconsciousness.

Management

Quickly give the sufferer a sugary substance, such as:

- 5–7 jelly beans
- glass of soft drink (not diet)
- glass of fruit juice
- 2–4 teaspoons of sugar or honey.

If the sufferer is not feeling better in 5–10 minutes, give them some more sugar. After sugar intake, offer the sufferer some carbohydrate (starchy) food, such as:

- a piece of fruit
- a glass of milk
- a sandwich
- 2–4 dry biscuits.

If the sufferer becomes unconscious, apply DRSABCD, and call 000.

High blood sugar

In a hyperglycemic (high blood glucose) attack, the casualty will usually need to inject insulin to correct the imbalance. An attack can be brought on by:

- sickness
- infection
- stress
- too much carbohydrate food at once
- not enough insulin or diabetes medication
- other tablets or medicines, such as cortisone.

Signs and symptoms of high blood sugar

- feeling constantly thirsty
- passing large volumes of urine frequently
- feeling tired
- rapid pulse
- feeling dizzy or faint
- acetone smell (like nail polish remover) on the casualty's breath
- blurred vision
- drowsiness
- unconsciousness.

Investigate

You can go to the Diabetes Australia website and use its handy risk calculator for Type 2 diabetes, developed with the Australian Department of Health. Or use the link to go direct.

Managing high blood sugar

- DRSABCD
- nothing to eat or drink
- if the sufferer is conscious, allow them to administer medication and seek medical advice

Diabetes can be maintained and controlled by eating meals at regular intervals, maintaining a healthy diet that includes simple carbohydrates and fewer fats, participating in regular exercise and administering medication at the scheduled times.

Epilepsy

Epilepsy is a condition involving reoccurring seizures due to an interruption of the electrochemical activity in the brain. Sudden bursts of this electrochemical activity can upset the brain's normal function and disrupt the brain's messages to the body. These disruptions can vary from a brief loss of consciousness (*petit mal*) to muscular spasms and convulsions (*grand mal*). It is important from the first instance of seizure that the first aider protects the sufferer from hurting themselves against any objects, such as furniture.

Signs and symptoms

Signs and symptoms of *petit mal* may go unnoticed, as the sufferer may tend to:

- stare
- have temporary memory loss or odd movements.

Signs and symptoms of *grand mal* include:

- the sufferer suddenly cries out and falls to the ground
- their body is rigid with jerking movements
- excess saliva flows from mouth
- possible loss of bladder and/or bowel control
- afterwards, the sufferer may be tired, confused and agitated, and may become unconscious.

Management

- Ensure the area is clear of objects that may cause further injury.
- Once convulsions stop, place the sufferer in the recovery position to rest and monitor their breathing.
- Be aware that the sufferer may feel uncomfortable about moving if they have had a loss of bladder control.
- Seek medical advice.
- If the sufferer becomes unconscious, apply DRSABCD and seek urgent medical help, but do not leave them.
- DO NOT restrain the casualty or place anything in their mouth.

Asthma

Asthma is a respiratory condition caused by the bronchi going into spasms and becoming narrower. Excess mucus may be produced, causing difficulty in breathing. Factors that can trigger an asthma attack include:

- exercise
- respiratory infections
- reflux
- house dust and smoke
- exposure to sudden change in weather condition, especially cold air
- allergies, such as pollens, foods or bee stings
- certain food additives or preservatives.

Signs and symptoms

- tightness in the chest and difficulty in breathing (particularly exhaling)
- wheezing
- pale and sweaty skin
- rapid and weak pulse
- shortness of breath or rapid shallow breathing.
- blue colouring of the skin around the lips, earlobes and fingertips
- coughing, particularly at night.

Management

Asthma sufferers should carry an Asthma Action Plan with them, or have one in their school or place of work. This outlines the required treatment of their condition when it is good, mild, severe and life-threatening. If there is no Asthma Action Plan, follow the steps below in the event of an asthma attack:

- Reassure the sufferer and assist them into an upright position.
- Keep the casualty calm and reassure them.
- Administer four puffs of the prescribed asthma medication (reliever inhaler) one puff at a time, with the casualty taking four normal breaths in between each puff.
- If breathing does not appear to improve after about 4 minutes, repeat medication.
- Encourage the sufferer to relax and control their breathing.
- Seek medical advice if breathing does not appear to improve.

Anaphylaxis

Anaphylaxis is a severe allergic reaction that is rapid in onset and can be life threatening. It is often triggered by food, medication or insect sting, but there are many other possible triggers.

Anaphylaxis is an unpredictable condition. Many people who experience it have a known allergy, and some may have had one or more milder allergic reactions previously. Other people, who are not even aware that they have an allergy, can suddenly experience severe anaphylaxis. Even the first episode of anaphylaxis can be fatal. Anaphylaxis is preventable and treatable, and can be triggered by the following:

- food such as nuts, seeds, shellfish, milk, soy, wheat and eggs
- insect sting such as venom from bees and wasps
- medication such as some antibiotics or contrast agents (dyes) used in diagnostic x-rays and scans.

Signs and symptoms

- swelling and redness of the casualty's skin, and an itchy, raised rash (like hives)
- swelling of the throat, wheezing and/or coughing
- difficulty speaking
- difficulty breathing or swallowing
- rapid, irregular pulse, tightness in the chest, headache, vomiting and diarrhoea
- dizziness or unconsciousness
- metallic taste in the mouth.

Management

- Lay the casualty flat; do not allow them to walk.
- If available, administer an EpiPen.
- Call 000, or 112 from a mobile phone.
- Further adrenaline can be given if there is no response after 5 minutes.
- If the casualty loses consciousness, follow DRSABCD.

Poisoning

A poison is a substance that is dangerous to normal bodily functions. Poisons can enter the body by being swallowed, absorbed through the skin, inhaled or injected. The majority of casualties from poisoning are young children who do not understand the dangers of poisonous substances. Poisons can be household products, medicines, naturally occurring animal or plant products and industrial chemicals. The severity of the condition varies depending on the strength and quantity of the poison **ingested**.

Poisoning in children can be prevented by:

- disposing of out-of-date and unwanted medicines on a regular basis
- buying products with child-proof packaging
- storing medicines and household products in locked cupboards
- keeping all medicines and cleaning products in their original containers
- returning poisons to their safe storage place immediately after use
- keeping the Poisons Information Centre details close to the telephone.

Signs and symptoms

Condition may vary depending on the substance taken in, but signs and symptoms of poisoning can include:

- dizziness or drowsiness
- headache
- nausea or vomiting
- reduced or blurred vision
- rapid pulse
- dilated pupils
- abdominal pain
- difficulty breathing
- burns or discolouration of the skin
- odours on the breath or skin
- signs of shock.

Management

- DRSABCD
- If the casualty has collapsed, call 000.
- Call the Poisons Information Centre for advice on 131126.

To manage **inhaled poison**:

- Move yourself and the casualty to fresh air.
- Loosen tight clothing.

To manage **absorbed poison**:

- Protect yourself by using gloves, goggles and protective clothing.
- Remove contaminated clothing carefully to avoid any further skin contact.
- Flush the skin with running water for 15–20 minutes.

To manage **ingested poison**:

- Contact the Poisons Information Centre on 131126, and keep the container close.
- Do not induce vomiting or give the casualty anything to eat or drink. Wash the corrosive substance off the mouth and face with water, or wipe it off.

Bites and stings

Insect stings and animal bites are painful, and some are potentially lethal. Bites and stings often occur at the beach, in the garden, at playgrounds or around the home. Although most stings and

bites are minor, they are often painful. However, some can be lethal, such as stings from bees, wasps or ticks, which can produce an anaphylactic reaction.

Venom from the sting or bite that is injected directly into the bloodstream may work rapidly as it circulates around the body. If injected just beneath the skin, the venom will move more slowly, as it spreads in local tissue fluids and moves into the lymphatic system before entering the blood stream.

If the casualty remains still, the general effects are slower.

Table 8.2 Symptoms and management of bites and stings

Source	Signs and symptoms	Management
Bees and wasps	Painful burning feeling with some swelling Difficulty breathing if the casualty has an allergic reaction.	DRSABCD Remove the sting by scraping it with a fingernail. Do not squeeze the sting out. Apply ice to the sting and monitor the casualty in case of allergic reaction. Seek urgent medical advice if allergic reaction occurs.
Redback spider	Stinging feeling Swelling and intense local pain Sweating Nausea or vomiting Loss of coordination	DRSABCD Keep bite site clean and apply ice. Reassure the casualty and seek medical advice.
Funnel-web spider	Extreme pain Nausea, vomiting, excessive sweating, muscle twitching, breathing difficulties, numbness around the mouth, confusion leading to unconsciousness	DRSABCD Call ambulance urgently for medical advice. Apply a firm pressure immobilisation bandage (beginning from the extremities if bitten on the limbs). Ensure casualty does not move.
Tick	Irritation at the site Headache Blurred vision Weakness in the limbs Difficulty swallowing or breathing	Grasp both sides of the tick with pointed tweezers and pull upwards. Try to pull it out in one piece. Seek medical advice.
Snake	Puncture marks or scratches Headache Nausea or vomiting Blurred or double vision Drooping eyelids Voice change Bleeding from the bite Difficulty breathing Drowsiness Slurred speech Pain or tightness in the chest or throat Dark urine (blood or muscle breakdown products)	DRSABCD Immediately call 000. Rest and reassure the casualty. Apply a firm pressure immobilisation bandage, and ensure the casualty does not move. Record the time of the bite, when the bandage was applied and any identifications of the snake. Do not elevate or wash the injury site.

>>

>>	Source	Signs and symptoms	Management
	Bluebottle	Immediate pain Stinging Lines of welt marks form with surrounding redness of the skin	DRSABCD Calm the casualty and prevent them from rubbing the injured site. Gently remove adherent tentacles with sea water. Immerse the injured area in hot water for 20 minutes to relieve the pain. (Check that the water is not too hot.)

Exposure to heat and cold

The temperature of a healthy human body is about 37 °C. If the body is exposed to extreme temperatures, the person may suffer from either **hyperthermia** (exposure to hot, humid conditions causing the body temperature to rise) or **hypothermia** (extreme cold conditions causing the body temperature to drop).

Hypothermia is generally caused by an over-exposure to cold conditions, such as being immersed in cold water or snow without adequate protective clothing, meaning the body is unable to maintain its normal temperature.

Hyperthermia can occur due to conditions of extreme heat, even if the body is at rest. This condition is generally called heat stroke and can be fatal for young children and the elderly. When moving to a hot climate it is important to increase the daily water intake to ensure the body has enough water to carry out its normal functions. Heavy sweating removes water from the body at a rapid rate.

Exercise-induced heat exhaustion usually occurs when the body generates heat from exercise metabolism and the core body temperature rises unless exercise is restricted. Heat exhaustion is more common in trained athletes, who usually push themselves to the limit, marathon or fun run participants, defence force personnel and firefighters.

Exposure to cold, including hypothermia

Signs and symptoms

- shivering
- loss of concentration
- loss of control over the small muscles, such as the muscles of the fingers
- facial skin turns grey or blue in colour
- drowsiness
- lethargy
- confusion
- loss of physical coordination
- slowed breathing
- slurred speech
- coma
- death.

Management

- DRSABCD
- Call 000 for medical assistance.
- Move the casualty to a warm, dry place for protection.
- Remove wet clothing and wrap the casualty in blankets or a sleeping bag.

- Place the casualty in the recovery position, cover their head to maintain heat, give them a warm drink, use body-to-body contact under a blanket to provide warmth.
- It is important to stabilise the body's core temperature, rather than attempt rapid rewarming.
- Seek medical advice.

Exposure to heat, heat stroke, hyperthermia, heat exhaustion

Signs and symptoms

- feeling hot
- exhaustion
- weakness and fatigue
- headache
- thirst and nausea
- rapid breathing and pulse
- flushed skin
- irritability and mental confusion
- seizures and unconsciousness.

Management

- DRSABCD
- Call 000 for medical assistance.
- Lay the casualty in a cool, well-ventilated and shaded environment.
- Loosen tight clothing and remove unnecessary clothing.
- Sponge the casualty with cold water or apply ice packs in the area of large vessels (neck, groin and armpits).
- If they are conscious, give the casualty a cool drink.
- Seek medical advice.

Summary table

Outline a summary table of medical conditions. For each condition, include a description of the:

a condition
b signs
c symptoms
d management of the condition.

Role play

In small groups, role play ONE of the following first-aid situations. Before commencing the role play, give a brief description of the condition.

a heart attack
b stroke
c diabetic reaction
d hypothermia attack
e epileptic fit in the classroom
f asthma attack from 'cold snap' in weather
g snake bite to the hand
h bee sting (victim suffers from anaphylaxis)
i two-year-old child swallows cleaning fluid
j small child at the beach suffers heat exhaustion.

CHAPTER SUMMARY

- Shock is the result of the circulatory system not functioning properly, in response to a trauma and can be life threatening.
- An injured person should never be moved unless they are in immediate danger from a collapsing structure, fire, poisonous fumes or traffic hazard.
- In most injury situations it is important to get medical assistance as quickly as possible. In an emergency situation, calling 000 or 112 is the first step in medical referral.
- Fractures are defined as open, closed or complicated.

CHAPTER REVIEW ACTIVITIES

1 **Explain** why it is important to raise an injured person's legs above the level of the heart in the case of a bleeding laceration.
2 **Describe** the importance of using a splint for a broken bone.
3 **Justify** a procedure for managing a soccer player who has rolled over on their ankle, but insists on continuing to play the match.
4 Explain how you would manage an unconscious casualty suffering burns after a mild explosion.
5 **Outline** preventive strategies that could be used to prevent heat exhaustion in a 14-kilometre fun run.

Getty Images/iStock/OSTILL

CHAPTER 9
Administering first aid

IN THIS CHAPTER:

Physical environment	**195**
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PHYSICAL ENVIRONMENT

Before any first aid is administered, the immediate physical environment needs to be taken into consideration. The environment may have been the cause of the accident, or may pose further threats to the first aider, bystanders and the injured person. It is therefore important to **analyse** safety issues in each environment, and to plan self-protection and management strategies before approaching the accident site.

The management of a situation will be more successful if the first aider is calm and in control. Common accident scenes include traffic accidents, water environments and electrical situations. These types of incidents usually attract a lot of attention, so maintaining confident and firm control is a good way to approach the scene.

The first steps are vital and apply to all accident scenes:

- Keep the accident area clear – this may include directing traffic. This may be done by bystanders; also ask one of them to call emergency services.
- Check for any other dangers, such as fallen wires, fuel or explosive gases, shattered glass or sharp debris, rip currents in the water, or fire.
- Check that all casualties have been located and assess the priority of their injury management.
- When calling emergency services, you will need to report the exact location of the accident, the number of casualties, the type of accident and injuries and any special services that may need to attend the site, such as rescue squad or fire department.

Traffic accidents

To secure control of a traffic accident scene, undertake the following:

- Avoid danger from other traffic. Park surrounding cars to protect the scene and use the vehicles' hazard lights. Situate bystanders in appropriate positions to warn approaching traffic, especially if the scene is not clearly visible.
- At night, light up the scene with headlights on low beam.
- Avoid any fallen powerlines. Do not touch the vehicle if it is in contact with any powerlines.
- Account for all occupants of each accident vehicle. Some occupants may be hidden behind debris, or may have been thrown from the vehicle.
- Turn off the car engine where possible.
- Extinguish all cigarettes, and have fire extinguishers ready (if available).
- Once the accident site is secure, continue with DRSABCD and injury management.

Water environment

When attending a water rescue, the safest approach is if the first aider does not have to enter the water. It is important that the first aider does not attempt a rescue beyond their own swimming capabilities. A rope, an esky lid, a ball, or anything else that floats can be used as a lifesaving aid for someone in the water.

Getty Images/Oliver Strewe

Figure 9.1 Beach water environment

Factors to consider in an injury management plan for a water rescue include:

- the number of casualties (in a boating accident, for example)
- the distance from the shore or from the edge of a boat or pier
- the water depth and temperature (dams can be extremely cold from a depth of 1 metre or more)
- what rescue equipment is available
- the physical and psychological state of the casualty, and their swimming ability
- rips or currents at the beach
- hidden dangers under the water.

Once you are sure the accident site is safe, continue with DRSABCD and appropriate management of the casualty's injuries.

Electricity

There are many dangerous aspects of electricity that may not be common knowledge to most people, such as the way electricity travels and the voltage of a line. All electricity should be approached and treated with extreme care, as an electric shock may be fatal.

Factors to consider in an injury management plan for an electric shock include:

- Approach the casualty with extreme care and determine the power source.
- Turn off the power source, where possible, and remove the plug from the outlet.
- If unable to turn off the power, stand on a dry area and use a non-conductive item, such as a broom handle or a piece of wood, to attempt to move the power source.
- Stand clear of high-voltage powerlines until the power source has been cut off, as fatal shocks can be received even from a distance away. Contact emergency services.
- Once the accident scene is safe, continue with DRSABCD and injury management.

Emergency

In pairs, create an emergency scene and present it to the class. Describe the scene and the management procedures you would follow.

INFECTION CONTROL AND PROTECTION

It is essential for the first aider to ensure they undertake good hygiene practices by assuming that every situation is potentially infectious, in order to prevent transmitting diseases or infections.

Controlling infection is achieved by protecting the first aider and the injured person from the transmission of:

- droplets – nasal, airway or throat secretions
- bodily fluids and blood – vomit, saliva, urine, faeces or pus
- infected needles or sharp objects.

Common diseases may be transferred to the first aider during treatment; however, it is rare that serious diseases such as hepatitis are passed on. There has been no proven case of HIV (AIDS) being transferred. Precautionary methods before and after treatment include:

- wash hands before giving treatment, if possible
- cover any exposed wounds
- avoid touching potentially infected material (dressings) with bare hands
- use disposable gloves (if they tear during treatment, remove them, wash hands and put on a new pair)
- if expired air resuscitation (EAR) has to be administered, use a resuscitation mask if available (disinfect after use)
- dispose of all treatment materials in a secure plastic bag
- wash hands thoroughly with soap and warm water
- clean contaminated surfaces with detergent and water
- remove any personal protective clothing (apron, mask, eye protection or gloves).

HIV/AIDS

HIV (Human Immunodeficiency Virus) is a virus that damages the immune system by attacking the white blood cells that protect the body against infection. When the white blood cell count has effectively been destroyed, the virus becomes AIDS (Acquired Immune Deficiency Syndrome). At this point the immune system is so damaged that the patient is susceptible to repeated infections, which can be fatal.

HIV is transferred through blood or bodily fluids, so it is essential that extreme care is taken by the first aider when dealing with 'sharps' that may have been used by a casualty. Blood or bodily fluids are not likely to be transferred unless the first aider has open wounds, and even then this is still not likely, as blood from the first aider's wounds will flow from the body.

Blood-borne viruses

Hepatitis B and C are **blood-borne** viruses and are transferred through contaminated blood. Hepatitis B is also transferred through semen, vaginal secretions and saliva, to a lesser extent. Both viruses cause an infection in the liver and can develop into more fatal conditions, such as liver cancer. A vaccine against hepatitis B is available to the public.

To prevent the transfer of hepatitis it is essential to follow the safety precautions listed above when attending to a casualty, and to take extreme care when dealing with or disposing of 'sharps'.

Controlling infection

Weblink

Investigate the safe work procedures outlined in the Australian Department of Health Guidelines to control the transfer of infection (refer to Chapter 8, Infection control). Follow the link, or go direct.

Work health and safety

Outline the principles of work health and safety (WHS) as they apply to your workplace or school.

Debates

1 Debate the issue: 'The employer is responsible for the safety of their employees.'
2 Class debate: 'How will I know how much first aid to give?'

LEGAL AND MORAL DILEMMAS

There are always questions about whether to or not to perform first aid on a victim, and about whether there are legal ramifications for the first-aid provider.

Legal implications

There are four legal considerations in relation to first aid.

Duty of care

If you choose to provide first aid you have taken on a duty of care for the casualty. Duty of care is preexisting in some situations, such as a teacher for a student or an employer for their employee. As a first aider you have a duty to the casualty to provide reasonable care to your level of training. Once the duty of care is taken on, you must continue providing assistance until either another first aider arrives and takes over, the casualty recovers, or qualified emergency assistance arrives.

Negligence

Negligence cases are bound by precedent, and a number of general rules have applied for many years. Under common law, for a case for negligence against a first aider to be successful, the casualty has to prove that:

1 the first aider owed the casualty a 'duty of care'
2 this duty was breached by the first aider
3 the injury occurred due to the breach of duty
4 the injury could be directly related to the breach.

Consent

A first aider must seek permission from the casualty before administering first aid. If the casualty is unresponsive or unconscious, consent is assumed. If the casualty is a child, consent must be given by the parent. In a life-threatening situation, consent is implied.

Recording

A first aider should keep a record of any incident that they have assisted in. The record should include the incident, the first aid provided, the advice given and what medical referral was given. This can be used in court to support the first aider.

Moral obligations

It is important to remember that the first aider is only expected to administer aid to the best of their ability, until professional support is available. It is also important to remember that an injured person can legally refuse any treatment.

A first aider is not legally obligated to stop and assist in an emergency, unless a duty of care is owed to the person. However, most people feel a sense of responsibility and citizenship to others, and will often offer help in any way possible. Avoidance of providing aid in an emergency situation is generally due to a fear of legal action. Australia's legal system tends to protect the first aider, as long as they administered aid within their level of training. If the casualty was injured during first aid, the prosecution of this action would be difficult to prove.

Commonsense versus heroics

It is essential that the first aider uses commonsense when attending a situation, in order to prevent any further danger to themselves or others. A person with poor swimming skills jumping into a river to try and save someone else could result in another casualty, instead of saving a life. It is vital to assess if the situation is beyond control, such as a room filled with poisonous gases, before attempting a rescue.

SUPPORT FOLLOWING FIRST-AID SITUATIONS

Some emergency situations result in severe injury or loss of life, and can cause trauma to those who have witnessed the incident, particularly if it involved a family member or a young child. Each case needs to be treated individually, as everyone responds to situations differently. There are many support networks available that can help someone recover from the ordeal.

Debriefing

It is valuable to the first aider and others who were involved to debrief about the incident, as a person may experience strong physical and emotional aftershocks. Stress, guilt, depression, grief, fear, anger and anxiety are some emotions that can result from a trauma, and these can be managed through support networks.

The first aider can debrief and go through their injury management plan to reassure them that the procedure followed was the most appropriate for the situation. This reassures them that the best methods were followed, and that they provided aid to the best of their ability.

Counselling

Some incidents may be so traumatic that professional counselling is required to help deal with the trauma. The length of time it takes an individual to recover emotionally will depend on who was involved, the severity of the incident and other events that may be happening in their lives.

Your community

Investigate your local area and outline the debriefing and counselling services available in your community.

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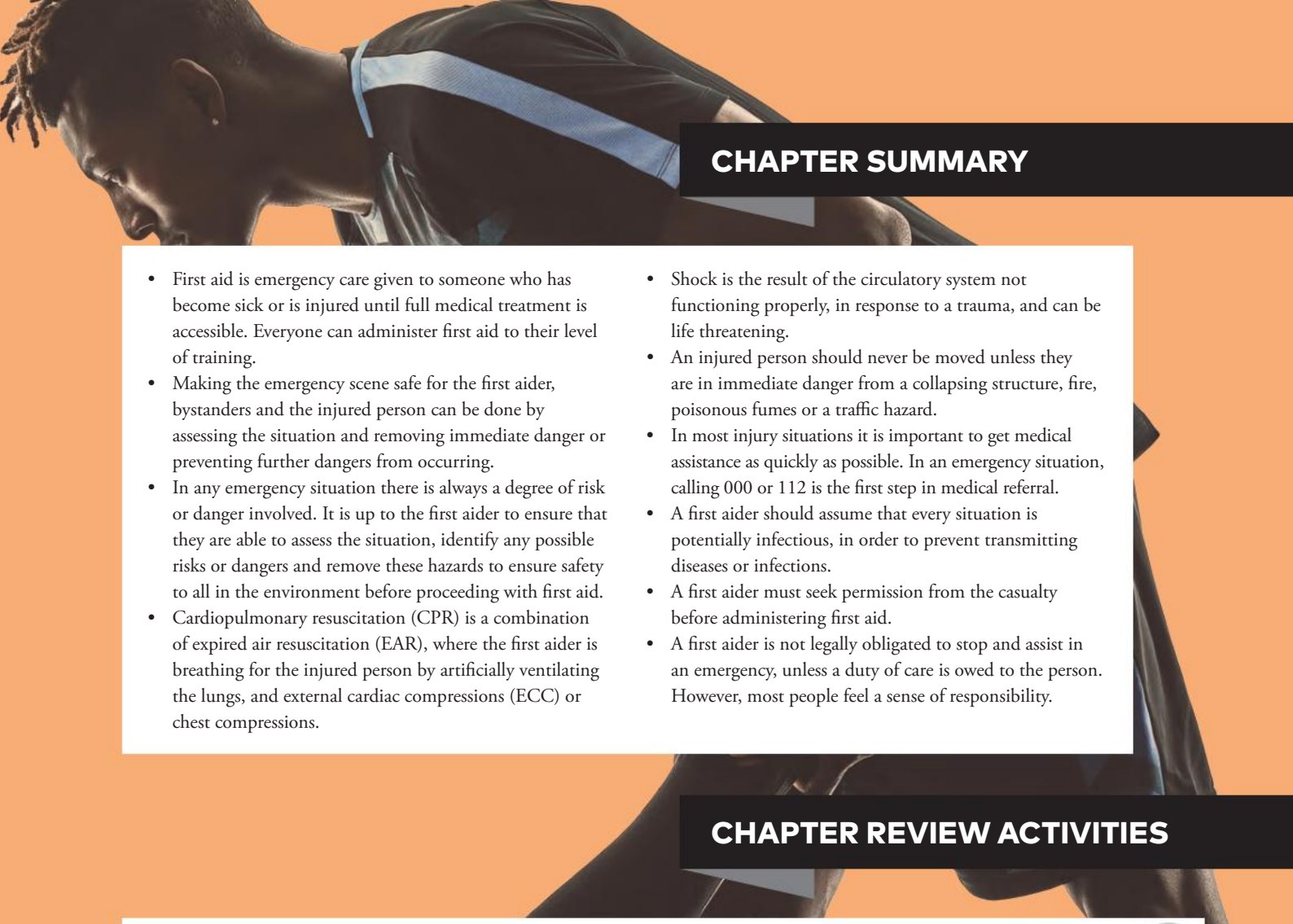

CHAPTER SUMMARY

- First aid is emergency care given to someone who has become sick or is injured until full medical treatment is accessible. Everyone can administer first aid to their level of training.
- Making the emergency scene safe for the first aider, bystanders and the injured person can be done by assessing the situation and removing immediate danger or preventing further dangers from occurring.
- In any emergency situation there is always a degree of risk or danger involved. It is up to the first aider to ensure that they are able to assess the situation, identify any possible risks or dangers and remove these hazards to ensure safety to all in the environment before proceeding with first aid.
- Cardiopulmonary resuscitation (CPR) is a combination of expired air resuscitation (EAR), where the first aider is breathing for the injured person by artificially ventilating the lungs, and external cardiac compressions (ECC) or chest compressions.
- Shock is the result of the circulatory system not functioning properly, in response to a trauma, and can be life threatening.
- An injured person should never be moved unless they are in immediate danger from a collapsing structure, fire, poisonous fumes or a traffic hazard.
- In most injury situations it is important to get medical assistance as quickly as possible. In an emergency situation, calling 000 or 112 is the first step in medical referral.
- A first aider should assume that every situation is potentially infectious, in order to prevent transmitting diseases or infections.
- A first aider must seek permission from the casualty before administering first aid.
- A first aider is not legally obligated to stop and assist in an emergency, unless a duty of care is owed to the person. However, most people feel a sense of responsibility.

CHAPTER REVIEW ACTIVITIES

1 Describe the safety procedures needed to reduce the risk of infection when providing first aid.
2 Identify support services available for first-aid providers.
3 Discuss the difference between a first aider's legal and moral responsibilities.
4 Explain the management procedures needed for a diabetic having a low blood sugar incident.
5 Identify the signs and symptoms of a fracture and outline the management for the injury.
6 Describe the procedures that should be taken to reduce risk of contact with bodily fluids, and in the event of contact with bodily fluids, in first-aid settings.
7 During an under-16 Rugby League match, a player is spear-tackled by an opposing player, landing on his head and neck. The player remains still on the ground and is in clear distress. Propose appropriate management procedures to ensure the safety of the casualty in this situation.
8 Describe the signs and symptoms and appropriate management procedures for a heart attack.
9 Analyse how the particular safety issues associated with traffic accidents and water environments may raise legal and moral dilemmas for an individual.
10 Discuss strategies that can be used by a first aider to avoid legal implications.
11 Explain the difference between debriefing and counselling after a serious accident.

WS
Extra exam-style questions
Option 1 Assessment tasks
Assessment tasks

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OPTION 2: COMPOSITION AND PERFORMANCE

CRITICAL QUESTIONS

How do the elements of composition apply to different movement mediums? **203**
How are the elements used to compose movement? **222**
What is the role of appraisal in the process of composing and performing? **238**

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have finished this option you should be able to:

- develop, refine and perform movement compositions in order to achieve a specific purpose
- use a range of sources to draw conclusions about health and physical activity concepts
- analyse factors influencing movement and patterns of participation

KEY TERMS

achievement
appraisal
arrangement
arranging movement
creating movement
defining the purpose
dynamics
elements of composition
formations
improvisation
innovation
performance space
relationships
repetition
sequencing
time and rhythm
transition

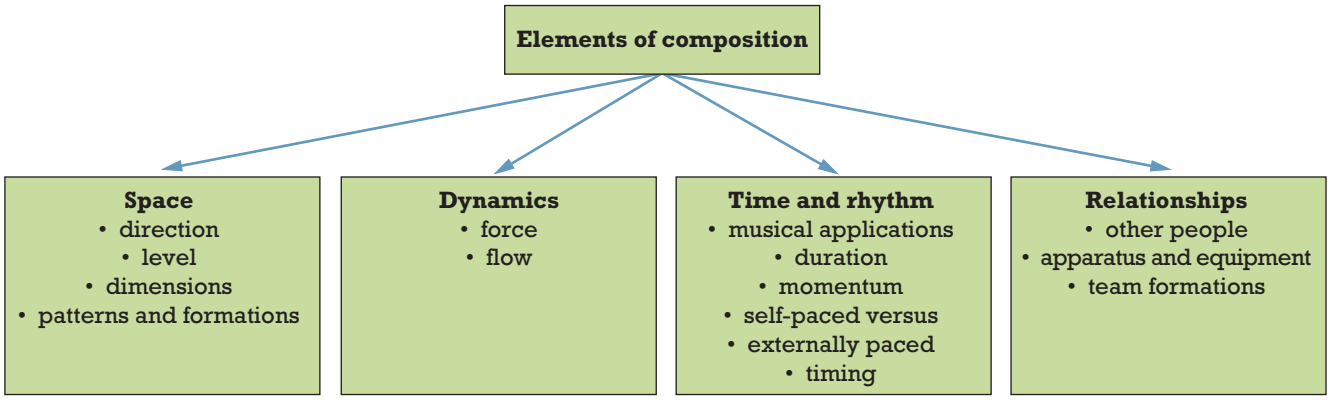
Getty Images/iStock/OSTILL

CHAPTER 10
Elements of composition and movement mediums

IN THIS CHAPTER

Space	**203**
Dynamics	**208**
Time and rhythm	**210**
Relationships	**215**

This chapter will discuss the four elements that make up a performance: space, **dynamics**, **time and rhythm**, and **relationships**.



SPACE

Physical space can be described as an area set apart or available for use. It may be identified as personal space, which is the immediate area around a person, or general space, which includes shared items around the person, such as a stage area, or equipment or goal posts in sport.

Strategies

Participate in a game of tennis using the dimensions of a badminton court. Comment on how this changed your strategies and techniques required to participate effectively.

Shutterstock.com/Norenko Andrey

Personal space is characterised by the area around the individual's body, otherwise known as the 'kinesphere'. The personal space around the performer may expand or contract.

Direction

Direction refers to the posture and movement of the body or body parts in relation to the space, audience and other performers. Direction used by performers includes forwards, backwards, right, left, down, up, diagonal and sideways.

Choreographers have their performers face a given direction to reflect their intent. For example, facing a corner may indicate fear or hiding, and facing on a diagonal indicates a focus for the next movement.

Basic geometric forms include straight lines or rows that extend from wing to wing, or from upstage to downstage. Choreographers may modify these by changing the direction the performer faces or by adding turns. Other examples of shapes and paths performers may use include the zig-zag, square, curve, circle, figure eight, serpentine and random patterns. Pathways may also be performed in a clockwise or counterclockwise direction.

Diagonal pathways are visually pleasing. However, the effect will change according to the performer's focus and direction, and whether the dancer is moving forwards or backwards along that diagonal.

In addition to horizontal patterns along the stage floor, performers such as those from Cirque du Soleil explore vertical space through movements such as lifts and jumps. They may use platforms and scaffolds to extend the vertical range of spatial design.

Alamy Stock Photo/Piero Cruciatti

Figure 10.1 Cique du Soleil performers explore vertical space in their routines.

Level

Level refers to movement up and down the vertical axis. The body can be moved through high, medium and low levels. For example, in sport aerobics, competitors will create routines that use high-level jumps, medium-level squats and low-level push-ups.

The high level occurs where the body shape is vertically long or where the body leaves the floor. These movements include vertical balances on rise, jumps and leaps. The high level may reinforce the idea of strength or power, and sometimes demonstrates uncertainty and a lack of stability. It may also be contrasted with the low level for a desired effect. An example of a high-level performance would be an Australian Rules football player leaping in the air to take a mark.

Newspix/Mark Stewart

Figure 10.2 Jeremy Howe of the Magpies takes a spectacular mark over Tom McDonald of the Demons during the 2017 AFL season. These players are high-level performers.

The medium level consists of **non-locomotor** and **locomotor** movement where there is contact with the floor by either the feet or hands, but not both. Locomotor movements include running, turning, galloping and sliding. Non-locomotor movements and shapes are unlimited, and are mainly dependent on the performer's skill level and creativity. The medium level is generally the most used in all forms of physical activity.

The low level involves the use of both non-locomotor and locomotor movement, performed close to the floor. Movements on the low level may include crawling, rolling, sitting, kneeling, and lying down on the floor. The low level may be used to represent fear, nervousness or hiding, but may also be used to convey the message of stability by using a low centre of gravity.

Thinking about space

1 Examine photographs and images of dances and gymnastics routines that
   a use circular and straight-line floor patterns
   b use low and high levels in space
   c take up a small amount and large amount of space.
2 Discuss what these dances might be about and why they use space in this way.

Dimension

Dimension refers to the size or extent of shape or movement. It involves height, depth and width. Words that describe dimension include wide, tall, narrow, thin, small, rounded, long, short, tubular, conical and spherical.

Performance space

The performance space is the area in which the activity is performed. In dance, the performance space is usually seen as being a **proscenium** stage, but it can be as varied as the choreography may determine.

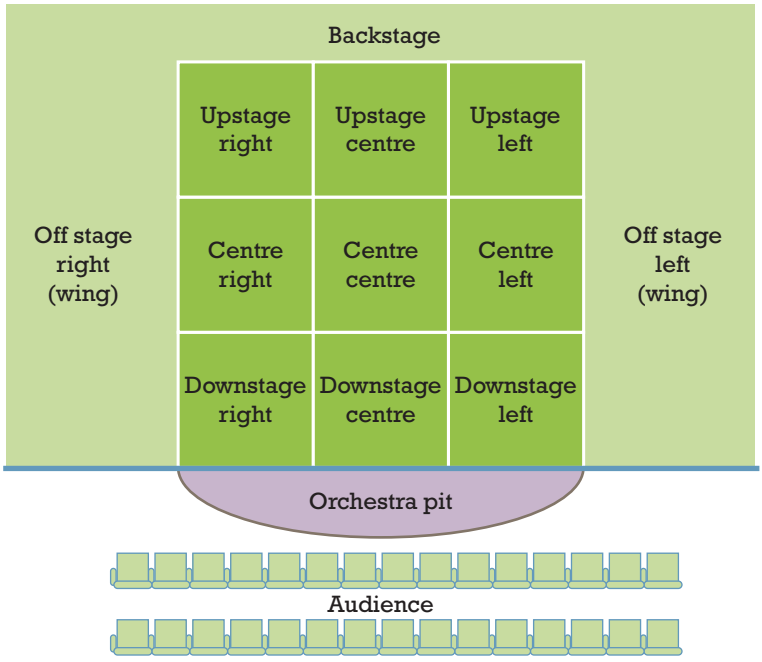


Figure 10.3 Proscenium stage

The performance space has strong and weak areas. For example, the centre stage is considered a powerful position and is used as the starting point for most performances. The corners of the space are considered weak areas. The strong and weak areas will be altered by the direction, shape and focus of the performer.

There is a close link between the idea of the performance and the spatial design. Spatial design will consider body shape, the pathways created on the floor and the pathways created in the air. For example, if the concept of a dance performance is fear, the fear point will likely be located in the left corner of the performance area. Most of the performance would then focus on moving away from the left corner, thus representing the performer looking to escape their fear.

Modifying the performance space may also affect the decisions made by the performer. For example, if a tennis court was shrunken to the equivalent size of a badminton court, the players would have to change their tactics, having lost length and width of the court. Alternatively, if badminton players expanded their game to a tennis court, this would create more opportunities for placing their shots into open areas on the court.

Similarly, if a gymnast was well rehearsed in a floor routine that involved a range of tumbling sequences, their ability to gain enough momentum to complete the tumbles may be limited if the floor dimensions were reduced.

In team sports, offensive teams are looking to create more space for them to be able to score points, while the defensive players are looking to reduce the space available by closing in quickly on the attack.

In football, players' ability to create space on the field is important to creating effective offensive plays. Coaches play a central part in helping players understand how to look for and create space. Knowledge of where the defenders are before receiving the ball will help the player understand where the space is.

The player's first touch of the ball should allow the attacking player to lead into space and set up their team for their next play. When in possession of the ball, the attacking player will be enclosed by defending players, which in turn will create space for the rest of the attacking team.

Getty Images/Bongarts/Dean Mouhtaropoulos

Figure 10.4 The dynamics of soccer involve the use of space by attacking and defending players

Patterns and formations

Floor pattern

A floor pattern is the pathway that the dancer takes when moving through space. It is also an indicator of where the dancer has been. The floor pattern can be any combination of straight, circular, curved, zigzag or spiral movement patterns. The floor pattern in a composition will also reflect the strong and weak areas of the performance space.

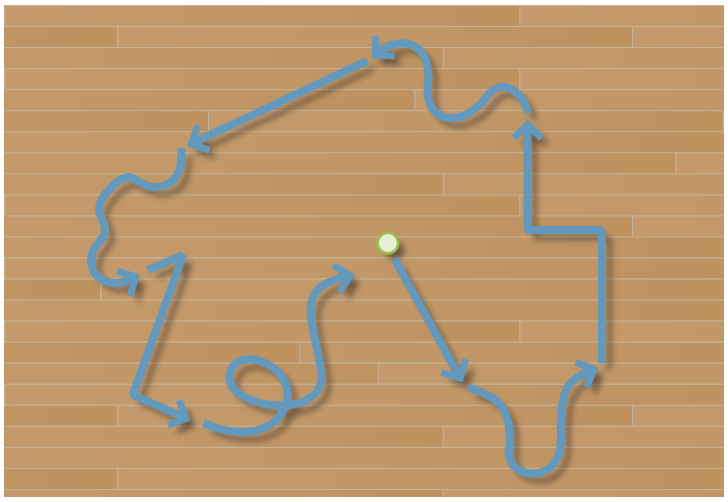


Figure 10.5 A floor pattern used by a dancer

Weblink

Movement patterns

Imagine there is no ball in play in a particular sport and observe the movement as pure movement. What patterns and formations do you observe?

A **choreographer** will make use of a floor pattern prior to the performer actually performing. An example of where this is essential would be when preparing for a large event, such as the opening ceremony of the Olympic Games. It would be chaotic if thousands of performers did not know exactly where they should be and what they should be doing.

In sport, a range of offensive and defensive patterns and formations are used. In cricket, the type of fielding pattern used depends upon the type of competition played (test, one-day or Twenty20), the types of shots the batter likes to play and the strengths of the bowler. A team that is behind and needing to score quick runs would be aiming to hit boundaries; therefore, the fielding team would be looking to protect the boundaries by placing fielders in key outfield areas.

In hockey, attacking formations are used extensively when setting up for short corners. Most teams have a range of plays available, depending on the strengths and weaknesses of the defensive team.

Small tennis

Participate in a game of tennis using the dimensions of a badminton court. Comment on how this changed your strategies and on the techniques required to participate effectively.

Space and movement

Watch a basketball, netball or hockey game. Explain how the elements of space apply to these games.

Aerobics

Working in small groups, watch video footage of an aerobics routine, then design and demonstrate how the routine could be enhanced by varying direction and formation.

Analyse

Analyse the photo at right and give an outline of each of the following elements:

a direction
b level
c shape
d dimension
e personal space
f possible interpretations.

Shutterstock.com/AYakovlev

DYNAMICS

Dynamics involves the variation of force and flow. The degree to which these two factors are utilised produces a range of movement qualities. Movement quality refers to the look or artistic view of a work, and is how someone would describe the feeling of the work. To achieve effective movement quality, the choreographer employs dynamics. Dynamics describes how the body moves, and is the element that gives dance its expressiveness.

Force

Force gives movement a sense of lightness or heaviness. Force is the intensity of the release of energy, and reflects how the dancer actively uses their body mass, on a scale from light to strong. How force is used creates particular dynamics, and therefore achieves the required quality.

A light action, such as a classical ballet performance, involves the body moving, giving an impression to the audience of almost weightlessness. A strong action, such as a sports aerobics performance, has the performer's full body mass behind the movement. In this case the body gives in to heaviness, and a feeling of sinking into the floor.

Shutterstock.com/doodko

Figure 10.6 A dancer holding a pose

Release of energy

Release of energy depends on the amount of force used to make movement occur. Words that describe release of energy include sudden, slow, strong, jerky, sag, forceful, sustained, collapse and swing.

If a movement is sustained, then the release of energy will be slow. Movements that are sudden and sharp require a fast release of energy. Varying the speed of energy release throughout the movement will cause the dancer to either speed up or slow down.

Rudolf Laban studied the language of movement. Laban's studies initially began in the dance sector and expanded to include education applications and movement rehabilitation. **Laban Movement Analysis** (LMA) is a language and method used to document, interpret, visualise and define all variations of human movement.

Laban's eight efforts assist in connecting the quality of a specified movement, and in expressing the type of force, energy and attack required for each style or theme. The efforts may also be utilised as a theoretical foundation for varying or investigating choreographic elements, as well as to create ideas through **improvisation**.

The eight efforts also help to clarify and provide language for identifying features of movement that describe various dance expressions or methods. For example, Modern Dance symbolises efforts such as 'press' or 'wring', while Ballet can be categorised by the terms 'floating', 'dabbing' and 'gliding'.

Table 10.1 How the three elements of weight (force), space and time combine to produce eight basic effort actions

Effort	Weight	Space	Time	As if ...
punch	strong	direct	sudden	'striking like a boxer'
press	strong	direct	sustained	'moving a piano'
dab	light	direct	sudden	'catching a butterfly'
glide	light	direct	sustained	'skimming along ice'
slash	strong	indirect	sudden	'slicing tall grass with a sickle'
wring	strong	indirect	sustained	'squeezing water from a towel'
flick	light	indirect	sudden	'shooing away a mosquito'
float	light	indirect	sustained	'wafting among the clouds'

Source: Rudolf Laban, www.artsalive.ca/en/dan/make/toolbox/elements.asp

Flow

The flow of movement also lies on a scale, this time the range existing from 'free' to 'bound'. A free movement proceeds unopposed and unrestrained. An example of this is seen in a rhythmic gymnast's ribbon routine. The ribbon must always be moving, and the gymnast uses a range of graceful movements to provide the audience with a feeling of freedom.

Alamy Stock Photo/Olena Buyskykh

Change of routine

Using an existing video footage for an aerobics routine, design and demonstrate (in small groups) how the routine could be enhanced by varying direction and formation.

A **bound** movement is one of careful precision that is highly controlled and can be stopped at any moment. For example, when the rhythmic gymnast is practising to use the clubs, this would involve a lot of stoppages, requiring control.

Force and flow

Watch 10 minutes of a game of tennis or football. Describe where force and flow are used throughout the match, and identify how changing dynamics can achieve the communication ideas.

TIME AND RHYTHM

Time can be defined as a limited period during which an action or process exists or takes place. Rhythm is a difficult concept to define because it is open to a variety of interpretations. Our understanding of rhythm is that it is an identifiable flow of movement and/or sound. The word rhythm originates from an ancient Greek word, 'rhio', meaning 'to flow'.

Musical applications

Beat

The beat in music can be regular or irregular. Regular beats give the feeling of steadiness and strength. They are like a clock ticking by itself, and are used in marches and standard dance music, such as a waltz. Irregular beats provide an opportunity for unpredictability due to the lack of continuity, suggesting uncertainty and doubt.

Alamy Stock Photo/Jerónimo Alba

Figure 10.7 Ballroom dancers performing a waltz

In classical music, the beat is flexible and is an expressive element, hence the need for a conductor to show the beat through the up and down movements of their baton. The conductor helps the musicians stay together on the beat. Popular dance and rock music, in contrast, usually has a steady never-ending beat such as that indicated by a drummer.

A **measure** is a grouping of beats. If a piece of music has four beats to a measure, the first beat is considered strong. The second beat is usually heard as being weaker than the first, the third beat strong and the fourth beat weak.

Tempo

Tempo can be defined as the speed of the beat. Tempo will generally have three main classifications: fast, medium and slow.

Fast tempo

Fast tempo can give movement the feeling of hurrying, nervousness or a build-up in excitement or power. An example of fast tempo would be dramatically falling to the floor.

Medium tempo

Medium tempo can suggest a feeling of steadiness or variability. An example of medium tempo would be when a performer uses gallops to move around the floor.

Slow tempo

Slow tempo could be associated with fear, comfort, pain or fatigue. An example of slow tempo would be when a person crawls slowly across the floor and into the foetal position, creating a feeling of either comfort or pain.

Getty Images/blanaru

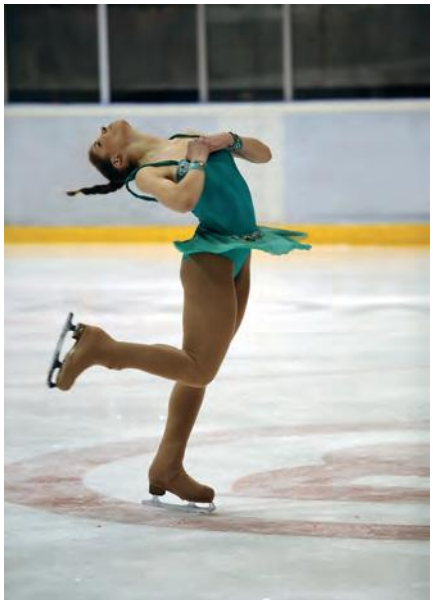
Accent

An **accent** highlights or emphasises a piece of music. A unit of time in music is referred to as a bar. Most accents occur at the beginning of the bar. An accent in music is created whenever a music tone sounds. If a tone is played or sung loudly or with a unique quality, the tone is said to have a strong accent.

A performer creates an accent whenever they take a step. They can create a strong accent by making a step larger than usual, or by delaying the step slightly and then stepping quickly to arrive on the beat. For example, a dancer may accent a step by stomping their foot or by making unusual moves with their upper body.

Duration

Duration is the length of time it takes to complete a movement, a dance or 'work'. Some movements may take several beats to complete, such as a sustained balance or extension, while others, such as a jump, will be completed within a single beat. Choosing the duration of a movement will often be linked to the intent of the performance and may be linked to the use of variety and contrast.



Getty Images/technotr

When an accent occurs at regular intervals, metre is produced. **Metre** is the grouping of beats around an accent. This establishes regularity in timing. It provides a predictable structure that supports and propels the movement.

Momentum

Momentum is linked to increasing or decreasing speed. Increasing speed gives the feeling of building intensity or climax, while decreasing speed provides contrast to a climax, weakening, depression or winding down.

Sportspeople and teams look to gain momentum throughout their season, with the aim of peaking

for the finals. A gymnast, dancer or aerobic athlete will vary the momentum throughout their performance to create a contrast in feelings for the audience. An example of this is in a gymnastic floor routine, where the audience appreciates the finesse and graceful movements of holding a position or a demonstration of flexibility, then gets excited by a tumbling routine.

Self-paced versus externally-paced

Self-paced activities

Self-paced activities allow the performer to complete an activity at their own speed and according to their own skill level. In gymnastics, performers are able to participate and compete in their sport based on self-paced practices. Other examples of self-paced activities include a golf swing, a tennis serve or hitting a softball off a tee.

Externally-paced activities

Externally-paced activities are influenced by a range of external factors. In dance and aerobics, the performers are influenced by the music they hear and feel. In activities such as batting in cricket, the performance will be externally-paced by unpredictable factors such as the bowler, the pitch and possible environmental conditions, such as wind and rain.

Design a self-paced routine

Use the following list of action words to design a self-paced performance routine. Once completed, add two forms of music and attempt to perform the same routine.

run	float	kick	stamp	close	creep
skip	soar	punch	inflate	shrink	bound
swing	spring	flick	grow	wither	balance
leap	vault	shimmy	rise	collapse	listen
gallop	perch	tremble	extend	squeeze	vibrate
slide	settle	wiggle	spread	melt	explode
roll	pause	flee	swell	drip	sink
bend	hold	dart	open	jab	freeze

Timing

Timing is very important when performing. This may be related to the timing required to work together in a team or group performance, or it may be timing related to a piece of music. It is quite evident when a performer is out of time with the remainder of the group, and this will impact on the audience appreciation and possible judges' scoring.

Choreographers use timing with their performers in a number of ways, such as:

- going faster or slower throughout the performance
- varying the length of movements, which allows the movements to be elongated or sped up compared to the original choreography
- adding accents
- using freestyle timing, as opposed to the typical choreography to a regular beat
- changing the style of music, such as replacing a $\frac{4}{4}$ with a waltz.

Time may also be organised in other ways, such as clock time, sensed time, or event-sequence.

Clock time

In clock time, the performance is based on units of seconds, minutes or hours. For example, a specific piece of a performance may be allocated a time limit, such as 60 seconds, where each of the choreographed movements should fit.

Sensed time

In sensed time, performers take on another performer's timing, such as progressively moving from a walking to running tempo by working from each other's cues, instead of a music score.

Event-sequence

Event-sequence timing refers to when an internal or external performance experience may result in a follow-up performance by another group. An example is when a sporting team scores and the cheerleaders respond with their own celebratory performance. This occurs throughout a match and the cheerleaders perform planned routines until the completion of the match.

In sport, timing the ball is essential to being able to complete an activity effectively. Poor timing in baseball will result in a foul ball, an outfield catch or an easy out for the fielding team.

In golf, poor timing could result in the ball not being hit straight and instead landing in the bunker, trees or water. This result, in turn, sets up the next shot to be in a less than desirable position, and probably a more difficult opportunity to achieve a good score for the hole. See the case study below.

IMPROVING YOUR GOLF SWING TEMPO AND TIMING

… Good timing in the golf swing is found when the proper sequence of motion produces correct body and club position at impact. Good timing is a product of consistently producing good rhythm and tempo. Or, simply put, consistent tempo and rhythm leads to consistent timing – thus more consistent golf shots.

Someone who swings his or her clubs with a tempo faster than the ideal, or with uneven rhythm from club to club, has trouble hitting solid golf shots? When you see someone else swing, or make a swing yourself which results in poor balance, the culprit is often improper tempo or rhythm resulting in poor timing at impact.

Source: www.golfproductnews.com/golf-swing-tempo-rhythm-timing

Alamy Stock Photo/Findlay

Figure 10.8 Karrie Webb at a recent golf tournament in Scotland

Time and rhythm comparison

1 Analyse video footage of a golf swing, a runner, a dancer, a gymnast and a sports aerobics competitor.
2 Observe how the **elements of composition** are used.
3 Compare the use of time and rhythm for each activity.

Time and force experiment

1 While seated at their desks, each student in the class should move their arms very fast and freeze when they think a minute is up. Keep track of the time of the first and last person to stop.
2 Perform the same activity again, but with slow-moving arms. Check the difference in time between the first and last freezes.
3 Finally, move your arms for five seconds at a time. Use energy in different ways each time, such as heavy/light, smooth/sharp, tense/loose.
4 Discuss as a class how this activity relates to time and force.

Timing experiment

Investigate how time is used by participating in the following activity:

1 Stand up and sit down at your desk, taking a set amount of time (eight counts, four counts, two counts, etc.).
2 Change places in the room within a set amount of counts.
3 Vary the number of counts to do either of these things.
4 Try combining the two ideas. Stand up, change places, and then sit down. Use a specific number of counts for each movement or a total number of counts to complete all three movements.
5 Experiment with music.

RELATIONSHIPS

A relationship is the communication or link between things, be they performers to each other, performers to objects, or a performer's body parts to each other. Awareness of relationships is encouraged by learning about the concepts of connecting, leading, following, meeting, parting, near, far, passing by and surrounding.

Other people

Audience

The audience plays a large role in any performance. If the audience is receptive to what it is viewing, this in turn encourages the performer to continue or even improve their efforts. If a match is being played between two teams, such as Australia and England, where a traditional rivalry exists for players and spectators, home-ground advantage adds a distinct benefit for the home team. Many athletes, when interviewed, refer to the audience 'pumping them up' and giving them the motivation to succeed.

Getty Images/Ryan Pierse - CA

Figure 10.9 An enthusiastic crowd, such as this one at an Australia v England cricket match, contributes to the players' motivation.

ALL THE WORLD'S A STAGE: IMPACT OF AN AUDIENCE ON SPORT PERFORMERS

If, as William Shakespeare said, all the world's a stage and all the men and women merely players, then nowhere is this more apparent than in sport. A total of 1.84 million people attended matches in the 2003 Rugby World Cup; 1.17 million attended matches in the 2004 European Soccer Championships; and 3.60 million attended the 2004 Olympic Games in Athens. There are many examples of sport performers being affected because they have to perform in front of an audience. For example, when talking about the reaction of the home supporters to a frustrating draw, Jermaine Jenas, who plays for Newcastle United soccer team in the English Premier League, said 'The supporters get frustrated, just as the players do, but it's important that they stick behind us and try to remain positive. What they do is often projected onto the pitch. We know they are feeling a bit nervous …'

Jones, MV, Bray, SR and Lavallee, D, 2007, 'All the world's a stage: impact of an audience on sport performers', in Jowett S, Lavallee D (eds), *Social psychology in sport*, Champaign, IL (USA), Human Kinetics, pp. 103-113

Reflection

Imagine you were playing in a basketball grand final and with only seconds remaining you were fouled while taking a shot. Your team is behind by one point and the two free throws you are about to take, if made, will win your team the grand final. The crowd is split in their allegiance, with some cheering, and others jeering. How are you feeling? What thoughts are going through your mind?

Other performers

Other performers can also encourage the individual or team to raise their level of performance. Whenever Australia plays against New Zealand, both teams 'step up' and perform their best in whichever sport is being played. The Queensland rugby league team are renowned for the way they grow in confidence and ability when they proudly wear the maroon jersey.

In contact dance, the connection between the dancers is made by direct body contact and may be achieved with the thighs, hips, chest, cheek or back, depending on the style of dance, the link required for a particular move, or the vibe of the music. Contact dance uses all three levels, from moving on the floor to riding high up on someone's shoulder. The degree to which a dancer trusts their own body will determine how much they trust their partner.

Mirroring

Work in pairs and mirror your partner's movements. Begin with slow, smooth movement. Change leaders and begin with slow, smooth movement again, then progress to sharp movements.

Which movements are easier to follow – smooth, slow movements or fast, sharp movements?

Unison and contrast

In groups of five or six, design a 30-second routine that demonstrates unison and contrast among all group members.

Apparatus and equipment

The type of apparatus or equipment used is very important relationship to a performer. A softball player's mitt must not only fit correctly, it must also be one they feel comfortable with and can use effectively. The mitt is an extension of the arm and hand and as such is crucial in contributing to the athlete's performance.

Snow skiers and boarders are required to adjust their styles and intensity according to the surface of the snow. The rope and ribbon in rhythmic gymnastics are both extensions of the body, as are the tennis racquet, cricket bat and baseball bat for each respective sport. If the apparatus or equipment does not feel right, such as being too heavy or difficult to manoeuvre, then the performer is likely to deliver a poor performance.

Gymnasts clearly have a strong relationship with the apparatus and equipment they use. Artistic gymnasts are required to use a range of apparatus, such as floor, bars and vault as part of their competitive routines, and to be the overall winner, they must master all apparatus. Rhythmic gymnasts must be able to master a range of equipment, including the ribbon, ball, hoop, rope and clubs, as part of their competition routines.

Team formations: positional play, partner work

In aerobics and dance, an effective group routine performance relies on all members maintaining synchronised routines and organised team formations. If a performer forgets a part, this will be obvious to the judges and the team will be penalised accordingly. Therefore, communication during practice time is essential. This is why the choreographer plays such an important role in the overall team performance.

In sport, formations refer to the way a team lines up its defence, midfield and forward line at the beginning of the match. The relationships between the players' positions may change according to the situation. For example, a midfielder may move back for a period of time to assist their teammates in defence and then return to their original position in offence. Following are some examples of how defensive and offensive formations are used in sport.

Alamy Stock Photo/Roman Lacheev

Figure 10.10 Effective group aerobics routines rely on communication between the performers

Group formations

Using a sport or activity of your choice, analyse the purpose and benefits of various group formations.

Defensive formations in soccer

When referring to formations in soccer, defenders are listed first, then midfielders and forwards. For example, a 4-4-2 formation has four defenders, four midfielders and two forwards. Goalkeepers are not counted because this position does not change.

The most effective coaches are not necessarily the ones who devise the best formations, but rather, are the ones who devise the best formation for their team to use its strengths and to hide its weaknesses.

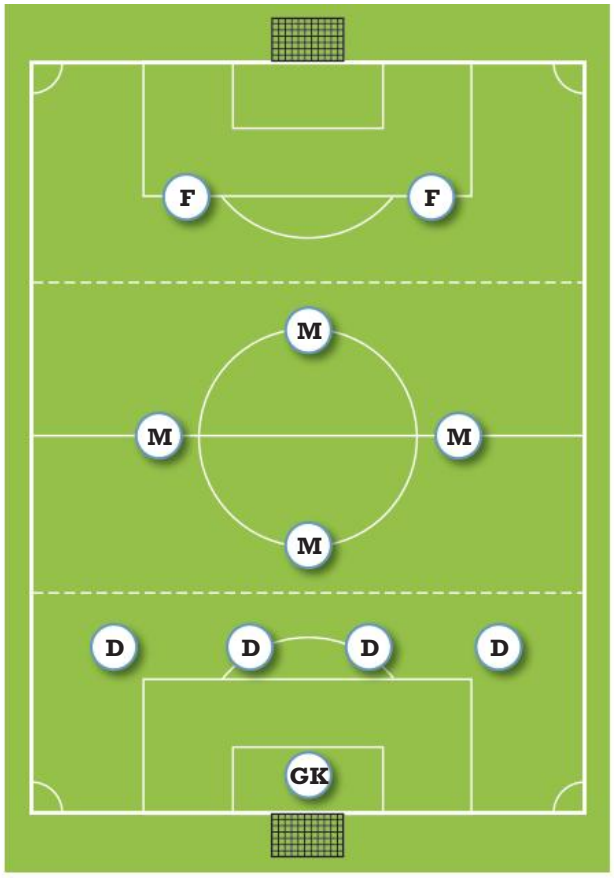
4-4-2 formation

The 4-4-2 formation is one of the preferred formations of today's game. A forward is moved into the midfield, putting a lot more pressure on the two players up front to score goals. The theory is that using another player in the midfield bottles up the opposition in the midfield before they can get to the attacking third.

3-5-2 formation

Most soccer games are won or lost in the midfield, which is why the 3-5-2 formation is popular. A team that doesn't have its midfield operating at peak efficiency suffers in ball possession and scoring chances. Therefore, many coaches like to use as many as five midfielders to try to control the ball and the game.

A coach would not change a team's formation drastically during a match, particularly for young or inexperienced teams, who may get confused. For example, if a team is trailing and trying to tie up the match, taking out a midfielder for a forward may work. If a team is leading, replacing a midfielder with a defender and/or a forward with a midfielder may also be an effective tactical move.



D Defender GK Goalkeeper F Forward M Midfielder

Figure 10.11 4-4-2 formation

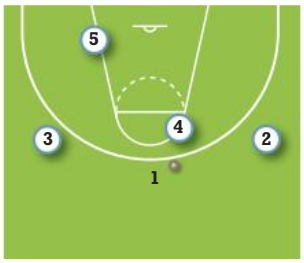
D Defender GK Goalkeeper F Forward M Midfielder

Figure 10.12 3-5-2 formation

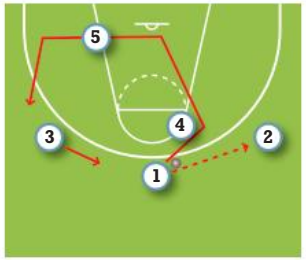
Offensive formation in basketball

1-3-1 formation

Basketball requires a range of offensive formations throughout a game. Figure 10.13 shows how a team may create a 'strong side' formation, which allows the attacking team to create more scoring opportunities.



1 Start position is a 1-3-1 with a point guard (1), two wing players (2 and 3), a high post (4) and a low post (5)



2 The play should start on the weak side, where there are fewer players. Player (1) passes the ball to player (2)

3 The player on the high post (4) makes a cut down the key then moves to the low post. the low post (5) cuts to the basket and moves to the high post position

4 With both post players 'ball side' they create a 'strong side', where 4 players create an offensive threat

Visual analysis

Analyse the photo below and, based on the information in this chapter, complete the following table.

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Direction	
Level	
Shape	
Dimension	
Personal space	
Possible interpretations	

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CHAPTER SUMMARY

- Space can be identified as personal space or general space.
- Direction refers to the posture and movement of the body or body parts in relation to the space, audience and other performers.
- Level refers to movement through high, medium and low levels.
- Dimension refers to the size or extent of shape or movement.
- Modifying the performance space impacts on the decisions made by the performer.
- In sport, a range of offensive and defensive patterns and formations are used.
- Dynamics describe how the body moves and gives dance its expressiveness.
- Force gives movement a sense of lightness or heaviness. Flow of movement lies on a scale from free to bound.
- Time is a limited period during which an action or process exists or takes place.
- The word rhythm originates from the ancient Greek word 'rhio', meaning 'to flow'.
- A beat can be regular or irregular. Tempo has three main classifications: fast, medium and slow. An accent highlights or emphasises a piece of music.
- Duration is the length of time it takes to complete a movement. When an accent occurs at regular intervals, metre is produced.
- Self-paced activities allow the performer to complete an activity at their own speed and according to their own skill level. Externally-paced activities are influenced by a range of external factors.
- Timing is required to work together in a team, group or piece of music.
- A relationship is the link between performers, objects, or a performer's body parts.
- The audience, performers, opponents, team members and partners all play an important role in performance.
- An effective group performance is reliant on maintaining organised team formations.

CHAPTER REVIEW ACTIVITIES

1. Name the four elements of composition and list the components associated with each element.
2. Outline the difference between symmetrical and asymmetrical shapes. Give specific examples.
3. Describe how space and direction may be used in a performance.
4. Compare the use of locomotor and non-locomotor movement.
5. Design a floor pattern for a gymnast performing a floor routine.
6. Discuss how force and flow may be applied to a sporting performance.
7. Evaluate the effectiveness of applying a beat, tempo and accent to an aerobics performance.
8. Identify how a performer's body **alignment** plays an important role in the coordination of movement.
9. Select a sport of your choice and analyse its association with duration, momentum and timing.
10. Explain how body planes may be applied when performing a dance sequence.
11. Assess how a range of points of contact may be used to enhance a performance.
12. Examine the relationship that exists between other people during a performance.
13. Justify reasons for the use of apparatus or equipment within a performance.
14. Investigate the use of team formations from both an offensive and a defensive perspective.

Getty Images/iStock/OSTILL

CHAPTER 11
Elements used to compose movement

IN THIS CHAPTER

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A2 GYMNASTICS

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The process of combining and arranging movement 231

SELECTED MEDIUM 1: DANCE

In this section, students are to specialise in a selected medium in order to develop and perform a movement composition. In your composition, you apply those elements that have relevance to your medium.

THE PROCESS OF CREATING MOVEMENT

Motivating factors

The purpose or motivating factors that may be used to compose movement can come from a range of stimuli, which may be visual, auditory, tactile or based on themes and ideas. Ideas to inspire dance-making can come from many sources, such as personal experiences and feelings, the environment, observation, the imagination, memories and current affairs.

Not all themes or ideas lend themselves to movement. Some might not appear to have potential for movement at first glance, but may prove stimulating upon reflection and discussion. Many of these ideas can be used to tell a story, demonstrate specific skills, to entertain or to challenge the audience's feelings and ideas.

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Express a mood in movement

Select a feeling or attitude (for example, conflict, pity, peer pressure), then examine possible motivations for it. Create a short movement study to express this mood, feeling or attitude.

Express a song in movement

Using a song and focusing on the chorus section, interpret the mood or meaning of the words in the chorus and develop a sequence that represents the song.

Generating movement relevant to the purpose

From the stimulus, dancers develop a concept. From the concept, the dancer will look to **improvise** and generate movement to develop an image that best represents the purpose. The movement is usually personal and original to the choreographer.

For example, if the choreographer selected the starting point as 'dreams', they would begin by coming up with ideas about dreams, such as running, nightmares, creatures, images, friends, flying, colour, falling, places, peaceful and floating.

Having decided on the theme or idea, the choreographer would create concept maps of possible movements for further exploration. For example, if 'nightmares' was selected, the choreographer would determine which actions, dynamics and space concepts would be associated with it.

Exploring variations and improvising

Choreographers can use manipulation to create movement variety in any dance form. They change the use of space, timing, energy and body shape, or have dancers perform the same actions on different pathways with a different use of focus or body movements.

The creation of improvised movement material is made possible through a variety of creative movements, including body mapping, levels, shape and dynamics, sensory experiences and contact improvisation. Dance improvisation is not about creating new movement, but rather, freeing the body from regular movement patterns.

Improvise with props

Improvise movement by exploring use of props and accessories, such as chairs, masks, tunnels and streamers. Explore the potential and the restrictions created by the props.

Belly dancing is one of the most commonly improvised dances because dancers have live music to dance to, or because the songs are changed every time they are performed. Professional belly dancers sometimes dance several times a week and do not have the time to choreograph individual dances for every piece of music.

One of the more modern styles of improvisation is known as Contact Improvisation. It is a way of dancing playfully with a partner, based on physical sensation, and investigates how to play through sharing touch with surfaces, with gravity and with other dancers.

Some choreographers refer to Contact Improvisation as a moving massage. They see it as a dance that fine-tunes the senses and awakens the ability to listen and respond to what is happening in the moment. What makes it different from other dances is that partners are often

moving in and out of physical contact while rolling, spiralling, springing and falling. They find ways to have fun and improvise while supporting and following each other's movements. The dancing is unpredictable and inspired by the physical and energetic contact the partners share.

BEING IN THE ZONE: PHYSIOLOGICAL MARKERS OF TOGETHERNESS IN JOINT IMPROVISATION

Performers improvising together describe special moments of 'being in the zone' – periods of high performance, synchrony, and enhanced sense of *togetherness*. Existing evidence suggests a possible route for attaining togetherness – interpersonal synchrony, the fine-grained sensory-motor coordination that promotes social connectedness …

Experienced musicians, actors, and dancers describe peak moments of high performance and synchrony during joint improvisation. These moments are referred to as 'being in the zone' – a state of 'unselfconscious awareness, in which every individual action seems to be the right one'. Subjective reports suggest a strong sense of togetherness in such moments, marked by dissolution of the self-other boundaries. These special moments, arising from a continuous coordinated interaction between people, are defined here as moments of togetherness …

Source: Noy L, Levit-Binun N, Golland Y, 'Being in the zone: physiological markers of togetherness in joint improvisation', ***Frontiers in Human Neuroscience*****, 2015, p. 137, http://doi.org/10.3389/fnhum.2015.00187**

Shutterstock.com/Monkey Business Images

Figure 11.1 Teaching choreography

Smooth and sharp

1. Divide a space into three parts: left, middle and right.
2. Designate the left and right sides of the space as the areas where smooth movement occurs, and use the middle space for sharp movements (or vice versa).
3. Improvise movements in the designated spaces.
4. You may move freely among the three spaces.
5. The class then divides into two groups and watches each other.
6. Assess whether the dancers are actually moving smoothly in the smooth areas and sharply in the sharp areas.

Groups

1 Using a movement sequence of 16 counts, and with the class divided into four groups, each group begins the sequence four counts after the preceding group.
2 As a class, view a dance or sequence and discuss the choreographic principles and structures that exist.
3 Describe how the choreographer manipulated and developed the elements of movement.

THE PROCESS OF COMBINING AND ARRANGING MOVEMENT

Rules and conventions of the medium

Principles of composition

Principles of composition are tools or devices that have proven useful in creating effective and interesting dances. The principles used will vary according to the choreographic purpose.

All dances need to begin somewhere, and then build in intensity and interest, reaching a high point known as the climax. A climax can be created in many ways. For example, dances can increase in intensity of energy and speed to a high point, before decreasing to a lull.

One rule is that dancers need to move from point A to point B. One of the simplest actions for moving through space is a random walk. This can be achieved by just walking around and changing direction at any given time. Other basic actions include moving forward, backward or sideways.

Contrast

Contrast is also a general requirement of dance, and can be achieved by combining unlike movements. Movements can differ in action, body, dynamic, space or relationship concepts.

Unity

Unity is an essential part of performing. When all the parts work together to contribute to the whole dance, there is unity. Every movement, no matter how brief, should work towards the intent of the composition. Unity is achieved when the removal of any portion of the composition damages the whole dance.

An example of a dance that lacks unity is one in which all movements seem at first to have the same character or ambience about them, but then suddenly a movement or series of movements appears that is very different in feeling. Such movements do not fit with the feeling of the choreography; rather, they stand out as distinct from the essence of the piece and interfere with the interconnectedness of the dance. It is easier for observers to absorb and get involved in a piece of choreography that maintains unity because it has the capacity to attract and hold the audience's attention.

Three-minute dance

Design and perform a three-minute group dance that uses **repetition**, contrast and unity to demonstrate the process of combining and arranging performance.

Sequencing

Sequencing and development refer to the ordering of movement (sequencing) in a meaningful way (development). When movements are purposefully connected to each other, they gain significance and take on meaning. As the dance unfurls, each movement and idea should grow logically out of the previous one. This creates continuity, helping the audience follow the purpose of the dance.

Choreographers consider each movement and ensure that it contributes to the whole dance composition. When sequencing movements and dance sequences, the dancers should be encouraged to use their understanding of the principles of composition. Dancers should be given the opportunity to contribute to the movement sequence; this is essential in order for their dance experiences to take on meaning.

Playing with movement sequences

Transform a short movement sequence based on an element of everyday life (for example, sports, getting ready for school) by repeating, distorting or eliminating sections.

Transitions

Continuity is an important feature when preparing a strong piece of choreography. Choreography with continuity progresses in a way that leads to a rational finale. The weight of choreography is focused on the method, with the objective of carrying the observer along with the performance. The choreographer delivers a natural and controlled set of phrases to ensure that one movement phrase leads naturally into the next. To achieve this continuity, the choreographer must use **transitions**.

Transitions are used when movements and dance sequences require connection. Transitions should work towards the purpose of the dance composition by connecting the movements and dance phrases in a meaningful way.

Transitions from one sequence to the next are an important part of the choreography and add to the unity of the performance. However, if the movement from one phrase to the next is obvious, the transitions have been poorly developed and/or performed. Poor transitions divert the audience from the intent of the performance because they draw attention to the **arrangement** and purpose of the choreography, rather than allowing the audience to focus on the overall emotion and intention of the performance.

Repetition

Repetition of movement sequences or parts of sequences can be reassuring for an audience. This provides the audience with an opportunity to see the movements in more detail, allowing them to become familiar with the movement vocabulary the choreographer is using.

Some repetition is acceptable to dance arrangement. Particular phrases must be repeated in choreography so the audience can observe those movements again and recognise them. Repetition provides a feeling of conclusion to a piece. It reinforces movements and phrases that are critical to the performance. Effective repetition of movements generally transpires later in the performance.

Repetition can also be used to give movements emphasis. When used effectively, repetition can also help create unity by relating parts of a dance to each other. Some choreographers use repetition to create a hypnotic effect, or to build tension.

Variation

Using variety within dance can engage and hold an audience's interest. Variety can be incorporated in several ways, such as by using unlike movements, varying dance phrases in length and structure, and varying spatial, dynamic, body, or relationship aspects when movements or phrases are repeated.

1 One way to include variety is to avoid repeating a movement or phrase in the exact way each time it is included in a work. Try changing the direction, use of energy, or timing of a selected movement.
2 Another method of varying movement is to avoid repeating the movement or phrases on both sides of the body. Constant repetition of a movement right to left or left to right is predictable and uninteresting. Stop and reconsider when you begin to fall into this pattern. Develop a phrase that has one continuous thread of action and that avoids repeating the same movement on the right and then left sides of the body.

Getty Images/Patrick Riviere

Create variations

1 Divide the class into two groups. One group's role is to create a dance routine that uses six movements. The second group's role is to create five transition movements.
2 Both groups then work together to combine their movements and form a dance sequence.
3 Using this routine, experiment with the variations of movement (length, space and body formation).
4 Discuss the impact these variations have on the performance.

Cha-cha

1 Learn the skills required to perform the cha-cha ballroom dance.
2 Practise the techniques required and work in pairs to refine the correct movements.
3 Describe what it felt like to learn a new skill and explain how you approached the refinement of movement.

DANCE ISN'T ABOUT THE FLASHY MOMENT

Julie Diana for *Dance Magazine*

Brenda Daniels includes in her syllabus a quote from Merce Cunningham describing how every movement is just as important as the next. 'We don't prioritize big steps – we show how every tendu or gesture with the arm is fully investigated and embodied,' she says. 'I want my students to understand that dance isn't about the flashy moments, but the connecting steps or moments in between.'

Thinking about how movements connect is a more mature concept than basic vocabulary, alignment or coordination, but it's one that can be introduced early on and emphasized throughout a dancer's training. Let class be an opportunity for students to develop the quality and artistry of each transition step. 'Like any other correction,' says Daniels, 'if you emphasize the idea again and again, students start to incorporate it on their own.'

Source: www.dance-teacher.com/theory-practice-art-transition-2392823896.html

Question

Do you agree with the passage above? Why/why not?

SELECTED MEDIUM 2: GYMNASTICS

Modern gymnastics was developed by a German doctor in the early 19th century as a series of exercises for young men. In 1896, gymnastics featured in the first summer Olympic games. In 1928, women were permitted to enter in 'artistic gymnastics' team events and by 1952, a full women's Olympic program was in place. Rhythmic gymnastics was added to the 1984 Olympic games.

While the men focused on displaying power in their routines, the women concentrated on gracefulness and creativity. A woman's floor routine required low levels of tumbling, leg holds, lunges, turns and leaps, which were elements from men's routines, but performed, preferably, with feminine elegance.

Ballet entered the sport as numerous ballet dancers converted to gymnastics and adapted their floor and beam routines to include greater rhythm and beauty. Recently, women's gymnastics has developed routines considerably closer to men's routines. Women now perform increasingly difficult somersaults and twists, and display far greater levels of strength.

Men complete artistic gymnastic routines on the floor, pommel horse, rings, parallel bars, high bar and vault. Women complete artistic gymnastics routines on the floor, beam, uneven bars and vault. Women also compete in rhythmic gymnastics using four out of the five possible apparatus: ribbon, rope, hoop, clubs and ball.

THE PROCESS OF CREATING MOVEMENT

Defining the purpose or motivating factors

The purpose or motivating factors to participate in gymnastics and compose movement may come from a range of stimuli.

Parents are motivated to involve their children in gymnastics for many reasons. Gymnasts learn about fitness from a practical standpoint. They learn the benefits of warming up prior to exercise and the requirement of practising and listening to a coach.

Gymnasts are motivated by experiencing success, as they learn to control their body and complete progressively more difficult gymnastic skills. There are many health benefits associated with gymnastics. Health professionals note that participating in gymnastics at an early age helps reduce the risk of obesity and health issues connected with an inactive lifestyle.

Weight-bearing activities such as gymnastics build strong muscles and bones. The nature of skills executed by a gymnast have been shown to develop positive body alignment and a healthy posture. Gymnasts require physical strength and endurance. A gymnast must develop excellent upper-body strength in order to raise their body up and over the bars, the rings and to launch themselves over the vault and across the floor. Lower-body strength is also required to run, jump, dismount and land safely. Endurance is essential to practise skills repetitively until they are mastered. Determination and control are also vital when learning gymnastic routines.

Gymnastics also promotes flexibility, coordination and balance. Gymnasts are renowned for their ability to place their bodies into positions far beyond the range achieved by most people. Rhythmic gymnasts in particular have significant levels of flexibility. Gymnasts demonstrate the ability to coordinate a range of movements in the one routine, ranging from combinations of skills on the bars, such as swings and rotations, to the floor, such as rotations, twists and landings. Balance is also a key component for a gymnast, as it demonstrates both strength and grace. A gymnast learns to automatically perform a routine in relation to the apparatus to effectively achieve each component of the set routine.

Getty Images/Dean Mouhtaropoulos

Figure 11.2 Australian gymnast Georgia-Rose Brown competing in the women's floor exercise final during the Gold Coast Commonwealth Games in April 2018.

Floor routine

Watch both a male and a female floor routine in artistic gymnastics. Identify the range of skills required to complete each routine. Are they harder or different, depending on gender?

Weblink

Generating movement relevant to the purpose

Gymnastic associations have established various routines for the purpose of creating consistent levels that all gymnasts and coaches can work towards. These routines also provide opportunities for children to compete at various levels by performing the set routines for each level. Although set routines make judging considerably easier, they do mean the opportunity to be creative with movement is limited.

These set routines are seen as a progression for gymnasts to learn the skills in a safe environment. In the management of gymnastics programs, it is crucial that routines chosen are suitable for the gymnast's age and ability. Each skill is built upon as the gymnast progresses to the next level to ensure all activities are conducted with the gymnast's safety in mind. All routines require appropriate planning and coaching to ensure gymnasts are physically prepared to perform the skills. This includes appropriate lead-up activities and progressive skill movements and practices.

Gymnastics is based on the foundation of six dominant movement patterns.

Table 11.1 Dominant movement patterns

Movement pattern	Examples
Locomotion	Walking, running, jumping, hopping, galloping, skipping
Landings	Arms, legs – landings performed off different heights and onto different surfaces
Statics	Supports, balances, hangs
Rotations	Rolls, cartwheels, turns
Swing	Forwards, backwards, side to side – tuck, straight legs, long-arm, short-arm
Spring	Feet, hands – straight jumps, tuck jumps, star jumps, pike jumps, straddle jumps, half turn, full turn

As the gymnast develops their skills, the opportunity for creative movement increases. This is particularly the case for gymnasts performing floor routines. While there are set components a gymnast is judged upon, the opportunity to display these creative skills is based on their willingness and ability to perform increasingly difficult skills to an expected level of accuracy.

Exploring variations and improvising

Coaches and gymnasts must adhere to certain elements of a gymnastic routine, but they are able to explore variety within the restrictions set by the governing body. This may occur through the use of space, timing, energy and body shape, or by having gymnasts perform the same actions on different pathways with a different use of focus or body movements.

The creation of improvised actions is generally not recommended, considering gymnasts practise their routines repetitively over a long period of time in preparation for their competition and judged performance. To improvise during the routine would not be beneficial to the performance, especially when performing a skill requiring a high level of risk.

Variation and improvisation is more suited to the training gym, where the gymnast and coach can discuss learning new skills or modifying existing routines to enhance the quality or difficulty of the routine.

Weblink

Improvisation

Watch a video that shows a 'save' by 16-year-old gymnast Jordan Chiles from Washington, USA. Search on the Deadspin website or follow the weblink.

As a class, discuss what other improvisations a gymnast could apply to their routines.

Getty Images/Tim Clayton - Corbis

Figure 11.3 A gymnast and their coach can explore variations to routine during training.

Analysis

Using a movement sequence of four sequenced gymnastic actions, and with the class divided into four groups, each group performs eight actions in total.

1 Student 1 begins the sequence with their first four actions. They are then followed by Student 2, then 3, etc.
2 After each student has performed two actions and the group have eight actions, they perform this in front of the class.
3 The class then observes each routine and describes the issues associated with choreographing the routine, how it was manipulated and how the elements were varied and improvised to complete the total routine.

THE PROCESS OF COMBINING AND ARRANGING MOVEMENT

The rules and conventions of the medium

There are very clear rules and conventions associated with all forms of competitive gymnastics. These rules are designed to ensure consistency and to provide a set of principles to which all gymnasts must adhere. The following rules and conventions apply to each Olympic gymnastics apparatus.

Women's floor routines

Routines are performed to music and last between 70 and 90 seconds. A gymnast is required to cover the entire floor area during her routine. Women's routines combine dance movements and sequences with a variety of tumbling and acrobatic elements. Required elements include: two acrobatic series, one with at least two or more saltos (flips), and a dance series with at least two elements. The various manoeuvres should blend harmoniously. Mood, tempo and direction should vary.

Men's floor routines

Unaccompanied by music, the routine must last between 50 and 70 seconds and feature three to five tumbling passes performed in at least two directions. Also included are a variety of tumbling and acrobatic elements, combined with other gymnastics elements such as strength and balance, elements of flexibility, handstands and choreographic combinations. Each routine must include at least one forward and one backward tumbling series. A static balance or strength element (held for two seconds), during which the gymnast demonstrates his ability to rest on one leg or arm, must also be incorporated. Transitional skills should be executed with proper rhythm and harmony.

Apparatus

Vault

The vaulting apparatus used in international competition was officially replaced in 2001 by a larger vaulting table. The new structure was designed to be safer – both in the push-off area and in collision situations – with protective padding. Vaults are quick, but complicated. Gymnasts gather speed running towards the vaulting table, launch themselves off the springboard towards the vault, propel themselves into the air with a push off the vault, then execute a combination of twists and somersaults before landing on the mat with as much control as possible. Marks are awarded for the control of the body and the landing position. The majority of women do 'Yurchenko' style vaults, which involve a round-off onto the springboard and a back handspring onto the table, while men typically choose 'Tsukahara' vaults – a forward entry with a quarter or half turn onto the table.

Beam

Requirements for beam routines include a connection of two different dance elements, one with a split of 180 degrees, a turn on one foot, an acrobatic series of at least two flight elements, acrobatic skills in different directions (forward, sideward or backward) and a dismount. A good beam performer exhibits flexibility, rhythm, balance and elegance. A beam exercise must last no more than 90 seconds; a deduction will occur if the routine is not within that time frame.

Uneven bars

Continuous swinging movements are predominant on this apparatus. The exercise should include movements in both directions, above and below the bars. The gymnast must move from the high bar to the low bar, incorporating grip changes, releases and catches, and circle swings through the handstand position. Elements with twists and somersaults with multiple grip changes and high flight should be demonstrated for maximum scoring.

High bar

A routine consists exclusively of swinging movements without interruption and with various grip positions. The gymnast should perform continuous clean movements and must not touch the bar with his body. Requirements include changes of grip and swinging movements both forward and backward. The gymnast also must execute at least one move in which he releases the bar and has a visible flight phase before re-grasping the bar. A good dismount is high, acrobatic and cleanly landed.

Parallel bars

A parallel bars routine consists primarily of swinging and flight elements, plus intermittent holds. The gymnast should travel along and work both above and below the bars. Requirements include two swinging elements, one in support and one from a hang. The exercise may contain at most three stop or hold parts. Additional pauses equal to or greater than one second are not permitted.

Rings

Ring routines should include a variety of movements demonstrating strength, support and balance. The gymnast should perform a series of swings and holds with both forward and backward elements, and the routine should finish with an acrobatic dismount. Gymnasts are also required to hold all strength and handstand positions for a minimum of two seconds. Deductions will be taken for unnecessary swings.

Pommel horse

During the pommel horse routine, a gymnast must cover all three areas of the horse – the middle and both ends, divided by handles – while performing continuous, circular movements interrupted only by required scissor movements. The hands are the only part of the body that should touch the apparatus. The entire exercise should flow with a steady, controlled rhythm, with at least one element of value performed on both ends of the horse.

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Getty Images/AFP/KAZUHIRO NOGI

Apparatus

Compare the rules and conventions of men's and women's gymnastics apparatus. Share as a group what impact this may have on the composition and performance of gymnastics routines.

Weblink

Rhythmic gymnastics

Rhythmic gymnastics combines ballet, dance and acrobatics with expressive movement and the manipulation of apparatus such as the ball, clubs, hoop, ribbon and rope. This sport is ideal for developing flexibility, strength and body coordination. It stems from various dance styles and exercise regimes that share the common idea of expressive movement as a tool for exercise.

Individual program: During the individual program, an athlete will manipulate only one of these five apparatuses at a time – rope, hoop, ball, clubs and ribbon. One apparatus is rotated out of contention every two years, with the gymnast required to compete on the remaining four events.

Group program: The group program consists of five gymnasts competing in two different routines. In one routine, all of the athletes use the same apparatus. In the second routine, the gymnasts use two different pieces of equipment.

Music and choreography: All routines must be performed with music, with only short pauses of music allowed. The choreography must centre around a theme that is developed from beginning to end using a variety of body movements and the handling of apparatuses.

Sequencing

Sequencing and development refer to the ordering of movement (sequencing) in a meaningful way (development). When movements are purposefully connected to each other, they gain significance and take on meaning. As a gymnastic routine unfolds, each movement and skill should grow logically out of the previous one. This creates continuity, and builds momentum towards the final skill or landing.

Coaches consider each movement to ensure that it contributes to the whole gymnastics routine. When sequencing movements, the gymnast should be encouraged to use their understanding of the principles of composition. Gymnasts should be given the opportunity to contribute to the movement sequence, as this is essential for their routines to take on meaning.

Sequencing is a very significant component of a gymnastic floor routine. The gymnast is expected to construct a continuously flowing routine, rather than showcasing disconnected elements. The Code of Points explains the key objective of a floor routine as being 'to create and present a unique and well-balanced artistic gymnastic composition by combining the body movements and expression of the gymnast harmoniously with the theme and character of the music'.

Transitions

Transitions are required when movements and gymnastic sequences are connected. A score is awarded for the 'connection value' of the routine. This value is then added to the total score awarded. On every event except the vault, a connection value is awarded when certain skills or skill types are completed effectively and seamlessly as transitions.

The greater the number of athletic and dance moves the gymnast can connect in the routine, the more points the gymnast will receive on their total score. Although it may be difficult to maintain strong connections throughout the routine, one apparatus in particular, the beam, is the most difficult. Gymnasts are required to perform very difficult skills while standing on a narrow piece of apparatus, where coordination and balance is crucial. Combining these critical skills with the requirement to ensure flowing transitions occur throughout the routine requires outstanding skills.

Transitions

Observe a floor routine and identify how the gymnast has sequenced their routine with transitions. Analyse the effectiveness of the routine.

Repetition

Repetition of movement sequences or parts of sequences can be reassuring for an audience. It provides the audience with an opportunity to see the movements in more detail, allowing them to become familiar with the movement vocabulary the choreographer is using. Repetition can also be used to give movements emphasis. When used effectively, repetition can also help create unity by relating parts of a routine to each other.

A gymnast is unlikely to use repetition when competing in an event because they are trying to show as many skills as possible in the time allowed.

However, when training, one of the most valuable principles in gymnastics, and one of the leading methods to being a successful gymnast, is the use of repetition. Repetition can be used whether you are a new or an experienced gymnast. Repetition follows the common theory that the more you practise, the better you will become.

It is important to note that just 'repetitive practice' is not enough. A gymnast should adopt the theory of 'quality repetitive practice', where both the coach and the gymnast pay attention to detail when perfecting the skills through repetition.

The aim of repetition is to develop autonomous learning, aiming to reach the point where the skill does not need to be thought about when it is being performed. At this point the skill is well learnt. The gymnast should be able to perform the full routine automatically without needing to focus on execution.

Getty Images/AFP/SAEED KHAN

Figure 11.4 Australia's Georgia-Rose Brown competes on the balance beam during the women's individual all-around final in the artistic gymnastics event during the 2018 Gold Coast Commonwealth Games

Variation

Variety within gymnastics is very important for a gymnast's overall score in competition, as well as for engaging and holding an audience's interest. Variety can be incorporated into gymnastic routines in several ways, such as using skills, technique, body positioning, spatial positioning and the various types of apparatus when routines are performed.

Judges prefer to see variety in competition routines, with the gymnast's movements utilising high and low points in a floor routine, changes in direction, specialised skills, and artistic movements and connections as part of their overall routine.

Variety is also seen in terms of the music choice for women's floor and rhythmic gymnastics. A gymnast's choice of music is a central component of their routine, and the skills performed must be synchronised with the routine, personality and style.

Variation

Learn three skills required to perform two rhythmic gymnastics events. Practise the techniques required and work in pairs to refine the correct movements. Describe what it felt like to learn a new skill and how you approached the refinement of movement.

GYMNASTICS WALKS FINE LINE BETWEEN TRAINING AND OVERTRAINING

The girls will come in, often wide-eyed and eager, to get a feel for what the typical day of an elite gymnast looks like. After watching three-time Olympic medallist Aly Raisman make her way through another energy-sapping, mettle-testing, soul-draining workout, those same girls who dream of following in Raisman's footsteps often leave in tears.

'I feel bad that I'm supposed to be inspiring them and they don't even want to do it anymore,' Raisman said. 'I think people are surprised at how hard it is.'

Six hours a day. Six days a week. Week after week. Year after year. Usually for as long as their bodies – not to mention their brains – can take it …

'Mentally you will be tired, but physically you are doing less when you're getting closer, then you can avoid overtraining,' Martha Karolyi (USA Coach) said …

At this point in the Olympic cycle, 'healthy' is a relative term. When the 2012 Olympic team arrived in London, reigning world champion Jordyn Wieber was dealing with stress fractures in her right leg. While the adrenaline took over during competition, she spent the majority of her down time in treatment and limited her practice routines. Though Wieber helped the 'Fierce Five' roll to gold, she also failed to qualify for the all-around final, finishing as the third American behind Raisman and Gabby Douglas …

'Everybody was banged up at the Olympics,' she said. 'I'm on the Olympic team already. I'm not going to give that up.'…

'I think people always say we train so much, but the system works,' Raisman said. 'You kind of have to push yourself to the point where you feel you can do your routine in your sleep … I'm not saying it's easy or it's fun. It's fun now that I've put in the work and it's all coming together.'

Source: by Will Graves, Associated Press, 10 July 2016.

Question

If the gymnast achieves success – in this case, medals at the Olympic games – does the performance success justify the hard work required? What role does the coach play in preparing the gymnast?

CHAPTER SUMMARY

- From a concept, the dancer will generate movement to represent the purpose.
- The creation of improvised movement material is made possible through a variety of movements.
- Improvisation involves freeing the body from regular movement patterns.
- Effective dances build in intensity and interest, reaching a climax.
- Contrast can be achieved by combining unlike movements. When all the parts work together to contribute to the whole dance, this is referred to as unity.
- Sequencing refers to the ordering of movement.
- Transitions connect movements and dance phrases.
- Repetition can be used to give movements emphasis.
- Using variety within a performance can engage and hold an audience's interest.

CHAPTER REVIEW ACTIVITIES

1. Identify why the purpose of the performance is an important factor.
2. Design a movement sequence according to the purpose or theme of 'flying'.
3. Evaluate the impact improvisation may have on a performance.
4. Propose three variations to a sequence.
5. Describe how choreographers may select and refine movements.
6. Explain the use of repetition when creating a routine.
7. Examine how dancers or gymnasts use transitions throughout their performance.

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CHAPTER 12
Role of appraisal in composing and performing

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WAYS OF APPRAISING

Viewing a performance should be an active experience for the audience and should help them to become engaged visually, aurally, emotionally and **kinaesthetically**. Judgements and reflections are often made at the completion of the performance.

There are three ways an audience may respond to a performance:

- **On an emotional level** – feelings evoked by the performance.
- **On an associative level** – associations made with the performance or with images in the performance. Associations could be of a personal nature or could come from a cultural perspective.
- **On a formal intellectual level** – responses after a formal analysis and interpretation of the performance.

Responses may vary and shift in emphasis from person to person and from performance to performance. For example, one person may have an immediate emotional response to a performance, while another may respond on an intellectual level. One performance may demand an immediate emotional response, ensuring that most audience members will respond this way initially, while another performance may encourage members to make immediate associations with images from a cultural perspective.

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Figure 12.1 Audience view of a performance

Appraisal

There are three ways of appraising composition and performance: observing, analysing and experiencing.

Observing

Observing entails a judge or a group of judges watching the performance and reporting back to the performer at the end. The judge's responsibility is to outline both positive and negative aspects of the performance. This may be achieved objectively, by giving a score, or subjectively, by verbalising their opinions, feelings or impressions about the performance.

Objective scoring may use a checklist or **criteria** that identify the skills and techniques required within the performance, and a deductions list, which is used when a performer does not complete a skill satisfactorily.

Sample observation sheet						
Use the following sheet to help critique your peers' performances. Circle what you observe.						
Name: _____						
Type of performance: _____			Music used: _____			
BODY MOVEMENT:						
Locomotor						
	walk	run	leap	hop		
	gallop	skip	slide	jump		
Non-locomotor						
	push	sway	spin	rise	bend	
	pull	shake	sink	stretch	fall	
ELEMENTS OF PERFORMANCE:						
Space						
Pathways	straight	curved	zigzag	angled		
Shape	curved	straight	angled			
Directions	right	left	forward	backward	circular	diagonal
Levels	high	medium	low			
Time						
Beat	steady	uneven				
Rhythm	long	short	combined			
Tempo	slow	medium	fast			
Force						
Energy	sharp	smooth				
Weight	heavy	light				
Flow	free	bound				

Figure 12.2 Sample observation sheet to be used when critiquing a performance

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Feedback for the performer is very important, as it allows them to refine their movements and to improve further performances. It can be very useful for the performer to watch their routine on video, as this helps them to appraise their own performance and identify any errors they may be making.

Appraising at a school level by peers can be conducted on a more basic level and without the stress of having to give marks. The sample observation sheet on the previous page may be used to show students what to look for and help them reflect upon the performance at the completion.

Analysing

Analysing involves examining the technical features of the performance. This is best achieved by an experienced judge or coach who can look at the overall routine and the specific body positions and movements. A complete analysis may involve breaking down each movement within the performance piece, and then rebuilding each component back into a meaningful and effective performance.

The feedback provided from analysis helps a performer to compare their performance to others'. Statistics are a common method of analysing performances. For example, in ballroom and Latin American dancing, judges give scores according to what they see on the dance floor. The dancers themselves then use these marks to compare their techniques to those of dancers who achieved higher scores. This form of analysis is sometimes the only way of gaining feedback on a performance.

Experiencing

When used effectively, experiencing is one of the most useful methods of **appraisal**. It involves performing movements and gaining feedback at the same time. Sometimes this is referred to as concurrent feedback.

An example is when a dancer moves into a position where they feel out of control or are losing their balance. The dancer would immediately react to ensure they did not fall or injure themselves. When a dancer performs a movement that feels smooth and links with the next movement, the automatic feedback is positive and allows the dancer to continue on with their performance. Generally, this type of appraisal occurs during practice and can result in a faster and improved level of performance.

Observation

In small groups, report on a variety of movement interpretations of a given idea or emotion. Use the following points as criteria for observation:

Does the performance

a clearly define an emotion or idea?
b show sensitivity and openness to other interpretations?
c identify a number of perspectives?
d take risks in offering or demonstrating divergent interpretations?
e use movement to communicate the performers' ideas?

ASPECTS FOR APPRAISAL

The appraisal or judgement of a performance can be a effective means of providing meaningful feedback. Was the performance good, or not, and why? Did the performers meet established standards for technical accomplishment? Was the interpretation appropriate for the choreography?

Considering that a performance may involve several media, it may be effective in some respects, and ineffective in others. However, a judgement in isolation is not enough. There must be some effort to explain how the judgement was made, based on what the appraiser saw during the performance.

An appraisal builds upon the elements of description and context noted earlier. In dance, typically, there is human movement, music or sound, scenery, costumes and sometimes a plot. In addition, the appraiser is often required to separately evaluate the performance of the particular dancers on stage and the choreographic design, which exists independently of the performance.

Elements of composition

When preparing for a performance, a range of safety issues must also be considered by all stakeholders. These include:

- Ensure correct lead-ups and other prerequisite skills have been learnt.
- Ensure the performer is physically ready to perform the skills required.
- Confirm the performer understands the safety rules.
- Maintain a line of sight throughout the period of time the activity is occurring.
- Ensure the coach/choreographer is qualified for the role.
- Ensure associated protective equipment (e.g. landing mats) are suitable, even, impact absorbing and non-slip.
- Ensure appropriate spacing between equipment stations.
- Avoid slippery, hard or rough working surfaces.

Appraising the elements of composition refers to the initial learning in this module. Performers use the elements of composition (see Table 12.1) as a guideline for designing a well-rounded composition that produces a range of varied movements.

Table 12.1 Elements of composition

Space ☐ direction ☐ level ☐ dimensions ☐ patterns and formations	**Dynamics** ☐ force ☐ flow
Time and rhythm ☐ musical applications ☐ coordination of movement ☐ duration ☐ momentum ☐ self-paced versus externally paced ☐ timing	**Relationships** ☐ body parts ☐ points of contact ☐ other people ☐ apparatus and equipment ☐ changing relationships ☐ team formations, positional play, partner work

A person appraising a performance based on the elements of composition may make use of a checklist or develop questions to assist them in focusing on requirements of the performance. For example, a question may be 'What relationship exists within the area of space?' or 'How are time and rhythm used in the performance?'

Using the elements of composition also provides effective feedback for the choreographer and performers, as it gives them a guide to which areas were their strengths or weaknesses.

Creativity and innovation

Creativity and **innovation** are important aspects for the audience, especially those who attend performances regularly. Appraisal of the creative and innovative aspects of a performance requires identification of these aspects. Such identification is difficult without using sources of knowledge external to the performance.

In aerobic gymnastics, the appraisal of artistry refers to the ability of the gymnast(s) to transform the composition from a well-structured routine into an artistic performance to express themselves with high quality level of movements respecting their gender or age group. They must combine the elements of the art and the sport into one attractive message towards the audience, in sport manner. Unique/memorable routines include details to enhance the quality of the routine, through expression, and the ability to transform movements, both gymnastic elements and choreography, into a singular artistic whole.

Relatively few reference films of dance performances are available, so dance appraisers often cannot study recorded performances beforehand. In dance, it is difficult to determine exactly which movements in a performance are the creative design of the choreographer and which are firmly the interpretations of a particular director or dancer.

Facial expressions, for example, are usually contributed by the dancers and considered 'interpretation', but they might in fact have been planned by the choreographer in advance. An appraiser who recognises the changes might still be uncertain who to credit: the choreographer, the dancer or the coach.

Alamy Stock Photo/Jeremy Graham

Figure 12.3 A traditional Balinese dancer uses facial expressions to enhance the performance

Music is an effective method of demonstrating creativity and innovation, as well as helping appraisers differentiate between performances in competitions. Music can be used to represent the style of performance, the intentions of the performance and the style of the performer. The performer's ownership of the selection of music is very important, because they are the person who will be in front of the audience.

When a performer is excited about a piece of music they will be enthusiastic about the routine. This will lead to creativity during the performance. An audience will undoubtedly see the performer enjoying their connection with the music, which in turn should result in a positive experience for the spectators and appraiser/s.

Arrangement of movement

A choreographer working on the **arrangement** of movement in a performance must consider rules and conventions of the medium. They are arranging movements to provide flow and connection between sequences. For example, in ballroom dancing the choreography of each style of dance must demonstrate flow and unity between the performers. This is emphasised by the long flowing dresses and graceful movements of the performers.

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Figure 12.4 Ballroom dancers must demonstrate flow and unity.

When arranging movement, the type and style of music will play a significant role. The music and performer will accentuate key moments in the performance for the audience and/or appraiser. The style of music will also influence the style of performance. For example, music of a slow tempo may be more suited to dancing the waltz. A high-tempo piece of music may be suited to a high-energy arrangement for sport aerobics.

When creating a routine, there will be different parts of the music that may influence the emotion, tempo and dynamics of the arrangement. The music may have parts that represent strong actions, flowing movements or peculiar sounds. The choreographer and performer will be looking to identify what type of movement the sound brings to mind and how that sound could be expressed.

A person appraising a performance is assessing whether the performer has achieved the following points:

- sequencing of movements
- exploration of a range of ways of linking movement between phases of a performance
- using repetition effectively and in subtle ways
- experimenting with the effect of variation in movement.

Achievement of purpose

A performer will appraise their own work through many forms of feedback. Feedback may be received through the reaction of the audience, both throughout and at the end of the performance.

Appraisal may come from members of the audience or a judge evaluating whether the purpose of the performance is evident and has been achieved. The appraisal will indicate whether a performance has been able to deliver the intended message.

Appraisers can determine if the performer has achieved their purpose by conducting formal and/or informal assessments. Criteria used may include:

- observations of the performance
- a description of what the performance represents
- analysis of movement vocabulary
- production tools
- interpretation of content, such as ideas, themes and subject matter
- choreographic intention
- structural elements
- overall evaluation of the performance.

The appraiser must be able to identify the context in which the performance was initially created and then performed. Examples of context include cultural, political, environmental and social perspectives.

If an audience cannot determine the purpose of the performance they may be distracted by trying to work out what it is about, and may develop unfavourable opinions. When the audience clearly understands the purpose of the performance, they can enjoy the performance and its many subtleties.

Convey a purpose

Work with a partner or small group to create and perform a performance sequence that conveys a purpose. Each group is required to design criteria that reflect the following aspects of performance:

a elements of composition
b creativity and innovation
c arrangement of movement
d achievement of purpose

Note: It may be helpful to make and review a videotape of the performance.

Modify a sequence

Create a sequence and use peer assessment to assist in modifying it. Identify and record what was modified each time and give reasons for each change.

ESTABLISHING AND APPLYING CRITERIA

When establishing and applying criteria it is important to note that a number of steps are required to achieve an effective analysis and informed judgement. The following steps are used to help students develop a deeper understanding of dance and to assist in setting criteria for a peer assessment.

Preparation

The preparation information should be brief. Too much information can strongly influence the students' first impressions and can inhibit the flow of ideas.

First impressions

This gives peers the opportunity to express their first reactions to the performance presentation. It provides a non-judgemental atmosphere where peers will feel confident giving their first reactions and where all students' reactions will be accepted.

Students may use the following criteria:

- moments in the performance they liked the most
- how particular moments in the dance made them feel
- costumes or outfits they liked
- how the actions, music or sound-score made them feel.

Description

This step requires students to recall and describe what they have seen and heard in the presentation. Students are describing what they have observed; they are not interpreting. Students should limit their observations to things they have seen and heard.

Criteria used may include:

- a description of the movements (for example, strong high leaps, fast turns, slinking movements on the floor)
- the relationships of the performers (for example, solos, duets, trios, a group of three performers with a fourth performer moving in isolation)
- the way space was used (for example, the performers always moved in a circle, usually moved on the diagonal, moved in a small space, had round shapes or angular shapes)
- the dynamics or qualities of the movements (for example, lyrical movements, fast and sharp movements, collapsing and suspending movements)
- descriptions of the sound-score, costumes, outfits, props, and sets.

Analysis

In this step, students analyse how the choreographer combines and arranges the movements, sound, costumes or outfits, performers, props, and sets to achieve certain effects. They refer to criteria as they analyse the performance.

In the analysis stage, students look at the following criteria:

- the relationships between any of the criteria listed during the description stage
- the relationships of the performance elements to one another
- the form of the performance; for example, whether it tells a story (narrative) or whether there are two distinct parts in the performance
- the relationship between the movements, sound, costumes or outfits, performers, props and sets
- movements that were in unison, repeated, repeated with a variation, etc.
- the casting of the performers, or which performers did what
- the ways the principles of composition were used.

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Figure 12.5 Practising the combination of movements

Interpretation

Students are asked to reflect on their observations and to discuss what the performance means to them. Students should take into consideration their own perspectives, associations and experiences.

Students might consider the following checklist in their interpretation of the performance:

- Did the performance tell a story?
- What was the theme or the subject of the performance?
- Was the performance expressing a feeling or an idea?
- What did the performance mean to them?
- What images did the students associate with the performance?
- Why did the choreographer create the performance?

During the discussion, students will be clarifying their ideas. They may discover that there are different points of view, as each student brings a unique set of life experiences and perceptions to the dance. New insights into possible interpretations will also give the students an opportunity to share ideas.

Figure 12.6 Evaluating a performance

Informed judgement

The students will be considering two aspects of the performance: the choreography and the performance of the activity. Their criteria should include:

- whether the performance worked as a whole
- how the performance compares to other dances in a similar style
- whether the performers were successful in their performance
- whether all aspects (including sets, costumes or outfits, lighting, props, sound-score and movements) contributed to the performance
- whether the performance conveyed the choreographer's intentions.

Evaluating a performance

Students responding to their own and their peers' work is an important part of the appraisal process. Responding can occur during the appraisal process, where the routines are presented as works-in-progress, as well as at the end of the project. Gaining feedback about their works-in-progress also assists students in refining their compositions.

The following points should be taken into consideration when conducting peer assessment:

- Before students show their work, ensure that a positive atmosphere has been established, in which students are willing to take risks.
- Students may feel particularly vulnerable when showing their dances, because it is they who are being watched.
- In order to maintain objectivity, all comments should be constructive and kept to observations about the movements, props, sets, sound-score and costumes.

To facilitate discussion, use video recordings that can be replayed several times to allow students time for deeper reflection. Works-in-progress can also be compared to final products so students can see how the work has changed.

Analyse a performance

Watch a video of a performance and critically analyse the following:

- elements of movement
- creativity and innovation
- arrangement of movement
- achievement of purpose.

BANGARRA DANCE THEATRE HAVE PRODUCED AN EXCEPTIONAL WORK

Jill Sykes, 30 June 2017

Bennelong is an extraordinarily powerful work, a benchmark in Australian dance creativity. It sums up yesterday, today and perhaps tomorrow in a swirling series of storytelling episodes that explore Indigenous lives in an Australia colonised by Europeans.

The pivotal figure of the work's title was an Aboriginal man born around 1764. Though there will always be debate about the details, we know Bennelong was captured in 1789 and absorbed into colonial life to the point where he accompanied Governor Phillip to England in 1792. Returning to Australia, his life deteriorated and he died in 1813.

Bangarra Dance Theatre has gone beyond the broad-brush recall of these events to invest them with Indigenous cultural context and emotions – above all, to link them with Indigenous life in Australia tody and how it might be in the future.

I will never forget a piercing conversation with Bennelong's choreographer, Stephen Page, more than 20 years ago, when he talked about the two lives that Indigenous people must lead to maintain their cultural inheritance and flourish in a 'white' world. This is the underlying theme of Bennelong.

So it is a piece of theatre to be enjoyed and appreciated on several levels. As a dance work, it is boldly choreographed in an athletic style that concentrates on the ensemble yet provides an eye-catching variety of steps within the group.

Performances are outstanding, led by bearded and bushy-haired Beau Dean Riley Smith in the title role and Daniel Riley as Governor Phillip, seeking to understand each other's ways but failing. Their achievement is made possible by the strength of their supporting cast.

Steve Francis has composed most of the music, which is a hugely important and persuasive element. But other credits go to such diverse composers as Matthew Doyle, Elgar, Haydn and Iain Grandage. The dancers sing on tape and in performance; words by dramaturg Alana Valentine and protesting voices from news tapes are heard.

Jennifer Irwin's great range of costumes makes another major contribution, from the soft beauty of the opening pre-European scenes to the colonial formality and then the mash-up of everyday contemporary, smart to torn jeans.

Jacob Nash's discreet yet effective set designs are enhanced by Nick Schlieper's lighting. Production is smooth and fast-moving. After its Sydney season, Bennelong is touring interstate. Don't miss it – and tell your friends. This is an exceptional dance theatre work in content and performance.

Source: www.smh.com.au/entertainment/dance/bennelong-review-bangarra-dance-theatre-have-produced-an-exceptional-work-20170630-gx1u5m.html

Question

Using the above review of a dance performance, analyse the effectiveness of the performance.

CHAPTER SUMMARY

- Viewing a performance should be an active experience for the audience members and should assist them to become engaged visually, aurally, emotionally and kinaesthetically.
- An audience may respond to a performance on an emotional level, on an associative level or on a formal intellectual level.
- The three ways of appraising composition and performance are observing, analysing and experiencing.
- The appraisal or judgement of a performance can be an effective means of providing meaningful feedback.
- The four aspects of appraisal are elements of composition, creativity and innovation, arrangement of movement and achievement of purpose.

CHAPTER REVIEW ACTIVITIES

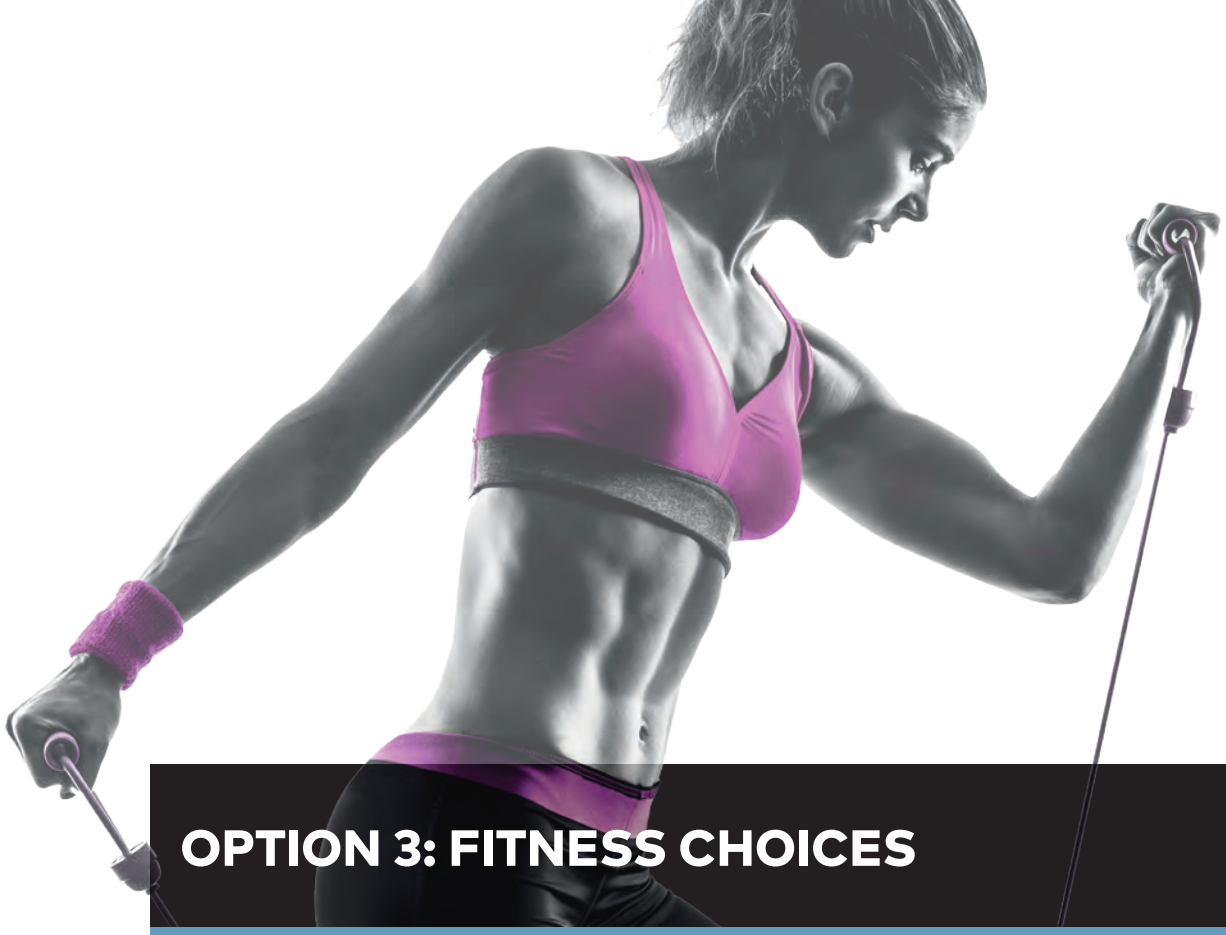
WS

Extra exam-style questions

Option 2 assessment tasks

Assessment tasks

1 **Outline** the aims of a performance.
2 **Describe** three ways an audience may respond to a performance.
3 **Justify** why establishing and applying criteria is important before appraising a performance.
4 **Identify** the steps associated with setting criteria for a performance.
5 **Discuss** how the interpretation of the viewer may affect the appraisal.
6 Design marking criteria for a performance you may have seen recently.



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OPTION 3: FITNESS CHOICES

CRITICAL QUESTIONS

What does exercise mean to different people? 250
What are the ways people choose to exercise for fitness? 260
What influences people's choice of fitness activities? 278

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have finished this option you should be able to:

- describe factors that contribute to effective health promotion
- propose actions that can improve and maintain an individual's health
- plan for participation in physical activity to satisfy a range of individual needs
- form opinions about health-promoting actions based on a critical examination of relevant information
- use a range of sources to draw conclusions about health and physical activity concepts
- analyse factors influencing movement and patterns of participation
- use different sources to gain an understanding of opinions people have of fitness and exercise

KEY TERMS

access
accuracy of information
advertising
appropriate
barriers
commodification
commodity
determinants
direct marketing
ethics
individual
influence
motivation
settings

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CHAPTER 13
The meaning of exercise to different people

IN THIS CHAPTER

Meanings of exercise 250
Value of exercise and fitness 255

MEANINGS OF EXERCISE

In this chapter we will critically examine questions such as:

- to what extent should exercise be a part of lifestyle?
- what does it mean to be fit?

According to the Oxford Dictionary, the general dictionary meaning of exercise is 'Activity requiring physical effort, carried out to sustain or improve health and fitness.'

However, the meaning and relevance of exercise can vary considerably from one individual to another individual. Exercise can include everyday walking from one place to the next, whether it be at school, a workplace or at home; or just doing something physical, such as placing items on shelves or cleaning. All this is general exercise that we do in our everyday lives without even thinking of it as exercise. Exercise can also be planned and structured, and may include recreational activities such as walking the dog, or participating in gruelling competitive sports, such as triathlons.

The amount of exercise a person does, and the type and **intensity** of the exercise, will vary according to the reasons a person may have to exercise. Most people say that they exercise to stay 'fit and healthy' and to reduce the risk factors associated with lifestyle diseases.

Exercise as a form of physical activity

Exercise involves a certain level of intensity. **Physical activity**, on the other hand, can mean any form of exercise or movement. The World Health Organization defines physical activity as 'any bodily movement produced by skeletal muscles that requires energy expenditure'. Physical inactivity has been identified as the fourth greatest risk factor for global mortality, causing an estimated 3.2 million deaths each year.

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Physical activities can range from walking to playing sports, or doing any number of daily routine activities such as cleaning, gardening or walking the dog. So 'exercise' and 'physical activity' are synonymous – both refer to bodily movements. All levels of movement can have significant benefits for health, such as a reduced chance of cardiovascular disease or diabetes.

Many people may not feel the need to be involved in extra physical activity if their work (occupational activity) involves constant moving and lifting, such as landscaping or brick laying. Others may feel that the work they perform around the house (household activity) as daily chores is enough activity for them. On the other hand, people whose work is very sedentary and stressful may feel that they need a planned activity program or exercise in order to keep themselves healthy.

Intensity

The intensity of an exercise regime varies depending on the needs of the individual and the resources available. Physical activity can be closely linked to the age of the participant. For an elderly person, participating in lawn bowls may be fairly intense, while a younger person may find it less gruelling. The more intense an activity, the more it reflects exercise, as it has a specific goal. Low-intensity activities include basic house chores or slow walking, while moderate intensity activities include brisk walking, basic resistance training, or any activity that involves the heart rate increasing into the aerobic training zone (60–80 per cent of maximum heart rate).

High-intensity exercise involves elevating the heart rate above 80 per cent of maximum. A good measure of this is the talk test. If you are able to talk freely while exercising, you are working at a low to moderate intensity. If you are struggling to talk without running out of breath, you are performing at high intensity. It is important to note that as you get older, less effort will be required to reach this point, and if you are unfit, you will not able to hold a conversation for long. A general rule is that the lower intensity your physical activity, the longer you will be able to go before feeling fatigued. The WHO recommendations for physical activity are shown in Table 13.1.

Table 13.1 WHO recommendations for physical activity

Children and adolescents aged 5–17 years	Adults aged 18–64 years	Adults aged 65 years and above
• Should do at least 60 minutes of moderate- to vigorous-intensity physical activity daily. • Physical activity of amounts greater than 60 minutes daily will provide additional health benefits. • Should include activities that strengthen muscle and bone, at least three times per week.	• Should do at least 150 minutes of moderate-intensity physical activity throughout the week, or do at least 75 minutes of vigorous-intensity physical activity throughout the week, or an equivalent combination of moderate- and vigorous-intensity activity. • For additional health benefits, adults should increase their moderate-intensity physical activity to 300 minutes per week, or equivalent. • Muscle-strengthening activities should be done involving major muscle groups on two or more days a week.	• Should do at least 150 minutes of moderate-intensity physical activity throughout the week, or at least 75 minutes of vigorous-intensity physical activity throughout the week, or an equivalent combination of moderate- and vigorous-intensity activity. • For additional health benefits, they should increase moderate-intensity physical activity to 300 minutes per week, or equivalent. • Those with poor mobility should perform physical activity to enhance balance and prevent falls, three or more days per week. • Muscle-strengthening activities should be done involving major muscle groups, two or more days a week.

Reprinted with permission of the World Health Organization (WHO), www.who.int/mediacentre/factsheets/fs385/en, accessed on 17/12/17.

Weblink

Investigate

Look at Australia's Physical Activity and Sedentary Behaviour Guidelines for a comparison with the WHO guidelines listed in Table 13.1. Australia's guidelines are on the Australian Department of Health website.

Age

Adopting an active lifestyle at a young age will have lifelong benefits. A 60-year-old person may be able to walk as briskly and for longer than a 20-year-old if they have maintained a high-activity regime for much of their life. Inactive people should start with small amounts of physical activity and gradually increase duration, frequency and intensity over time according to the **FITT principle**. Physical activity of any intensity is a protective factor against chronic health issues such as **cardiovascular disease** and diabetes.

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WHAT DOES IT MEAN TO BE FIT?

Jennifer Morton, 9 May 2017

When a stranger suggested that my fitness levels were lacking because I can't swim 100 metres, I questioned the meaning of fit.

To me, being fit means having a lean, muscular and strong body.

'My body may not be super toned right now but I'm as fit and healthy as I need to be,' says Jennifer Morton.

'Fitness [physical fitness] is defined by being able to perform a task or activity without undue fatigue, which is typically achieved through a regular exercise program as well as good dietary practices,' says Luke Bowen, an exercise physiologist at Hills Sports Medicine and Sydney Sports Medicine Centre.

Three years ago, I was fit. I had exercise routines that included mat and boxing workouts for building muscle and strength; running and dancing for cardio and endurance; and yoga for restoration and relaxation. My diet was a mix of fresh, whole foods and lots of water. I felt good and I looked great.

Between the age of 42 and 44, I was in the best shape of my life. I'm now 46, five kilograms over my usual weight and frequently inactive.

Insufficient activity kills 1.6 million people around the world each year, according to the World Health Organisation. Cardiovascular and respiratory disease, cancer and diabetes is responsible for 81 per cent of all noncommunicable diseases globally, which accounts for 70 per cent of the world's deaths.

To test my current fitness, I went to a step aerobics class at my local community centre. I hadn't done a step class since 1992 but I've done lots of Tracy Anderson routines so I was confident I could keep up.

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After 20 minutes (mostly the 'warm-up'), I could feel the heat radiating off my face as if I was on fire. By the end of the 60-minute class, I proved to myself that I was fit enough to endure it but I didn't enjoy it. And I think that's why I let my fitness slip. I wasn't enjoying the full-on regimes I forced myself to do.

'It's important to find things you love doing so you stay fit,' says Karla Gilbert, a nutrition and health coach on the Gold Coast. 'There's so much you could do to keep fit and it doesn't have to be huffy-puffy stuff.'

At 42 years old, Gilbert could be the poster pin-up for fitness. She's lean, toned and active but she says physical appearance isn't everything.

'You can be fit and not healthy. There are plenty of fit athletes out there who are not healthy. Later in life they end up having diabetes, heart disease and other ailments because they haven't nourished themselves properly,' she says.

'To me, fit means living a lifestyle that enables me to do the things I want to do without limits. That might mean endurance racing on a SUP board or doing a 10-kilometre hill run. My level of fit is different to the average bear.'

We may not all be average bears, but 'fit' will mean something different to everyone.

'A bricklayer requires a certain level of muscular strength and endurance, as well as aerobic capacity to perform his trade, whereas a rugby league player requires a higher level of strength, power and ability to perform frequent bouts of high intensity running or collisions. The fitness requirement is different in each scenario,' says Bowen.

Drew Baird, head coach and founder of Drew Baird Fitness, agrees.

'Fitness is so subjective. A weight trainer, may look like the poster child for fitness on the outside, may not be able to run a marathon and a marathon runner may be hopeless at lifting weights. Fit is subjective to whatever activity you are actually doing,' says Baird.

I learnt a lot while researching the topic of fitness. Mostly, it's not just about the shape of your body.

'The fusion between a physically fit body and an emotionally fit mind, to me that's fitness. I know so many people who have amazing bodies but are on depression medication and people that don't have amazing bodies who are happy,' says Baird.

'Fitness is not out of reach for anyone. Everyone can achieve their optimum level of fitness, health and happiness if they have the motivation, the correct strategy, and the willingness to adjust that strategy when needed.'

I may not be able to swim 100 metres but that's OK, I'm not a swimmer. It's been two days since the step class and my calf muscles are in agony. My body may not be super toned right now but I'm as fit and healthy as I need to be.

Source: www.smh.com.au/lifestyle/health-and-wellbeing/fitness/what-does-it-mean-to-be-fit-20170509-gw0oze.html, accessed 17/12/17

Exercise and its relationship to fitness

Fitness is the result of regular exercise, proper diet and nutrition, and proper rest for physical recovery. If a person is fit, they can generally function efficiently and effectively to enjoy leisure, be healthy, resist disease and cope with emergency situations. Fitness is generally defined as a person's ability to live a happy, well-balanced life. It embraces the physical, social, intellectual and spiritual aspects of their life. Once again, it is relative to an individual's circumstances and their reasons for wanting to be fit.

Fitness is a combination of health-related components and skill-related components. Health-related components include aerobic fitness, muscular strength, muscular endurance, flexibility and body composition. Skill-related components include agility, balance, coordination, speed, power and reaction time. Both sets of components interact and are interdependent. A deficiency in any component can reduce an individual's overall fitness.

According to the Australian Bureau of Statistics, in 2011–12 only 43 per cent of adults met the 'sufficiently active' target, and 60 per cent of adults surveyed did less than 30 minutes of physical activity a week. Less than 20 per cent did an hour or more of activity per week, though overall, adults averaged 33 minutes of activity a day.

Media

The media portrays fitness largely in relation to body image. A 'fit' person is often portrayed as having a low percentage body fat that reveals muscles, referring to this as being 'in shape'. Sometimes these shapes are directed at specific activities. Recent shows on television highlight fitness programs such as CrossFit, which embrace health- and skills-related components such as flexibility, balance, strength, muscular endurance and power. (See Core 2 for more about these.)

Over the past ten years there has been a major focus on exercise as a positive health benefit, with people gaining a greater understanding of the positive effects on health. Research has shown that there is generally a greater focus on a general level of fitness before fitness goals become more specific.

Specific training for sports

A basic fitness level can be gained from exercise aimed at broad goals of overall health and wellbeing, with a regular moderate workout regime and healthy diet. This achieves general good health in muscle tone, and healthy skin, hair and nails, while preventing the age- or lifestyle-related health issues such as heart and organ complications that accompany poor diet and inactivity. For specific sports, fitness activities have different requirements and need specific components of fitness. Specific exercises and intensities are then planned to meet these requirements.

Some examples of sports that require specific training to prepare athletes to perform well are:

- **100 metre sprint** – the athlete must be trained to work anaerobically throughout the race, which also involves speed and power
- **marathon** – the athlete must be trained to work aerobically, and their cardiovascular endurance must be built up to a maximum.

Job-specific fitness

Some occupations require employees to have certain levels of fitness. For example, lifeguards must undergo rigorous swim testing to replicate surf conditions.

The beep test is used by a number of protective services, such as the fire brigade and the police force, where participants are required to reach a certain level before they are accepted.

Customised exercise or training programs can be designed to suit an individual's requirements and lifestyle in order to promote and maintain their physical fitness. Many people now research a vast variety of activities and programs online so that they can design their own program. This can be a risky undertaking, as individuals may not have the professional knowledge and skills to design an exercise program that specifically meets their physical capabilities and needs.

Australia's Physical Activity Guidelines

Go to the Australian Department of Health website and search for Australia's Physical Activity and Sedentary Behaviour Guidelines. Read the guidelines, then answer these questions:

1 Explain the statement 'Great reasons to be active'.
2 Discuss the difference between the physical activity recommendations for 5–12 year olds and 13–17 year olds.
3 Outline the Physical Activity Guidelines for Adults.
4 Explain why the government has outlined the need for physical activity recommendations for children and young people.

Cultural differences

1 Select two different cultures and discuss the types of activities members of each culture may participate in. Suggest reasons why they may participate in these types of activities, and discuss the value each culture places on exercise.
2 Describe how an individual's attitude to physical fitness is influenced by:
   a family
   b peers
   c social groups
   d media.

Fitness apps and technology

Research how technology has changed the face of fitness in the last ten years.

VALUE OF EXERCISE AND FITNESS

Values are judgements and opinions that people take on. These are shaped by the society in which the person lives. These values can have a powerful influence on the way a person lives their life, who they choose to associate with, the type of work they do, and the sport they choose to play. This process, which shapes a person's life, is called socialisation.

Values and attitudes will vary from one culture to another, and according to a person's gender, age, socio-economic status and ability. In most societies, however, there is usually a dominant culture that has a large influence on physical activity and fitness. Other major influences on an individual's value of fitness include family, peers, social groups and the media.

Alamy Stock Photo/Hemis/DEGAS Jean-Pierre

Figure 13.1 Aqua cycling started in New York in 2013.

Changing attitudes to fitness

Fitness has been a concern of Australian governments from as early as the 1930s. In New South Wales in 1939, the National Fitness Council was established to promote physical fitness in the general community. It advised the Education Department on the best ways of implementing physical fitness for school children. The government perceived that changes in technology in the home and workplace were causing a decline in health and fitness in our society. However, the main reason for fitness promotion in the 1930s was to prepare the individuals going off to war.

Despite the recognised health benefits, physical activity levels are lower in industrialised countries such as Australia. Labour-saving devices such as dishwashers and clothes dryers, and passive forms of entertainment such as computers, televisions, video games and the internet have increased time spent in sedentary activities.

Throughout the 1970s and 1980s there was a significant positive shift in fitness attitudes, and the 'fitness

boom' began. The 'Life. Be in it' campaign encouraged people to think about their health and activity, and contributed to the mass movement of joggers 'pounding the pavement' in an effort to decrease morbidity and mortality rates.

In the 1980s, more people started going to the gym, taking aerobics classes, donning lycra and 'getting physical' with Olivia Newton-John. Health promotion continued, with an increasing range of activities available. This led to more women, in particular, participating and enjoying all levels of physical activity.

Since 2000 there has been a significant increase in the purchase of fitness equipment for home use. Home gyms, treadmills, elliptical machines and stationary bikes have become readily available and are easy to use in the home. Although a fitness centre provides a social atmosphere and a larger range of equipment, many people prefer to exercise in the privacy of their home. The availability of equipment such as suspension straps and fitballs has contributed to more home gyms being set up in an effort to make fitness more efficient and convenient.

According to the Australian Bureau of Statistics, approximately 25 per cent of people did not take part in any activity in 2013–14. This has contributed to an increase in overweight and obesity among Australian children and adolescents over the past two decades. Computer and electronics companies are now producing games that are designed to get children moving, even if it is in their own lounge rooms. A person can now learn to dance or play tennis from a computer game. Wii games such as dancing and step activities have been produced in an effort to get sedentary people active. Technology has also had a huge impact on fitness through apps for smartphones that monitor sleep patterns and steps. This information can then be mapped as data to reveal exercise and fitness patterns.

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Figure 13.2 Technology is changing the way we become fit.

The value a person places on physical fitness depends on many factors, and will differ for every individual. Attitudes to fitness will change according to everyday experiences and **motivations**. A person's, age, culture, family, peers, media, past experiences and socio-economic status will all affect their attitude to fitness. The diagram on the next page outlines the motivators for physical activity; these are applicable to any stage of a person's life.

Fitness as a commodity

The 'fitness boom' in the 1980s contributed to fitness being a big business today. Fitness quickly became a growth industry in which everything from deodorant to energy drinks to clothing were promoted as essential for a person to achieve their desired fitness. To participate in an aerobics class, a person needed to have the 'right' attire and footwear. Companies such as Nike and Reebok took advantage of the situation, producing items such as leotards, tights, shorts, socks, headbands and wristbands, shoes and tracksuits.

These companies were sending the message that it was not just how well a person did in an aerobics class that mattered, but how they looked while doing it. The leisure wear and technology industries have changed the way we become fit. Today, companies such as Lululemon Athletica and Lorna Jane have made activewear fashionable for the gym and working out, as well as socialising.

With the health and fitness industries still growing, opportunities for business in fitness include:

- personal training
- fitness centres
- diet and nutrition
- exercise for the elderly
- coaching clinics
- marketing and promotions
- equipment hire and sale.

EXERCISE CAN LEAD TO LONG – AND HEALTHY – LIFE

Michelle Hamilton, 6 September 2013

One needs only to step out the door and go for a run to reap the benefits of exercise – you finish refreshed, more alert and with a sense of accomplishment. A study published this week in the British Journal of Sports Medicine reminds us that that effort will pay off in the future as well, not just with added years, but with healthy ones.

In the study, researchers in Australia assessed the physical activity level and the physical and mental health of 12 200 men aged 65 to 83. Ten to 13 years later, subjects who were still alive were assessed again.

The analysis showed that the men who exercised at least 2.5 hours per week were more likely to be alive 10 years later. And after adjusting for lifestyle and disease (i.e., age, marital status, body mass index, smoking, alcohol use and the prevalence of heart disease), active subjects were more likely than their inactive peers to enjoy those years free of mental and physical ailments, including depression.

In other words, exercise helps keep our faculties intact as we age – if we keep at it. Men who began the study as active seniors but stopped exercising lost many of the health benefits associated with exercise. Subjects who continued to accumulate at least 2.5 hours of weekly activity were 60 per cent more likely to age healthfully. Moreover, men who started exercising during the study increased their chance of healthy aging by 35 per cent.

'We found that the health benefits of physical activity appeared to be all but lost among active men who became inactive over the following decade, whereas men who were physically inactive and became active accrued the benefits of healthy aging. Taken together, these results support the hypothesis that physical activity promotes healthy aging,' the authors write.

The research follows on the heels of another study that shows that it's better to be a fit senior than an unfit one: That research found that active older adults were less prone to distraction than their inactive peers.

Source: www.runnersworld.com/newswire/exercise-leads-to-long-and-healthy-life, accessed 17/12/17

Questions

1 Outline how exercise can lead to a longer life.
2 Discuss the ways exercise can lead to a long and healthy life for both females and males.

Weblink

Life. Be in it

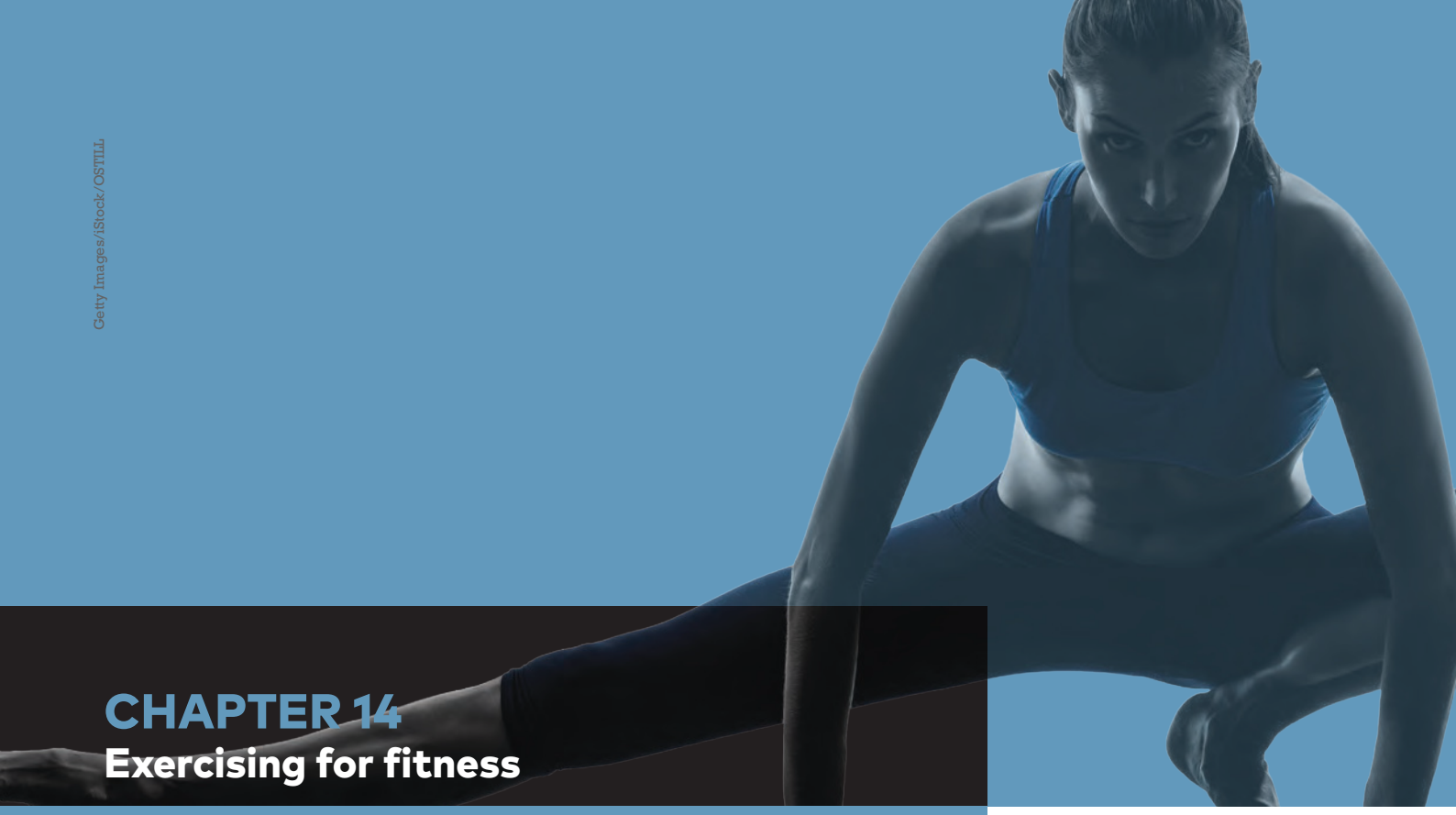
1 Watch and discuss the 'Life. Be in it' campaign.
2 Why was the campaign so popular?

CHAPTER SUMMARY

- Exercise and physical activity are synonymous, both referring to bodily movements.
- Exercise is a component of physical activity and varies in intensity depending on the individual's needs. It can be categorised as light (low), moderate (medium) or vigorous (high) in intensity.
- The measurement of physical activity and the intensity rate at which activity is performed will vary according to the fitness, age and ability of the individual.
- Adults should accumulate 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week.
- Labour-saving devices (such as dishwashers) and passive forms of entertainment (such as computers, television, video games and the internet) have increased the leisure time spent in sedentary activities or work environments.
- Decreasing levels of physical activity are believed to have contributed to a doubling in the prevalence of overweight and obesity among Australian children and adolescents over the past two decades.
- Growth in interest, demand and economic potential has led the fitness industry to develop in different ways in different countries. This **commodification** has led to the promotion of a wider range of services and products.

CHAPTER REVIEW ACTIVITIES

1. Outline the ways in which exercise can contribute to one's health.
2. Discuss the term 'exercise' in relation to one's fitness.
3. **Explain** how one's fitness can promote a healthy lifestyle.
4. Outline how the fitness industry and the media have contributed to the value that people place on exercise and fitness.
5. **Analyse** a range of opinions about the value people place on fitness.



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CHAPTER 14
Exercising for fitness

IN THIS CHAPTER

Individual fitness activities 260
Group fitness activities 266

After studying this chapter you should be able to:

- participate in physical activities to draw conclusions and gain a greater understanding of health and physical activity
- analyse factors that influence movement for different groups in society
- make decisions about health-promoting actions based on research.

INDIVIDUAL FITNESS ACTIVITIES

In this section we will evaluate the range and variety of fitness activities available, and learn how to participate competently and safely in a range of fitness activities

There are many fitness activities a person can participate in, depending on their lifestyle and personal circumstances. Some individuals will choose to participate in fitness activities without a partner or group. Flexibility is a major reason an individual will choose to train or participate in fitness activities on their own. Not having to rely on others gives individuals the opportunity to train whenever they wish and at relatively short notice if needed. This may pose a minor safety issue because it may mean there is no one available to help if assistance is required. But in terms of organisation, solo training is a major plus because it gives individuals control over their training.

Individual fitness activities also are much more cost effective because they do not involve high-cost registration fees (as may apply to some team activities). There is also no added responsibility for covering other roles such as scorers for team sports. Solo training is much more time effective for individuals because there is no time wasted in waiting for others to be there to train with. Individuals are able to set their own timetable for activity and not train according to a timetable set by a personal trainer or a group. Shift workers in particular have benefitted

from changes in opening hours of gymnasiums and training facilities. Many gymnasiums now open 24 hours a day, 7 days a week to accommodate people who want to train at different hours of the day. The busy times of gymnasiums are generally between 5–9 a.m. and 4–9 p.m. This has also led to training becoming more cost effective because some gyms offer a reduced membership rate for off-peak hours. Gymnasiums are also not as busy during off-peak hours, saving people more time by not having to wait their turn to use popular equipment or machines. The availability of gym and fitness equipment suitable for home use is increasing, meaning that people do not have to leave the comfort of their home to participate in fitness activities.

The age of individuals is also a major influence on fitness. Younger people between the age of 15–30 generally have much more time available for individual fitness activities because they usually do not have family responsibilities. They also have disposable income that can be used for gym memberships. As people get older they tend to participate in activities such as power walking, cycling and swimming, which are easier to do with less organisation. The older people are, the more popular these activities become. Water-related fitness activities such as swimming and aquarobics are popular with older Australians because of their low-impact nature. This is especially important for older people who may not be in the same physical shape as years earlier.

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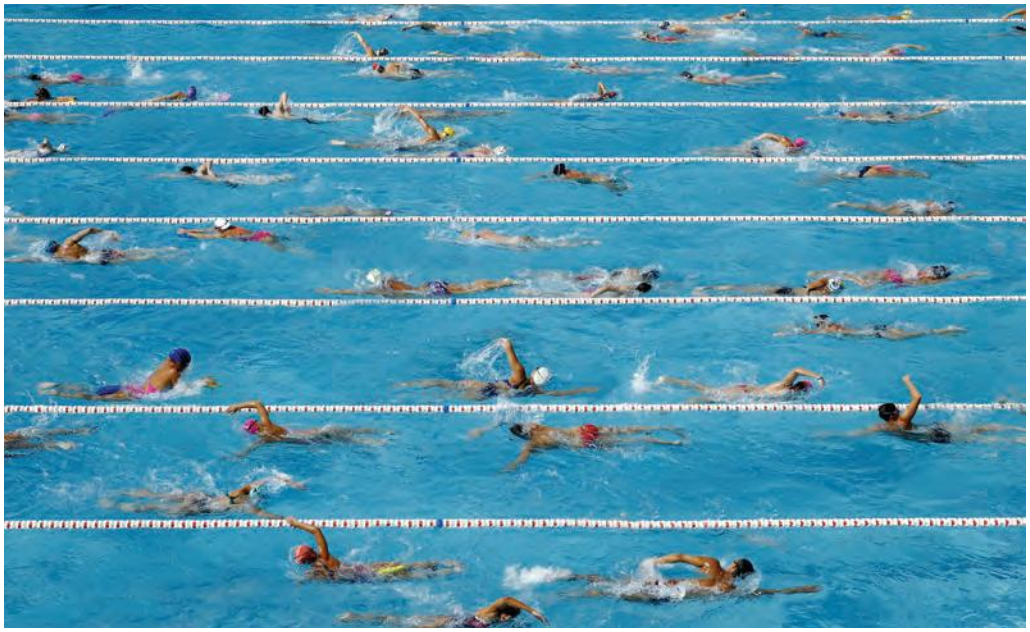
Figure 14.1 24 -hour gyms provide flexibility for individual fitness

Modern technology has led to an increase in the participation rates in fitness activities for individuals. Companies such as Garmin, Fitbit and smartphone manufacturers have created technology that interacts with phones, watches and computers to record data. Individuals can track their data and monitor improvement levels by analysing the data collected. The ability to track data such as number of steps taken per day has led to competition between individuals. The technology can even send us prompts if we have been sitting for too long and can give us information on the type and quality of sleep we are getting.



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General tips

Before you begin any fitness activities:

- warm up before starting
- build activity slowly
- use the correct technique for the chosen activity
- wear suitable attire, especially footwear
- consider weather conditions if doing outdoor activities
- drink water before, during and after activity, especially in warm weather
- complete a suitable cool-down activity.

Power walking

Power walking is an excellent form of exercise for people of all ages and abilities. A walking program should start gradually, and then increase in length and pace as the walker gets used to it. This activity is ideal for beginners because it is low impact and requires no special equipment or cost. As the person's level of fitness increases, they can increase the intensity by adding hand or ankle weights, or by walking up hills.

When power walking, it is important to wear correctly fitted footwear with adequate cushioning and protection to avoid injuries to the feet, legs and back. Regular weight-bearing exercise can improve cardiovascular fitness and bone strength, reduce excess body fat and boost muscle power. It is a great way to exercise and socialise, as participants are able to limit intensity and continue to talk while exercising.

Shutterstock.com/bokan

Figure 14.2 Power walking is a great way to get fit and socialise.

Jogging, running

Running or jogging can be great exercise for both the body and mind. You can run any time and anywhere, by yourself or with a group. Most runners run casually for the physical, social and mental benefits. Casual runners usually love the accessibility of running – no fancy equipment is required, and you can do it almost anywhere. It's never too late to start running – many people have taken up the sport in their fifties, sixties and even seventies.

Serious runners believe there is a difference between running and a leisurely jog, and training runs differ in pace and intensity. Running can raise the heart rate quickly, so its benefits are mostly endurance and strength-related. Running is not recommended as a method of weight

loss, primarily because advancing distance and speed too rapidly will result in injuries, setting many people back and causing additional, more serious, problems. However, it is an inexpensive form of weight management and improves cardiovascular fitness.

Swimming

Swimming is a healthy activity that can be enjoyed at all stages of life, and it offers numerous health benefits.

Regular swimming builds endurance, muscle strength and cardiovascular fitness. It can serve as a cross-training element in regular workouts. Before a land workout, a person can use the pool for a warm-up session. Swimming a few laps after a workout can also help a person cool down, move blood through the muscles to help them recover, and help them relax as they glide through the water. It can also be used for rehabilitation from lower body injuries, maintaining some level of conditioning during recovery. In Australia swimming is also an activity for individual safety, given that much of the population lives near the coast.

As a non-weight-bearing activity, swimming is excellent for anyone with muscular or skeletal problems, and is especially beneficial for elderly people.

Cycling

Cycling is enjoyed by people of all ages as a form of transport, recreation and sport. It is an exercise that helps to improve cardiovascular fitness, balance, endurance and muscular strength. Many people take up cycling because it has a low impact on weight-bearing joints, making it especially suitable for older people or those who have suffered leg injuries.

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Figure 14.3 Cycling is a great way to get fit and have an adventure with friends or family.

Safety and protection are important factors when cycling, particularly on roads that lack dedicated bicycle lanes, where the cyclist has to ride on the road with traffic. It is important that cyclists wear helmets and light-coloured clothing to ensure they are visible to drivers. The cyclist should also ensure that their bicycle is correctly sized for their height, weight and ability.

Weight-training programs

Weight training uses the force of gravity (in the form of weighted bars, dumbbells or weight stacks) to oppose the force generated by muscle through concentric or eccentric contraction. Weight training uses a variety of specialised equipment for specific muscle groups and types of movement.

The basic principles of weight training involve a manipulation of the number of repetitions (reps), sets, tempo, exercise types and weight to increase the strength, endurance, size or shape of a person. The specific combinations of repetitions, sets, exercises and weight depend on what the individual wants to achieve; sets with fewer reps can be performed with heavier weights.

For people using home gym equipment, it is essential to seek advice from qualified instructors before starting a program. This ensures that the correct technique or 'form' is used when lifting weights to avoid serious injury.

Tai chi

Tai chi has been referred to as 'yoga in motion', a moving meditation. It can be a powerful key to relaxation, increased focus and concentration.

Tai chi is a physical exercise that focuses the mind while conditioning the body. It is an ancient Chinese system of slowly flowing movements and shifts of balance that strengthen the legs while conditioning the tendons and ligaments of the ankles, knees and hips. This increases their range of motion and makes them more resilient, and less prone to injury. The constant weight shifts train balance and body awareness, leading to confident ease of movement, both while performing the exercise and in everyday life.

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Figure 14.4 Tai chi in motion

Western science recognises numerous benefits of tai chi. Practising tai chi for 20 minutes a day:

- reduces levels of stress hormones during and after practice, dissipating stress and reducing stress-related weakness
- improves immune function and heightens mood
- strengthens the body and mind
- increases stamina

- increases oxygen uptake and utilisation (more efficient breathing)
- reduces blood pressure
- slows the decline in cardiovascular power
- increases bone density
- increases strength and range of motion of joints, contributing to greater leg strength, knee strength, and flexibility.

Pilates

Pilates was created by Joseph Pilates during World War I to improve the rehabilitation program for returning veterans. Joseph Pilates believed that mental and physical health are essential to one another. He recommended a few precise movements that emphasise control and form to help injured soldiers regain their health by strengthening, stretching and stabilising key muscles. This became known as 'The Pilates Principles', used to condition the entire body: proper alignment, centring, concentration, control, precision, breathing and flowing movement.

Shutterstock.com/wavebreakmedia

Figure 14.5 Pilates exercises the entire body, and emphasises core strength.

Pilates took the world by storm because of its contribution to avoiding injuries. All sorts of people, from dancers to footballers, do Pilates because the benefits are as much mental as they are physical. Though different groups have added their own moves, essentially Pilates involves training your muscles to improve posture and alignment. By focusing on your core strength, you enhance the little muscles in the body, making you better able to support the larger ligaments, tendons and joints. This is sometimes done by using specialised equipment, such as a reformer.

Yoga

Yoga has a similar concept to Pilates, but classes differ in style, emphasis and content, depending on the training and background of the teacher. Yoga offers great variation for fitness, and its emphasis on better flexibility to avoid injury has made it very popular. Yoga is also a good way to manage stress and still the mind while challenging the body.

Characteristics of yoga include:

- **awareness of breath** – working with breathing to calm the nervous system and to enhance self-awareness
- **physical postures** – to build strength and flexibility and release tension stored in the muscles
- **relaxation** – taking the benefits of the physical practice into the mind, enabling thoughts to become calm and clear, and contributing to a general feeling of wellbeing.

Yoga is suitable for people of all fitness and activity levels and all ages, shapes and sizes. Anyone, from the very young to the elderly, can benefit from the practice of yoga, but it is important to choose a style of class and teacher appropriate to your needs.

Emerging individual fitness trends

Our fascination with self-improvement shows no signs of abating, and there are many new exercise trends aimed at helping individuals meet their health goals. According to experts, high-impact aerobic workouts and expensive home gym equipment appear to be past their prime.

For those who prefer to train on their own, employing a personal trainer has become one of the most popular fitness approaches. This may be due to the personalised attention the individual receives, as well as fitting in with their lifestyle. Often people are more likely to keep to appointments with a personal trainer than they are to stick to the training times of a fitness centre or prescribed training schedule.

Shutterstock.com/Bojan Milinkov

Figure 14.6 Personal training is a still a growing area of individual fitness.

GROUP FITNESS ACTIVITIES

In this section we will compare a variety of fitness activities by investigating:

- the benefits of each fitness activity
- where the fitness activity is available
- who would be attracted to the activity
- the cost involved
- the time commitment required
- sources for further information
- personal reflections on participation.

Group fitness activities are generally more planned and structured than individual activities. Usually advice and support is provided from an instructor or coach, and along with the social benefits of these activities, they tend to take place in a motivating environment.

Aquarobics

Aquarobics, although generally lower impact than land-based aerobics, still offers most of the same fat-burning and endurance-building benefits as other forms of aerobic activity, without the strain on the joints. An aquarobics session of around 30 minutes will help you burn about 300 calories. Most classes will run for around 45 minutes and should include a warm-up, a cool-down, and stretching exercises. The classes are performed in the pool and will include movements like jogging, kicking, jumping, squats and dance movements.

Getty Images/FatCamera

Figure 14.7 Aquazumba is a combination of Zumba and aquarobics.

The main benefits of this type of exercise are: it is great for all fitness levels, it builds strength and flexibility, and it is an excellent cardiorespiratory exercise.

Aerobics

Almost every gym and fitness centre in Australia offers classes that combine a variety of dance moves, steps and weights, all choreographed to high-energy music. Aerobics classes can be low impact or high impact. Aerobics is an easy way to get an intense cardiovascular workout, and an individual does not have to be skilled in any particular sport to take part. The classes are often designed to give an all-over body workout and improve coordination. Participating in a workout with other people can be a great motivator to exercise hard, and the dance moves can be a lot of fun, so aerobics is great for lifting your mood and releasing stress.

'Pump'

Pump classes are resistance workouts that feature low weight loads and high repetition movements. They are a great combination of music, easy-to-follow moves and strengthening exercises designed to develop a toned, strong body. Pump exercise classes use barbells with adjustable weights, working the major muscle groups through a series of exercises including squats, presses and lifts.

Step aerobics

A step aerobics class is distinguished from other forms of aerobic exercise by its use of an elevated platform – the step. The height can be tailored to an individual's needs by inserting risers under the step. Step aerobics classes are offered at many gyms and fitness centres.

Step movements are choreographed to music and are performed for 45–60 minutes. The stepping action is ideal for improving muscle condition, especially in the legs and buttocks. To work out the upper body, one usually uses light weights. These classes will also improve coordination and endurance.

Spin classes

A spin class is a high-intensity interval-based workout on a stationary bike, usually set to adrenaline-inducing music and led by an instructor. The intensity of the class differs throughout, and often involves a virtual ride on flat roads, hills and sprints. Participants often have to get up and out of the saddle.

Spin classes are low impact and are therefore safer on the joints than running. Cycling with the feet secured on the pedals is called a **closed kinetic chain activity**. This keeps the hips, knees and ankles in alignment; it reduces or prevents injury and allows the muscles to be loaded in the right places. Cycling classes are a close second to jogging and casual running for weight loss, and are much gentler on the body's joints.

Getty Images/Christian Science Monitor

Figure 14.8 A spin class

Circuit training

Circuit training is a type of interval training that combines strength exercises with endurance or aerobic exercises, bringing together the benefits of both cardiovascular and strength training workouts. 'Circuit' means a group of activities. Selected 'stations' are positioned around the facility, which are to be visited in rapid succession. The stations may comprise resistance equipment, such as hydraulic equipment or free weights, as well as allocated spaces to do squat thrusts, push-ups, jumping jacks, sit-ups, jogging on a mini-trampoline and other exercises. Each person should complete the activity in one station before they proceed to the next station. They then continue until they have passed through all stations once or twice as required, or until a certain time requirement has been met.

The most common type of circuit is a timed circuit. This type of circuit involves working to a set time for both rest and exercise intervals. For example, a typical timed circuit might involve 60 seconds of exercise and 60 seconds of endurance activity in between each exercise. This form of activity has grown in popularity, with boot camp classes reflecting military-style training on beaches and in other **settings**. Circuit classes can be operated in gymnasiums, but also parks and other outdoor venues.

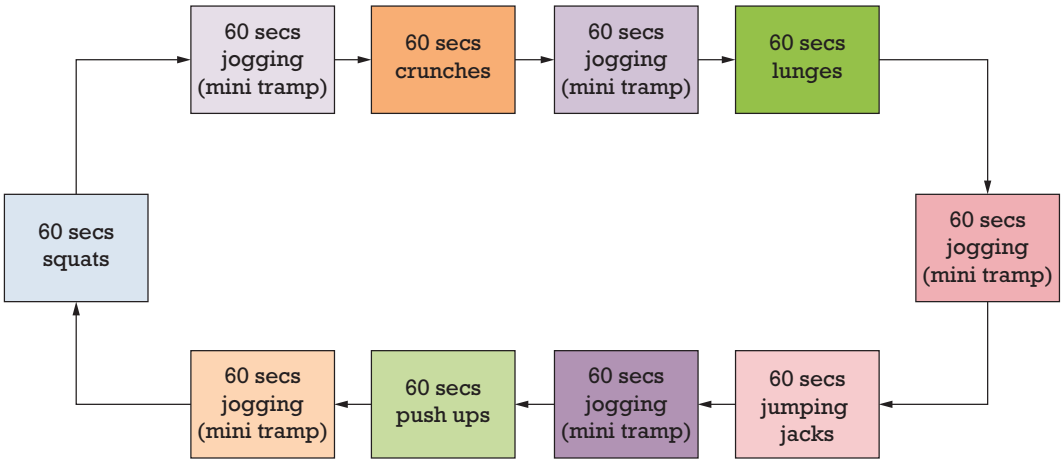

Figure 14.9 A typical circuit layout

The FITT principle

FITT stands for Frequency, Intensity, Type and Time. It is a basic formula for what is necessary to gain benefits from an exercise program. These are general guidelines for individuals of low to moderate fitness levels, and are used as a basis to establish a training program. However, there are as many ways to train as there are people doing the training, so a program needs to be customised to fit specific needs and goals. See Chapter 5, pages 139–40 for more about this principle.

Team games

Most team games can improve fitness when played vigorously. However, a certain level of skill is usually required to play the games effectively. Some team games include soccer, netball or touch football.

Racquet sports such as squash, tennis and badminton are popular forms of exercise and can be played socially or as part of a team competition. Energy expenditure during a team game will not be as high as individual running for the same amount of time, but the enjoyment and social aspects involved in team games make them very appealing.

Exercise for specific groups

There are some groups of people for whom exercise guidelines need to be modified to ensure their safety. These groups include pregnant women, children and the elderly.

Pregnant women

Regular exercise is valuable not only for the duration of pregnancy, but also in preparation for labour and delivery, as it increases strength, flexibility, endurance and stamina. Many women who exercise regularly before they become pregnant find that they continue exercising throughout their pregnancy with little or no discomfort. However, before a pregnant woman begins any exercise program it is important to consult a healthcare professional, who can outline personal exercise guidelines based on the individual's medical history.

A major concern for pregnant women while exercising is the potential for the foetus to overheat. When a pregnant woman exercises, her core temperature increases and so does the baby's. The woman can regulate her body temperature through sweating, but the baby cannot. Therefore, it is very important that a pregnant woman does not exercise excessively, does not raise her body temperature past 38 °C, maintains adequate hydration, and does not exercise on hot, humid days. Activities also need to be non-contact, and specific exercises may need to focus on abdominal and pelvic floor muscles.

Getty Images/Jose Luis Pelaez Inc

Figure 14.10 Exercise can continue throughout pregnancy, under the guidance of a healthcare professional.

Children

For children, exercise means playing and being physically active. Children exercise when they have sport and PE classes at school, as well as sports classes outside school. They also exercise at recess, such as climbing on playground equipment or playing tag.

Children at play in a playground can display three components of fitness in action: endurance, such as when they are playing 'tag'; strength, such as when they climb across the monkey bars; and flexibility, such as when they bend down to tie their shoes.

Parents should encourage their children to do a variety of activities so that they can work on all three components. A combination of moderate and vigorous activities for at least one hour a day is recommended for children between the ages of 5–12 years, and at least one hour of physical activity every day is recommended for 12–18 year olds. This can be built up throughout the day with a variety of activities.

The Australian Department of Health has brochures on its website with recommendations for physical activities for each age group:

- Active kids are healthy kids (5–12 year olds)
- Get out and get active (13–17 year olds).

It is important to recognise that children are still growing and developing. The delicate process of bone and muscle formation can be severely damaged by exercise that contradicts the guidelines. For example, weight training using heavy weights can damage the growth plates of bones, and repetitive activities can lead to 'overuse' injuries such stress fractures.

Fitness

Athletes and people wanting to increase their fitness will undertake activities that resemble their sport or the area of fitness they are trying to develop. This will vary, depending on the time of the year, whether the athlete is a professional competitor, and the program outlined by their coach. Athletes are motivated to stay fit in order to maintain their success. Athletes who compete at a representative or professional level may also strive to be physically fit to gain a psychological 'edge' over a competitor. These athletes generally have personalised and challenging fitness programs, designed by their coach or personal trainer. These training programs generally use periodisation to break the program into three phases: off-season (transition), pre-season and in-season. Each phase has specific goals for the athlete. Depending on the sport or activity, the playing season and the athlete, these programs may be designed for all year round or for a limited time.

Elderly people

Just like the young, elderly people can gain many benefits from exercising, including improvements in strength, balance, coordination and mobility. If the person has not exercised for a while, they should start slowly. Even walking for just 10 minutes a day will provide great benefits.

Older people who exercise have:

- higher VO_2max values (the maximum volume of oxygen) and half the expected decrease in VO_2max due to age.
- higher high-density lipoprotein (HDL), the good cholesterol, and lower low-density lipoprotein (LDL), the bad cholesterol
- enhanced glucose tolerance and insulin sensitivity
- greater strength and reaction time, and a reduced risk of falling
- increased bone density, which reduces the risk of osteoporosis.

Exercise guidelines for older people

Before beginning an exercise program, older people should seek a medical examination and clearance from a healthcare professional. The following guidelines should also be taken into account:

- Ensure all gym equipment is safe and inspected regularly for defects.
- Exercise should be supervised by an experienced and registered trainer to ensure correct technique is followed.
- Always begin with regular stretching and strengthening exercises before commencing more dynamic aerobic activities.
- Cycling and swimming are recommended over jogging.
- Older people should not exercise at extreme temperatures, as their metabolism is less tolerant of environmental stress.
- Weight training should be delayed until the individual has built up fitness and muscle.
- Undertake exercises that keep both feet on the ground, such as squats, to reduce the risk of overbalancing.
- Use light weights if lifting above the head.
- Abdominal work is safer on the floor than on a swiss ball.
- Isometric exercises are rarely appropriate.

Psychological benefits

While the physical benefits of exercise are obvious, the psychological benefits are not as commonly known. Many studies have shown that older people who exercise gain great benefits from the social interaction, and many people report a marked increase in self-esteem. Healthy aging is a common concern, and functional fitness has emerged as a response. Functional fitness extends our quality of life by helping our muscles continue to do the things that support activities of daily living.

Alamy Stock Photo/Jozef Polc

Figure 14.11 Fitness is an important part of healthy ageing.

OLDER AUSTRALIANS HEALTHIER AND MORE ACTIVE BUT STILL STRUGGLE WITH FITNESS

Alina Eacott, 22 July 2017

Older Australians are generally healthier and more active than their peers more than 25 years ago, but their level of fitness has decreased, new research has found.

The health and fitness of more than 100 people aged between 60 and 70 was examined by researchers from Flinders University in Adelaide, replicating a study conducted in 1991.

The study tested participants' fitness on an exercise bike and also examined health factors including blood pressure, cholesterol and glucose levels.

They were also asked to detail their fitness regimes.

'As we all know, Australians are getting older, we've got an ageing population, so it's really important for us to try and work out the trends in health and fitness over time,' researcher Dr Lucy Lewis said.

'We were really interested in the comparison between that 1991 study and now 2017 to have a look and see what was happening.'

Barbara Kupke, 60, said she walks daily.

'I walk every morning before I go to work for about 30 minutes … and then usually three times a week I go to the gym,' she said.

Ms Kupke returned excellent results.

'When you get the results that suggest that your fitness age is in your 20s and your health age is in your 40s you sort of think, that's ok, I'm ok with that,' she said.

People 'more sedentary than ever'

When compared with the results from 1991, people aged between 60 and 70 are overall taller and heavier, and their BMI remains in the overweight category.

Dr Lewis said their health was generally better.

'Older adults in our study had lower blood pressure and lower total cholesterol levels than the people in 1991,' she said.

Results showed people in the age group were engaging in more physical activity than in 1991.

Despite that their actual level of fitness had decreased.

'Australians are now perhaps more sedentary than ever, and they're also spending increasing amounts of time sitting during the day, so inactivity such as watching television, sitting at a desk or using a computer,' Dr Lewis said.

'That could perhaps go some way to explaining why people in our study were actually participating in more physical activity but had lower fitness.'

www.abc.net.au/news/2017-07-22/sedentary-lifestyles-hurt-older-australians-fitness-levels/8732258. Reproduced by permission of the Australian Broadcasting Corporation – Library Sales © 2017 ABC

Emerging group fitness activities

Traditional and basic exercises that use the body, and not much else, to get in shape are increasingly popular. The exercise workout of the future could simply be simply calisthenics, such as push-ups, sit-ups, jumping jacks and sprints.

People are more interested in exercise programs that help them move through daily life more easily. They care more about being able to pick up their child without hurting their back, or doing chores around the home without getting injured. People are looking for exercise workouts that increase flexibility and core strength in order to achieve a healthier life and lifestyle.

An emerging fitness trend that is gaining popularity is a combination of 'opposing' exercises of mind–body movements and aerobics. These workouts include Cy-Yo, which is an hour-long workout combining 10 minutes of yoga, 40 minutes of speed cycling on a stationary bike, then another 10 minutes of yoga to cool down and refocus the mind.

Boot camps

Boot camps are now commonplace group activities that combine a number of exercises in outdoor situations. Pilates and yoga will continue to grow in future years. These programs are also diversifying and merging. Special populations (such as kids and fitness) and special needs (such as post-rehabilitation) are similarly seen as growth areas.

Shutterstock.com/wavebreakmedia

Figure 14.11 Boot camps reflect a military style of training.

The phrase 'health and wellbeing' is increasingly used, and many new activities support this concept. Whether a person prefers indoor, outdoor, individual or group activities, a vast variety of activities are now available to help people from all ages and different walks of life stay fit and healthy. Workplace wellbeing programs are also gaining popularity.

TOP FITNESS TRENDS 2017: THE DIGITAL AGE AND EXERCISE COLLIDE

Sarah Berry, 3 November 2016

The digital age has well and truly collided with fitness.

For the second year in a row, the American College of Sports Medicine (ACSM) has named wearable tech as the top fitness trend for the coming year.

Despite questions about how effective they are at motivating us to stay fit in the long-term, sales of wearable tech continue to grow and are predicted to be worth a staggering $34 billion by 2020.

'It's trendy – any tech is cool and any industry gets swept up in it,' says Nardia Norman, trainer for the Australian Institute of Fitness. Besides, she adds, 'people look for things outside themselves that give them that pop of motivation.'

Technology has made fitness affordable and accessible as well as potentially giving us confidence by providing feedback about our activity.

'Long-term change is reliant on someone's confidence and self-belief,' Norman says, 'these tools can give evidence of success which can make people feel more confident.'

Tech also allows trainers to tap into the data to keep a track of clients' literal movements and to help keep them on track.

'It's number one for a reason – people want that instant feedback,' says Luke Istomin, co-founder of F45 and Varlah. 'At the moment, it gives you great data, but it doesn't make you accountable or tell you what to do next.'

So, for a program he's developing, Istomin manually monitored the sleep and movement patterns of 60 clients using FitBits and used the information to keep them accountable, based on their goals.

He adds that 'the exciting part' is how quickly tech is improving to help people put that information to good use and achieve their goals.

Not that it will ever replace the personal trainer, Norman says.

'Humans absolutely love and adore face-to-face connection,' says the former fitness trainer of the year. 'People still want human interaction.'

And when that human interaction is with their trainer, they want them to be educated and experienced, the number four trend, up from fifth place last year.

'It is great to see that educated and experienced fitness professionals are still high on the list,' says Norman. 'I honestly think that the general population is growing weary of ''insta-experts'' and online ''fitness stars''. Of course ''insta-star-fitness-experts'' will still continue to ''inspire'' and dominate social media real estate, but the reality is that the consumer is searching for professionals with credibility and proven experience.'

She worries that the Insta-fitness stars are better at marketing than training and, along with selfies, are busy dishing out shame-based, 'cookie-cutter' programs, based on aesthetics instead of health.

'They are built around making people feel bad about themselves – I think they're shame-based and you can't create lasting change around shame,' Norman says. 'They're not individualised and most of them rely on low-calorie diets that are ruining most women's bodies.'

Istomin adds that, with the 'hundreds and thousands of trainers and new training techniques popping up' there is more need than ever to ensure they are educated …

Source: www.smh.com.au/lifestyle/health-and-wellbeing/fitness/top-fitness-trends-2017-the-digital-age-and-exercise-collide-20161103-gsh75j.html

Question

Follow the link to read the article in full, and then as a class discuss the impact the article might have on the fitness industry.

Weblink

Table 14.2 2017 fitness trends

Ranking	Trend
1	Wearable technology
2	Bodyweight training
3	HIIT (high intensity interval training)
4	Educated, certified, experienced fitness professionals
5	Strength training
6	Group training
7	'Exercise is medicine'
8	Yoga
9	Personal training
10	Exercise and weight loss
11	Fitness program for older adults
12	Functional fitness
13	Outdoor activities
14	Group personal training
15	Wellness coaching
16	Workplace health promotion
17	Smartphone exercise apps
18	Outcome measurements
19	Circuit training
20	Flexibility and mobility rollers

Source: www.smh.com.au/lifestyle/health-and-wellbeing/fitness/top-fitness-trends-2017-the-digital-age-and-exercise-collide-20161103-gsh75j.html

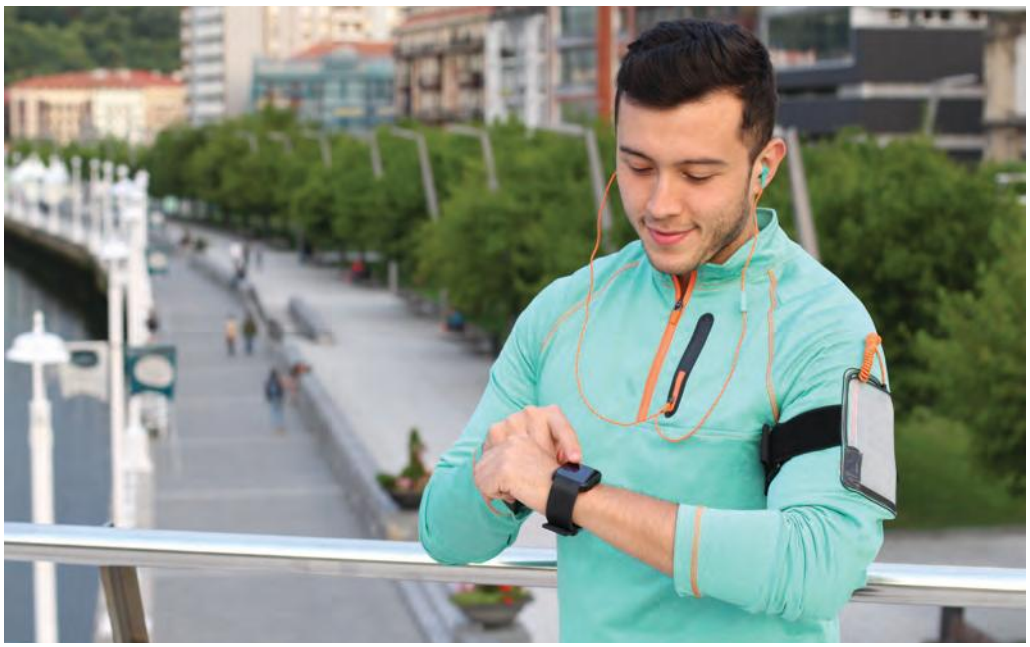

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Figure 14.12 Wearable technology was the number one fitness trend in 2017.

Boot camp

Take part in a professional circuit session or boot camp at your local fitness centre. Evaluate the safety requirements and discuss the variety of people who would relate to this activity.

Fitness trends

Weblink

Search for 'The top 20 fitness trends for 2018' (or follow the link). Describe the various forms of fitness, both individually and from a group focus, that are gaining popularity.

Sport safety

Go to the NSW Department of Tourism, Sport and Recreation website and search for 'Kids in gyms'. Discuss the safety issues that parents and coaches have to consider when children are involved in sport.

Design an activity

Design an activity for a group of people from one of the following categories: children, pregnant women or the elderly.

1 In your planning, make sure you address the following aspects:
   a why the activity was chosen for that particular group
   b ensure that the activity uses cheap or free equipment for an individual at home
2 Design something that could be used to advertise the activity.

Older Australians

Read the article 'Older Australians healthier and more active but still struggle with fitness' on page 272. What do you think society can do to enable older people to remain active?

Local activities

Make a class list of all available activities in your area, and randomly allocate students to three activities each. Complete these activities and evaluate each activity based on the following questions:

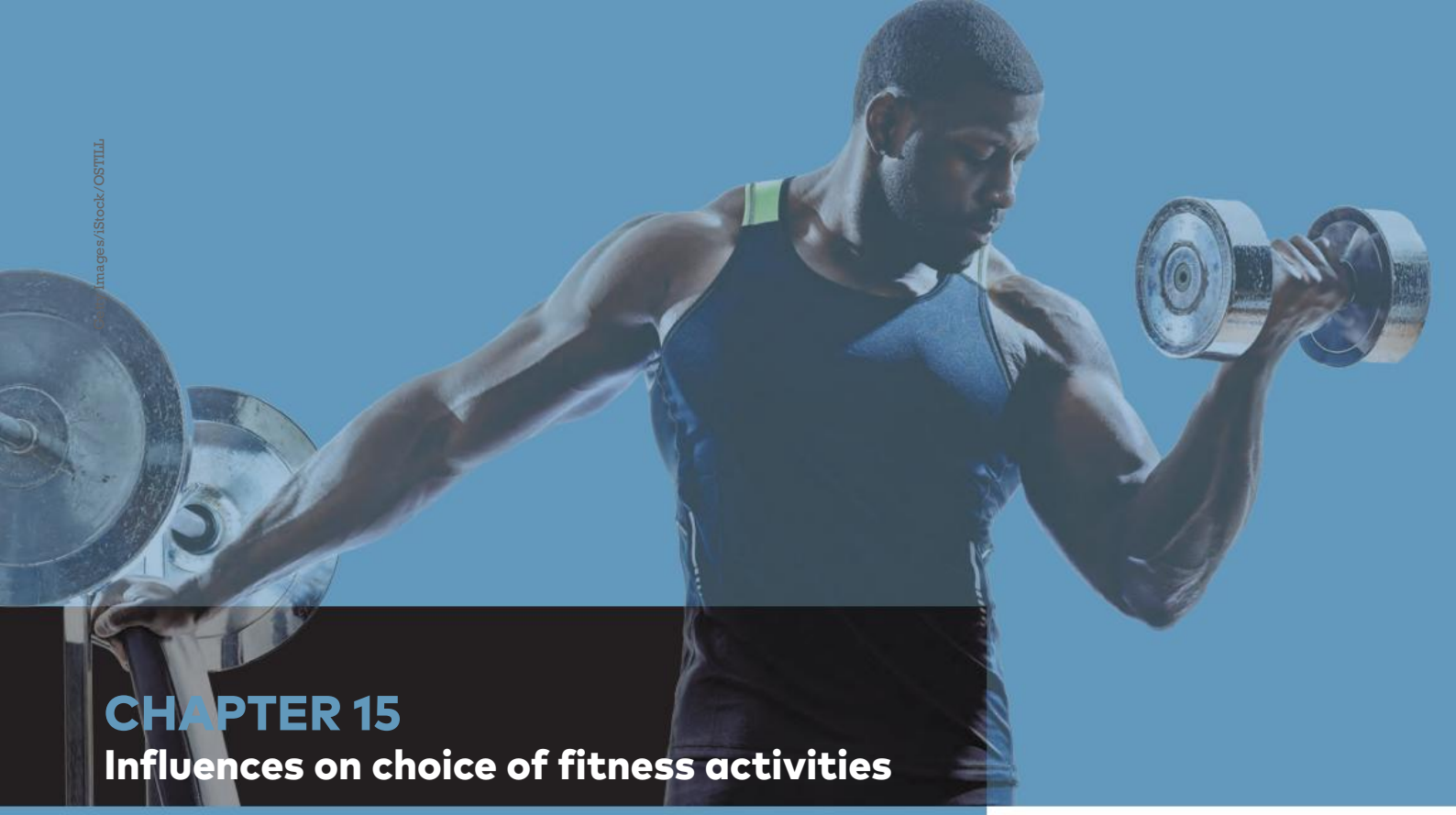
a What did I get out of this activity?
b What were the costs associated with this activity?
c What time commitments were associated with this activity?
d Who would be best suited to do this activity? Why?

CHAPTER SUMMARY

- The choice of exercise a person participates in depends on many contributing factors, such as cost, time, age, cultural background, fitness level and preferred exercise methods.
- Some people prefer to exercise on an individual basis. Individual activities include power walking, swimming, running, cycling, weight training, tai chi and yoga.
- Group fitness activities are generally more planned and structured than individual activities, as they involve more than one person. These include aerobics, aquarobics, pump classes, step classes, circuit training and team games.
- There are some groups of people for whom the guidelines for 'normal' exercise need to be modified in order to ensure their safety. These groups include pregnant women, children and the elderly.

CHAPTER REVIEW ACTIVITIES

1 Compare the advantages and disadvantages of participating in individual and group activities.
2 Explain the role of a fitness consultant or personal trainer
3 Clarify how an exercise program for a child may differ from one designed for an elderly person.
4 Outline the services that may be offered by the different community groups within your local area.
5 Discuss the importance of cultural groups within the community.



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CHAPTER 15
Influences on choice of fitness activities

IN THIS CHAPTER

Settings for exercise 279
Advertising and promotion 282
Motivators and barriers to participation 286

After studying this chapter you should be able to:

- recognise factors that lead to positive health and fitness
- analyse factors that influence movement
- utilise a range of sources to draw conclusions on health and physical activity.

When a person chooses which activities they want to participate in, their choices are based on many factors, such as time, socio-economic status, and other commitments that influence their lifestyles. But for whatever reason a person chooses a particular activity, they generally do so believing that exercise will benefit their health.

Research studies worldwide have investigated the role of fitness among all major groups within society – men, women, children, the aged, the disabled, workers, the unemployed, the fit and the unfit – and have found that fitness development plays an essential role in bringing positive benefits to people's lifestyles.

Left to right: Shutterstock.com/karelnoppe; Getty Images/fotokostic; Getty Images/Photodisc

Figure 15.1 People engage in many different kinds of fitness activities.

SETTINGS FOR EXERCISE

In this section we will evaluate the appropriateness of fitness activities by considering:

- Does this fitness activity suit my fitness needs?
- Could I continue to participate in this fitness activity?
- Are other fitness activities more suitable for me?

The environmental setting a person chooses to exercise within depends on the type of activity they wish to do. Some may choose commercial fitness centres, where there are specialised instructors and equipment. Others may choose to exercise at home or with community groups. There are advantages and disadvantages to all settings, and it is important for an individual to weigh up what will suit them best.

Exercise at home

Exercising at home can be very convenient. It is also relatively inexpensive – most gym equipment found in commercial fitness centres can be bought at a reasonable price and used at home. Such equipment is designed to be compact and easy to assemble, and is usually able to be folded and stored once the person has completed their daily exercise program. Portable exercise equipment such as weight machines, treadmills, exercise bikes and punching bags can also be included in a 'home' gym to help an individual maintain their fitness level.

Some of the main disadvantages of having home gym equipment are:

- risk of injury from incorrect use or technique
- keeping motivated
- ensuring a combination of strength and aerobic exercises are included in the exercise routine.

Community facilities

Many local councils provide facilities where fitness activities are conducted for members of the community. These activities are generally cheaper than at a commercial fitness centre. Common activities include aerobics, yoga, Pilates, many forms of martial arts, gymnastics, various forms of dance activities, indoor sports and water activities, if a swimming pool is available.

When local councils build new leisure centres, they often include a large range of multi-purpose spaces to facilitate a variety of activities. Some key advantages of these centres include a usually central location, and social interaction with community members. Councils will often operate activities free of charge for those members of the community who cannot afford to do classes at commercial gyms. This has a positive effect on the individual, both physically and socially.

Fitness centres and personal trainers

The biggest advantage of commercial fitness centres over home gyms is the wide range of supervised and structured activities offered. Personal trainers can design a specialised program to suit an individual's requirements and capabilities, using a large range of equipment and activities.

A program may include use of rowing machines, treadmills, exercise bikes or step machines for cardiovascular workouts, and weight machines and free weights for building strength. Undertaking group classes or circuit training may provide additional benefits from social interaction and cross training. Some people may prefer the one-on-one support of a personal trainer throughout a training session.

While fitness centres provide services to improve a person's overall health and lifestyle, they are more expensive than home gyms or community centres.

Getty Images/davidf

Figure 15.2 Running groups are a popular way for people to exercise together.

Exercise clubs

Exercise clubs offer people the opportunity to participate in a particular activity with others who share the same interest. These clubs generally cater for individuals of all levels of ability, from the novice to those with advanced skills.

Some examples of exercise clubs include Little Athletics, rowing, swimming, surf lifesaving, cycling, distance running and triathlon. These clubs offer opportunities for an individual to begin at a low level of competition or participation, and work their way up to more challenging levels.

Cultural groups

Many exercise clubs are also formed within cultural groups. Australia is a multicultural country, and some people feel more comfortable participating in programs that cater for their particular cultural group. These group activities also provide settings and protocols that adhere to an ethnic group's cultural learnings and beliefs.

These groups provide the opportunity to exercise with others who wear similar dress, speak the same language and have common backgrounds. Some examples of these cultural groups include Irish dancing, line dancing, Gaelic football or belly dancing.

Alamy Stock Photo/Neil G Paterson

Figure 15.3 Opposing players during a game of Shinty, a traditional Scottish team game that has similarities to hockey. Shinty is mainly played in the Scottish Highlands.

TECHNOLOGY'S EFFECT ON FITNESS: PAST, PRESENT & FUTURE

Technology has always evolved in order to help man find solutions and make processes more efficient.

Communications have come a long way from the days of Morse code to today's smart phones.

The typewriter has become a relic while main frames are regarded as dinosaurs in the age of compact technology.

Fax machines and snail mail have been rendered obsolete by e-mail. But how technology has changed health and fitness seems to have taken a different course.

The idea of health and fitness itself has come a long way. It is no longer synonymous with vanity or treated simply as a pastime.

With stress-related illnesses on the rise coinciding with the increasing cost of health care, more people are turning to exercise as a means to get healthier and fitter.

The evolution of technology in fitness

If you have been regularly exercising in the gym as far back at the 1980s, you would note that not much has changed by way of exercise equipment.

Yes, we now have anti-gravity treadmills, selector-ised dumbbells for a quick-weight change and cable motion equipment.

But these have barely differentiated from products a decade ago.

The reason for this is that the evolution of technology in fitness did not correspond with the evolution of training systems.

In fact, today's training systems are more aligned with basic, old school workouts that hardly require sophisticated gym equipment.

Aerobics classes once popular in the 1980s have given way to boot camp classes and core strengthening programs.

These are methods that combine bodyweight movement and old school equipment such as kettlebells, bands and the medicine ball to improve natural strength, functionality and coordination.

Even the innovative and highly effective TRX suspension cable systems are used to increase resistance and difficulty levels for bodyweight exercises like pushups, pull ups and squats.

Treadmills and elliptical machines still line many cardio areas in the gym but the technology behind it have hardly changed.

However, its function has shifted from steady state to interval-type training.

In a strange conundrum, technology in fitness has evolved to support training programs that have gone back to basic, fundamental and traditional exercises.

Thus, the effect of technology in fitness can hardly be noticed in exercise equipment. But it has clearly manifested itself in wearable technology.

How fitness wearables have influenced the health and fitness lifestyle

It can be said that the jump off point in how technology has changed health and fitness can be traced in 2007 with the introduction of FitBit.

FitBit represented the new generation of fitness wearable; the fitness tracker. Its function was to record movement for the purpose of creating a baseline of its user's degree of physical activity.

By having a baseline, you have a reference point on the changes needed to improve your health and fitness lifestyle.

It also coincided with the results of a study conducted by the Center for Disease Control (CDC) in Finland from 2007 to 2008 that showed taking 10 000 steps a day may prevent heart disease and type 2 diabetes.

The best thing about fitness trackers is that as a wearable, they are portable.

You can wear them on your wrist, clip on your garment or keep inside your pocket. It has become the perfect companion for the boot camp or every day exerciser.

The fitness tracker is very convenient for those who prefer exercising outdoors.

Whether it is running up and down hills or doing calisthenics at the park, the fitness tracker will record your progress and give valuable feedback.

People who want to start a health and fitness lifestyle now have a portable 'training partner' that will inform them on their level of progress, the amount of calories consumed for the day, the quality of sleep and with some devices, correct their exercise technique.

Because a fitness tracker can only be as accurate as the amount of data it is given, people who invest in one have to wear it 24/7.

>>

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This alone requires dedication and encourages its wearer to be more committed to a health and fitness lifestyle.

The future of technology in fitness

The value of fitness wearables lies in the fact that the data it collects can be used as an immediate reference so improvements on the health and fitness program can be implemented.

Compatibility issues notwithstanding, data which are presented via well-made graphics and other pertinent information can be accessed through your desktop, smart phone and any other mobile device.

As more people become reliant on mobile technology, expect the importance of technology in fitness to grow over the next few years.

In 2014, mobile devices officially became the dominant avenue for online traffic, replacing the desktop.

IT industry analysts expect the number of smart phones to hit 6.1 billion units by 2020.

Interestingly, sales of fitness wearables are projected to grow from 25 million units in 2015 to 45 million units in 2017.

Based on the convergence of this data, it seems that fitness wearables will continue to have an influence on health and fitness in the years ahead.

The good news is we can assume more people will strive to become healthier and fitter as the world continues to address issues on stress-related illnesses and global obesity.

Source: Extract from https://www.exercises.com.au/how-technology-has-changed-health-and-fitness, accessed 18/12/17

Question

After reading the article above, discuss as a class what impact you believe these changes have had/will have on the fitness industry.

Self-reflection

Reflect on three activities you have participated in, then answer for each one:

1 Does this activity meet your exercise and fitness needs? Why or why not?
2 Would you continue to do this activity now or in the future? Why or why not?
3 Does this activity target a particular group within a community? Why?
4 Are other fitness activities more suitable for me, and if so, why would they be better?

ADVERTISING AND PROMOTION

As mentioned earlier, fitness is now a **commodity** that is being marketed in our society. Each year, businesses and individuals outlay vast amounts of money to attend commercial fitness centres or to purchase fitness equipment and affiliated products, such as protein drinks and health or recovery bars. Commercial fitness centres spend a lot of money enticing buyers to purchase equipment or memberships at their facilities. The money required to run a successful fitness centre must be recouped through client memberships; similarly, the money needed to research and improve fitness equipment must come from the sale of equipment.

The growing number of exercise and fitness providers in the community means that advertising and promotion strategies are vitally important for attracting potential clients.

Another area of growth is the purchase of fitness products and services online. Certainly the internet is a powerful and useful tool for researching products and services, but buyers should be mindful of the authenticity of the websites used for this purpose, and the credibility of the vendors.

Who do you believe?

Spring is a time when many people contemplate getting fit and healthy, and losing weight for summer. People often want a 'quick fix' weight-loss regime. Some fitness providers claim to offer these quick fix methods of weight loss and fitness gain, but how do people decide who and

what to believe? The following checklist can help distinguish between authentic information and misinformation:

- ☐ Is the program a government initiative?
- ☐ Is the organisation, its products and services reputable?
- ☐ What outside organisations endorse its products and services?
- ☐ Do the facilitators have appropriate qualifications and training?
- ☐ Are the products endorsed by the Australian fitness industry (Fitness Australia)?
- ☐ Are the prices comparable for the same types of memberships or equipment available elsewhere?

Reputable organisations will be happy to answer questions about their products, services and employer qualifications.

Promotional techniques

Fitness centres will use many promotional and advertising techniques to attract consumers. These include **direct marketing**, limited-offer memberships, telemarketing and text messaging.

Alamy Stock Photo/Simply Signs

Direct marketing

Mail-outs and pamphlets are delivered directly to people within the vicinity of a fitness centre. These may include introductory letters, brochures about the centre and what it offers, or an advertising gimmick such as the offer of a free introductory session. Consumers are advised to be cautious of any hidden costs that may be revealed once they join. Open days and free introductory membership periods are strategies often used to get potential customers through the door – and that's when the hard sell begins.

Limited-offer membership

Limited-offer memberships are a common technique that fitness centres use to keep their current customers, encourage new customers or try to entice past customers to return. This technique usually offers a low price for a set period of time, for example, just $99 for 99 days, or join for three months and receive one week free.

Telemarketing and texting

Telemarketing and texting is similar to direct marketing, but contact is made over the phone, inviting consumers to take up offers and free trials.

Digital marketing

Digital marketing involves personalised offers and limited-offer memberships, encouraging referrals as a way to help get training partners. Some digital marketing campaigns promote fundraising to support charities and world issues, to raise a sense of community and belonging.

While the above techniques are the most common, the media is also a popular platform for advertising fitness services and products. Newspapers, magazines, radio, television and the internet are all valuable avenues for advertising.

FITNESS INDUSTRY CODE OF PRACTICE

The Fitness Industry Code of Practice has been developed to guide consumers in their dealings with fitness businesses in NSW. The Code applies to all fitness centres, personal trainers and allied service providers (e.g. massage therapist, yoga teacher) within a fitness business in NSW that are members of Fitness Australia. The Code sets a standard of consumer protection addressing financial safety, physical safety and dispute resolution.

The Fitness Industry Code of Practice is supported by NSW Fair Trading, Fitness Australia and NSW Sport and Recreation.

Code objectives

- to set a benchmark for consumer protection in the fitness industry
- to set standards of business practice and service delivery that protect consumers financially and promote their health and wellbeing
- to establish procedures to resolve consumer complaints
- to promote a drug free fitness environment.

Code summary

The Code is administered by Fitness Australia. Fitness businesses in NSW that become members of Fitness Australia must adhere to the Code. Under the Code, these fitness providers must (in summary):

- display at the premises a current Fitness Australia Certificate of Membership or sticker
- supply sufficient information to enable a consumer to make an informed decision about becoming a member
- not use false or misleading advertising or marketing practices
- ensure that all promotional material is truthful, accurate and unambiguous
- provide consumers with a copy of this brochure prior to entering into a membership contract
- allow prospective members to inspect the premises without any obligation to purchase a membership
- provide consumers with a copy of the Code for perusal, upon request
- offer a range of membership contract options including periodic billing and pre-payment
- disclose the full price of all goods and services offered (this includes joining fees, frequency of payments, early cancellation fees, exercise consultation fees, fees for individual visits, etc.)
- provide a consumer with a copy of the proposed membership contract (if requested) and a copy of the contract when signed
- not use unreasonable sales methods to sell memberships (e.g. harassment or coercion)
- not accept pre-paid membership/renewal fees beyond a 12-month period
- offer a cooling-off period that allows consumers to terminate new membership contracts of 3 months or more
- provide for refund or membership deferment where sickness or physical disability arises
- provide appropriately qualified staff to conduct fitness or allied fitness programs
- maintain a high level of cleanliness and comply with occupational health and safety standards
- ensure that all equipment is correctly installed, mechanically sound and serviced as required
- ensure that all exercise areas provide adequate safe working space and are not overcrowded
- ensure that all consumers' personal information is handled in accordance with Privacy Act requirements
- respond to consumer complaints promptly, using an established complaints resolution process.

For a copy of the Code, to look at the Complaints resolution procedure, or to check if a fitness business is a member of Fitness Australia, go to the Fitness Australia website (or follow the link).

If things go wrong

If you are unable to resolve a problem with your fitness business, trainer or allied service provider:
Step 1: Check if the fitness business is a member of Fitness Australia via its website.
Step 2: If the fitness business is a member of Fitness Australia, put your complaint in writing to: Complains Administration Officer, Fitness Australia, PO Box 6453, Alexandria NSW 2015. Or email: complaints@fitness.org.au.

If they are not a member of Fitness Australia contact Fair Trading on 13 32 20 or lodge a complaint. If Fitness Australia is unable to resolve your complaint you should contact Fair Trading.

Source: Fitness Australia and NSW Sport and Recreation, © State of New South Wales (NSW Fair Trading). For current information go to fairtrading.nsw.gov.au

Question

How does the Fitness Industry Code of Practice help the industry?

Accuracy of information

In New South Wales, the Department of Fair Trading is the monitoring 'watchdog' to ensure that advertising is truthful and not misleading. The fitness industry as a group has developed a voluntary Code of Practice that fitness providers can choose to abide by. Contact can be made with the Department of Fair Trading if a person feels that any information provided is misleading or inaccurate.

Ethics of advertising

The word '**ethics**' has many different meanings in different settings, however, the basis is a sense of what is right and wrong. For example, advertising that aims to sell short-term weight loss programs or long-term memberships should be investigated carefully before a commitment is made, as this type of advertising can be misleading. Consumers should be looking to match a fitness package with a program that promotes the long-term benefits of regular exercise and a healthy lifestyle.

Fitness Australia has established a Code of Ethics that includes professional integrity in advertising fitness services and products: 'Exercise professionals may advertise in connection with their professional practice if the advertising is not false, not misleading or deceptive or likely to mislead or deceive, is not vulgar or sensational, and does not claim or imply superiority of the fitness professional over any or all other fitness professionals. The advertisement for the fitness professional may contain a statement of the areas of expertise in practice.'

(Source: Fitness Australia, https://fitness.org.au/articles/rep-registration-menu/fitness-australia-code-of-ethics/64/73/76.)

Advertisements

Analyse four advertisements for fitness and exercise services, investigating the following questions for each advertisement:

a Who is the advertisement targeting?
b What does the advertisement offer?
c What are the benefits of the service?
d Are the claims believable?

Discuss your findings as a class.

Fitness products/services

Select two fitness products or services from various media sources and answer the following questions for each:

1 What is the name of the product or service?
2 What techniques are being used to sell the product or service?
3 Who is the target group?
4 What does the advertisement offer?
5 Does it provide 'value for money' to the consumer?
6 How or by whom is the service or product endorsed?
7 What are the advantages and disadvantages of the service or product?
8 Would you purchase or use this service or product? Why or why not?

MOTIVATORS AND BARRIERS TO PARTICIPATION

While something will trigger one person to put down a bag of chips and start doing some form of physical activity, that same thing might not have any effect on another person. Individuals respond differently to varying circumstances in their lives, and this also applies to realising the benefits of exercising. Starting a new, active, healthier lifestyle is something a person has to do for themselves – it is making an investment in their future, to ensure that they will live to see their senior years, and that those years will be spent actively doing what they enjoy.

Motivation to exercise

There are two forms of motivation to exercise: fear of mortality and positive motivation. The most positive motivation is seeing the results of the effort put in.

Positive motivators

Positive motivators include:

- achieving set goals
- taking a picture of oneself and looking at it every day
- writing down the reasons for exercising, and thinking of the benefits
- finding a buddy to work with
- choosing a form of exercise that is enjoyable
- keeping a journal that shows the positive results.

Alamy Stock Photo/VisualNarrative

Figure 15.4 Making exercise enjoyable is a key positive motivator.

Negative motivators

Negative motivators include:

- statistics indicating the rising obesity levels and death rates related to inactivity
- awareness of poor health and disease resulting from lack of activity and poor eating habits
- 'early grave' concerns of suffering in the aged years from lack of activity.

Parents and older people can find motivation difficult to find. Raising children can take away time and leave parents too tired for physical activity. Finding time for physical activity will not only improve physical health, it will also boost mental health. Increased self-esteem and confidence, as well as reduced depression and fatigue, is a strong motivator for continuing physical activity.

Lack of pleasure when exercising, low self-motivation, lack of time, negative thinking and lack of equipment can all be **barriers** to exercise. To increase fitness, it is important that these barriers are identified and overcome. Finding a good exercise partner, having a plan for when to work out, setting goals using a journal and recording data to support your goal all contribute towards diminishing barriers and maintaining motivation.

Factors affecting choice of exercise

Many factors affecting the choice of exercise are dependent on the motivators for and the barriers against exercising. As discussed, different people have different reasons for wanting to exercise. These may include wanting to prevent an illness, to develop a social training atmosphere, or simply to feel healthy and active.

Barriers, as discussed later in this chapter, also play a major role in influencing an individual's exercise choices.

Training with a partner

Most people will probably have days when they just don't feel like training. A great way to stay motivated and stick to a training schedule is to team up with a reliable training partner. This is usually someone who shares the same goals, so they can motivate each other. It is generally someone the individual trusts, works well with, respects and is supported by.

Training with a partner helps both people stick to a schedule, minimising the number of workouts missed. This commitment will help both partners stick to the agenda. If a training session has been arranged, it is less likely that either partner will not turn up and let the other down.

Shutterstock.com/Robert Kneschke

Figure 15.5 Partner training can take many forms.

Good training partners also help push each others' limits. As in other areas of life, a little competition helps people strive to do better.

Partner training provides all the benefits of one-on-one personal training without the expense. As well as the benefits of having someone else to keep them motivated, benefits will also come from social interaction, healthy competitive challenges and increased wellbeing associated with reaching goals together.

Overcoming barriers

Barriers to participating in physical activity are different for all individuals. They are most frequently associated with age, gender and income. Barriers relating to physical capabilities increase with age. However, financial barriers such as cost of equipment or supplies, admission fees and transportation costs often decrease with age, as many people become more independent and more financially stable.

Men and women both agree that time and cost are barriers. In addition, they may be too busy with family or not at ease socially, or restricted by a lack of transportation.

Adolescents are also affected by time constraints. While adults are restricted by family and work commitments, adolescents are restricted by involvement in other recreation activities and their commitment to friends. Adolescents are also likely to experience barriers to the activity itself, such as boredom, sweating a lot, finding the activity too hard, and having a general dislike for sport.

General barriers a person may have to overcome to participate in activity include:

- **lack of motivation** – reasons to get up and participate
- access **to facilities** – convenience of activity or equipment and usefulness of facilities
- **cost** – having the money to participate
- **negative feelings** about physical activity
- **priority** – conflicts with lifestyle commitments
- **family responsibilities** – time constraints and availability.

When deciding to participate in physical activity, it is important to remember:

- The best type of physical activity is one that is enjoyable, because this means it is more likely to be maintained and continued.
- Identify personal barriers to exercise before starting.
- Incorporate physical activity into daily life, such as taking the stairs instead of the escalator or lift.

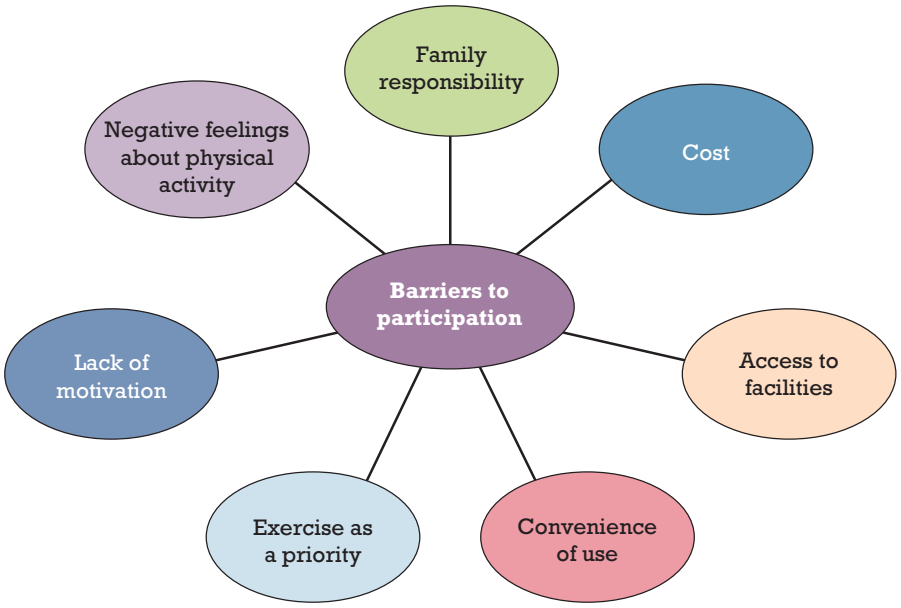


Figure 15.6 Barriers to participation

Many people believe that regular physical activity and exercise benefits their health and wellbeing, but some people experience barriers that prevent them from participating. These barriers can influence the beginning of a program, the maintenance of a program or the resumption of a program after injury or illness.

Why I choose to ...

What types of exercise do you prefer, and why? In your answer, discuss which of the following factors have led to your choices:

a access to facilities
b convenience of use
c cost
d feelings about fitness and exercise
e exercise as a priority
f influence of other responsibilities, e.g. family, work.

Barriers to participation

Using the information provided in Figure 15.6, expand the brief explanation for each barrier, and describe how the situations might differ between an adult and a child.

CHAPTER SUMMARY

- The choice of exercise environment depends on the activities a person chooses. Some may choose to participate in exercise with specialised instructors and equipment, such as commercial fitness centres; others may choose to exercise at home or with community groups.
- The benefits of exercise can be physical, social and emotional.
- With the number of exercise and fitness providers now active in the community, advertising and promotion strategies are very important for attracting potential clients.
- Barriers to participation are different for all individuals. Differences occur most frequently with age, gender and income.

CHAPTER REVIEW ACTIVITIES

1 Discuss the ways in which barriers to fitness can be overcome or adjusted to fit an individual's lifestyle.
2 Compare the reasons why people exercise and the reasons why they do not.
3 Discuss how goal setting increases the chances of maintaining an exercise program.
4 Describe how the benefits of exercise can influence the choices people make when selecting exercise programs.
5 Outline the factors to be considered when deciding to use a fitness service or buying fitness products.
6 Identify and describe four common barriers to participation in regular exercise.

Getty Images/iStock/OSTILL

OPTION 4: OUTDOOR RECREATION

CRITICAL QUESTIONS

What is the value of outdoor recreation? **292**

What are the technical skills and understanding needed for safe participation in outdoor recreation? **297**

What impact does group dynamics have on the outdoor experience? **324**

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have finished this option you should be able to:

- describe how individuals can improve and maintain their health
- plan for participation in physical activity, taking into consideration individual needs
- participate safely in challenging outdoor activities utilising technical and interpersonal skills
- analyse movement patterns and participation in physical activity using a variety of sources.

KEY TERMS

abseil
bearing
belaying
canyoning
caving
comfort zone
contour lines
convergence
facilitation
grid
legend
magnetic declination
self-efficacy
thermoregulation

Getty Images/iStockphoto/STILL

CHAPTER 16
Value of outdoor recreation

IN THIS CHAPTER

Why do outdoor recreation? 292

Once you have read this chapter you should be aware of the physical, social, intellectual and emotional aspects of participation in outdoor recreation.

WHY DO OUTDOOR RECREATION?

Outdoor recreation can be defined as any type of physical activity that takes place outdoors or in natural settings, which provides opportunities for individuals to connect, in groups or as a community, to the natural environment. It also develops an individual's environmental awareness and an understanding of the importance of conservation.

People participate in a wide range of outdoor recreation activities for a variety of reasons. Participating in outdoor recreation can enhance physical, social, intellectual and emotional development. Outdoor recreation activities offer the participant both intrinsic (internal) rewards, such as achievement of personal goals, and extrinsic (external) rewards, such as club membership and well-maintained equipment. Socialising and improved health and wellbeing are the most highly rated reasons for participating in outdoor recreation. An individual's choice of activities can be influenced by availability, cost or economic factors, level of activity and social factors. Anyone who has a medical condition or is a senior citizen should seek medical clearance before participating in strenuous activity.

Types of activities vary according to the individual's interests, level of fitness, confidence and courage to try new things. Activities may include:

- **abseiling**
- boating/sailing
- bushwalking
- camping
- canoeing
- **canyoning**
- **caving**
- climbing

- cycling
- fishing
- horse riding
- kayaking
- mountain-bike riding
- **orienteering**
- **parkour**
- rafting
- rock climbing
- sailboarding
- scuba diving
- skateboarding/rollerblading
- skiing/snowboarding
- snorkelling
- stand-up paddleboarding (SUP)
- surfing
- windsurfing.

Getty Images/piskunov

Figure 16.1 Sea kayaking is appropriate for all levels of ability.

Stress management/relaxation

There are a variety of triggers for stress. These may include low self-esteem, poverty, family pressures, long working hours, increased travelling time to work, discrimination or harassment, drug abuse or unemployment. Young people may experience increased stress levels due to conflicts with peers, financial pressure to get a job, academic pressure, a breakdown in a relationship, or indecision surrounding their sexuality.

Experiencing nature is a positive way to reduce stress and its effects. Muscle tension, blood pressure and electrical brain activity can all be reduced within minutes of exposure to an outdoor environment. Visiting natural environments such as a national park or beach can also produce a physiological change towards relaxation and boost recovery from mental fatigue.

Facing a challenge head-on and overcoming fears associated with the risks of the activity can also be an effective stress-management technique. Setting goals, both personal and group, along with effective planning and implementation, are effective stress management techniques.

For most people, being in a safe outdoor environment is relaxing. It allows people to leave the stress of their everyday lives and focus on the enjoyment of the environment and the activities associated with it. People find diverse ways to relax, including surfers catching a wave, bushwalkers enjoying a national park and people fishing and watching the water. These people are all finding ways to recover from fatigue and tension in their lives.

Alamy Stock Photo/Stuart Pearce

Figure 16.2 Some outdoor activities involve a challenge for the participant.

Enjoyment, challenge and excitement

Outdoor pursuits offer the individual an escape from their everyday life and routine and a chance to enjoy themselves. The environment and activity is chosen by the individual or group, and is therefore enjoyable to them. A group of people cycling through the bush or a snowboarder carving up the snow are examples of people enjoying an outdoor environment.

Many outdoor activities involve taking a risk, and therefore provide a challenge to the individual. A challenge should ideally trigger emotions such as excitement, confidence, fear and apprehension. The participant may experience success, failure, adventure, risk taking and uncertainty, especially when the outcomes of the experience cannot be predicted. A mountain biker riding down a difficult course or a kayaker in extreme rapids are examples of challenging activities.

Some people love the rush of a challenge and a successful result, while for others the anticipation of a weekend away can lead to great excitement.

Outdoor recreation should be viewed as an exciting opportunity to enjoy an experience that may not be easily accessible in everyday life.

Social interaction

An individual will choose activities according to their interests, needs, personality, budget and lifestyle. Outdoor recreation can a provide a range of social interaction opportunities, such as like-minded people meeting once a week for a kayak paddle, or a group of people going camping together.

Friendship, teamwork, group dynamics and effective communication are all important skills in successful social interaction. As the relationships develop within the group, the activities they undertake may expand.

Appreciation of the environment

There is a vast array of beautiful natural environments in Australia, including a range of coastal areas, grasslands, forests, inland waterways, and tropical, alpine and desert environments in Australia. Some people enjoy these environments simply by visiting them and appreciating the aesthetics, while others prefer to participate in activities within the environment.

Appreciating the environment may involve educating others about it. The rules and regulations governing outdoor environments exist to ensure all people are able to enjoy the environment, now and in the future. People need to be careful to leave the environment in the same condition as they found it.

Getty Images/iStock Editorial/Wendy Townrow

Figure 16.3 Camping is a popular form of outdoor recreation, and provides opportunity for a social activity.

Health and fitness

Many people participate in outdoor recreation to improve their level of health. This might involve activities to improve their physical, mental, social, emotional and spiritual health. Individuals might use different activities to address different components of health. For example, people may fish to relax and benefit their mental health. Bushwalkers may soak up the beauty of the environment and be in touch with their spiritual health, while a mountain climber reaching their target will experience an emotional high.

Some people participate in outdoor recreation to improve their fitness. There are five health-related and six skill-related components of fitness. An individual may need to improve these components in order to participate in their chosen activity, or they may use the activity as a training strategy to improve a particular component. Rock climbers would need to develop strength, power and agility, while a bushwalker would work on cardiorespiratory endurance. The length of time people can participate in an activity is dependent upon their health and fitness.

Eighty things to do in and around Sydney

Weblink

Read the article 'Eighty things to do in and around Sydney' by Amelia Zhuo, Juanita Truong and Georgia Bell, *Sydney Morning Herald*, 8 January 2016, and then describe five venues and activities in your local area that are used for outdoor recreation.

The South Coast

Weblink

Go to the NSW Office of Environment and Heritage website and look for the section on outdoor recreation in the South Coast region (or follow the link). Read the information, then answer these questions:

1 What are the most popular activities undertaken each year?
2 What percentage of the South Coast residents surveyed participated in a) water sports, b) bushwalking or c) mountain-bike riding?
3 The activities most people are interested in are picnicking, walking and water sports. Explain why this might be the case.
4 List the top five barriers to participating in outdoor activities.
5 Describe the main reasons people participate in physical activity.

CHAPTER SUMMARY

- Outdoor recreation can be defined as any type of physical activity taking place in an outdoor or natural setting that provides opportunities for individuals to connect, in groups or as a community, to the outdoor environment.
- The rewards of being involved in outdoor recreation can be both intrinsic and extrinsic.
- People participate in outdoor activities for a wide range of physical, social, intellectual, spiritual and emotional outcomes.
- Experiencing nature is a positive way to reduce stress and its effects. Muscle tension, blood pressure and electrical brain activity can all be reduced within minutes of entering an outdoor environment.
- Outdoor pursuits offer individuals an escape from their everyday lives and routines and a chance to enjoy themselves.
- An individual will choose outdoor activities according to their interests, needs, level of fitness, personality, budget and lifestyle.
- Some people enjoy the environment by simply visiting it and appreciating the aesthetics, while others prefer to enjoy it by participating in activities within the environment.
- Socialising and improved health and wellbeing are the most highly rated reasons for participating in outdoor recreation.
- An individual may need to improve their fitness in order to participate in the chosen activity, or they may use the activity as a training strategy in order to improve their fitness.

CHAPTER REVIEW ACTIVITIES

1 Discuss the reasons different people may have for participating in the following six activities:
   a abseiling
   b surfing
   c bushwalking
   d conservation activities
   e parkour
   f mountain-bike riding.

2 How might an outdoor recreation activity have more than one physical, social, intellectual or emotional outcome?

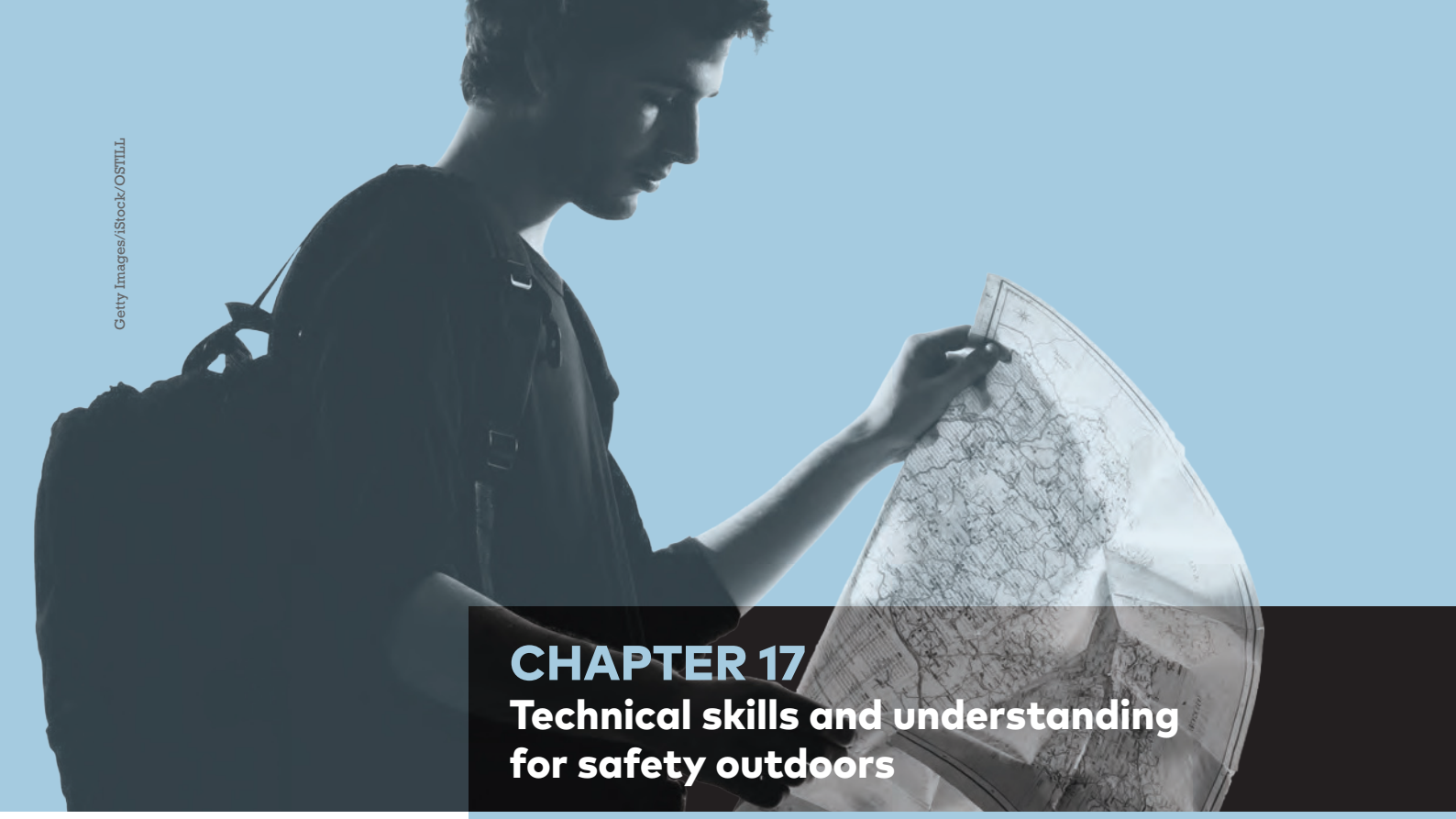
3 Choose an outdoor activity and discuss three reasons why people participate in that activity.

4 What are the benefits of participating in outdoor recreation activities?

5 Compare the challenges and risks associated with two outdoor recreation activities with the benefits achieved.

6 Assess the health benefits of participating in an outdoor recreation activity of your choice.

7 Discuss the following statement: 'Appreciating the environment may involve educating others about it'.



Getty Images/iStock/OSTILL

CHAPTER 17
Technical skills and understanding for safety outdoors

IN THIS CHAPTER

Planning skills	**297**
Campsite selection	**304**
Conservation skills	**306**
Navigation skills	**309**
Emergency management skills	**314**
Skills needed for other outdoor activities	**320**

Before an individual or group embarks on an outdoor recreation activity, they need to develop specific technical skills appropriate to the activity. They also need to ensure they understand the guidelines and regulations for safe participation in the activity. Risk-management plans are compulsory in all school outdoor recreation activities.

PLANNING SKILLS

Safe practices in outdoor recreation are based on knowledge, skills and prior experience to reduce the possibility of something going wrong. Safe and enjoyable participation in any activity relies on good preparation – the planning and preparation before the event has a major influence on the outcome. When planning an outdoor recreational activity, the individual or group should identify the environments they will be experiencing, develop management plans to address the risks, make a checklist of resources they will need, and address all legal and administrative requirements.

Environment planning

When planning an outdoor recreation activity, it is important to identify and manage any risks associated with the environment. These may include a change in weather conditions and the physical environment. Environmental planning is one of the most important components of an effective plan. It can include researching weather forecasts, checking for mobile communication reception and checking for changes in landforms in the area.

Weather

The weather can be an integral part of an enjoyable outdoor activity, but it can also turn the event into a challenging and unpleasant experience. It is important to check the long-term weather forecasts for the area. Some key factors to consider include temperature, precipitation, wind, wind chill, storm warnings and UV factor. A sudden change in one or more of these factors can increase the danger to the participants. For example, a sudden drop in temperature combined with a wind chill factor can lead to hypothermia. A thunderstorm can cause damage through flooding and fallen trees, and high-velocity winds can cause damage to equipment and the environment. The best source of information regarding the weather is the BOM (Bureau of Meteorology) site or app, as these provide live updates and weather warnings.

Getty Images/Akchamczuk

Figure 17.1 Camping is an outdoor recreational activity with specific guidelines that must be followed for a safe and enjoyable stay.

Place

The physical environment or venue can provide great beauty and enjoyment, but it also carries inherent risks. The organisers should gather specific information about the venue, including guide and topographic maps, satellite photographs and recent records of changes to the landforms. These are available through local recreation clubs or relevant government departments. Access to mobile reception should also be researched, as this can provide up-to-date information and access to emergency services. Knowledge and understanding of the local fauna and flora and conservation strategies are also important. Most national parks require groups to purchase entry permits and to register their intended itinerary. The chosen venue should be selected to match the goals for the group and the ability level of its members.

Practical application

Check out your local current and long-term weather forecasts via the Bureau of Meteorology or WillyWeather websites.

Weblink

Emergency management planning

The main aim of emergency management planning (risk assessment) is to ensure the safety of participants during an activity. A risk-management plan should address the identification, assessment and reduction of all inherent risks for an outdoor activity. It should dictate how incidents will be managed if or when they occur during a program.

Three factors need to be considered when identifying risks:

- the participants
- the equipment
- the environment.

Emergency management plan

The plan should assess the degree of risk and the probability of an incident occurring for all potential hazards. The aim of risk reduction is to implement a range of strategies that will eliminate or control the risks to an acceptable level. This plan should be documented, communicated to all stakeholders, and monitored and reviewed throughout the activity. This emergency plan should include the group's aims and objectives, the itinerary, consent forms, medical plans, emergency phone numbers, emergency escape plan and quantity of rations. A copy of the emergency management plan should be sent to the relevant authorities and family members well before the start of the activity.

Practical application

The NSW Department of Education provides information on sport safety guidelines. You can go directly to the website (look under sport/policy) or follow the link.

1 Check out the risk-management plans for various school-based activities.
2 Choose three activities and describe a risk-management plan for each.

Weblink

Escape routes

It is important to have planned escape routes in case of emergency such as bushfires, flooded rivers, extreme weather, illness or severe injury. These need to be planned strategically along the route before the trip, and marked on the map.

First aid

All participants should carry their own basic first-aid kit, consisting of the following items:

- heavy elasticised bandage, gauze roller bandage, triangle bandage
- sterile non-adhesive pads
- adhesive strip dressings
- foam strips for blisters
- antiseptic cream
- safety pins, scissors, needle, surgical gloves
- sunscreen
- insect repellent
- mild and strong pain relief tablets
- any personal medication to be used by the individual, including EpiPen.
- an aluminised foil 'space' blanket

In addition, a comprehensive first-aid kit should be carried by all outdoor adventure groups. This should cater for all types of emergencies and environmental conditions, and should be stored in a waterproof container. A group kit should include all the items in a personal first-aid kit, as well as antiseptic swabs, eye pads, gauze swabs, hypo-allergenic surgical tape, saline eye wash, plastic bags, butterfly closures, wound dressings (different sizes), a sting relief compound, a first-aid manual and a small notepad and pencil.

Image courtesy of NSW First Aid

Figure 17.2 A basic first-aid kit should be carried by all members of the outdoor recreation group.

Weblink

Investigate

More detailed information on first-aid treatment and first-aid kits is available on the St John Ambulance website.

Communicating with authorities

Permission is required to use most outdoor areas, such as camping and climbing in national parks or wilderness areas. Relevant authorities monitor the usage rate in these areas, and for conservation reasons may limit the number of people using an area over a period. It is important to research and seek approval from the relevant state and local authorities and community bodies to secure access required for the outdoor activity.

Check the route first

Checking the routes before the activity is a valuable fact-finding mission. It allows for up-close observation of the terrain and tracks, and for planning of escape routes by direct observation.

Food and water

When planning a menu for an outdoor activity, you need to consider the type and duration of the activities that are planned. When calculating what types of food and how much to take camping, establish arrival and departure times and work out how long your trip is going to last. Choose dishes that can be prepared with the equipment available. Also consider whether there are rubbish disposal facilities, or if you must carry out what you carry in. Food should be carried in sealed containers.

Food taken on outdoor activities needs to be nutritious, lightweight, easily prepared, easily cleaned up, and durable enough to withstand a range of temperatures and travel. Dehydrated foods and fruit gels are lightweight and high in energy.

A balance of protein, carbohydrate, fat, fibre, minerals and vitamins should be included in a diet plan. Make sure you cater for any specific dietary requirements. Although a balanced diet is important, the main nutritional requirement to think about is energy. Energy requirements increase with activity and in colder weather. As a rough guide, you should be basing your intake on the energy required for a day of moderate to heavy exercise. Young males expend around 18 000 to 25 000 kilojoules per day performing moderate to heavy exercise, and for young women that figure is between 13 000 and 18 000. More specific information can be obtained from exercise/kilojoule charts.

Figure 17.3 Examples of packaged foods suitable for camping.

A typical day's menu

Breakfast

Muesli, milk, sugar, preserved fruit, egg, toast, butter or substitute, tea or coffee, juice, water.

Snacks

Dried fruit, nuts, pumpkin seeds, glucose lollies, energy gels, chocolate, fruit, scroggin and jerky.

Lunch

Bread with fillings, biscuits, cheese, preserved meats, fruit, nuts, dried fruit, tea or coffee, juice, water.

Dinner

Pasta or rice dish, soup, vegetables, biscuits, fruit, nuts, tea or coffee, juice, and water.

Water

Dehydration is a lack of water in the body, and is a potentially life-threatening condition. To avoid it, every person needs to drink adequate amounts of water during outdoor activities. The required amount will vary according to the individual's metabolism, weather conditions, the type of activity and the altitude.

The need for water increases as the temperature increases and the level of activity increases. Water consumption also increases in freezing conditions, due to the increased rate of breathing and the lack of humidity. In summer, you will need at least 3 to 4 litres per day. Remember, thirst is an indicator that your body needs water, and water quenches your thirst best.

Assessing water quality in the environment is a highly technical skill, and group leaders should research this subject before setting off. A lot of water in Australia's watercourses is not suitable for drinking unsterilised. For this reason, it is essential to bring some purification tablets, a water filter or some other form of sterilisation – the easiest is boiling equipment. Before selecting a water source check for obvious signs of pollution, such as slime, suspended matter or a foul smell.

In some areas, it may be necessary to carry your own drinking water. Check with local authorities before leaving.

Think it through

Three trekkers plan to go on a three-day walk in the mountains. They estimate that they will expend 18 000 kilojoules per day if the weather is good. One person is gluten intolerant and another is lactose intolerant.

1 Prepare a food packing list for the group identifying foods for special needs, and meal plans.
2 Estimate how much water the group will need.
3 What adjustments would need to be made if the weather was forecast to be very cold?

What you should take

When planning your equipment requirements, you should aim to have enough equipment to survive on your own without other facilities for the duration of the activity. Calculated food rations should be supplemented with high-energy food bars or snacks in case of emergency. The following are some equipment checklists for typical outdoor activities.

Checklist for a day walk

- ☐ daypack
- ☐ first-aid kit
- ☐ drinking water
- ☐ food
- ☐ laminated map
- ☐ compass
- ☐ sunscreen
- ☐ torch
- ☐ sunglasses
- ☐ penknife/multi-tool
- ☐ matches
- ☐ watch
- ☐ rain jacket
- ☐ hat
- ☐ trowel and toilet paper
- ☐ general repair kit
- ☐ whistle
- ☐ insect repellent
- ☐ shoes suited to the terrain
- ☐ clothes suited to the weather conditions

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Checklist for bushwalking/camping

- ☐ rucksack
- ☐ sleeping bag
- ☐ tent, pegs, poles
- ☐ sleeping mat
- ☐ ground sheet
- ☐ toiletries
- ☐ stove and fuel
- ☐ cooking equipment
- ☐ food
- ☐ water bottle
- ☐ water purifier or tablets
- ☐ trowel and toilet paper
- ☐ cooking utensils
- ☐ pot scrubber
- ☐ tea towel/pack towel
- ☐ matches/lighter
- ☐ resealable plastic bags
- ☐ plastic garbage bags
- ☐ pot grabber
- ☐ daypack
- ☐ torch or lamp
- ☐ first-aid kit
- ☐ seat pad/air cushion
- ☐ hat
- ☐ general repair kit
- ☐ whistle
- ☐ insect repellent
- ☐ sunscreen
- ☐ compass
- ☐ watch
- ☐ laminated map
- ☐ mobile phone and/or a personal location device/ emergency beacon
- ☐ shoes suited to the terrain
- ☐ clothes suited to the weather conditions

Your pack should be as light as possible and big enough to carry everything you need. It should also be comfortable, and preferably waterproof or water resistant.

Practical application

1. Weigh your school backpack.
2. Add weight until it weighs 8–10 kilograms.
3. Carry it around school for the day.
4. How did you feel at the end of the day?
5. Why is it important to pack light for an outdoor adventure?

Tent

The tent should be selected according to the conditions. Good ventilation is important, as is strong reinforcement around the grommets or loops for poles. Flysheets provide an extra layer of weather protection. Mosquito nets can be valuable in certain conditions.

Alamy Stock Photo/OJO Images Ltd/Tom Merton

Figure 17.4 A modern, lightweight tent

Appropriate attire

It is strongly recommended that people wear the appropriate protective gear for their chosen activity. Make sure you have the right equipment for your activity and for the prevailing weather conditions. If you are hiking, the type of boots will depend upon the conditions on the trail and personal choice. If you are doing water sports, everyone needs to have an appropriately rated personal flotation device (PFD).

When camping in the bush, you should pack clothing items such as wet weather gear, a windproof jacket, thermals, walking shorts, underwear, pyjamas, thick moisture-absorbing socks, comfortable footwear, gaiters, swimwear, a hat, sunglasses and casual wear. It is advisable to wear or carry layers of clothing that can be easily removed or added, in case of sudden changes in weather. In hotter climates, it is recommended that individuals wear light-coloured clothing with a sun-protection rating, and a hat and sunglasses.

Legal and administrative requirements

The leader of the outdoor activity should ensure that all possible planning and preparation has been undertaken before commencing the activity. If they are in a paid position, they have a duty of care (legal responsibility).

Permissions and liaison with authorities

During the planning stage of an outdoor expedition it is important to check if you need to gain permission from the relevant authorities in the area. This may include the National Parks and Wildlife Service, property owners, the rural firefighting service, the police and/or emergency services in the area. Information for all types of parks and legal requirements can be obtained from the NSW National Parks and Wildlife Service website.

The group leader should ensure that all required permissions have been finalised and that trip intention forms have been lodged with appropriate authorities. The trip intention forms should include the intended route, expected time of departure and arrival, number of people in the group, and phone numbers of group members and contact persons.

Medical forms

The leader should be aware of any medical conditions participants may have, and should ensure there is a trained first-aid person in the group.

Overnight camping

Design and plan an overnight camping trip. Include the following considerations in your planning, along with any other relevant information:

a equipment – what and how much?
b transport – how and when?
c hike – where and how long?
d campsite – where?
e games/activities – type and length of time?
f cooking – where and when?
g costs
h risk-management procedures.

CAMPSITE SELECTION

It is important that the group leader carefully researches and plans campsites in the area they are going to visit. In choosing a campsite, they should consider landforms, trees, animal and insect life and availability of water and firewood, as well as susceptibility to sudden changes in weather. The campsite should have an area to shelter in case of emergency, and a possible escape route.

Geography, environment and climate

When planning and selecting a campsite, the following points should be considered:

- Make sure you have approval from the local authorities to camp in the area, and check that it is not a restricted area. Special permits are needed to visit Indigenous heritage areas.
- Check with the relevant authorities to confirm regulations about collecting firewood and lighting fires. In some national parks, collecting wood (even dead wood) is prohibited or restricted. If you are relying on using wood for cooking, ensure that it will be readily available.
- Confirm the availability of firewood.
- Confirm the availability of safe water for drinking, cooking and washing.
- Consider the drainage of the site in case of rain. Select an elevated, firm and well-grassed area.
- Be wary of camping too close to overhanging cliffs or rock faces, to avoid falling debris.
- Avoid camping too close to creeks, or in narrow valleys, as dampness can present a problem. Gullies and dry riverbeds can also pose a hazard in wet weather, bringing a risk of flash flooding.

Alamy Stock Photo/Blue Gum Pictures

Figure 17.5 An ideal campsite is both beautiful and has a well-thought-out layout.

Establishing the campsite

At established camping grounds, such as in national parks, there are usually designated fireplaces, toilets and waste disposal areas. When camping in bush areas, however, you will need to develop and implement your own campsite layout plan. Several things need to be taken into consideration.

Cooking area

Set up your cooking area downwind from the tents to avoid smoke and sparks blowing into the area. Make sure the cooking area is well away from tents, and that the fireplace area is only small. Extinguish all fires after you finish cooking, and especially before going to sleep.

Rubbish disposal

Aim to leave the area in better condition than when you found it by following the principle: 'If you carry it in, carry it out'. All food waste should be collected in a sealed bag and carried back to an approved disposal site. Don't bury any food waste or packaging or leave it to decompose. Pour any soapy washing water onto absorbent soil to allow the soap to break down. Do not give food scraps to the local animals, as this affects their normal patterns of eating and may attract them to your food when you are not there.

Toilet facilities

Select a secluded spot downwind from the camp for your toilet, within easy walking distance but well away from any watercourse (at least 100 metres). Urinate in areas of thick vegetation. Dig individual latrines about 2 metres deep and bury all faeces and paper.

Use recycled or unbleached toilet paper, for minimum environmental impact. Don't bury tampons or sanitary pads –these should be carried out in sealed plastic bags.

Washing

Don't use soaps, shampoos or detergents in watercourses. When using soaps and shampoos, wash using a container well away from the watercourse and pour waste water onto absorbent soil. Swim downstream from the campsite to avoid polluting and stirring up your drinking water.

Falling tree branches

Before setting up the site, evaluate it for potential dangers. Make sure there are no overhanging branches or dead trees. In thunderstorms or high winds, these hazards can lead to falling branches or trees, which can be very dangerous to people in the campsite.

Practical application

Bring a tent to school and have your campsite up a campsite in an appropriate area.

CONSERVATION SKILLS

It is everyone's responsibility to conserve our environment for the enjoyment of future generations.

All outdoor activity has some impact on the environment. When we walk through the bush we disrupt vegetation and animal life. Everyone has a responsibility to respect nature and to minimise their impact on the environment. Groups planning an outdoor activity need to develop conservation knowledge and skills. Aim to follow the 'Take only photographs, leave only footprints' principle. There are many apps available that can be used for the identification of local flora and fauna, such as the Google Goggles app.

© Gerrit Fokkema

Figure 17.6 Check with local authorities to see what activities are allowed in your local area.

Leave no trace

Groups who enjoy the outdoors have a responsibility to minimise their impact on the natural environment and to ensure they leave no trace of their visit. Visitors need to ensure that their activities don't disrupt or destroy vegetation or animal life.

To do this, it is best to camp in an existing site, rather than creating a new one, and ensure it is at least 20 metres from any creek, lake or wetland. Do not dig trenches around tents – instead, choose a well-drained or elevated site.

Take your rubbish home with you. Don't leave food scraps, as they can be harmful to native animals and do not decompose quickly. Don't burn or bury rubbish. Burying food waste disturbs the soil, and native animals will just dig it up later.

Collect firewood well away from your camp and use it sparingly. Where possible, use a lightweight stove for cooking. Make sure you observe all fire regulations and days of total fire ban. Where possible, use existing fireplaces rather than creating your own. Ensure fires are safe and that they are completely extinguished before you leave.

To help protect water quality, wash up at least 50 metres from streams and avoid pouring soap or detergents into the waterways.

Take out all rubbish, bury all human waste and don't wash chemicals into the waterways.

Minimal impact

It is important that everyone participating in outdoor activities is aware of conservation issues and knows the regulations and special concerns of the area. It is important to develop strategies for moving your group through the environment. This may include walking quietly, in single file, and staying on known tracks. If the group moves off the track, spread out and don't break vegetation or disturb animal life. Ensure you have food items with minimal packaging, and bags to carry out all rubbish. Preserve the past by examining but not touching cultural or historic structures and artefacts. Observe wildlife from a distance, and don't follow or approach them. Respect Indigenous Australian culture and country.

Weblink

Investigate

Go to the website of Bushwalking NSW and investigate the Bushwalker's Code. Go direct, or click on the link.

Ethical issues

Environmental impact

Everyone has an ethical responsibility to ensure their intrusion into any outdoor area has a minimal impact. This ethical approach means people can experience the natural environment while also helping to protect it. All visitors may feel that they are conserving and protecting the environment, but they will go about this in different ways. The way visitors conduct their activity generally reflects their values and attitudes towards the environment. Consideration of the environment and its inhabitants is paramount to conservation, ensuring the area is conserved for future generations to enjoy.

BUSHWALKING PAIR RESCUED IN TASMANIAN WILDERNESS NOT HEADING BUSH AGAIN, MUM SAYS

Peta Carlyon, updated 28 April 2017

The 13-year-old Tasmanian boy lost in Tasmania's south-west wilderness for three nights with his dad will not be going bush again if his mother has anything to do with it.

Stephen Ward and his father, John, 41, escaped relatively unscathed from their ordeal.

Joanne Ward-Pearce said the pair had learnt a lesson but she was proud of their survival skills.

In an amazing tale of survival, the pair was found on a muddy track in the Western Arthurs on Thursday afternoon after enduring three nights lost in freezing conditions.

It was their first bushwalk in Tasmania and was meant to be a bonding exercise.

It nearly turned to tragedy but left them unscathed, apart from Mr Ward's mild hypothermia. As well as being inexperienced, they were underprepared for the punishing conditions.

With snow falling on nearby mountains, their chances of survival were rated 0–5 per cent by some searchers on Thursday morning, after a third night in the open.

They had intended to do a day walk but were found about 15 kilometres from where they set off, the Huon Campground.

Ms Ward-Pearce travelled to nearby Strathgordon and said it was 'the longest time' of her life.

'I think they've both learnt a lot, and sometimes bad things have to happen for good things to be learnt,' she said.

'It is not about what they did wrong, or what they did, what they should have, could have done, they're here.

'So [I'm] just very grateful and very thankful for that.'

Ms Ward-Pearce said the pair would not be going hiking again if she could help it. But in the meantime, she said she couldn't be prouder.

'When you've got a 13-year-old son who can think like that and be that calm, what's not to be proud of?'

In a Facebook post following the successful rescue, Ms Ward-Pearce said 'thank you doesn't seem enough for what the police and SES and volunteers have done in the last couple days'.

'Thank you to the media for letting me have my space 'til I was ready. So much love goes out to all my family and friends for the support I have received over the last couple days, for what has been the worst two days of my life.'

Luck and fortuitous food find

Despite being underprepared, rescuers have credited the pair with 'smarts' after they built a temporary shelter.

'That's most likely saved their life,' said search coordinator Sergeant Chris Williams.

>>

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'They've had the smarts to build something like that and keep themselves out of the weather.'

But it also came down to luck, with the duo stumbling on a food drop left by other walkers near the track.

Experienced bushwalker Geoff O'Hara has hiked the Western Arthurs Traverse across the top of the range three times.

He said it was easy to lose the track in cloudy misty conditions and it should only be tackled by experienced walkers.

'When the cloud is there and the pad, or the track, which is so small and very hard to find, when you actually lose that you're in big trouble,' he said.

In the 12 months to February, there had been 135 bushwalking rescues in Tasmania.

'Western Arthurs Traverse is a very hard walk, it's a very demanding walk, it's not for everyone,' Mr O'Hara said.

'I recommend people when they go out there to be prepared, to have the skills and have the capabilities and be aware of their own skills and capabilities.

'You really do need to be self-sufficient out there, and so if you do get off track the best thing is to just sit and wait and rescue will come.'

Source: www.abc.net.au/news/2017-04-28/pair-rescued-in-tasmanian-wilderness-not-heading-bush-again/8478034. Reproduced by permission of the Australian Broadcasting Corporation – Library Sales © 2017 ABC

Questions

1 What medical condition did Mr Ward suffer?
2 What went wrong on this trip?
3 How did Stephen and John Ward cope with the conditions and ensure their survival?
4 Why do you think there have been so many rescues of bushwalkers in Tasmania?
5 What advice did Mr O'Hara give about going out into the outdoor environment? Explain why this is important.

Newspix/Richard Jupe

Figure 17.7 Rescued bushwalker John Ward is taken by stretcher to a waiting ambulance in Hobart.

Inquiry

Discuss the following issues from an ethical point of view:
1 Should some areas be set aside as human-free?
2 Should four-wheel-driving and hiking be banned in some areas?

NAVIGATION SKILLS

Navigation is being able to direct yourself from one place to another. In an outdoor environment this may be done using a range of bush skills, a map, a compass and observational analysis. The use of mobile navigational equipment (global positioning systems or GPS) is increasing, but this should not stop people developing basic navigation skills such as the ability to read maps and compasses.

Map reading

A map is a pictorial representation of the Earth's surface. Topographic maps, which are created from aerial photography such as Google Earth, are used in outdoor recreation to aid navigation. All maps have standard symbols for natural and artificial features. These include features such as:

- **cultural:** roads, buildings, urban development, railways, airports, names of places and geographic features, administrative boundaries, state and international borders, reserves
- **hydrography:** lakes, rivers, streams, swamps, coastal flats
- **relief:** mountains, valleys, contours and cliffs, depressions
- **vegetation:** wooded and cleared areas, vineyards and orchards.

Topographic maps are divided into numbered vertical and horizontal lines that form a **grid**. To give a quick and accurate location of a particular landform feature, a grid reference is used. A grid reference consists of six numbers: three that refer to the vertical lines on the map, followed by three that refer to the horizontal lines.

Contour lines are imaginary lines on a map that join points of equal height above sea level. They provide valuable information about the shape, gradient and height of landforms. Lines that are close together indicate a steep slope. The numbers on the lines indicate whether the slope goes up or down. Contour lines that are further apart indicate more gentle slopes. Evenly spaced contour lines indicate uniform slopes.

Learning to read maps and interpret landforms from contour lines are important skills that will make your journey more enjoyable.

Some key features on maps are:

- cliff – very steep fall in the land
- gorge – deep valley with steep sides
- hill – high, round area of land
- spur – an area of high land protruding from a mountain
- knoll – a small hill located on a spur
- saddle – the lowest point between two knolls.

A topographic map may also include specific features such as ground relief (landforms and terrain), drainage (lakes and rivers), forest cover, administrative areas, populated areas, transportation routes and facilities (including roads and railways), and other human-made features.

Scale is the ratio between the distance on a map and the actual distance on Earth's surface. The scale is always printed on a map, and can be used to measure or calculate distance. A numerical scale represents the scale in numbers. For example, a scale of 1 to 100 000 means that 1 centimetre on the map equals 100 000 centimetres (1 kilometre) on land. A bar scale shows the scale in pictorial form.

A **legend** or key provides an explanation of the symbols used on a map.

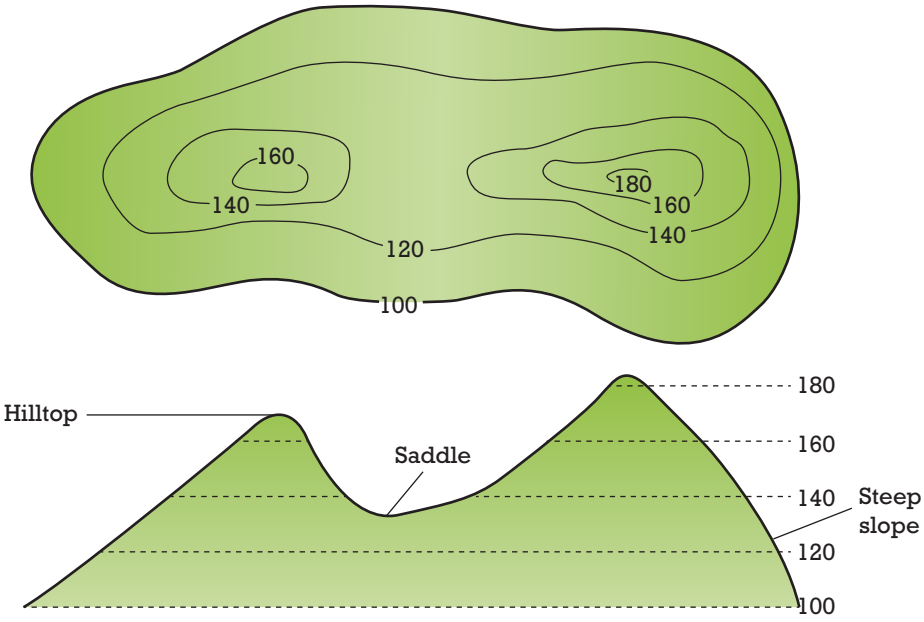


Figure 17.8 How contours represent landforms

Grid bearings

Grid bearings are an accurate method of locating features on a map. On a topographic map, vertical and horizontal lines represent a scaled distance on the land, making them useful for measuring approximate distance. A grid reference is a number that indicates where the point that you are trying to locate appears on the map grid. The numbers in grid references always have the eastings first, followed by the northings.

Magnetic bearing

A compass is a precision instrument used to establish **bearings** (directions). To understand how a compass works, and how it is used to help read a map and plan a route, you first need to know some basic geography.

The two 'norths'

Magnetic north

Magnetic north is determined by Earth's magnetic field. If there are no other strong magnetic forces around, a compass needle will always point to magnetic north.

True north

True north is the direction to the geographical North Pole (the northern end of Earth's axis). On topographic maps, the vertical lines point to true north, also known as grid north.

There is a slight variation between true north and magnetic north. On the east coast of Australia, the calculated difference between true north and magnetic north is 11 degrees.

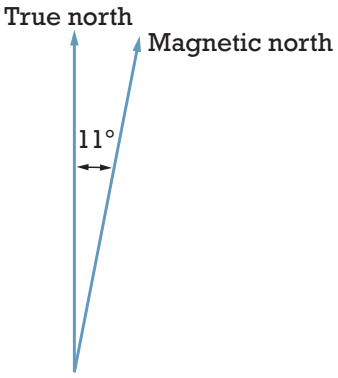


Figure 17.9 The difference between the two norths

Practical application: Using a compass in the field

Hold the compass firmly in one hand in front of your chest. This orientates your body with the compass. To find magnetic north:

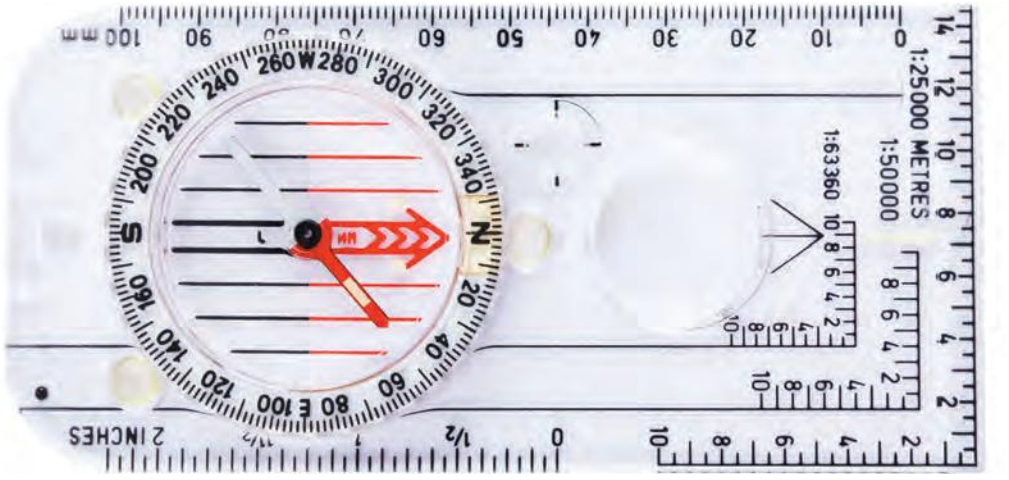
1 Turn the compass housing so the north point (N or 0 degrees) aligns with the index line. Now turn your body so the red end of the compass needle also aligns with the index line. The direction of travel arrow now points north.
2 When outdoors, you can take a bearing from a landmark such as a tree or water tank and then use that to orient yourself on a map.

To take a compass bearing:

1 Turn your body so the direction of travel arrow is pointing at the landmark.
2 Turn the compass housing until the N lines up with the red end of the compass needle.
3 The bearing is the number that now aligns with the index line.
4 To convert the compass bearing to a grid bearing, add 11 degrees.
5 Place the bottom edge of the long side of the compass on the map, directly on the point where you are.
6 Keeping the corner on that point, rotate the whole compass (not the housing) until N points to the top of the map, parallel with the grid lines.
7 The long edge of the compass now points to the landmark from which you took the bearing.

To take a bearing off a map:

1 Place the compass on the map with the long side making a line from the point where you are to your destination.
2 Turn the map and compass together until the red end of the compass needle points to the top of the map.
3 Turn the compass housing until the N lines up with the red end of the compass needle.
4 The bearing is the number that now aligns with the index line.
5 To convert the grid bearing to a compass bearing, subtract 11 degrees.
6 Hold the compass away from the map and set it to the new bearing.
7 Turn your body so that the red end of the needle points to N.
8 You are now facing your destination.



Shutterstock.com/StockPhotosArt

Figure 17.10 A simple compass

Measuring distance on a map involves comparing the length between two designated points with the linear scale on the map. This can be done by using a ruler to measure the distance on a map, then using the scale to convert that measurement to metres or kilometres.

When moving through the environment we don't usually walk in straight lines all the time. When calculating the total distance of an irregular path, the route needs to be broken down into segments and each segment measured individually, then those figures added together and converted using the map's scale. A good trick is to mark the segments on a flat edge of paper, adding each section as you go.

Distance may also be measured by calibrating the length of each step the person takes, or the pace at which the group walks.

Practical application

1 Purchase or download a topographic map of your school or local park.
2 Using a compass, map the bearings of eight landmarks in the area. Pace out the distance between the landmarks and compare it to the scaled distances on the map.
3 Check your measurements using a GPS or Google Maps on your mobile phone.

Natural navigation

The sun rises in the east and sets in the west. Due to Earth's tilt, the direction of the sunrise or sunset might not lead you in a true east or true west direction, but it can be used as a guide. The midday sun will point due north. Shadows will move anticlockwise.

North can be found using a shadow stick. In the southern hemisphere, a shadow cast by a stick will be shortest when the sun is in the north. To find north using a shadow stick, refer to Figure 17.11 and the following instructions:

- Clear a level area of ground and stand a straight stick in the ground. Check that it is perpendicular by using a rock 'plumb-bob' (a rock hanging from a string).
- One hour before and one hour after noon, mark the position of the shadow of the tip of the stick. (Remember to allow for daylight saving.)
- Joining the points of the shadow will give you a curved line (C) that is either convex or concave to the stick. Using a piece of string attached to the base of the stick (E), draw a circle that intersects the curved line (C).
- Joining the two points where the curved line meets the circle will give an east–west line (A–B). A line drawn at right angles to the east–west line will be a north–south line (D–E).

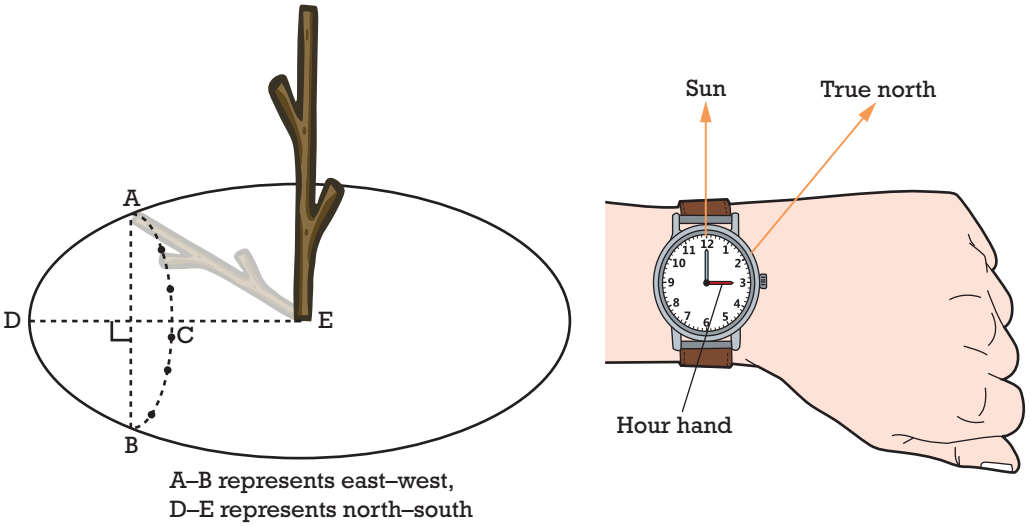


Figure 17.11 Natural navigation: (left) A shadow stick; (right) Finding north using an analogue watch and the sun.

A less accurate measure is to use your analogue watch. Point the number 12 at the sun. True north will be approximately midway between the hour hand and the number 12. (If daylight saving is in operation you must set your watch to standard time before using this method.)

In the southern hemisphere, it is possible to find due south using the Southern Cross star formation. A vertical line from the South Celestial Pole (an imaginary point in the sky) meets the horizon at a point true south from you. The South Celestial Pole can be found by:

- finding the halfway point between the Pointers and Achernar
- extending the long arm of the Southern Cross four times its length, starting from the star nearest to the pole
- finding the intersection of the line joining the Pointers and the long arm of the Southern Cross (extended).

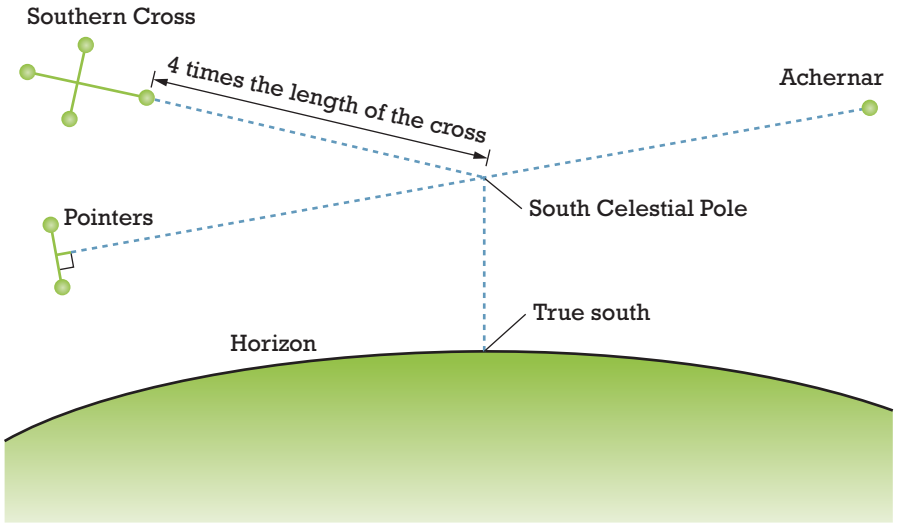


Figure 17.12 How to find south at night using the Southern Cross star formation

The traditional method of navigation is to use a map and compass. Owning a GPS (Global Positioning System) device does not mean you do not need a compass.

Another option is to use Google Maps on your mobile phone. It is worth keeping in mind that having GPS apps running in the background on a mobile phone can dramatically decrease battery life. It is best to use a mobile phone and handheld GPS as a quick update, but to always plan the trip using a scaled topographical map, and to carry a map and compass. If you use a mobile phone, it is best to select an app with offline map mode. This will ensure that you are never left stranded without mobile coverage, and it will save your battery life too.

Practical application

1 Use a shadow stick and an analogue watch to find north and east, as indicated in Figure 17.11.
2 At home tonight, go outside and use the Southern Cross to find true south.

Investigate

Weblink

Follow the link to the Australian Geographic website and investigate its list of the best outdoor apps.

Practical application

1 Pace out a 100-metre distance at normal walking pace. Count your steps and record your time.
2 Calculate your average velocity and stride length.
3 How long would it take you to walk 6.8 kilometres at the same pace? How many steps would this take?

EMERGENCY MANAGEMENT SKILLS

Risk analysis, prevention and management strategies

Emergency management skills can help an individual or group recognise and address safety risks. Some potential issues include getting lost, bushfires and flooding, hypothermia, heat exhaustion, dehydration, injury and fear. A thorough knowledge of environmental conditions and the individual needs of the group provides an important basis for planning for emergencies. A good emergency plan should include strategies such as wilderness first aid, strategies to use if you are lost, and what to do in the event of things like bushfires, lightning and flooded waterways.

Wilderness first aid

A good knowledge of first aid and a well-equipped first-aid kit are extremely important in managing illness and injuries in outdoor environments. In the event of an accident, some important points to remember are:

- Do not put yourself in danger in order to assess the casualty.
- Apply the principles of DRSABCD.
- Treat injuries in order of life-threatening risk.
- Determine whether the injured or ill person can continue or whether emergency services need to be contacted.
- If emergency services do need to be brought in, organise a pick-up point and shelter for the casualty.

Thermoregulation

Thermoregulation is a process that helps the body maintain its core internal temperature. All thermoregulation mechanisms are designed to return your body to homeostasis, a state of equilibrium. A healthy internal body temperature falls within a narrow range. The average person has a baseline temperature of between 37 °C and 37.8 °C.

If your body temperature reaches extremes, this can affect your body's ability to function. For example, if your body temperature falls to 35 °C or lower, you will develop hypothermia. This condition can potentially lead to cardiac arrest, brain damage, or even death. If your body temperature rises as high as 42 °C you could suffer brain damage, or even death. Many factors can affect your body's temperature, such as spending time in cold or hot weather conditions. Your hypothalamus is the section of your brain that controls thermoregulation.

To manage heat exhaustion, lie the patient in a cool place with circulating air, remove unnecessary clothing, sponge the patient with cool water, give them cool water to drink and seek medical aid.

To manage heatstroke, follow the DRSABCD principles. Lie the patient in a cool place with circulating air, remove unnecessary clothing, apply cold packs or ice, cover with a wet sheet, ensure 000 has been called and give the patient sips of water.

To manage hypothermia, follow the DRSABCD principles. Lie the patient in a warm dry place, out of wind, rain, sleet and cold and off wet ground. Remove any wet clothing, warm the patient with a blanket and head cover, give them warm drinks and ensure 000 has been called.

Snake bites

The signs and symptoms of snake bite include puncture marks or scratches, nausea, vomiting and diarrhoea, headache, double or blurred vision, drooping eyelids, bleeding from the bite site, breathing difficulties, drowsiness, giddiness, problems speaking or swallowing, pain in the chest, respiratory weakness or cardiac arrest.

When treating snake bite, do not wash the venom off the skin, cut the bitten area, suck venom out of the wound, use a tourniquet or try to catch the snake. Treat the patient following the DRSABCD principles. Rest and reassure them, and apply a pressure immobilisation bandage, using a firm heavy crepe or elasticised roller bandage. Start just above the fingers or toes, and move upwards along the limb as far as can be reached, including the snake bite. Splint the bandaged limb and ensure the patient does not move. Write down the time of the bite and when the bandage was applied, and monitor the patient, regularly checking circulation in fingers or toes.

Table 17.1 Common medical conditions and treatments

Condition	Treatment
Sprains	Use a modified form of RICER (rest, ice, compression, elevation, referral). Stop the activity. Immerse the affected area in cold water for 20 minutes, then bandage firmly. Elevate the area and diagnose the damage.
Sunburn	Rest in a shaded area. Flush the area with cold water, then apply an appropriate soothing gel. Drink water in small sips. Try to stay out of the sun.
Blisters	Stop walking immediately and clean the area. Prick the blister with a sterile implement, then squeeze the fluid out with your fingers. Apply a sterile dressing and tape around the blister, or padding if it is painful.
Tick attachment	Use fine-tipped tweezers to remove the entire tick from the patient. If you do not have tweezers, put on gloves or cover your hands with tissue paper, then use your fingers. Do not handle the tick with bare hands. Do not try to smother a tick that is attached to your skin with petroleum jelly, nail polish, gasoline or rubbing alcohol.
Leech attachment	Find the head end (which is the small end) and push it sideways with your fingernail until it releases the suction. Do the same with the other end until it releases. You'll bleed immediately – this is normal. Make sure you use disinfectant afterwards and keep any wounds clean and covered to avoid infection. Finally, watch out for any large red marks or rashes, which can indicate an allergy to leech bites. Cover the bite with an adhesive dressing strip.
Burns	Cool initially under cold water until the pain subsides, then place a clean non-stick dressing over the area. Remove any clothing or jewellery near the burn that is not stuck to it. If pain persists, seek medical aid.

What to do when you are lost

If you are lost:

- STOP (stop, think, observe and plan).
- Check your maps, bearings and notes to try to find your position.
- Retrace your steps to a known point on the map.
- Find a high point of land where you can scan for familiar landmarks or for other members of your group. Try using a mobile phone from this elevated position.
- Stay where you are and attract attention by using an emergency signal. This could be in the form of shouting, an emergency beacon, SOS signals on a whistle, setting up a display on the ground, using a mirror to reflect light from the sun, or building a fire that produces billowing smoke in a safe position.
- In freezing conditions, seek shelter and mark the spot with bright articles, branches, equipment or skis.

If an individual becomes separated from their group, the party should remain together as a group, identify where the person was last seen and organise a search of the area. Try to find a high point of land from which to scan the area. If the person is not found, notify the police or a national park ranger as soon as possible. Provide information about the person's last noted location, the colour and type of clothing they are wearing, their rations of food and water and your party's location.

Bushfire procedures, lightning, flooded rivers

Storms

If you are caught in a heavy storm:

- find shelter
- avoid crossing high rivers
- avoid slippery rocks
- keep yourself warm
- be aware of exposed cliffs, large trees and lookouts (in the case of lightning, hail and high winds)
- avoid polluted waters.

If you get caught in a lightning storm, try not to panic. Stay calm and avoid open fields, elevated mountain tops and watery areas. If you are in a forest, move to a small group of trees surrounded by taller trees, or find a dry valley. Avoid lone trees, metal fences and rock ledges. If you are in an open area, look for a dry low-lying valley and crouch down, tucking yourself up into as small a target as possible. Remove metal objects and crouch on your backpack – do not lie flat. You can hide in a safe shelter, but not a tent. Avoid bodies of water and areas that have high flash-flood potential.

Bushfire or blizzard

Being caught in a bushfire or blizzard is a frightening experience, but your chances of survival are good if you take the right steps. Carefully assess what is happening, how close the front is, how fast it is moving and in what direction. Use all the information you can gather to plan a course of action, as well as alternatives, in case a problem arises.

In the case of a bushfire or blizzard, it is important to remember the following points:

- Shield yourself from the heat or cold and assess your position.
- Resist the temptation to run unless your chances of escape are very good.
- Cover all your exposed skin.

- The best places to cross a fire are at the back or the sides. If you have to move through the fire, choose a path with minimal obstructions and even ground leading to open, safe ground.
- In a bushfire, take refuge in an area of dense rainforest; lie down on bare ground or behind a fallen tree; bury yourself, or submerge yourself in a waterhole or stream.
- Before attempting a river crossing, check the flow, temperature and depth of the water; any visible signs of the riverbed; and the swimming experience of all members of your party.

TOP TIPS TO SURVIVE IN THE BUSH IF YOU GET LOST

Amanda Hoh, 2 August 2016

Two young girls who went missing and survived 19 hours in freezing bushland in central-west New South Wales at the weekend have been praised for their survival skills.

Marley Aplin and her friend Rhianna 'hugged up' to keep warm and kept each other in good spirits when they got lost at Ophir Reserve, north of Orange.

They also made a bed out of sand and leaves which according to Caro Ryan, a search manager with Bushwalkers Wilderness Rescue Squad, was a 'clever idea' to keep themselves insulated off the ground.

Ms Ryan told 702 ABC Sydney anyone who enjoyed camping or bushwalking had to be properly prepared before heading out and should avoid going alone.

She also suggested parents talk to their kids about what to do if they got lost, and shared her best tips for surviving in the bush if things did not go according to plan.

Think before you trek

Think Before You Trek is an initiative by New South Wales Police and the National Parks and Wildlife Service (NPWS) to encourage bush safety.

It is recommended bushwalkers use the 'TREK' acronym to remember the following tips:
T – Take adequate supplies of food, water, navigation and first aid equipment.
R – Register your planned route and tell friends and family when you expect to return.
E – Emergency beacons or personal locator beacons (PLBs) are available free of charge from the NSW police and NPWS.
K – Keep to your planned route and follow the map and walking trails.

Ms Ryan said an emergency beacon was particularly useful.

'If you are somewhere where your phone is not going to be working like the Blue Mountains, deep valleys and gullies which aren't going to get coverage, when things go wrong you can push the button and we'll come and get you,' Ms Ryan said.

Find higher ground

Ms Ryan said that if you did lose your way, set a time limit to try and find the track again.

She suggested that you should search for the track for 15 minutes and if you are unable to find your way, stay put.

'Try and get to higher ground and keep trying that mobile phone,' Ms Ryan said.

'But staying put is a really key thing.'

She also said it was important to let someone know where you were going as that would help rescuers pinpoint your last location.

Wear the right clothes

Bright clothes are best, camouflaged outfits are not.

'Unless someone is shooting at you, don't wear camo in the bush,' Ms Ryan said.

'Bright colours are the best things to wear in the bush.'

She also recommended wearing layers of clothing, particularly in winter, as they were easier to remove when the weather becomes warm, but also provided better insulation.

Ms Ryan said a windproof and waterproof jacket would always come in handy.

Have the tools

In addition to carrying food and water, Ms Ryan said packing some extra lightweight essential items was a simple way to ensure you are safe if you lose your way.

Some of those items include matches to light a fire to keep warm, an emergency space blanket, a compass, map and a camera.

'If you take photos with a flash and let the flash go off, that's a really handy way for helicopters to see you in the bush,' Ms Ryan said.

Ms Ryan said bracken ferns, which are found in bushland, were great to keep warm

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– as Marley and Rhianna devised when they settled in for the evening.

'Break off bracken ferns and pile them up in a big pile above your knee height,' she recommended.

'Not only is it going to be a whole lot softer but will give you good insulation from the ground.'

Finally, don't panic

While getting lost in the bush could be daunting, Ms Ryan said one of the best strategies was to try and keep your mind off the fact you are lost.

'If you've told someone where you are going, know that we are going to be looking for you,' she said.

'Go investigate the area around you for a few metres.

'Keep yourself calm, tell yourself some stories, think of happy memories.'

Source: www.abc.net.au/news/2016-08-02/tips-to-survive-in-the-bush/7681572. Reproduced by permission of the Australian Broadcasting Corporation – Library Sales © 2016 ABC

Questions

1 Describe what is meant by the 'TREK' acronym.
2 What is an emergency beacon?
3 List the items you should pack when going on an outdoor trek, and explain the reasoning behind this list.
4 Why is it important to not panic?
5 What strategies could have been used to prevent or better manage the situation described in this article?

Shutterstock.com/Rawpixel.com

Figure 17.13 If you get lost, stay visible and try to reach higher ground.

Emergency shelters

The best place to build a survival shelter is in the driest and most sheltered spot you can find. Try not to build a shelter in the bottom of a deep valley or ravine, where cold air settles at night.

Against a fallen tree

The simplest shelter is a fallen tree that has enough room underneath it for you to crawl in. Collect branches and lean them against the windward side of the tree (so the wind is blowing into it, not against it) to make a wall. Make the wall thick enough to keep the wind out. If you can, build a fire on the open side of your shelter – the heat will help keep you warm.

Under an overhang

Collect fallen branches and lay them against the top edge of an overhang, to create a wall. Lean the branches at an angle to help shield you from rain. Cover the branches with leaves, bark or whatever bush vegetation is available. Remember to make your shelter just big enough for you and/or your companions.

A-frame

Gather two sticks 1–2 metres long and one stick 3–4 metres long. Prop the two shorter sticks up in the shape of the letter A. Prop the longer stick up at the top of the A. Tie the three sticks together where they meet. The three sticks will be in the shape of an A-frame tent with one end collapsed against the ground. Prop up more sticks against the longer stick, then pile bush debris against the sticks until you have an insulated shelter open at the high end.

Figure 7.14 An emergency shelter could be as simple as this

Practical application

Try constructing an emergency shelter using natural materials at school.

SKILLS NEEDED FOR OTHER OUTDOOR ACTIVITIES

Canoeing/kayaking skills

When planning a canoeing or kayaking trip, first plan your trip on a map, noting distance and direction, any hazards, and places where you can go ashore. Check the weather forecast, especially the wind strength and direction and the possible impact of this. Check the time and height of the tide, and estimate how fast and how far your group can paddle in the forecast conditions. Check that your equipment is suitable for the trip and that you have suitable personal flotation devices (PFDs) and clothing for the conditions. Carry a personal first-aid kit, sufficient water (and food) for the trip, plus a spare container of fresh water. Ensure your paddling skills are appropriate for the trip, making sure you have practised capsizes, wet exits and recovery.

While on the rivers, each paddler should be aware of group plans, formations, the general nature of the river ahead, the location of any special gear and the signals to be used. The lead boat should check out any doubtful parts of the river, set the course, and should always be at the front. Each boat has a responsibility to the boat behind, and should pass on signals and point out obstacles in front. If one boat gets into trouble the group should raft up together, boats side by side, holding the edge of the distressed boat on either side.

When going out to sea, it is important not to travel beyond a returnable distance from shore in the prevailing conditions. Study the up-to-date weather forecast and the effects of tides. Formation positions should be nominated before an ocean expedition, and everyone should practise a team rescue drill to ensure that a capsized craft can be righted, emptied and the group can continue. In the event of someone capsizing, stay calm and position yourself on the upstream side of your craft. Only leave your craft if this improves your safety. If a rescue team is not close at hand and the water is dangerously cold, or worse rapids follow, swim for the nearest point of personal safety.

Choosing the right boat

The right boat will depend on what sort of paddling you want to do. The low seating position in a kayak gives stability, and the decks fore and aft shed water, meaning kayaks can withstand wind and waves better than open canoes. Canoes are usually paddled as doubles, and can be ideal craft for exploring sheltered lakes, creeks and rivers.

Paddles come in various shapes and sizes, and are made of various materials. Kayak paddles have two blades, usually feathered between 65° and 90°. The type of boat and paddling determines the required kayak paddle length.

Correct ergonomics and posture are essential for paddling. The paddler should lean forward 5–8° from the pelvis, back straight without being forced, shoulders ahead of hips, head, neck and shoulders relaxed. The legs should be slightly bent – enough that you can't quite push them straight without moving on the seat.

The safest way to carry the boat is to have a person at each end. End loops and toggles are there to give you a safe handhold.

Getting in the water

The easiest way to launch a kayak is to place it, facing the water, at the top of the swash zone on the beach. Stand either on deck or alongside the kayak, being careful not to let it get washed away. Sit astride the boat, wash the sand off your feet, then put them into the cockpit. Then, with knees straight and weight supported on your hands, slide in.

The easiest and safest method to empty out a boat is to have a person at each end, raising and lowering alternately. Hold the boat about half a metre in from the end so that it does not roll upright.

Forward paddling is the important stroke. The catch is the start of the stroke, where the blade enters the water. The key points are a clean entry, as far ahead of the feet as possible with the blade as vertical as possible, a full rotation of the torso, shoulder forward and a quick development of power.

For longer paddling trips you will use a more relaxed stroke. All the principles described above still apply, but the stroke will be a little lower and wider, with the top hand lower. The key points to concentrate on are to plant the blade by or ahead of the feet, bottom arm extended but not straight, and rotate the torso to pull back the shoulder and drive the stroke. The top arm holds its position relative to the shoulders, crossing the boat with the shoulder rotation. The power phase ends with the blade in line with the hips. Lift the blade out sideways, keep the top hand high and continue rotation to set the shoulders and paddle for the next stroke.

Getty Images/Kat Clay

Figure 17.15 Kayaking is a safe recreational activity if all safety guidelines are followed.

Weblink

Watch this

Follow the link to monkeysee.com to watch videos on basic paddling techniques for kayaking .

Abseiling skills

Abseiling is the technique of descending a steep slope using a fixed rope. This is performed mainly after a climb or where there is difficult access, such as sea cliffs, to the start of a climb. Ropes are the main equipment used.

Important points

Before starting your descent, ensure that all abseiling equipment is in good working order. This includes harnesses, helmets, ropes, safety lines, gloves and footwear. Try not to walk backwards. Sit fully in the harness with your hips bent at 90 degrees so your legs are straight and pushing you out from the wall. Remove your pack and clip it to your belay loop with a sling, so it hangs between your legs. Remember, the weight of the pack will cause you to move down the rope faster. Watch out for branches, ledges and anything you might abseil down onto. Always know where your rope is above and below you. Ropes swinging side to side, or loose ends tossed down, can cause rockfall. Stay light on your feet to increase your manoeuvrability.

Getty Images/Figure8Photos

Figure 17.16 Abseiling involves the use of ropes to reach otherwise inaccessible areas.

Weblink

Watch

Watch the video 'Rappelling basics 101' by Prepper Action, 3 March 2016. Google it, or follow the link. (Rappelling is another term for abseiling.)

Indoor climbing

Plan a class excursion to an indoor rock-climbing centre. The goal for all class members should be to learn the skills required and then demonstrate a basic level of proficiency in climbing and **belaying**.

Wilderness survival quiz

Weblink

Go to the wilderness survival skills website and click on 'Quiz' in the menu. How were your survival skills?

CHAPTER SUMMARY

- When planning an outdoor recreational activity:
  - identify the environments participants will be experiencing
  - develop management plans to address all potential risks
  - make a checklist of resources participants will need
  - address all legal and administrative requirements.
- The main aim of emergency management planning is to ensure the total safety of participants during an activity and to reduce the degree of risk.
- The group should ensure that all required permissions have been finalised and trip intention forms have been lodged with the appropriate authorities before the trip.
- When planning a menu for an outdoor activity, it is important to consider the type and duration of activities that are planned.
- A good knowledge of first aid and a well-equipped first-aid kit are extremely important in managing illness and injuries in outdoor environments.
- Evaluate the campsite, noting landforms, trees, animal and insect life, availability of water and firewood and susceptibility to sudden changes of weather.
- It is important that all visitors to the outdoor environment observe conservation issues and know the regulations and special concerns regarding the area they are visiting.
- Navigation means being able to direct yourself from one place to another in any environment. This may be done using a range of bush skills, a map, a compass and observational analysis.
- Strategies to include in an emergency plan include wilderness first aid, strategies to use if you are lost, and dealing with issues such as bushfires, lightning and flooded waterways.

CHAPTER REVIEW ACTIVITIES

1 Select an outdoor recreation area and research the weather conditions for that area for the next three days.
2 **Explain** why it is important to check the current forecast when planning an outdoor activity. Plan an outdoor activity for your area for the next three days. Include:
   a an emergency management plan, and explain why it is required
   b a menu for an expedition and an explanation of why the rations should be lightweight
   c strategies for the purification of water
   d the legal requirements or permissions that would need to be addressed.
3 **Describe** the guidelines that should be used when selecting a site for camping.
4 Discuss why it is preferable to use portable gas stoves rather than camp fires.
5 Consider the following statements: 'Take nothing but photos and leave nothing but footprints' and 'Leave the area cleaner than you found it'. Explain these statements in relation to the impact that outdoor activities can have on the environment.
6 Research the visitor's guidelines of a national park of your choice. Explain why these guidelines have been created.
7 Discuss the importance of the disposal of food scraps in relation to the wellbeing of wildlife in that area.
8 **Explain** how a compass, map and grid references are used in navigation.
9 Investigate three types of GPS devices and three mobile apps for outdoor recreation. What impact is the use of GPS having on outdoor recreation?
10 Research the most up-to-date information about fire danger levels and total fire bans for an area of your choice.
11 **Describe** the action that should be taken if:
   a your group gets lost
   b an individual is separated from the main group
   c your group is running low on food rations
   d two members of your group sprain their ankle and are unable to walk
   e your group gets caught in an electrical storm
   f a bushfire is rapidly approaching, with the wind behind it
   g your group needs to cross a fast-flowing river that is waist deep
   h you lose your map, compass and GPS two days into a trip.

WS Extra exam-style questions

CHAPTER 18
Impact of group dynamics on outdoor experiences

IN THIS CHAPTER

Leadership styles	**324**
Understanding group dynamics	**327**
Facilitation skills	**330**
Understanding strengths and weaknesses	**331**

Once you have read this chapter you should be able to:

- distinguish between different leadership styles and identify their suitability for different situations
- work cooperatively to solve simulated initiative challenges
- apply cooperative decision-making processes to solve problems and challenges faced during outdoor experiences
- describe how you control risks when participants are encouraged to push their **comfort zone**
- discuss ethical considerations that a leader faces in balancing challenge and safety in outdoor recreation.

LEADERSHIP STYLES

The choice of leadership style can be important in achieving success. Factors that may influence the leadership style include the nature and time frame of the task, prior leadership experience, and the skills the person possesses to facilitate positive group dynamics. The age of the participants and their emotional state at the time also affect leadership style. The leader must change their style in response to situations to facilitate the best possible group outcomes.

The leader must be able to provide support for all members of the group and be willing to take responsibility for less-experienced members. In some cases, the various leadership tasks,

such as navigator, experienced camper, cook and designated first-aid person, can be shared by several people.

A leader should be able to communicate effectively and foster positive group relationships. This involves being a good listener and observer and valuing all members' contributions. Leaders need to take into consideration each individual's abilities and aspirations, and must take charge to ensure the safety of all members of the group.

Democratic leadership

A democratic leader shares the decision-making with the group. The group discusses ideas and evaluates alternatives to reach a consensus on a solution. The leader should not try to influence the group's decisions, and should be willing to accept and implement any solution that has support of the entire group.

A good democratic leader encourages participation and delegates wisely, but never forgets that they are responsible for the final outcome. The democratic leader may use skills such as encouraging group members to establish personal goals and recognising and encouraging personal and group achievement.

There are times where the democratic style is not appropriate, such as when there is not enough time to gain everyone's input, when the group members are all new or inexperienced in their roles, and when safety is of critical concern.

Laissez-faire leadership

'Laissez-faire' is a French phrase meaning 'leave it be'. It is used to describe a leader who allows their team members to get on with their work. A laissez-faire leadership style is one in which the leader provides little or no direction and gives individuals as much freedom as possible. All control is given to the group members, who are responsible for determining goals, making decisions and resolving problems on their own.

The laissez-faire style can be used for groups who are experienced and skilled in their area. They know exactly what is required and can make their own decisions without any guidance or instruction. This style should not be used if it causes members of the group to feel insecure and unsure of their responsibilities, in situations where there is no regular feedback, or when the leader is unsuited to their role and is hoping the group will cover for them. This type of leadership is effective when group members are experienced, group goals are set and group dynamics are positive. However, the lack of direction means this style generally does not result in the achievement of the desired outcomes to the expected level in outdoor recreation.

Autocratic leadership

An autocratic leader likes to use the information they have available to them and make decisions on their own. Group members may provide input to the decision, but the leader decides which course of action to take. Group members are expected to adhere to their leader's decisions without receiving any explanations.

This style is effective in situations where there are new members who do not know which tasks to perform or procedures to follow, where individuals do not respond to any other leadership style, or when there is limited time in which to decide. An example of this type of leadership could be the leader taking control in an emergency.

The autocratic leader may not be effective if group members are resentful or have no trust in the leader, or when they become dependent on their leader making all their decisions. The autocratic style of leadership can lead to reduced morale among members, and can influence group dynamics.

Strategic non-intervention

Strategic leadership refers to the leader's ability to influence others to make decisions that enhance the achievement of goals while maintaining positive group dynamics. The group leader uses this style to determine when to provide input into decision-making based on the how the group is working. The leader evaluates the confidence group members have in their leadership against the confidence they have in the ability of group members to manage their own decisions and behaviour. This can be effective when group members are highly skilled and educated, where individuals have pride in their work and are trustworthy and experienced.

Alamy Stock Photo/Bruce Leighty - Sports Images

Getty Images/South_agency

Figure 18.1 Different styles of leadership will work better for different group members.

Weblink

Try watching

Watch the video 'Remember the Titans: Leadership' by SR Creative media, about what makes a good leader. What are the characteristics of a good leader, in your opinion?

Table 18.1 Leadership styles

Leadership style	When to use	When not to use
Democratic	When the leader wants to keep individuals informed and encourage team building and participation. When the group wants to share in decision-making and problem-solving duties.	When there is not enough time to get everyone's input. When the leader feels threatened by this type of leadership.
Laissez-faire	When the group members are highly skilled, experienced and educated. When the group members have pride in their work and are driven to perform successfully on their own.	When the leader cannot provide regular feedback to group members on how well they are doing. When the leader doesn't understand his or her responsibilities and is hoping the group will cover for them.
Autocratic	When there are new, untrained group members who do not know which tasks to perform or which procedures to follow. When group members do not respond to any other leadership style. When there is limited time to make a decision.	When the group becomes tense, fearful, or resentful. When members of the group expect their opinions to be heard.
Strategic non-intervention	To promote group decision-making and teamwork. To assess situations where individuals are encouraged to demonstrate leadership.	Where the situation is dangerous. When there is a lack of experience in the group.

Leadership styles

Allocate four students to each role play one of the four leadership styles. Split the remainder of the class into four groups.

1 Each leader is to address one group on the same issue, which should be decided by the teacher, such as instructing a group on how to set up a camp site.
2 Identify the type of leadership style that would work best in each situation and briefly outline what you would do while using that style of leadership.

UNDERSTANDING GROUP DYNAMICS

Stages of group dynamics

Each new group coming together for the first time develops different group dynamics. Factors affecting the development of group dynamics may include age, gender, intelligence, communication and skills. An individual's physical, social and emotional health will also have an effect. There are four distinct stages in the development of group dynamics.

Form

In any outdoor recreation experience, group members need an orientation session and 'icebreaker' activities to bring the individuals together as a group. There may be a degree of uncertainty among group members, as they are unsure of their role within the group. It is the leader's responsibility to set clear goals, get members acquainted with each other, create a positive atmosphere, assign simple tasks and be sensitive to the group's need for direction. The work rate at this stage is usually low, because individuals are focused on understanding the tasks and the skills required to successfully complete them. The length of this stage depends on the complexity of tasks, how clearly the task has been explained and how well the group members understand what is expected of them.

Storm

This next stage of group dynamics is characterised by group members being more assertive, and by the emergence of conflict, because different members have different approaches and needs. Members may have varying opinions about the group's goals and how best to achieve them. Individuals may begin to disagree with each other, and feel anger or frustration with the task or with other group members. This may lead to resentment of the leader. The leader needs to be democratic and intervene when necessary, and should provide opportunities for conflict resolution and negotiation. This can be achieved by focusing the group on taking more responsibility for the achievement of the task, and encouraging positive reinforcement.

Norm

The norm stage of group dynamics is characterised by team cohesion, where individuals develop an understanding and acceptance of other members of the group. Individuals develop a sense of belonging, and accept the group goals and their designated roles. Individual differences are resolved through positive group dynamics and the groups working more productively. The group leader can focus on the democratic and strategic non-intervention leadership styles, which allow group members to take a more active role and then reflect on their goals and progress.

Transform

In the transform stage, the group members demonstrate that they are operating more effectively and achieving a greater amount of work more efficiently.

The individuals in the group have set goals and have developed a sense of purpose, and are now focusing on getting the job done. Group members are more flexible, innovative and understanding of how each person's role contributes to achieving the group goals. Individual attitudes are characterised by increased confidence and motivation to contribute to the team. The leader adopts a more democratic style of leadership to encourage communication and allow more input from individuals within the group.

Conflict resolution

In any group situation where people have individual ideas, there is the potential for conflict. Effective conflict resolution involves effective communication and an acknowledgement from the individuals that there is a problem, and that they are willing to take steps to resolve it. This allows people see things from a unique perspective, and may change their opinion. Successful conflict resolution can mean the difference between the outdoor activity continuing or being abandoned.

Conflict resolution strategies

For collaboration to occur, both parties must buy in with a level of trust and commitment. This allows an honest examination of both positions, and an understanding of each other's point of view. The aim is to reach a win–win solution.

In a compromise, each party must move to a middle position that is agreeable to both parties. This relies on goodwill, as both parties must settle the dispute by mutual concession.

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Figure 18.2 Positive group dynamics require trust and a mutual commitment to working collaboratively.

Team building

Outdoor recreation activities are the ideal environment to facilitate team-building strategies. Team building allows group members to work towards achieving their individual goals as well as working as a team on the group goals. Team building aims to improve the quality of relations among group members, resulting in improved group dynamics and increased output. Successful groups work as a team, regardless of the individual roles of team members.

Cooperation

Cooperation is characterised by group members feeling valued and working together to achieve a common goal. Senior group members can provide assistance and advice to less-experienced members of the group to help build trust and achieve outcomes. All group members can support each other and provide positive feedback to help keep the team's morale high. Arriving at a camp site as a storm hits is an example of when cooperation would be needed.

Nine practical activities to try

1. **All in:** All in together is an effective team-based challenge where the group must fit inside a defined space. The space can be defined using either a rope or a tarpaulin. Once the group has achieved this, the size of the area is decreased, becoming smaller and smaller over time.
2. **Tarp ball:** The objective of this challenge is for the team to work together to navigate a ball around a tarpaulin for as long as possible without the ball falling through a hole or off the tarp completely.
3. **Pair balance:** This team-building activity helps to build trust and communication. Pairs must lean forward and balance with their palms against each other. They then must 'spring' off and 'land' together again.
4. **Through the hoop:** The team stands in a circle and group members hold hands. Hang one hula-hoop over one pair of joined hands. Each person in the circle must pass the hoop over themselves and on to the next person while always staying connected.
5. **Helium stick:** Teams are given a long thin stick, known as a 'helium stick', which they must lower to the ground using just their index fingers. Participants must remain in contact with the stick at all times. This can become frustrating and funny for all involved.
6. **Move the load:** Team members race against the clock to move as many tennis balls as they can from one bucket to another, without using their fingers or elbows. A variation is to move cups of water from one bucket to another.
7. **Blindfold maze:** Blindfolded participants are given a route by their partners, and then must retrace their steps without any instruction. The goal is to end up as close to the start point as possible.
8. **Toxic waste:** Equipped with just two ropes, the group must work out how to transport a bucket of 'toxic waste' and return it back to the safe zone without tipping it over. This fun team-building challenge is also sometimes known as 'Bomb removal'. It is an excellent challenge for highlighting the importance of teamwork, problem solving and leadership.
9. **Human knot:** Starting in a circle, participants each join hands with two other people in the group to form a human knot. As a team, they must then try to unravel the 'human knot' by untangling themselves without breaking the chain of hands.

FACILITATION SKILLS

In this section we learn how to apply cooperative decision-making processes to solve problems and challenges faced in outdoor experiences.

Leaders must have the skills to provide the necessary direction and support for group members to achieve their goals. These are the 'process' skills leaders use to guide and direct key parts of a plan, such as meetings, planning sessions and training of members and leaders. They need to concentrate on how to move through a plan and meet the goals effectively. Facilitation focuses on how individuals participate in the process of learning or planning, not just on what is achieved. A **facilitator** is neutral and never takes sides, shows good judgement and is knowledgeable. An effective leader can determine the right course of action in an unforeseen situation.

Communication skills

Effective communication is a key interpersonal skill. Communication is a two-way process that requires the ability to communicate messages to people, and to understand messages sent by them. By communicating clearly, an individual can avoid misunderstandings and potential conflict with others. Individuals should be aware of the messages sent through non-verbal channels, such as making eye contact and avoiding defensive body language. Differences in culture, attitudes, experiences and abilities should be considered before conveying a message, and clarification should be requested if a message is unclear.

Decision-making

The first step of decision-making is to identify the objectives and prioritise them. Next is to gather information, identify alternatives and develop an action plan. The alternatives need to be evaluated in terms of the objectives before the best option is chosen. The tentative decision is evaluated for possible consequences, and the plan is then executed and evaluated, and follow-up action is taken if required. The decision-making process can be subject to human error, as decision-makers all have personalities, prejudices, different attitudes to risk taking and a self-interest bias.

With the benefit of hindsight, it is easy to say that a decision was good or bad. One of the key factors in making decisions is to consider the individual's set of values, focusing on what is right and appropriate. In making good decisions it is important to consider the interests of both the whole group and the individual.

A well thought-out decision can lead a group to success, while a poor or rushed decision can result in to failure. When under stress or in emergency situations, individuals can sometimes make decisions quickly and without considering all alternatives. Staying calm while making decisions is important, such as when planning an escape route from a bushfire.

Flexibility

Facilitators need to be flexible in their approach to managing the group. The individual needs of the group, the weather, differing ability levels and an emergency can all cause changes to the original activity plan. The group leader needs to be flexible enough to be able make changes to the group plan to ensure the continued welfare of the group and the best outcome for all individuals. Individuals need to be flexible in response to a change in the plan in order to maintain positive group dynamics. Stopping to rest or set up camp when someone has twisted their ankle is an example.

Scenario

World War III has just occurred and ten people find that they are the only people left on Earth. They have calculated that within their bunker, there will not be enough resources for all to survive over the next two years. Therefore, some people will be required to leave. The table below lists the survivors.

1 In pairs, complete the table and determine who should live by ranking the members from 1–9 (with 1 being the highest priority).

Scaffold

Character	Reasons to keep alive	Reasons to sacrifice them	Pair ranking	Group ranking
45-year-old female scientist				
38-year-old male priest				
34- and 36-year-old married couple				
23-year-old single pregnant woman				
43-year-old male army officer				
68-year-old woman				
28-year-old male lawyer				
54-year-old male politician				
32-year-old female doctor				

2 Once completed, discuss your findings as a class and create a class ranking.
3 Reflect on how this activity progressed throughout the lesson.
4 What influenced your decisions?
5 Did anyone emerge as a leader?
6 Was there any conflict?

UNDERSTANDING STRENGTHS AND WEAKNESSES

Being ready

Individuals must understand their own strengths and weaknesses before deciding to take part in an outdoor activity. Firstly, each member should evaluate their health and fitness by getting a medical check-up. The challenges of outdoor activities can be daunting, so the individual also needs to assess their mental and emotional health, and their level of resilience.

Participants should have well-developed social skills to ensure they can interact positively within a group environment. An individual's attitude to risk taking and perceived comfort zones will also influence their readiness to participate in an activity. All aspects of the activities must be explained so each individual can fully understand what is expected of them and make appropriate decisions.

An individual should plan and purchase the appropriate equipment and clothing for the activity of their choice. Leaders should assess the risks on behalf of an inexperienced individual or group, as they may not have the knowledge or skill to make an informed decision.

Self-efficacy

Self-efficacy is a person's belief in their ability to succeed in an endeavour. This can affect the way a person feels or thinks, which affects their motivation and behaviour. Success is a motivating factor in building a keen sense of efficacy. Constant failure has a negative effect on self-efficacy and confidence. Individuals must work to overcome obstacles and challenges in order to achieve an important level of self-efficacy. This reinforces an excellent work ethic, which encourages them to continue working towards achieving goals and overcoming adversity. An individual's risk-taking capacity and mental health both influence their level of self-efficacy when taking on challenges.

Balancing challenge and safety

There can be a delicate balance in outdoor activities between the thrill of a risk-taking situation and the importance of safety. Safety considerations are a vital component of any outdoor recreation activity, but adventurers need to be motivated to participate by overcoming these challenges. Individuals take on the challenge of the activity by choice, but need to be mindful that the risks are within their level of competence. It is imperative to balance safety and challenge, and to remove risks while retaining the excitement and adrenaline rush that motivates individuals to participate in outdoor activities.

Challenge by choice

People must decide for themselves whether to participate in an activity. All group members are expected to respect the individual's right to sit out, or to participate at a personalised level of engagement. Challenge by choice helps individuals avoid peer or group pressure while challenging them to participate fully in the activity of choice. It creates opportunities for learning about how to set goals that are outside the comfort zone, where the greatest opportunities for growth and learning lie. An example of this would be an individual deciding to participate in activities that involve heights when they have a fear of heights.

An individual with a low level of skill and or experience may find easy activities quite interesting, but will probably feel fear when confronted with activities of greater difficulty. Conversely, a highly skilled or experienced individual may be bored by easy activities, but may find difficult activities highly motivating. In a group where members have a diverse range of skill and experience levels it can be very hard to determine an appropriate degree of difficulty for an expedition. Some participants will be out of their depth, while others may be bored. A fearful person may overestimate the risks involved in an activity, while a confident individual may underestimate them.

Pushing the comfort zone

An individual's comfort zone is a behavioural space in which activities and behaviours involve minimal stress or risk. It is a state of mental security offering happiness, low anxiety and reduced stress. It is an easy option to stay in your comfort zone, rather than facing the fear of challenging yourself. However, an individual who limits themselves to things they already have done will miss out on adventure opportunities and life experiences, and will limit their personal growth.

Everyone's comfort zone is different. Stepping out of your comfort zone involves trying new experiences to reach a state of optimal anxiety in a controlled way, but without causing yourself undue stress. Pushing yourself too hard can cause a negative result, and reinforce the idea that challenging yourself is a bad idea. Examples of pushing the comfort zone might include taking the first step over a cliff when abseiling, trekking on when you are tired, or pushing off in a kayak to enter the rapids.

Issues

Debate the following issues in class:

1 How do you control risks when participants are encouraged to push their comfort zone?
2 What ethical considerations confront a leader in balancing challenge and safety?

CHAPTER SUMMARY

- The four main types of leadership style are democratic, laissez-faire, autocratic and strategic non-intervention.
- Factors affecting the development of group dynamics may include age, gender, intelligence, communication and skills.
- Form, storm, norm and transform are the four distinct stages in the development of group dynamics.
- Conflict resolution involves effective communication from individuals and an acknowledgement from the individuals that a problem exists, and that they are willing to resolve it.
- Team building aims to improve relations among group members, resulting in improved group dynamics and all members working towards a common goal.
- Cooperation is characterised by group members feeling valued and working together to achieve a common goal.
- Facilitation focuses on how individuals participate in the process of learning or planning, not just on what is achieved.
- Communication is a two-way process that involves an ability to communicate messages to people, and understand messages sent to them.
- Self-efficacy is a person's belief in their ability to succeed in an endeavour.
- An individual's comfort zone is a behavioural space where activities and behaviours involve minimal stress or risk.

CHAPTER REVIEW ACTIVITIES

WS Extra exam-style questions

1 Brainstorm three problem situations that may develop on a group outdoor expedition of your choice. Explain the roles and responsibilities that group members would need to adopt in order to solve the problem in each situation.
2 Discuss three positives and three negatives of each leadership type, then suggest a situation in which each style would be most appropriate.
3 **Describe** the role of the leader in the development of group dynamics, from forming through to transforming.
4 **Evaluate** the importance of team building and cooperation in enhancing group cohesion.
5 You are the leader of an expedition which is two days into a four-day hike. Two members of the group of five are undermining your leadership and want to go home. They are planning to walk another route, which you know is beyond their capabilities. They also want to take half the food and water. Apply cooperative decision-making processes to try and solve this problem.
6 Discuss two facilitation skills that could be used to solve problems or challenges on an outdoor expedition.
7 **Critically analyse** the following statement: 'An individual who limits themselves to things they already have done will miss out on adventure opportunities and life experiences, and will limit their personal growth.'
8 **Explain** the skills needed by a leader to ensure that a new group of campers challenge themselves while taking risks within the bounds of their competence.

GLOSSARY

abduction moving a body part away from the midline of the body

accent (in music) highlights or emphasises a piece of music

adduction bringing a body part towards the midline of the body

agonist the muscle primarily responsible for producing movement

alignment relationship of the skeleton to the line of gravity and base of support.

analyse to identify components and the relationship between them; draw out and relate implications

anaphylaxis an acute allergic reaction

antagonist the muscle that relaxes as the agonist contracts, to ease movement and minimise the risk of injury

aorta the largest blood vessel in the body; it carries blood directly away from the heart

arranging movement (in dance) flow and connection between sequences

artery blood vessel that takes blood away from the heart to the rest of the body

axis a straight line around which a geometric figure or three-dimensional object is symmetrical

barrier factor that impedes or blocks participation in physical activity

bearing a geographic orientation of a line, given in degrees clockwise from 0 ° (north), 180 ° (south), 90 ° (east) or 270 ° (west) to 360 ° (north) again

belay controlling a climber's rope by fastening it to a person or device

blood-borne carried by the blood around the body

bound a movement of careful precision that is highly controlled and can be stopped at any moment

bronchi the largest tubes within the lungs, carrying air and CO_2

canyoning moving through canyons on foot; climbing, abseiling or swimming

capillary smallest blood vessel, connecting arterioles and venules, and enabling the interchange of water, oxygen, carbon dioxide, and many other nutrient and waste chemical substances between blood and surrounding tissues

cardiopulmonary resuscitation (CPR) the repeated action of chest compressions and artificial respiration performed during cardiac arrest

cardiovascular disease (CVD) a disease affecting the heart or blood vessels

caving climbing into and exploring caves

choreography the creation and composition of dances by arranging or inventing steps, movements, and patterns of movements

circumduction movement of a limb or extremity (hand, foot) when one end is fixed and the other can move in a circular pattern

closed kinetic chain activity physical exercises performed where the hand (for arm movement) or foot (for leg movement) is fixed and cannot move

commodification treating something as a commodity, something that can be traded

concentric muscle contraction the shortening of a muscle during an effort (opposite to eccentric contraction)

conduction direct transfer of heat by contact with a cooler object; the heat is conducted to the cooler object

condyloid joint a joint that can move side to side and front to back but cannot rotate (e.g. wrist joint)

constellation a group of stars forming a shape, as seen from the earth

contrast to emphasise differences by placing next to each other

coordinates (maps) values that designate the position of a point in a given reference or grid system

criteria standards applied in making judgments about the merit of a work.

defibrillation the emergency procedure in which an electronic device called an automated external defibrillator (AED) is applied to the chest of a person in cardiac arrest

describe to provide characteristics and features

determinants of health interacting factors, including individual, sociocultural, socio-economic and environmental

diaphragm a wide muscle across the bottom of the chest cavity, which controls breathing

diastolic blood pressure the pressure in the arteries when the heart is at rest between beats

direct marketing selling products or services direct to buyers, rather than via retailers

dislocate to disturb the normal position of a joint

displacement the movement of something from its usual or correct place

dorsiflexion movement (flexion) of the ankle, e.g. pulling the toes back towards the shin when stretching the hamstring muscles

dynamics (in dance) force and flow of movement

eccentric muscle contraction the lengthening of a muscle during an effort (opposite to concentric contraction)

elements of composition (in movement) space, dynamics, time and rhythm, relationships

epidemiology branch of medicine that deals with the incidence and distribution of diseases and other factors relating to health

ethics a system of moral principles or standards governing the appropriate conduct of an individual or group with respect to a specific situation; that is, the principles used to judge right from wrong

eversion rotating the foot so that the sole turns outwards

expiration breathing out

explain to relate cause and effect, or make the relationships between things evident; provide why and/or how

extension increasing the angle of a (bent) joint

facilitator a person who assists and encourages people to find their own solutions to problems or tasks

FITT principle frequency, intensity, time, type

flexibility the capacity of a joint or muscle to move through its whole range of motion

flexion the action of bending a joint when the angle of the bones at the joint decreases

fracture break (a bone)

gas exchange exchange of oxygen and carbon dioxide in the lungs (also called pulmonary diffusion)

gliding joint a joint in which the bony surfaces that the joint holds together are flat, or only slightly rounded

grid sets of parallel lines intersecting at right angles to form squares

health literacy the ability of an individual to access and understand health-related information (e.g. about diseases)

health promotion ways in which a healthy lifestyle is encouraged

hyperglycaemia (diabetes) high blood glucose

hyperthermia unusually high body temperature; high core temperature

hypoglycaemia (diabetes) low blood glucose

hypothermia unusually low body temperature; low core temperature

improvise to spontaneously create movement that includes an element of chance

ingest to swallow (by mouth)

inspiration breathing in

intensity (exercise) the level of exertion being applied to an activity

inversion rotating the foot so the sole turns inwards

isometric contraction a muscle contraction where there is no change in the muscle's length; a static contraction

kinaesthetic principles physics principles that control motion, flow and weight in time and space

Laban movement a language and method used to document, interpret, visualise and define all variations of human movement, invented by Rudolf Laban (1879–1958)

laceration a deep cut or tear in the skin

legend explanation of symbols or other matter in relation to a table, map or illustration

ligament soft tissue that connects bone to bone

linear motion movement of the body where all parts move in the same direction at the same time, along a line

locomotor movements that travel from one location to another

magnetic declination the angular difference between true north and magnetic north

measure (in musical performance) a grouping of beats

mediator somebody who works with both sides in a dispute in an attempt to help them to reach an agreement

metre (music) the grouping of beats around an accent; establishes structure

motivation the intensity and direction of effort

non-locomotor movements that do not travel, such as moving or balancing on the spot

orienteering using a map and compass to navigate between checkpoints along an unfamiliar course

Ottawa Charter World Health Organization document from 1986 which defined health as a human right

orienteering using a map and compass to navigate between checkpoints along an unfamiliar course

parkour running, jumping, climbing buildings and obstacles in urban environments at speed

physical activity any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level

physical fitness the ability to carry out daily tasks with vigour and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies

pivot joint a joint that moves by rotating, for example, the joint that allows humans to rotate their heads on their necks is a pivot joint

plantarflexion occurs at the ankle when the toes are pointed downwards and the heel is raised

plasma a clear yellowish fluid in the blood that caries nutrients, assists with waste removal, and blood clotting; 90% water

platelet a tiny cell fragment found in blood that helps the blood to clot in response to injury

principles of composition procedures that help sequence movements into a whole

projectile motion movement of an object through the air

pronation (hand and forearm) rotation of the hand or forearm so that the palm faces down or towards the back; the radius and ulna cross over

proscenium the part of the stage that is in front of the curtain

protective behaviours behaviours that can improve health, or reduce the chances of health problems developing

pulmonary artery blood vessel that carries blood from the heart to the lungs

pulmonary vein blood vessel that carries blood from the lungs to the heart

red blood cell blood cell that contains haemoglobin and transports oxygen and carbon dioxide

repetition the duplication of movements or movement phrases within choreography

risk behaviour behaviour that increases the likelihood of poor health

rotation moving a body part inwards or outwards along its longitudinal axis

saddle joint a joint where the end of ne bone is concave and the end of the other bone is convex

sedentary behaviour low levels of energy expenditure, sitting for long periods of time, not moving around

self-efficacy a person's belief that they can achieve a desired level of performance, and that this will influence/ improve their life

settings geographical areas, or institutions (e.g. school, workplace, community)

social capital a valuable resource resulting from social participation and cooperation in community-based activities

social construction the process of making meaning out of personal experience

stroke occurs when blood supply is lost to parts of the brain, due to blockage or haemorrhage, resulting in death of some brain cells

supination (hand and forearm) rotation of the hand or forearm required to make the palm face up; the radius and ulna do not cross

synovial joint a freely moveable joint, with a joint cavity; a space between articulating bones

systolic blood pressure the pressure of blood in the arteries when the heart beats

tendon connective tissue that attaches muscle to bone

thermoregulation the body's ability to compensate for small upward or downward variations in temperature (e.g. by sweating)

tempo the speed of the beat, in music

transition the bridging point at which a movement, end of a phrase or sequence progresses into the next movement, phrase or sequence

unity the feeling of wholeness in a dance achieved when all of the parts work together

white blood cell colourless blood cell that is part of the immune system, helping to fight infection and disease

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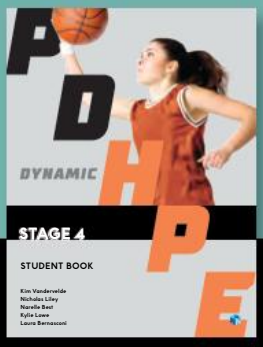

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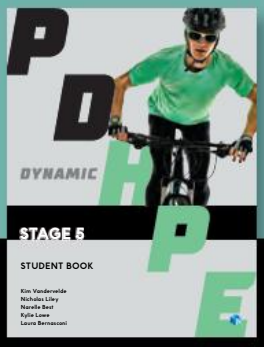

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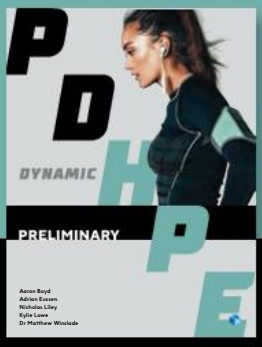

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