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CAMBRIDGE HUMANITIES FOR VICTORIA 7

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About the cover

One of the goals of the Humanities subject in the Victorian Curriculum is to 'appreciate the common humanity shared across time and distance'. Pictured on the cover of this book is Chinese Empress Leizu from 3000 BCE. She is alleged to have discovered the art of producing silk through raising caterpillars and weaving this silk, which was a crucial discovery that helped to connect Asia and Europe through trade via the famous Silk Road. The illustration was created by Melbourne-based artist Ben Sanders.

Please be aware that this publication may contain images of Aboriginal and Torres Strait Islander peoples now deceased. Several variations of Aboriginal and Torres Strait Islander terms and spellings may also appear; no disrespect is intended. Please note that the terms 'Indigenous Australians' and 'Aboriginal and Torres Strait Islander peoples' and 'First Australians' may be used interchangeably in this publication.

Cambridge University Press acknowledges the Australian Aboriginal and Torres Strait Islander peoples of this nation. We acknowledge the traditional custodians of the lands on which our company is located and where we conduct our business. We pay our respects to ancestors and Elders, past and present. Cambridge University Press is committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

Foreword

Dear student,

In the Humanities you study the most complex and strange thing in the entire universe: humans. You study the relationship between humans and their environment (Geography), humans and their societies (Civics and Citizenship), humans and their needs (Economics and Business), and humans and their past (History).

These disciplines are constantly changing, because humans do not stay the same. We change and grow as time goes on so that our relationship with these different areas grows and changes over time too. A study of the humanities will help you understand our world and your place in it.

In Year 7 History you will learn about the ancient world: the very beginnings of civilisation in different parts of the world. Most significantly, you will learn about the ancient past of our own country and the communities of First Australians who carry on this ancient culture today.

In Year 7 Geography you will learn about the role of water in our world and the relationship between water and different communities across the world. You will also look at the idea of 'place' and what influences people to live in different places across the world.

In Year 7 Economics and Business you will learn about making choices and how those choices affect businesses and the economy. In addition to this you will also learn about making smart decisions with your own money.

In Year 7 Civics and Citizenship you will learn about the way Australia is run, and its government and democracy more generally.

We hope that you enjoy learning about the world from its ancient origins to its potential futures.

– Ashley Keith Pratt, series author

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About the authors

Ashley Keith Pratt (*lead author: History*) is a teacher at a Melbourne high school who has worked in Victorian secondary schools for over a decade and has extensive experience teaching history. Ashley completed his postgraduate research in history education at the University of Melbourne and has contributed to curriculum design in Victoria though Victorian Curriculum and Assessment Authority (VCAA) review panels for VCE History. Ashley is Vice-President of the History Teachers' Association of Victoria (HTAV), a contributor to the HTAV journal *Agora*, and a VCAA assessor for VCE history exams.

Adrian De Fanti (*co-lead author: Geography*) has taught Geography and Mathematics at secondary schools for over 10 years. At his current school, he coordinates the Learning Management System and is the Dean of Learning and Innovation. Adrian has a particular interest in integrating technology into the Geography curriculum, including using geographic information systems to analyse spatial data, tracking change over time using satellite imagery, going on virtual field trips using virtual reality and collecting data in the field using spatial technology. Adrian is also an active member of the Geography Teachers Association of Victoria, where he regularly presents professional development sessions and revision lectures and writes a range of classroom resources.

Despina Polatidis (*co-lead author: Geography*) is a Geography and Humanities teacher at her current school. She has worked in Victorian schools for seven years and has experience teaching Geography, Legal Studies and English across Years 7–12. Prior to teaching, Despina practised law in Australia and the United States and was the recipient of the Blake Dawson Waldron Prize for International Environmental Law. She has previous experience as a VCAA assessor for Geography and as a committee member of the GTAV. Despina is passionate about the importance of fieldwork in Geography education and was a recipient of the Alex Lyne Fieldwork Award for Years 9 and 10.

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Yvonne Middlebrook (*lead author: Economics and business; Civics and citizenship*) is a Humanities and Religious Education teacher at her current school. She has worked in Catholic schools for 12 years and has experience teaching Legal Studies, Business, Economics and Media Studies Years 7–12. She has also taught history and geography for middle school. Yvonne has worked in curriculum development and faculty coordination. She has a passion for academic extension and is a school aerobics coach. Prior to teaching, Yvonne worked extensively in law, business banking, and marketing in Australia and Asia.

Dr Michael Adcock (*contributing author: History*) is a History teacher at his current school. He is also a lecturer, author and tour guide, who specialises in the social and cultural history of France. Michael regularly presents illustrated lectures for the History Teachers' Association of Victoria, the National Gallery of Victoria and Modern History Seminars in Sydney. His published works focus on the history of the French revolution, and includes a recent work on the Enlightenment. Michael is the tour leader for Academy Travel in Sydney; he conducts residential study tours in French history in Paris, and in the Russian revolution in St Petersburg and Moscow.

Jennifer Casey (*contributing author: History*) completed her Master of Teaching (Secondary) at the University of Melbourne in 2013, focusing on education in history, and civics and citizenship. Since graduating, Jen has taught VCE History: Revolutions, Australian History, Economics, Legal Studies and a range of Humanities subjects Years 7–10. Jen is a committee member of the Social and Citizenship Education Association of Australia (SCEAA), and an active member of the HTAV. She has published a study guide for HTAV and has contributed to SCEAA's journal, *The Social Educator*. Jen is a VCAA assessor for VCE history revolutions exams.

Brady Driscoll (*contributing author: History*) is the Co-Head of Humanities at her current school. She has worked in Victorian schools for seven years and has experience teaching History, English and English language Years 7–12. She has worked in curriculum development across multiple domains, and is passionate about history education for Years 7 and 8. Brady won a scholarship for the Gandel Holocaust Studies Program for Australian Educators.

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Tisha Eggleston (*contributing author: History*) is Head of History at her current school. She has been teaching for over 18 years in secondary schools in Australia and the United Kingdom. Tisha is an experienced teacher of History, English, Literature and English Language; working with curriculums including the General Certificate of Secondary Education in the UK, the Victorian Curriculum and the International Baccalaureate. She is dedicated to promoting the value of History for all students to foster critical thinking and empathy in our society.

Nick Frigo (*contributing author and digital content advisor*) is Digital Learning Leader at his current school. He has worked across several educational settings for more than 20 years. Nick is passionate about examining and experimenting with digital technology to teach history; his focus is to increase student engagement and maximise pedagogical effectiveness.

About the illustrator

Jean-Michel Girard is an illustrator based in Québec City, Canada, who has 30 years' professional experience working around the world. While Jean-Michel is able to work in a wide variety of styles (from hyperrealism to cartoon), he has specialised in historical illustrations as he is a long-time history aficionado. His attention to historical detail is extraordinary. Jean-Michel uses digital tools but with traditional drawing methods.

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Introduction

Cambridge Humanities for Victoria 7 is the culmination of many months of work by a number of experienced and passionate teachers to provide a fantastic avenue into the study of the Humanities. Living as we are during a time of rapid and dramatic change, this subject has never been more important. This textbook provides exciting insights into how different aspects of the human experience are interconnected, through the study of History, Geography, Economics and Business, and Civics and Citizenship. Understanding these subjects both individually and how they interact provides an essential toolkit to understand and influence the world around us.

An understanding of the Humanities is critical for citizens of this globalised twenty-first century. The chapters contained in this text will help teachers and students alike investigate important questions using up-to-date teaching theory and pedagogy. The authors of this textbook are sharing not just their expertise in their subject area but also their wealth of experience in teaching over many years to make the most engaging content and effective activities. What sets this text apart is the way which Visible Thinking routines have been used to help engage students and develop their understanding and insight into the Humanities, as well as providing them with opportunities to reflect critically on human experience both past and present.

Given that in today's world there is an overwhelming amount of content readily available, the skill to analyse this content is particularly crucial. Cambridge's Humanities series will help develop and expand critical-thinking skills.

While the print version of this text contains rich chapters, so too does the additional digital content. The Interactive Textbook version of this text is optimised to support and extend the learning experience. This includes providing additional content, multimedia resources and interactive activities to engage and deepen the understanding and absorption of the content. I'm sure you will share my joy in exploring both the print and digital content of this text.

– Nick Frigo, series author

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How to use this resource

Book structure

- All chapters have been closely aligned to the Victorian Curriculum for Humanities for Year 7
- This book contains four sections, with each section covering one of the four topic areas: History, Geography, Economics and Business, and Civics and Citizenship
- Every chapter starts with an engaging 'Setting the scene' story to help you jump into a new topic, and includes an activity that can be used to spark classroom discussion
- Each chapter has a Chapter overview which lists Learning goals for the chapter
- Each chapter is divided into numbered sections, and each of these sections cover a content descriptor from the Victorian Curriculum
- Each chapter section starts with Focus questions to drive your inquiries into the Humanities
- In all chapters QR codes are included for easy access to related videos
- At the end of each section are End-of-section Review questions and at the end of each chapter are End-of-Chapter Activity questions.

Activity types

This series uses a range of activity types including the following:

- Developing concepts and skills (activities that scaffold important concepts and skills from the Victorian Curriculum)
- Making Thinking Visible activities based upon Harvard's Project Zero's innovative Visible Thinking Routines (a guide to using these activities is available for teachers in the Online Teaching Suite)
- End-of-section Reviews (questions in both print and digital formats)
- Multiple other activity types, particularly in End-of-chapter activities, that vary from analysing historical visual sources to graph interpretation and map-reading
- Activities cover a range of different learning types and levels (a Glossary of activity verbs used in this series is available for teachers in the Online Teaching Suite).

Digital resources

This series uses the interactive Edjin platform, and includes both a student and a teacher edition.

In the Interactive Textbook version of this book students will find the following key resources:

- Self-assessment checklists (aligned to each chapter's Learning goals, for students to rate their progress)
- Interactive Chapter quizzes and Scorcher quizzes (timed, competitive and fun tests of knowledge)
- Google Earth tours of key locations in each chapter (to provide dynamic geographic context)
- Videos, image galleries and other multimedia materials such as interactive maps
- Additional PDF chapter on the COVID-19 pandemic of 2020
- A Victorian Curriculum Capability Project and downloadable assessment rubric (a research-based task; further information is available for teachers in the Online Teaching Suite)
- Downloadable worksheets for all activities
- Suggested solutions to all activities (enabled by teacher)
- A PDF downloadable version of the student textbook.

In the Online Teaching Suite, teachers will find:

- Guidance on using the digital versions of the book
- Teaching programs and teaching tips
- Curriculum grids for each topic area
- Additional activity worksheets.

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History

What is History?

Have you ever wished that you could build a time machine and explore the glory of ancient Greece or the grandeur of ancient Rome? Well, in history, you can explore these ancient civilisations!

History is the study of the past. We study the past so we can better understand the present and today's issues. History can answer questions like: Where do our customs come from? Why do people acknowledge, and pay respect, to the Traditional Owners and ongoing custodians of the land – the Aboriginal and Torres Strait Islander people – before a public speech? How did our ideas of government and democracy come about?

Events in the past may not be as simple as they seem. This is because events can be understood from different perspectives. In fact, people often argue about what an event means. New discoveries are made all the time and can change what we know about the past. We will never know the 'truth' about what happened but each new finding helps us get a better understanding.

The skills and knowledge that you gain in history will give you a new understanding of the world. You will learn how to find and understand historical sources. You will learn to think creatively and critically about information that you study. And you will come to your own conclusions about historical issues based on the evidence available.

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Introducing historical concepts and skills: *Using historical sources as evidence*

A good detective is always looking for clues and historians do the same thing!

An historian's favourite kind of clue is a *primary source*. Sometimes these primary sources are **artefacts** (something you can touch like a vase), sometimes they are documents (like a letter), and sometimes they are stories that have been handed down and told from generation to generation. The one thing that primary sources all have in common is that they were created at the time of the event or person you are studying. Primary sources help us to understand different perspectives and sometimes even the reasons why people acted the way they did.

Secondary sources are also very useful to an historian. Secondary sources are things that were created after the event to help us to understand it, like a textbook, a book or a webpage. These sources help give us the opinions of other experts who have studied the same topic and what they think about events or peoples from that time.

KEY TERM

artefact an object that is made by a person, such as a tool or a decoration; it is usually of historical interest

People often have very different views of the same events, so primary and secondary sources are useful tools to help us form our own opinions. When we explain what we think happened in the past we need to use primary and secondary sources to support our argument.

◄ **Source A**
The Phaistos disc is a great example of primary evidence. This terracotta disc was originally from the Minoan palace of Phaistos on the Greek island of Crete. It dates to around the middle or late Minoan Bronze Age (2 BCE). The spiral stamping, which is on both sides, gives us information about the Minoan civilisation at this time.

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Unit 1

Aboriginal and Torres Strait Islander peoples and cultures

Overview

Aboriginal and Torres Strait Islander peoples have the longest continuing cultures on Earth, having existed on and being connected to the Australian continent for over 65 000 years. We are privileged to live in a country with such an interesting and long history. Our knowledge and understanding of this history is important because it helps us become informed Australian citizens.

Video
Unit overview

This unit explores the history of ancient Australia and the people who lived at that time. It examines the relationship between Aboriginal and Torres Strait Islander peoples and the land, as well as the beliefs and practices of different cultural groups. The unit also explores the different types of sources that exist and the importance of protecting what remains of this past. As you investigate this topic, think about the special links to the land that different Aboriginal and Torres Strait Islander communities have because of their ancient history.

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Learning goals

After completing this unit, you should be able to answer these questions:

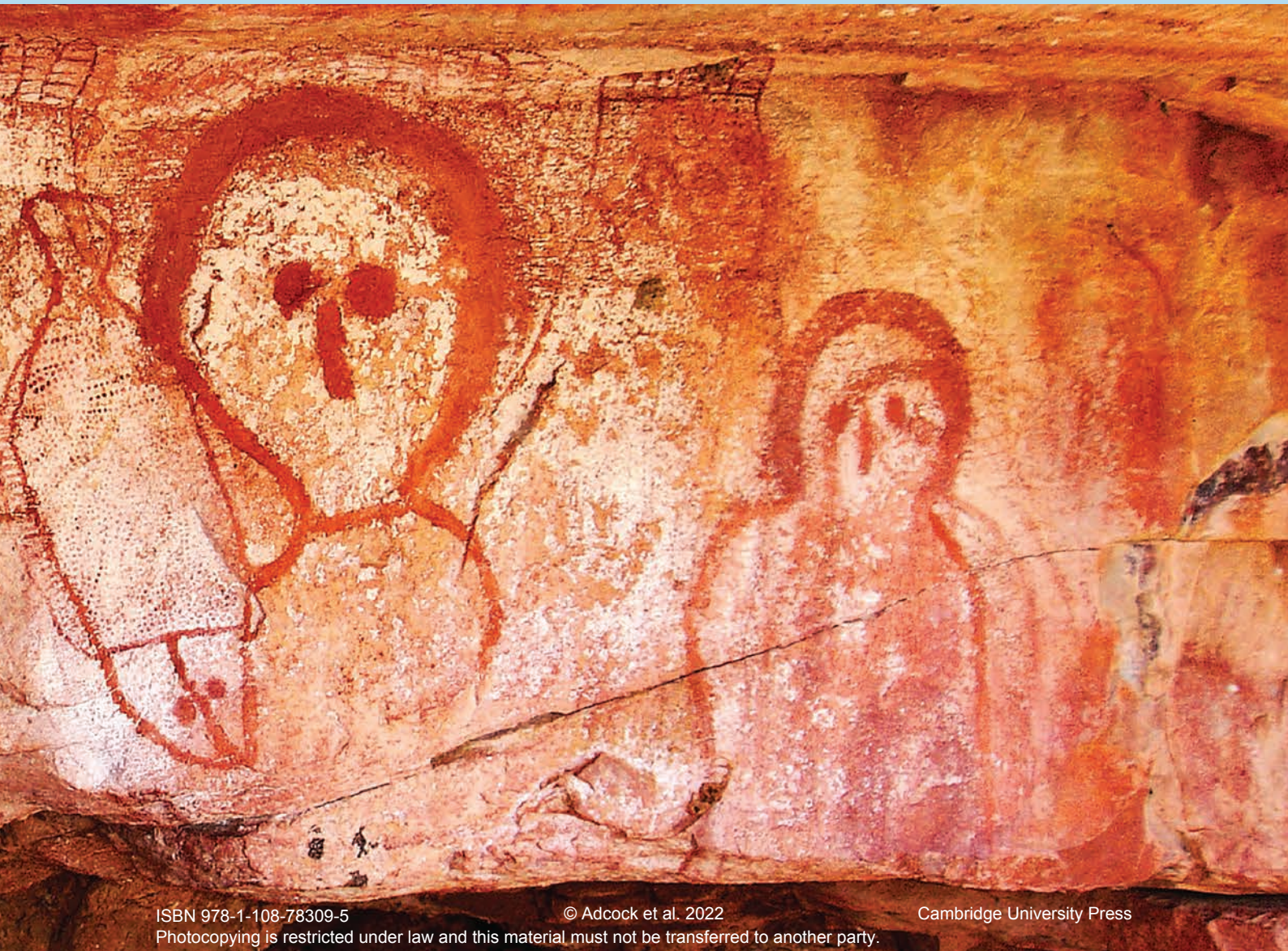
- How do we know about the ancient past?
- Why and where did the earliest societies develop?
- What emerged as the defining characteristics of ancient societies?
- What key beliefs and values emerged, and how did they influence societies?
- Which significant people, groups and ideas from this period have influenced the world today?

Introducing historical concepts and skills: *Sequencing chronology*

This unit will have a special focus on the concept of **sequencing chronology**, which means putting events into the order that they happened. As you read, you will develop your ability to arrange events in order. This will help you see patterns and links between events. In history, we can sequence chronology over large timespans, such as 60 000 years, and over smaller timespans, like 5–10 years.

Without a clear chronology, it is easy to get confused about what is happening, and how events and people are connected to each other. Look for opportunities to build your understanding of how to sequence chronology in this unit, because the skill is one you need to study history.

▼ **Source B** An example of an Aboriginal rock painting from the Kimberley region of Western Australia. Rock paintings like these are some of the oldest forms of artwork anywhere in the world. Some historians estimate the rock art in this region to be between 50 000 and 60 000 years old.



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CHAPTER 1

Aboriginal and Torres Strait Islander peoples should be aware that this chapter contains images and names of people who have, or may have, passed away.

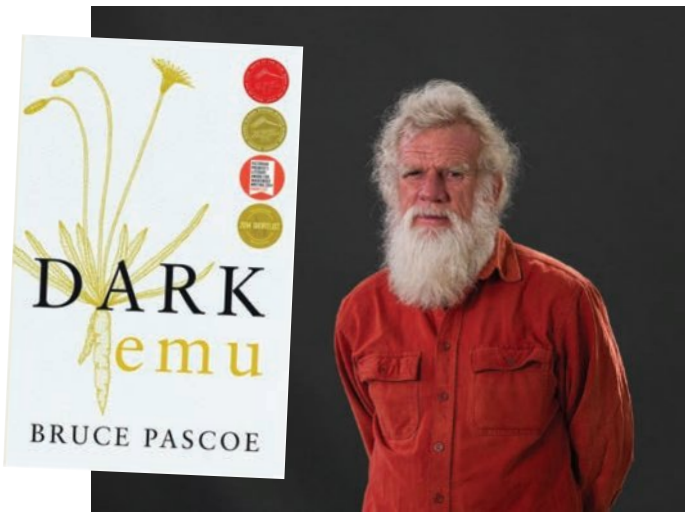
Aboriginal and Torres Strait Islander peoples and cultures

Setting the scene: the earliest examples of baked bread

Did you know that some of the earliest human achievements are found in Australia? For example, the ability to harvest and grind grains for baking was first developed by ancient societies in Australia.

Over 30 000 years ago, Aboriginal and Torres Strait Islander peoples were baking bread in Australia. They developed this skill alongside their ability to harvest seeds and grains. Historian Bruce Pascoe says this makes them the world's oldest bakers – they were baking 15 000 years before the next-known bakers, the ancient Egyptians.

How do we know this? One way is through the research of historians like Pascoe. Pascoe has written a lot about ancient Aboriginal and Torres Strait Islander peoples and how they developed farming practices around Australia. These practices enabled them to settle in specific regions, and rely less on hunting and foraging. They were able to manage the land to create food for their communities.



▲ **Source 1.1** Historian Bruce Pascoe and his book, *Dark Emu*, 2014 which explains the long history of agricultural practices by Aboriginal peoples in Australia

Historians give us explanations about the past, but they need to use evidence to back their theories. For example, in the case of Aboriginal and Torres Strait Islander peoples being the earliest civilisation to manage the land, Pascoe uses the existence of artefacts, such as grindstones, as evidence.

▲ **Source 1.2** This is a drawing of an existing grindstone is approximately 30 000 years old. It was used for grinding up plants and seeds into a paste so that it could be baked into bread.

Helen Wheeler from the Australian Museum tells us that grindstones:

> can be used for grinding seed into flour for bread making … This grinding stone and top stone shown here [see Source 1.2] were used by Indigenous women in New South Wales to grind seeds from grasses, trees, shrubs, succulents and ferns to release the starch for cooking purposes. The flour produced was mixed with water and eaten as a paste, or cooked in the coals of a camp fire and eaten as cakes or loaves. The stone is indicative of grinding stones used in the region for thousands of years.

▲ **Source 1.3** Helen Wheeler from the Australian Museum speaks about grinding stones and the bread making of ancient Aboriginal peoples

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Stan Florek, also from the Australian Museum, explains what the bread might have looked like and where the grains for flour came from:

> The First Australians were iconic hunters … Yet, they spent a good part of their time baking bread. Sure, this was bush bread, resembling damper in method and pita or Egyptian bread in its form…
>
> In central Australia … native millet … and spinifex … were commonly used, supplemented by wattle-seed. Elsewhere pigwig …, prickly wattle …, mulga …, dead finish seed … and bush bean … were mixed into flour.

▲ **Source 1.4** Stan Florek from the Australian Museum gives detailed information about what ancient Aboriginal peoples used for flour on the Australian Museum website

Another type of evidence that can be used to show that Aboriginal and Torres Strait Islander peoples were the world's earliest bakers is oral history. They relied on **oral history** to pass down information from one generation to the next. Pascoe has noted that there are stories and songs about baking from different parts of Australia.

Today, the Gurandgi Munjie group focuses on ancient Australian farming and baking.

Gurandgi Munjie works to revitalise native crops, which were once grown by ancient Aboriginal peoples. The group bakes breads with the flours they extract from their crops. In recent years, Gurandgi Munjie have tested growing native millet, kangaroo grass and *murrnong* (yam daisy). The group hopes to increase their harvests and begin selling so that they can earn a living and people can learn more about a natural, Australian diet.

KEY TERM

oral history information about historical events or periods that is passed from one generation to the next through spoken word, song or dance

▲ **Source 1.5** Bush damper being cooked in the Australian outback. Damper, which is also referred to as bush bread or seedcake, is a European term for the bread that has been made by Aboriginal peoples for thousands of years. This bread is made by crushing an assortment of native seeds into a dough (using grindstones, like the example in Source 1.2), sometimes with nuts and roots added, and cooked over coals.

MAKING THINKING VISIBLE 1.1

I used to think … but now I think …

Reflect on what you have just read about Aboriginal and Torres Strait Islander peoples. Finish off the following two sentences stems:

1 *I used to think…*
2 *But now I think…*

NOTE: Throughout this chapter Aboriginal peoples and Torres Strait Islander peoples may be referenced as First Australians, Aboriginal Australians or Indigenous especially within sources where we cannot change the wording. The appropriate referencing of Aboriginal and Torres Strait Islander peoples is used wherever possible, unless attributes specific to one group of peoples are being described.

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Chapter overview

Introduction

Aboriginal and Torres Strait Islander peoples have the longest continuing cultures in the world. There is archaeological evidence of human occupation of the Torres Strait dating back 2500 years. There is also evidence that Aboriginal and Torres Strait Islander peoples have lived on this continent for at least 65 000 years. Some historians think it is much longer than that.

This chapter explores the history of ancient Australia and the ancient societies that lived there, as well as the links to Aboriginal and Torres Strait Islander societies that live in Australia today. It examines the relationship between Aboriginal and Torres Strait Islander peoples and their land, beliefs, values and practices. The chapter also looks at different types of historical sources available for us to examine today, such as oral histories and archaeological evidence. The importance of protecting what remains of the ancient past is also explored.

As you investigate this topic, think about the relationship Aboriginal and Torres Strait Islander peoples have to the land. They have lived on and been connected to the land of Australia for tens, possibly hundreds, of thousands of years.

Learning goals

After completing this chapter, you should be able to answer these questions:

- How do we know about the ancient Australian past?
- Why and where did Aboriginal and Torres Strait Islander societies develop?
- What emerged as the defining characteristics of ancient Australia?
- What key beliefs and values emerged, and how did they influence Aboriginal and Torres Strait Islander peoples?
- Which significant people, groups and ideas from ancient Australia have influenced the world today?

Historical skills

After completing this chapter, you should be able to:

- Explain what **chronology** means in the study of history
- Understand the role of historians and archaeologists in uncovering the past
- Develop historical empathy with people in the past
- Interpret primary sources in both print and visual form
- Correctly use special terms specific to the topic under study
- Use evidence (such as dates, statistics and examples) to support an argument.

► **Source 1.6** This Aboriginal rock art is from a cave in the Northern Territory. Often the artworks were painted with rich, ochre colours. They give us a glimpse into the world of ancient Australia.

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Timeline of key events

What came before this topic?

- **Creation** According to the histories of the Kulin Nation, who live in the area of Port Philip Bay, the great eagle spirit, Bunjil, created the mountains, rivers, flora, fauna and laws for humans to live by.
- **140–70 million years ago** Dinosaurs roamed Earth
- **130 000 BCE** Homo sapiens emerged in Africa

Contemporary sculpture of Bunjil in Melbourne

Remains of Lake Mungo

65 000 BCE

Earliest archaeological evidence of Aboriginal and Torres Strait Islander peoples dates from this time; the artefacts are from Mudjedbebe in the Northern Territory

50 000–25 000 BCE

Evidence of megafauna living in Australia

40 000 BCE

The famous Mungo Lady and Mungo Man lived at this time

20 000 BCE

Peak of the Ice Age; the climate was dry and there was little rain, which made the deserts of Australia much larger

11 000 BCE

Tasmania is cut off from mainland Australia by rising sea levels

Representation of megafauna

Timeline activities

1 Look at the timeline to work out how old Aboriginal and Torres Strait Islander societies are. Do some quick research online to compare this age to the ancient societies of Egypt, China and Greece.

2 Research and describe what the megafauna were that lived in Australia over 25 000 years ago.

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What came after this topic?

- **1788 CE** Invasion and colonisation of Australia by the British Empire

The First Fleet was under the command of Captain Arthur Phillip and brought 750 British convicts to Botany Bay, where they established the first European settlement in Australia

Painting showing Lieutenant James Cook claiming the land for the British Empire

7500 BCE

Sea levels rise 100 metres; the flatlands north of the Kimberley region are flooded

3000 BCE

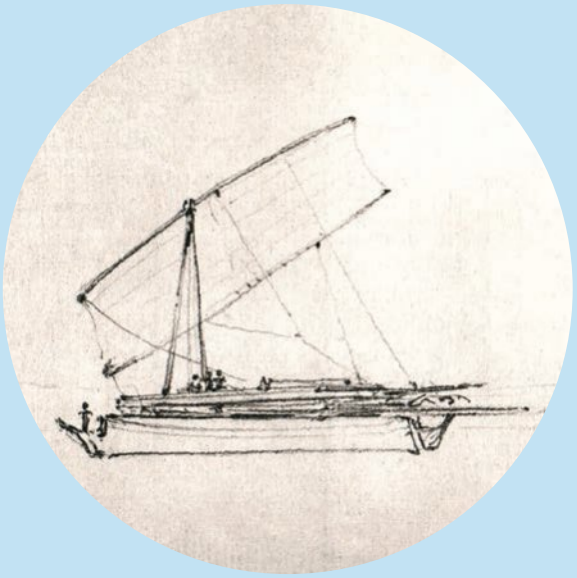
The great flood ends; a quarter of what was the previous continent is now underwater

1500 BCE

There is evidence of trade between Aboriginal and Torres Strait Islander peoples and the Makassan communities of Indonesia

1770 CE

Lieutenant James Cook arrives in Australia, claiming the land for the British Empire



Fishermen from what is now modern-day Indonesia sailed in small sailing boats to the northern coast of Australia to trade

BCE stands for 'Before the Common Era' (sometimes, 'Before the Current Era'), while CE stands for 'Common Era' (sometimes, 'Current Era'). There is also a calendar known as the 'Gregorian calendar' that uses the term BC instead of BCE and AD instead of CE. BC stands for 'Before Christ' and AD stands for 'Anno Domini', which is Latin for 'the year of our lord' (meaning from the time Jesus was born).

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1.1 Important geographical features to Aboriginal and Torres Strait Islander Peoples

FOCUS QUESTIONS

- How did geography influence the development of Aboriginal and Torres Strait Islander peoples?
- How did Aboriginal and Torres Strait Islander peoples use and manage the land?

Migration to Sahul

The geography of the world influenced where the first modern humans settled. The **climate** and shape of the land impacted on where humans migrated and how their cultures developed. These factors also influenced how they lived, the beliefs they had and their relationship with the land.

KEY TERMS

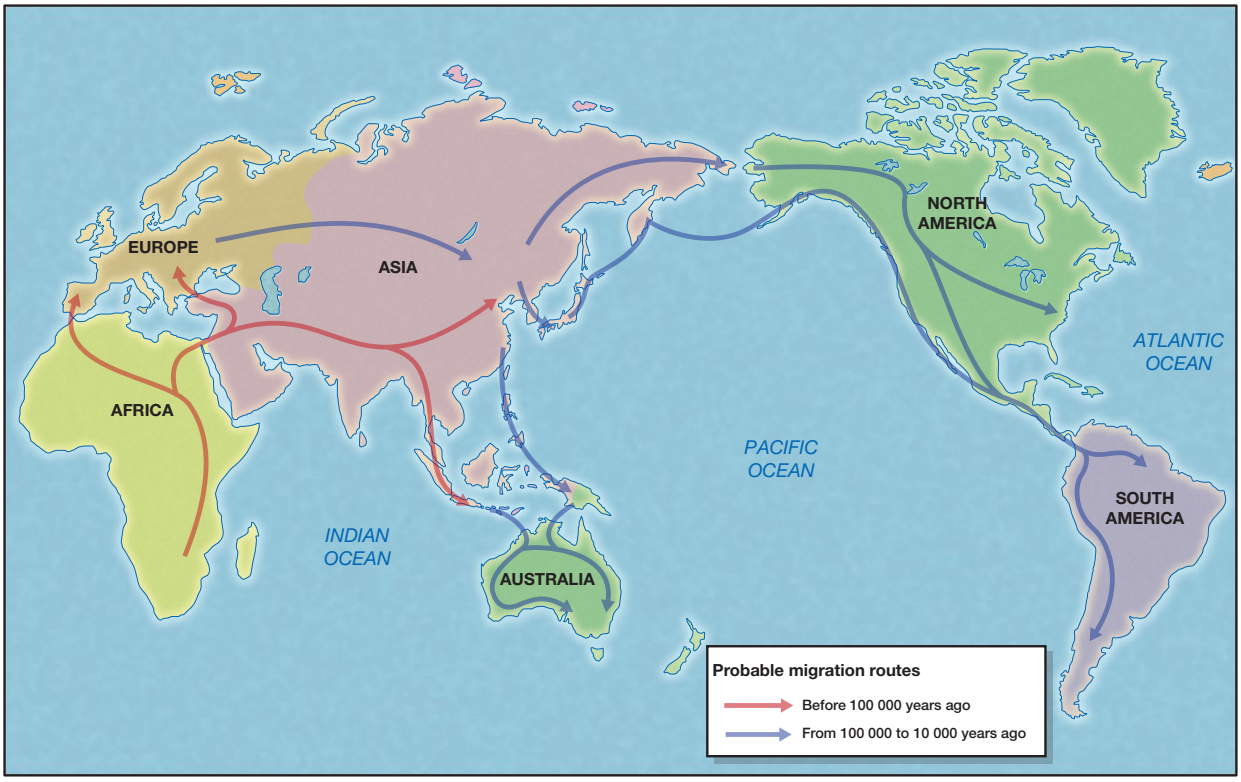
climate the general weather conditions usually found in a specific place

Sahul a continent during the Ice Age that contained the islands of Australia, New Guinea and Tasmania

The last Ice Age began about 115 000 years ago. During this time, land was gradually exposed so that the first humans could migrate to other areas by walking. The Ice Age ended about 11 700 years ago when sea levels rose because of the melting ice caps. This made the gaps between lands become larger and some groups were cut off from other groups entirely. For most of the Ice Age, mainland Australia and Tasmania were joined to the island of New Guinea to form a landmass called **Sahul**. Sahul separated when the sea levels rose about 10 000 years ago.

Since Tasmania was connected to the Australian mainland during the Ice Age, Bass Strait did not exist. Instead, the area was a plain populated by Aboriginal communities. These groups moved back and forth between what we now call Victoria and Tasmania.

▼ **Source 1.7** The migration routes of early humans



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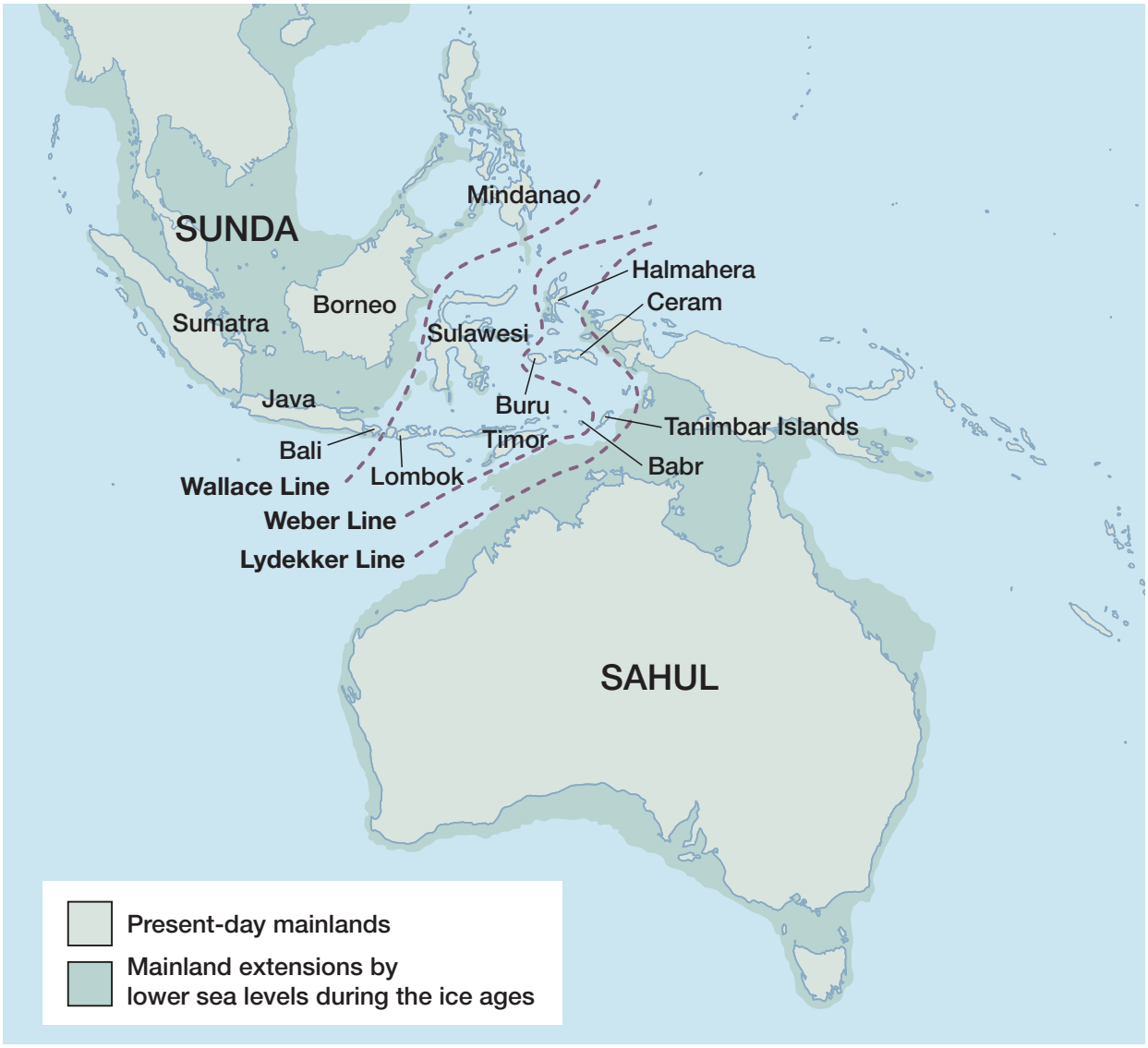

▲ **Source 1.8** Australia's landform 20 000 years ago. There were bridges of land connecting some of the islands of Indonesia to South-East Asia (Sunda). There were also bridges of land connecting New Guinea, mainland Australia and Tasmania (Sahul).

We know through scientific evidence that the first humans arrived in Tasmania about 40 000 years ago. We also know that sea levels rose to form Bass Strait approximately 12 000 years ago, which is also when Tasmania was cut off from the rest of Australia.

Geographical change over time

Sahul's changing climate and physical barriers impacted on the movement of humans. The climate and geography of Sahul also had a significant impact on how Aboriginal and Torres Strait Islander civilisation developed in different areas.

Land bridges (65 000 BCE)

Before the rise of sea levels, some present-day islands were joined by **land bridges**.

For example, Sahul had two land bridges that connected mainland Australia to New Guinea and Tasmania. Humans migrated to Sahul by first crossing what is now western Indonesia. They did this via a peninsula called Sunda, which extended from what is today known as South-East Asia. The humans then island hopped across the sea to Sahul.

We do not know whether Aboriginal and Torres Strait Islander peoples used rafts, canoes or other craft to cross the seas from island to island. The widest crossing is estimated to have been nearly 90 kilometres. We also do not know what kind of seafaring skills they had.

KEY TERM

land bridge a connection between two land masses that allowed humans and animals to cross to new areas

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KEY TERMS

radiocarbon dating a method of calculating the age of extremely old objects by measuring the amount of a particular type of carbon in them

luminescence dating a method of determining how long ago mineral grains were last exposed to sunlight or heating

megafauna large animals over 40 kilograms such as the elephant, rhinoceros and extinct diprotodon

It is possible that some of their voyages were accidental. For example, their rafts could have been blown across to other land areas by storms.

However, we have evidence of the land bridges through sampling and examining the seabed. We also know there were sea gaps between Sunda and Sahul because the remains of the animals that once lived on these lands are quite different. Some animal remains, such as dingoes and rats, were on both Sunda and Sahul, but these animals were probably brought by humans either deliberately or accidentally.

The oldest evidence we have found of human beings reaching Sahul is more than 65 000 years old. Some historians however argue that Aboriginal and Torres Strait Islander peoples arrived before this. The evidence was found in northern Arnhem Land at the Madjedbebe rock shelter in Mirrarr Country. More than 10 000 artefacts were discovered there, including stone tools and bone fragments.

To determine the age of the artefacts at Madjedbebe rock shelter, archaeologists used a combination of **radiocarbon dating** and **luminescence dating**.

Megafauna (50 000 BCE)

Aboriginal and Torres Strait Islander peoples lived alongside **megafauna**, which were very large animals that roamed the land for more than 20 000 years. In other parts of the world, the megafauna were hunted to extinction as humans spread to different continents. Historians consider it to be remarkable that humans and megafauna lived side by side in Australia for so long.

▼ **Source 1.9** This is an Illustration and photo-reconstruction of the Australian goose-like non-flying bird Genyornis newtoni. It was a large, flightless bird that lived in Sahul and over two metres in height. Genyornis newtoni became extinct 30 000 thousand years ago. Many other species also became extinct around the time that humans arrived. Same Aboriginal cave paintings seem to represent this species.

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▲ **Source 1.10** This photo was taken at the Australian Museum. It shows a reconstructed model of a *Diprotodon optatum*, which was an ancient rhino-sized mega-wombat. Its jawbone alone is 70 centimetres long.

The Ice Age (20 000 BCE–11 700 BCE)

During the Ice Age, the climate gradually became cooler. This resulted in the extinction of many megafauna, which could not adapt to the changing conditions. The lower temperatures made it difficult for plants and animals to grow, so food was less widely available. As food became scarce over thousands of years, animals became smaller.

Researchers have discovered that when the climate cooled dramatically, the populations of Aboriginal and Torres Strait Islander peoples reduced. They also sought sanctuary in well-watered areas such as along rivers.

The majority of Sahul was **uninhabitable** during the Ice Age. Many forests disappeared and a lot of areas transformed into arid deserts

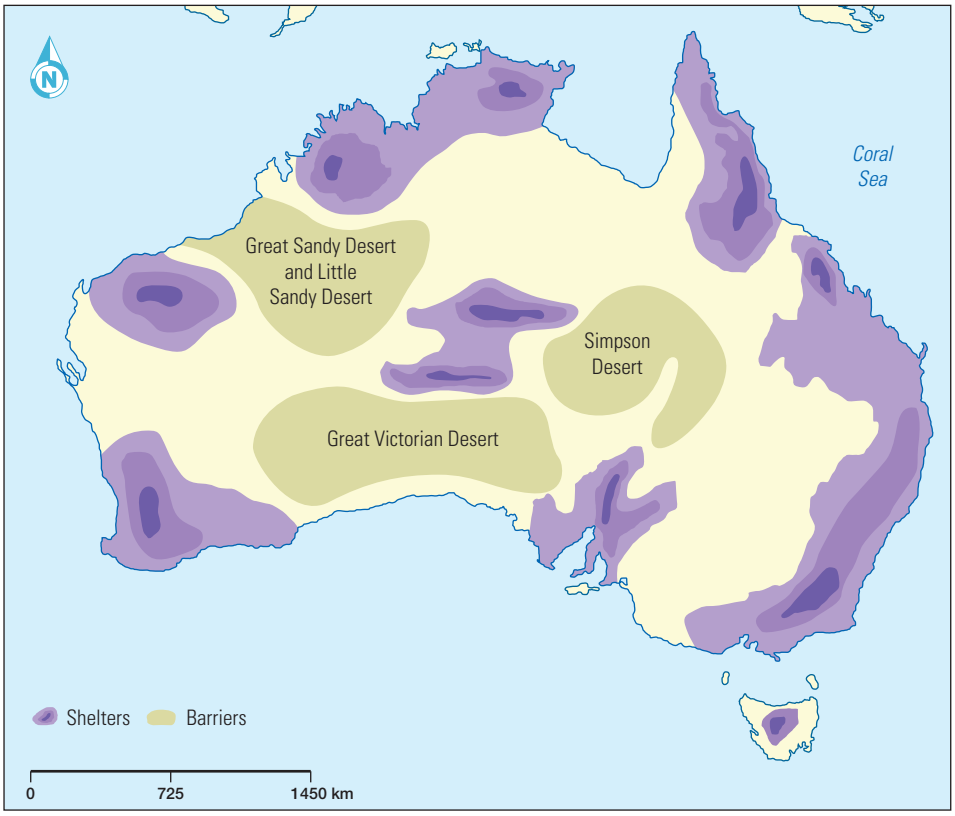
KEY TERM
uninhabitable areas not suitable to live in

The great flood (11 000–3000 BCE)

Following the Ice Age, sea levels rose to cover one quarter of Sahul's land mass. The Torres Strait was transformed into a series of islands, New Guinea became a distant land and Tasmania was cut off from the rest of Australia.

Although referred to the 'great flood', it wasn't a sudden flood like Australia sometimes experiences today; the sea-level rise was only 1–2.5 centimetres per year. Nevertheless, in low-lying, flat areas, this increase in water could mean strips of land hundreds of metres wide were covered in just one year. So, in a single lifetime, Aboriginal and Torres Strait Islander peoples could have experienced significant land loss. When stories are passed down and woven together, a 'great flood' becomes an appropriate term to describe what happened.

You can learn more about Australian megafuna on the Australian Museum website.



◄ **Source 1.11** This map estimates the areas in which Aboriginal and Torres Strait Islander groups congregated during the last Ice Age

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Social change over time

The rising of sea levels at the end of the last glacial period (11 700 BCE) had a significant effect on Aboriginal and Torres Strait Islander peoples. Historian Scott Cane says:

> In the Whitsunday Islands … the distance became too great, with the mainland over 30 kilometres away … the people were left to cope on their own [and] they did so by becoming specialised marine **foragers**. They developed their own artistic traditions and a distinct social and **linguistic** identity. They invented new tools to suit their particular **subsistence** needs: fishhooks from shellfish and turtle shell, spear points from bone and wood, as well as nets and shell-scraping tools.

▲ **Source 1.12** Scott Cane, *First Footprints: The Epic Story of the First Australians*, 2013, p. 197

KEY TERMS

forager a person or animal that goes from place to place in search of things that they can eat or use

linguistic related to language or the study of language

subsistence the state of existing by having just enough resources like food and water to stay alive

encroaching to take control or possession of something in a gradual way and often without being noticed

Some groups had to move further inland when the seas rose. People who were living on hills soon found themselves living on islands. Others ran into trouble when they had to move from the rising waters. There was likely conflict when people moved because settled groups would have felt like newcomers were **encroaching** on their territory.

The changes to where people went and lived would have occurred over a few generations. Some groups who were previously connected became isolated. For example, Tasmania was connected by a land bridge to the Australian mainland but this changed after the great flood. After Bass Strait was formed, the Aboriginal and Torres Strait Islander peoples living in Tasmania were separated from the rest of the mainland. As groups were parted, their understanding of the world changed over the generations.

As Aboriginal and Torres Strait Islander peoples changed locations, different languages developed and grew. We can imagine that if we had always lived in the desert and relocated near to the coast, we would need new words for things like 'beach', 'sand' and 'sea'.

DEVELOPING HISTORICAL CONCEPTS AND SKILLS 1.1

Sequencing chronology

A key skill all historians need to have is how to put events in the order they happened. When you do this, it is easier for you to see patterns and detect how things have changed over time.

1. Create your own timeline by using what you have read so far and the information from the timeline at the start of this chapter. Make sure that you outline the key phases that Sahul went through tens of thousands of years ago. Also make sure your timeline has the following for each phase:
   - Different time periods
   - The rough dates of the time period
   - The key characteristics of the time period
   - The impact on Aboriginal and Torres Strait Islander peoples living on the continent at that time.
2. Use the timeline you have created to write a short paragraph that explains the phases that the Sahul continent went through.
3. Describe the impact that these changes may have had on Aboriginal and Torres Strait Islander peoples living during those times.

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Managing the land

We can imagine that some of the practices we know about from the traditions of Aboriginal and Torres Strait Islander peoples today are similar to those of ancient Aboriginal and Torres Strait Islander peoples. We also have historical sources, such as archaeological evidence and oral stories, that tell us about ancient Aboriginal and Torres Strait Islander societies and how they lived.

We know that Aboriginal and Torres Strait Islander peoples managed and used the Australian landscape in a variety of ways. For example, they used water, fire and astronomy to make the most out of the environments they lived in.

▲ **Source 1.13** This illustration depicts shows a rock well with a stone cover at Mt Kooyoora (you can search online to see photos of stone wells in this area). Rock wells in Bull Gully catch and hold up to 168 litres of rainwater. These 'tanks' have never been known to dry up completely.

Water

Aboriginal and Torres Strait Islander communities, particularly Aboriginal peoples, often stored rainwater, sometimes in large shallow rock wells. Since animals also seek fresh water, these precious water reserves needed to be carefully protected from animal pollution and contamination.

The Dja Dja Wurrung people of the Kooyoora live about 220 kilometres north-west of Melbourne. Their ancestors depended on natural springs and wells for their water because the area lacks permanent streams and rivers. At Kooyoora, some of the water sources were covered with stone slabs to prevent evaporation and dirt falling in.

The **aquaculture** system at Budj Bim in south-west Victoria is an extraordinary example of how some Aboriginal and Torres Strait Islander peoples used water to manage the landscape. This eel-farming system is so remarkable that the area was added to the **World Heritage List** in 2019 because of its **cultural significance**. It is estimated to be 6000 years old.

The eel farm was created by generations of Gunditjmara people at Budj Bim. The area has a permanent supply of fresh water. Over many hundreds of years, the Gunditjmara people engineered a complex structure of **weirs**, channels and ponds so that they could farm eels. To harvest the mature eels they raised, they placed woven baskets in the channels and ponds to catch the fish.

KEY TERMS

aquaculture the cultivation of fish, shellfish, algae and other organisms in a water environment

World Heritage List UNESCO list of places that have cultural significance and so should be protected

cultural significance something that has visual, historic, social or spiritual value for a culture

weir a wall built under the water across a river so that the water level is raised and flows in a controlled way

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▲ **Source 1.14** The weir, channels and ponds at Budj Bim are 6000 years old. The aquaculture system was created by a group of Aboriginal and or Torres Strait Islander peoples to farm and catch eels.

Historical evidence shows that the Gunditjmara people smoked the eels. They did this in special hollowed-out trees. Heat from a fire was set underneath a hanging eel to evaporate water and preserve the eel for trade or storage. The Gunditjmara people also used dehydration to preserve the fish. Preserving eels allowed the Gunditjmara people to store the food for times when food was scarce. It also enabled them to trade any extra food with surrounding communities.

The Gunditjmara people's aquaculture system provided them with enough food to sustain their local village for the entire year. This suggests that these ancient people were a settled community. Further evidence of this at Budj Bim are the remains of constructed stone huts.

Fire

Many Aboriginal peoples used fire-stick farming to manage the landscape. This land-management technique is still in use today. Fire-stick farming involves burning the landscape in a controlled way to regenerate the land. It is a traditional practice of many Aboriginal peoples.

Historian Bill Gammage has explained in his book *The Biggest Estate on Earth* that using fire like this made resources 'abundant, convenient and predictable' for Aboriginal Australians (p. 3).

Aboriginal peoples called the fires that they deliberately lit 'cool fires'. Cool fires burned slowly and could be easily put out.

They were used because they:

- Reduced thick and prickly vegetation so that different areas were accessible
- Encouraged new growth by clearing away the undergrowth
- Created new plant growth that attracted animals for hunting
- Promoted the growth of specific plants used for cooking, warmth or spiritual reasons.

Many historians describe how fire was used by Aboriginal peoples to catch animals. For example, Gammage describes how the Mudgeegonga people in north-east Victoria would use fire to scare wallabies into a narrow gully where they could be easily ambushed. This strategy was repeated in many different areas around Australia.

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Aboriginal peoples also used fire to lessen the amount of 'fuel' in the native environment. Reducing the amount of plants and wood in an area helped prevent large bushfires occurring. This is one of the reasons why the large bushfires we see today in Australia were not as common for Aboriginal and Torres Strait Islander peoples in ancient times.

In addition to using fire to manage the landscape and create food sources, Aboriginal and Torres Strait Islander peoples used fire for cooking and warmth, as well as in spiritual ceremonies.

DEVELOPING HISTORICAL CONCEPTS AND SKILLS 1.2

Using historical sources as evidence

Joseph Lycett, who was born in England in 1774, was an artist who specialised in painting landscapes. Lycett was transported to Australia as a convict and arrived in Sydney in 1814. After he was pardoned, he painted several famous scenes showing the cultural activities of Aboriginal peoples.

Examine the source below and then answer the questions that follow.

▲ **Source 1.15** This watercolour painting is by Joseph Lycett (c. 1817 BCE). It is titled *Aborigines using fire to hunt kangaroos.*

Responding to the source

1. Who was the artist who painted Source 1.15? How might the answer to this question affect the way the events were painted?
2. Using the information you have read and the painting, explain how Aboriginal and Torres Strait Islander peoples used fire to help them hunt animals for food. Be sure to refer to specific parts of the painting in your answer.

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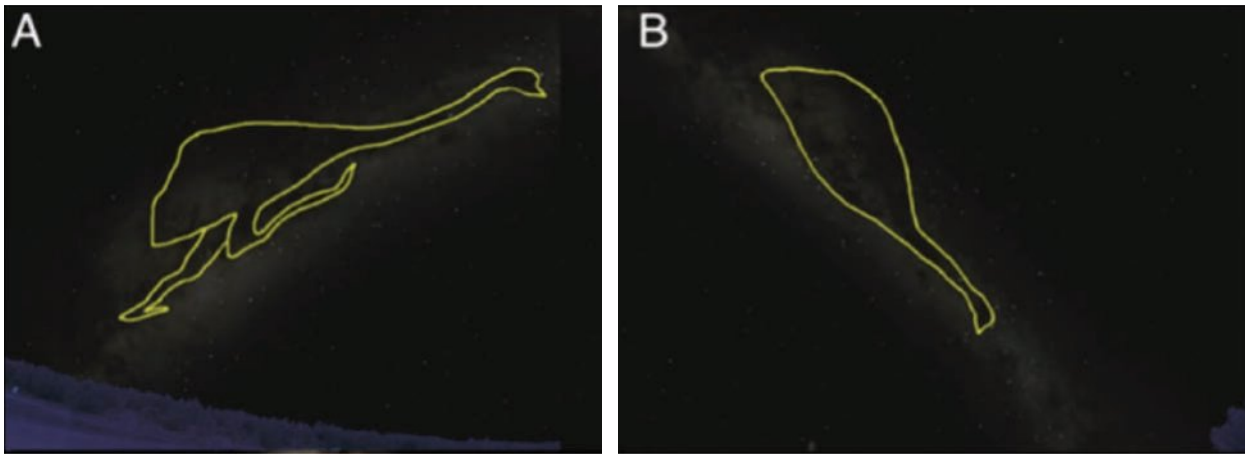
Astronomy

Ancient Aboriginal and Torres Strait Islander peoples also made use of the stars to help organise their lives and communities. They were the world's first astronomers. They used the stars to create complex seasonal calendars, which included details on the position of the stars and constellations. They linked the position of celestial bodies with changing weather patterns, animal behaviour and plant growth. They refined this knowledge and understanding over tens of thousands of years to become experts in seasonal changes.

The position of constellations and stars change in a predictable pattern. This is how Aboriginal and Torres Strait Islander peoples were able to establish connections between the positions of the stars and different times of the year. For example, ancient Aboriginal and Torres Strait Islander peoples across the country linked the Pleiades star cluster with whale migrations along the east coast. When the Pleiades constellation appeared in the night sky in early June, it marked the beginning of winter and the migration of whales up the coast. As the cluster began to disappear below the horizon in October and November, it marked when the whales migrated back down the coast to their feeding grounds near Antarctica. In other parts of Australia, this same cluster of stars is linked to other natural events that coincided with the beginning and end of winter.

Another famous example of using the stars to mark seasonal change is the 'celestial emu'. When this constellation first appears in the sky in late April, it marks the beginning of the Emu breeding season. When the constellation changes its direction in June, the emus nest and lay their eggs.



▲ **Source 1.16** These pictures show the changing direction of the celestial emu. The first image **(A)** shows the constellation in April and the second image **(B)** shows the constellation in June. This movement in the celestial emu marks the changes in the emu-breeding cycle. Aboriginal peoples used the movements of the stars as a natural calendar for events that occurred regularly each year.

Amazing but true …

According to the Deadly Story website:

Wurdi Youang is an Aboriginal stone arrangement located near Little River, Victoria on Wathaurong country. It is estimated to be up to 11 000 years old, meaning Wurdi Youang is likely to be older than Stonehenge and the Egyptian pyramids!

Wurdi Youang is believed to be a ceremonial place and an astronomical observatory similar to Stonehenge. This is because the stones line up with the places where the sun sets on the horizon at different points in the year. These alignments are accurate to within a few degrees and show the longstanding knowledge of astronomy (stars, planets, comets and galaxies) held by Wathaurong and all First Australian people.

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Systems of agriculture

Until recently, there was a wide-held belief that Aboriginal and Torres Strait Islander peoples were **nomadic**. Many people also believed that they were only **hunter-gatherers** who took what they needed from the land and sea around them. However, recent archaeological discoveries have confirmed the oral histories of many Aboriginal and Torres Strait Islander peoples, which is that their ancestors actively managed the land in complex ways and so were not nomadic hunter-gathers.

▲ **Source 1.17** Western Australian rock painting of a yam plant (*Dioscorea hastifolia*). It shows the plant's tuber (beneath the ground) and tendril (above the ground).

Many people do not know that Aboriginal and Torres Strait Islander peoples developed their own systems of agriculture. Historian Bruce Pascoe has researched and written about Aboriginal and Torres Strait Islander peoples' practices of farming **yams** and seeds. In his book *Dark Emu*, he notes that before the coming of Europeans, Aboriginal peoples used the wetter areas of the land to grow yams. Pascoe adds that 'beyond the high-rainfall zones of the coastal regions, grain was grown as the staple crop' (p. 29).

Pascoe used the original journals of the first European explorers and settlers in Australia to conduct his research. He quotes British colonist George Grey who wrote in 1839 that:

> …more had been done to secure provision from the ground by hard manual labour than I could believe …

▲ **Source 1.18** Bruce Pascoe, *Dark Emu*, p. 17

KEY TERMS

nomadic people without a fixed home who move from place to place

hunter-gatherers members of a society that live by hunting and collecting wild food, rather than by farming

yams starchy, potato-like root vegetables

▲ **Source 1.19** This image shows people digging yams, which was a staple of many of Aboriginal peoples' diet. There is a lot of evidence that Aboriginal peoples harvested the yam as a key food source.

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Pascoe reviewed many written historical accounts from the nineteenth century to see how Aboriginal and Torres Strait Islander peoples used the land. He shares that explorer Hamilton Hume noted:

> on the Darling [River] the Natives [sic] gather grain from the wild oats [a round grain] and grind it between two stones and make a paste and eat it … the same is done by the Natives [sic] to the northward …

▲ **Source 1.20** Cited by Bruce Pascoe, *Dark Emu*, p. 31

Similarly, Pascoe describes that Charles Sturt, on his trips into South Australia and Queensland, heard 'hundreds of mills grinding grain' in an Aboriginal 'town' (*Dark Emu*, p. 31).

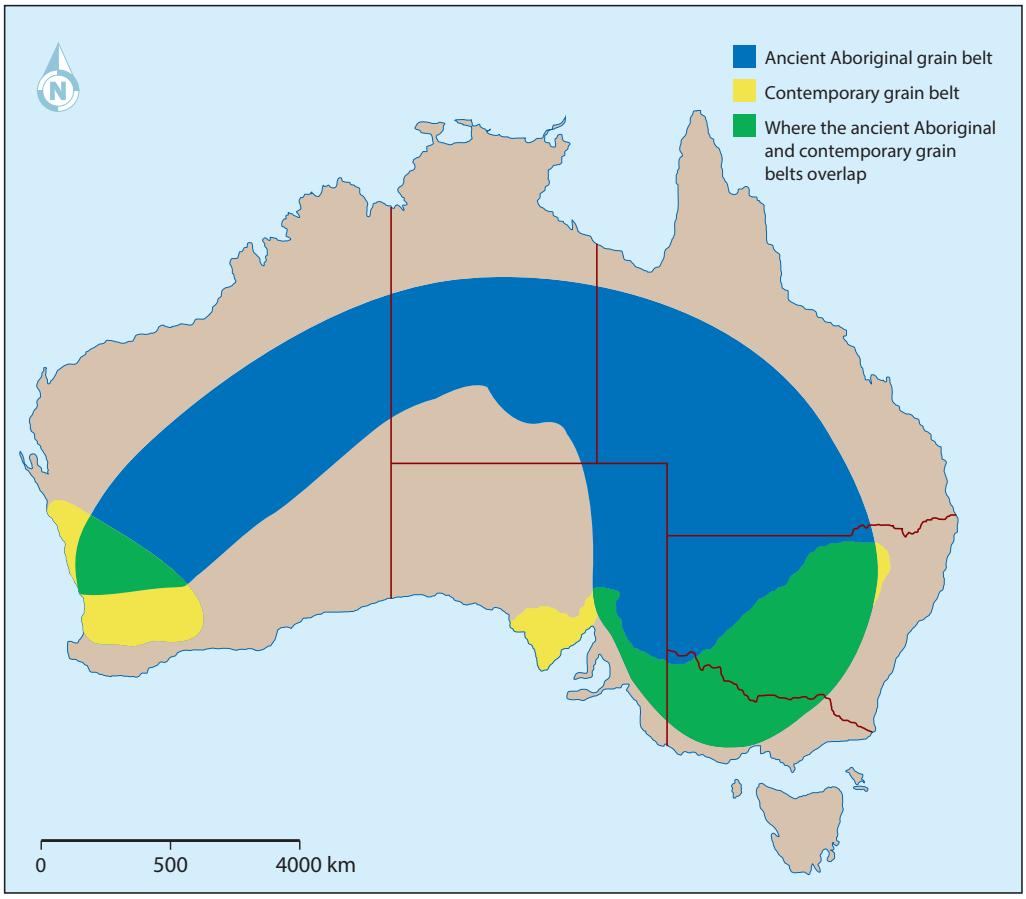
The historic journals that Pascoe quotes from reveal glimpses of what Australia might have been like before the Europeans came, and perhaps what ancient Australian societies were like. Pascoe's research shows us that early European explorers in Australia saw Aboriginal and Torres Strait Islander peoples managing the land in several ways:

> people building dams and wells; planting, irrigating and harvesting seed; preserving the surplus and storing it in houses, sheds, or secure vessels; and … manipulating the landscape – none of which fitted the definition of a hunter-gatherer.

▲ **Source 1.21** Cited in Bruce Pascoe, *Dark Emu*, p. 2

According to Pascoe's research, European settlers and explorers mention packed piles of hay, grain surpluses and three-metre wells. This reveals Aboriginal and Torres Strait Islander peoples as having sophisticated approaches to cultivating and storing food, and using agricultural methods alongside hunting and foraging practices.

Source 1.22 is a map of the grain belt that shows how much of the continent Aboriginal and Torres Strait Islander peoples were able to use for agriculture. As we saw at the start of this chapter, ancient Aboriginal and Torres Strait Islander peoples were the first known civilisation to develop agricultural practices and to bake bread.



▲ **Source 1.22** The ancient Aboriginal and Torres Strait Islander peoples' grain belt compared to the modern Australian grain belt

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MAKING THINKING VISIBLE 1.2

See, think, wonder

The map in Source 1.22 shows the difference between where ancient Aboriginal and Torres Strait Islander peoples grew grain and where we do today. Closely examine the map and write responses to the questions here.

1 What do you *see*?
2 What do you *think* about what you see?
3 What does it make you *wonder*?

END-OF-SECTION REVIEW 1.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 When was Australia separated from New Guinea?
2 Why did the megafauna die out in Australia?
3 What is the term used for the way Aboriginal and Torres Strait Islander peoples used fire to manage the landscape?

▲ **Source 1.23** Warlpiri people burning spinifex to promote growth in the Tanami Desert, Northern Territory

4 Which group created rock wells to store fresh water?
5 What is the name of the World Heritage site where Aboriginal and Torres Strait Islander peoples created a complex aquaculture system?
6 Which star formation was used to track the migration of whales down the eastern coast of Australia?

Interpret

7 How did the rise in sea levels during the great flood affect the peoples in Tasmania and the Torres Straight?
8 Describe the different ways that fire was used by ancient Aboriginal and Torres Strait Islander peoples.

Argue

9 Describe how Aboriginal and Torres Strait Islander peoples managed the Australian environment. Make sure you refer to specific sources to support your explanation.

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1.2 Significant Aboriginal and Torres Strait Islander beliefs, values and practices

FOCUS QUESTIONS

- What was life like in ancient Australia?
- What did Aboriginal and Torres Strait Islander communities believe and how did they interact with each other?

Aboriginal and Torres Strait Islander cultures

Aboriginal and Torres Strait Islander peoples see themselves as one long, continuing civilisation, so there are links between the various traditions and practices of Aboriginal and Torres Strait Islander peoples and the characteristics and values of their ancient ancestors.

The social and cultural practices of Aboriginal and Torres Strait Islander peoples are complex because they vary depending on the region being explored. However, the following are central to the cultural practices and beliefs of Aboriginal and Torres Strait Islander peoples:

- Country and The Dreaming for Aboriginal peoples
- Stories of the Torres Strait for Torres Strait Islander peoples.

Beliefs of Aboriginal peoples

Something that all Aboriginal peoples' cultures have in common is a deep connection to **Country**. The meaning of Country to Aboriginal peoples is more than just ownership. Mick Dodson, a lawyer from the Yawuru people of the southern Kimberly region, explains it this way:

> When we talk about traditional 'Country' … we mean something beyond the dictionary definition of the word. For Aboriginal Australians … we might mean homeland … and we might mean more than just a place on the map. For us, Country is a word for all the values, places, resources, stories and cultural obligations associated with that area and its features. It describes the entirety of our ancestral domains.

▲ **Source 1.24** Professor Mick Dodson, speech for Australian of the Year, National Press Club, Canberra, 17 February 2009

Here, Mick Dodson describes how Aboriginal peoples see themselves as deeply connected to Country and why there is this connection. Since Aboriginal and Torres Strait Islander peoples are the oldest continuing civilisation, they see themselves as deeply connected to the beliefs and practices of their ancestors from Australia's ancient past.

KEY TERMS

Country the sum total of the culture, values, stories, locations and resources of Aboriginal people's area

The Dreaming the collection of religious beliefs and cultural practices of Aboriginal peoples

The Dreaming

The Dreaming is the collection of religious beliefs and cultural practices of Aboriginal peoples. It establishes the structures of society and the rules for social behaviour. The Dreaming determines how one person relates

▲ **Source 1.25** The Welcome to Country ceremony for leaders of the G20 nations at the 2014 Brisbane summit

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▲ **Source 1.26** This photograph is from 1982 and shows schoolchildren listening to storyteller Maureen Watson

to another person in terms of **kinship**, as well as how different peoples are related to each other. It also outlines how people are expected to behave in their community. The Dreaming contains the rules for living.

Historian Bill Gammage explains The Dreaming in the following way:

> The Dreaming taught why the world must be maintained; the land taught how. One made land care compulsory, the other made it rewarding. One was spiritual and universal, the other practical and local.

▲ **Source 1.27** Bill Gammage, *The Biggest Estate*, 2011 p. 139.

Children learn how to behave according to The Dreaming at a very young age. The ways in which Aboriginal children learn their responsibilities have been popularised in published versions of teaching stories. You may be familiar with stories like Tiddalik, which has many versions between Aboriginal communities. Tiddalik teaches that water must be conserved. Tiddalik and other teaching stories, such as Dunbi the Owl, are told and re-told to Aboriginal children to show them how to behave and how to treat the land. Aboriginal communities continue to use stories to teach about The Dreaming, much as their ancient ancestors did.

Storytelling in the Torres Strait Islands

The Torres Strait Islander peoples tell traditional stories about the past, present and future. Their beliefs are passed down from one generation to the next as oral history. As with Aboriginal peoples' cultures, oral history within Torres Strait Islander peoples' traditions can be told in the form of spoken word, music, song and dance.

For many Torres Strait Islander peoples, the phrase *Ailan Kastom* (in English: 'island custom') refers to the unique cultures of the peoples of the Torres Strait. *Ailan Kastom* is a source of unity and strength. It bonds the peoples from the Torres Strait, whether they are living on the islands or on mainland Australia.

KEY TERM

kinship the relationship between members of the same family

▼ **Source 1.28** This photograph shows a Torres Strait Islander boy in traditional dress dancing at the Kaiwalagal music and arts festival

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The stories from peoples of the Torres Strait often tell how things came to be. For example, the Story of Gelam describes how the three Murray Islands were formed by mythical ancestors. These mythical ancestors were sea creatures that travelled across the Torres Strait. The story tells how the islands were shaped by Gelam, who travelled in the form of a dugong from Mua to the west of Torres Strait. Gelam moved rich, red soil from Mua to Mer (Murray Island), and took different types of yam, coconut and other food plants to the island. Gelam also spat out two red-bean seeds, which became the two smaller islands of Dauar and Waier.

ACTIVITY 1.1

Using historical sources as evidence

Stories passed down from one generation to another are a special form of historical source. Aboriginal and Torres Strait Islander peoples have many oral histories. These stories often describe how different aspects of the land came to be.

Watch the retelling of the Story of Gelam on YouTube by searching for 'The story of Gelam the creator of dugong'. Then, answer the following questions.

▲ **Source 1.29** A scene from an animated version of the Story of Gelam, which is a story told by Torres Strait Islander peoples

Responding to the source

1. Which nation does this history belong to?
2. What event does this history describe?
3. Using the historical source or storytelling as evidence, describe how the island of Mer was created.

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Oral histories

Oral histories give us important insights into the beliefs of the Aboriginal and Torres Strait Islander peoples in ancient times. These stories have been passed on from generation to generation, and are a central part of their cultures. Oral histories have helped to ensure that cultural practices and values from the earliest generations of Aboriginal and Torres Strait Islander peoples still have a presence today.

There are different types of oral history traditions, such as song, dance, art and craft making, but they all relate to The Dreaming or Torres Straight Islander stories. The oral-history tradition is one way that modern Aboriginal and Torres Strait Islander communities maintain links with their ancient ancestors.

In 2015, Patrick Nunn from the University of Sunshine Coast and Nicholas Reid from the University of New England analysed 21 First Australian oral-history stories from across the nation. The oral histories that Nunn and Reid looked at covered a period between 18 000 and 7000 years ago. We know that sea levels rose 120 metres as the last Ice Age ended so Nunn and Reid compared these facts with the oral histories that covered the same period. They discovered a remarkable level of consistency between the stories, all of which explained how the sea levels were slowly rising around the entire country.

Some of the oral histories Nunn and Reid researched were straightforward about the sea levels rising, such as those told by the Kulin Nation around Port Philip. Their oral histories describe how kangaroo hunting grounds were slowly lost to the sea as the sea level rose. Other stories, such as those told around Spencer Gulf in South Australia, use an **allegory** to describe how local communities angered the ancestor spirits, who then took away parts of country and gave it to the sea.

KEY TERM

allegory an artistic work in which the characters and events represent particular qualities or ideas related to morals, spirituality or politics

Many experts are amazed at how Aboriginal and Torres Strait Islander peoples' oral histories accurately recall events, even thousands of years after they occurred. The stories also give us valuable information about the world of the Aboriginal and Torres Strait Islander peoples in ancient times.

▲ **Source 1.30** Stories can be used to pass on knowledge of the environment, as well as how to use and conserve its resources

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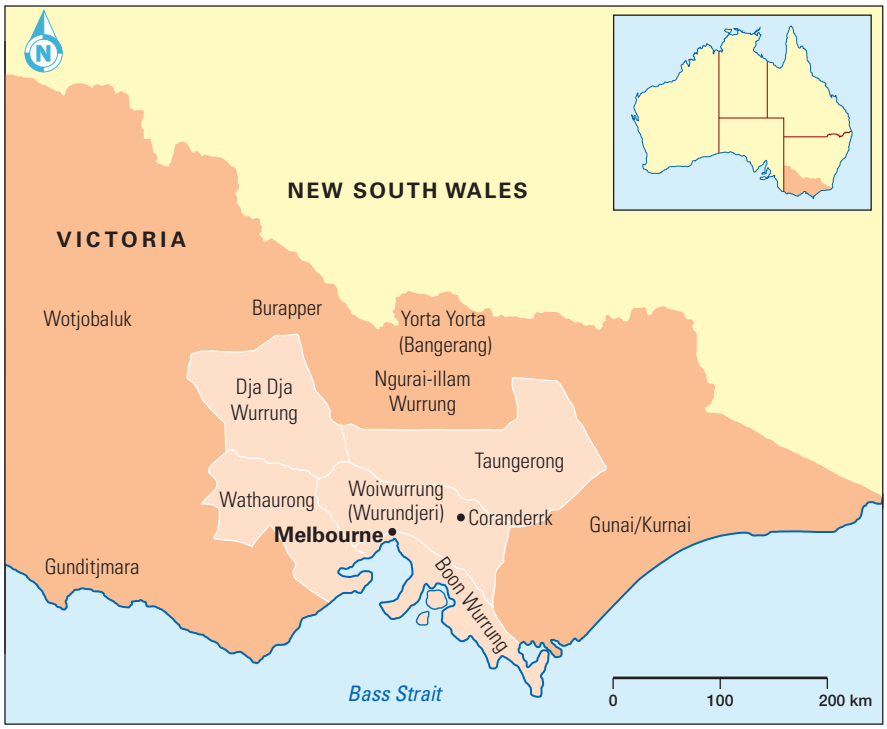
The Kulin Nation

The land we now call Victoria has been inhabited by Aboriginal peoples for thousands of years. Before the founding of the city of Melbourne, around 200 years ago, the region was Birrarang. Historian Tim Flannery describes Birrarang as 'a bountiful land beside a bay, through which ran the sparkling river Barrern' (*The Birth of Melbourne*, p. 1).



▲ **Source 1.31** The approximate territories of the five groups of the Kulin Nation (shaded in light orange) and some other Aboriginal peoples of Victoria

The different communities of this area formed a loose alliance called the Kulin Nation. The groups of people within the Kulin Nation spoke related languages and covered a large amount of territory across Victoria.

There are historical sources that describe how knowledgeable the peoples of the Kulin Nation were. James Kirby wrote the following in 1843 about a Kulin man:

> [He] would sit near the opening and just behind him a tough stick about ten feet [about three metres] long was stuck in the ground with the thick end down. To the thin end of this rod was attached a line with a noose at the other end; a wooden peg was fixed under the water at the opening in the fence to which this noose was caught, and when the fish made a dart to go through the opening he was caught by the gills, his force undid the loop from the peg, and the spring of the stick threw the fish over the head of the man, who would then … reach back his hand, undo the fish, and set the loop again around the peg.

▲ **Source 1.32** James Kirby, *Old Times in the Bush of Australia*, quoted by Bruce Pascoe, *Dark Emu*, pp. 6–7

Flannery's research on Melbourne's history shows that in the 1840s there was an abundance of fish at the Yarra Falls. When fishing there, people caught as many as 150 fish a day, each weighing up to a kilogram, in as little as four hours. Crayfish and large flathead were also easy to spear in the shallow water.

As well as the abundance of seafood and freshwater food, billabongs and swamps were spread around the bay, and they teemed with brolgas, magpie geese, Cape Barren geese, swans, ducks, eels and frogs. So plentiful was the wildlife that:

> …in all ordinary seasons … [First Australians] can obtain, in two or three hours, a sufficient supply of food for the day.

▲ **Source 1.33** Bill Gammage, *The Biggest Estate*, p. 151

These quotes show how the people of the Kulin Nation had many resources to use in their everyday life and were experts at managing the land.

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The beliefs of the Kulin Nation

The Kulin peoples, like other Aboriginal and Torres Strait Islander communities, have their own unique creation stories. Their histories describe how Bunjil, the great eagle spirit, created the world and everything in it. Other Aboriginal and Torres Strait Islander peoples have different creation stories such as the world being created by the Rainbow Serpent or Baiame the sky father. These differences remind us how diverse beliefs of Aboriginal and Torres Strait Islander peoples are.

▲ **Source 1.34** Pictured is the only known Aboriginal rock art depiction of Bunjil in Australia. It is found in a cave at the Bunjil Shelter in the Grampians National Park.

ACTIVITY 1.2

Using historical sources as evidence

Different Aboriginal and Torres Strait Islander peoples' nations have different histories about how the world was created. Search for Samuel Wark's short animation *Bunjil The Eagle* on Vimeo to find a history of one of these nations. Then, answer the questions that follow.

Responding to the source

1. Which nation does this history belong to?
2. Using this historical source as evidence, describe how Bunjil created the world and ended up amongst the stars.

Kulin ceremonies

The peoples of the Kulin Nation have traditionally used specific ceremonies at important events, such as at funerals or when children were formally recognised as adults. Outsiders were not allowed to witness these ceremonies. At ceremonies today, Kulin boys are given items to symbolise their transition into manhood, such as strips of possum skin.

The Wurundjeri people of the Kulin Nation performed different ceremonies for men and women.

Smoking ceremonies were used by peoples of the Kulin Nation to cleanse areas of bad spirits. Smoke was also used to promote general wellbeing. To do this, people would walk through the smoke so that they were cleansed.

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Amazing but true …

Australian rules football developed from a game played by the Woiwurrung people. At celebrations, they would play with a ball made from possum skin. Over time this developed into the modern game of Australian Rules Football.

Connections between communities

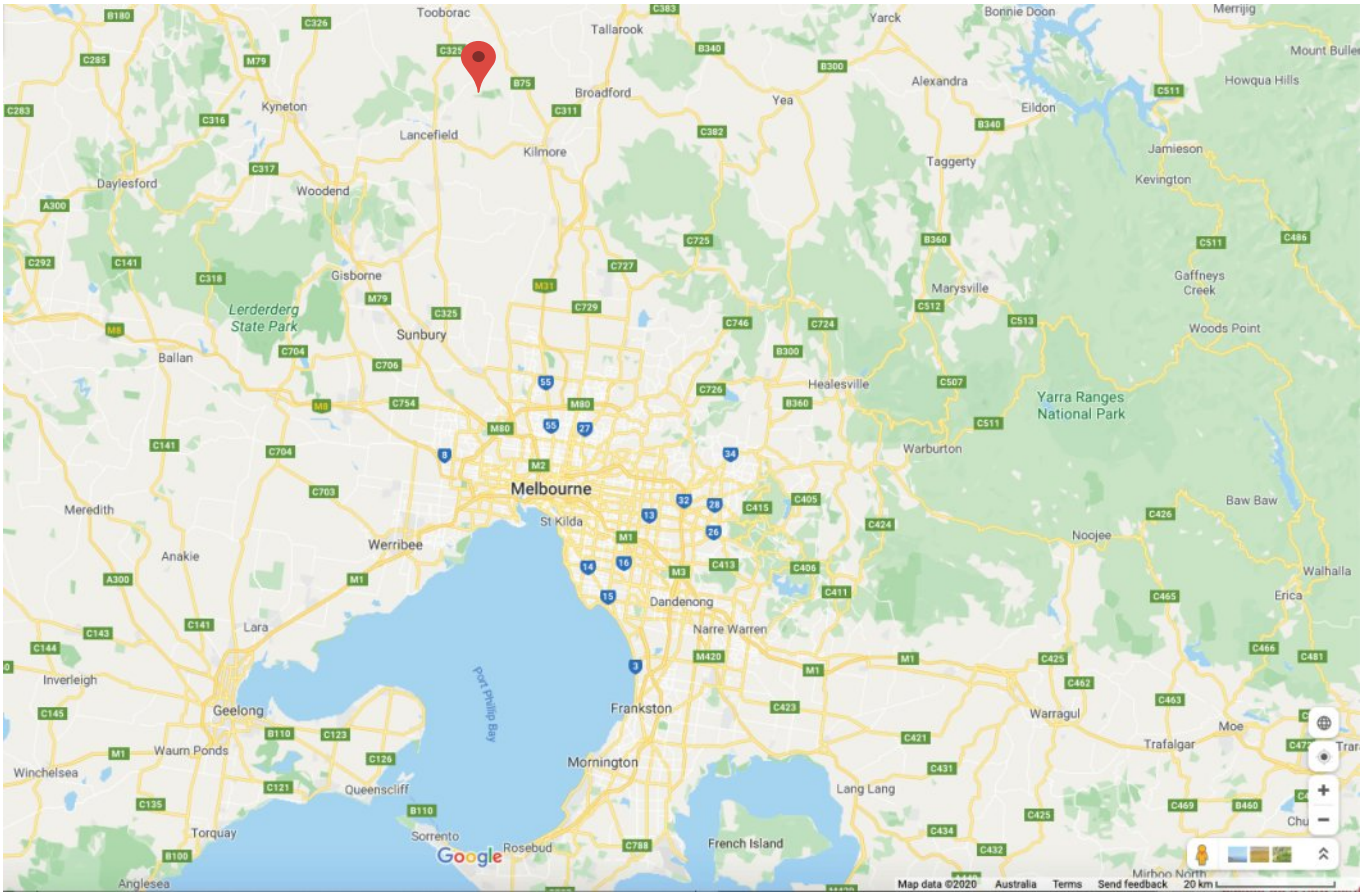
We know from historical evidence that ancient Aboriginal and Torres Strait Islander peoples communicated and traded extensively with one another. We know that they traded in ochre, shells, pituri leaves and wood, stone and other commodities. Some groups specialised in the production of a certain good that can be found far from where the good was originally made. This shows that ancient Aboriginal and Torres Strait Islander peoples had developed economic trade practices similar to those of other ancient civilisations.

Sometimes, different groups of Aboriginal and Torres Strait Islander peoples would come into conflict with each other, even within nations. Today, there is dispute between the Wurundjeri and the Boon Wurrung peoples of the Kulin Nation about the traditional ownership of some of the land along the Yarra River.

Trade

We have examples of goods, such as stone axes or hatchets from Mount William in Victoria, being found hundreds of kilometres from where they were original created.

The stone in Mount William was quarried to create stone axes for their own use, as well as to trade with other communities. Mount William contained stone that could hold a sharp edge much better than stone usually found in Australia so it was a valuable commodity.



▲ **Source 1.35** The Mount William quarry site is north of Melbourne

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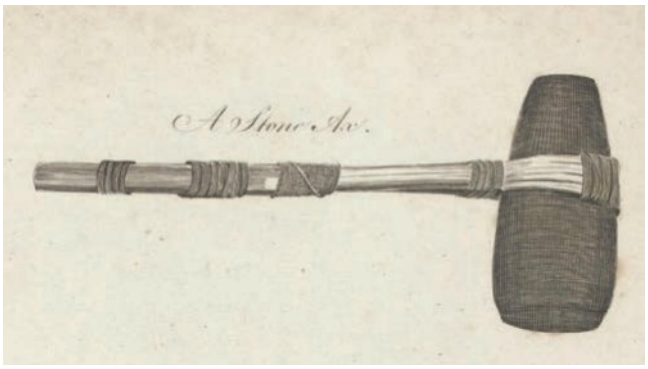
Historian Gary Presland explains how the Mount William stone axes were part of a large trading network that extended around Australia.

Hatchets have been traced to sites in New South Wales and South Australia, up to 700 kilometres away from the original source. These stone hatchet heads moved through a trading network that existed between friendly clans and involved the exchange of particular goods for stone hatchets. These pieces of stone were taken away in an unfinished state and later had an edge ground onto it. This was done by rubbing the blank against an abrasive agent, such as a sandstone outcrop, to form a sharp cutting edge. To make the handle, a length of wood was split at one end and the hatched head inserted. The head was then bound with kangaroo sinew with resinous gum gathered from trees applied.

A variety of goods were exchanged for the Mount William stone. A possum-skin cloak could be exchanged for three hatchet blanks, which suggests a high value (in terms of work-hours) for the blanks. And a particular type of reed used as spear shafts was traded from the Swan Hill area. Most of the Mount William stone hatchets that have been found show very little wear, which suggests they were prized more as social objects than as practical ones.

By plotting the areas where the hatchets have been found, it is possible to gain an understanding of trade routes in Victoria. Most Mount William hatchets have been found within or close to what was Kulin territory. The hatchets found in New South Wales and South Australia would have been exchanged from group to group. Conversely, there are only rare instances of Mount William hatchets in Gunai territory, in Gippsland, bearing out the belief that Kulin clans and those of the Gunai were hostile to each other.

▲ **Source 1.36** Gary Presland, *First People: Eastern Kulin of Melbourne, Port Phillip and Central Victoria*, 2010, pp. 142–3



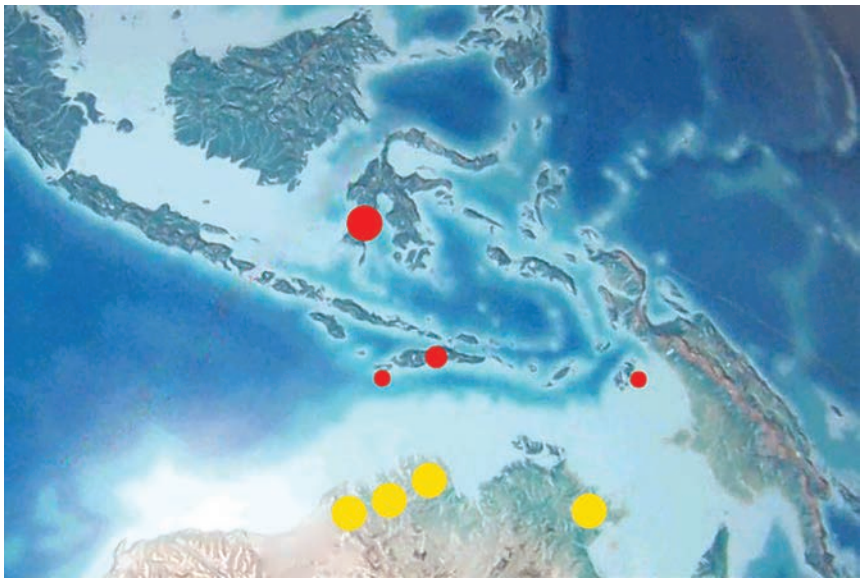
▲ **Source 1.37** Example of a stone axe from the Mount William area

There was trade between Aboriginal and Torres Strait Islander peoples within Australia, but there is also evidence of trade with other communities in the Asian region.

In **Arnhem Land**, the Yolngu people traded with the Makassan communities of Indonesia from around the year 1700 CE. The Makassans would sail to Arnhem Land and trade with the community, specifically wanting sea cucumbers, which they would then trade with the Chinese people for use in traditional Chinese medicines. The trade with the Makassans influenced the Yolngu people and gave them access to goods like tobacco, metal tools and fabrics, which were not available to them locally.

KEY TERM

Arnhem Land a region of northern Australia, west of the Gulf of Carpentaria, which contains the largest Aboriginal reservation



▲ **Source 1.38** Aboriginal and Torres Strait Islander peoples (locations shown in yellow) are known to have traded with Makassan communities in Indonesia (locations shown in red) from 1700 CE onwards

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Digital quiz
Please see the Interactive Textbook to access digital activities

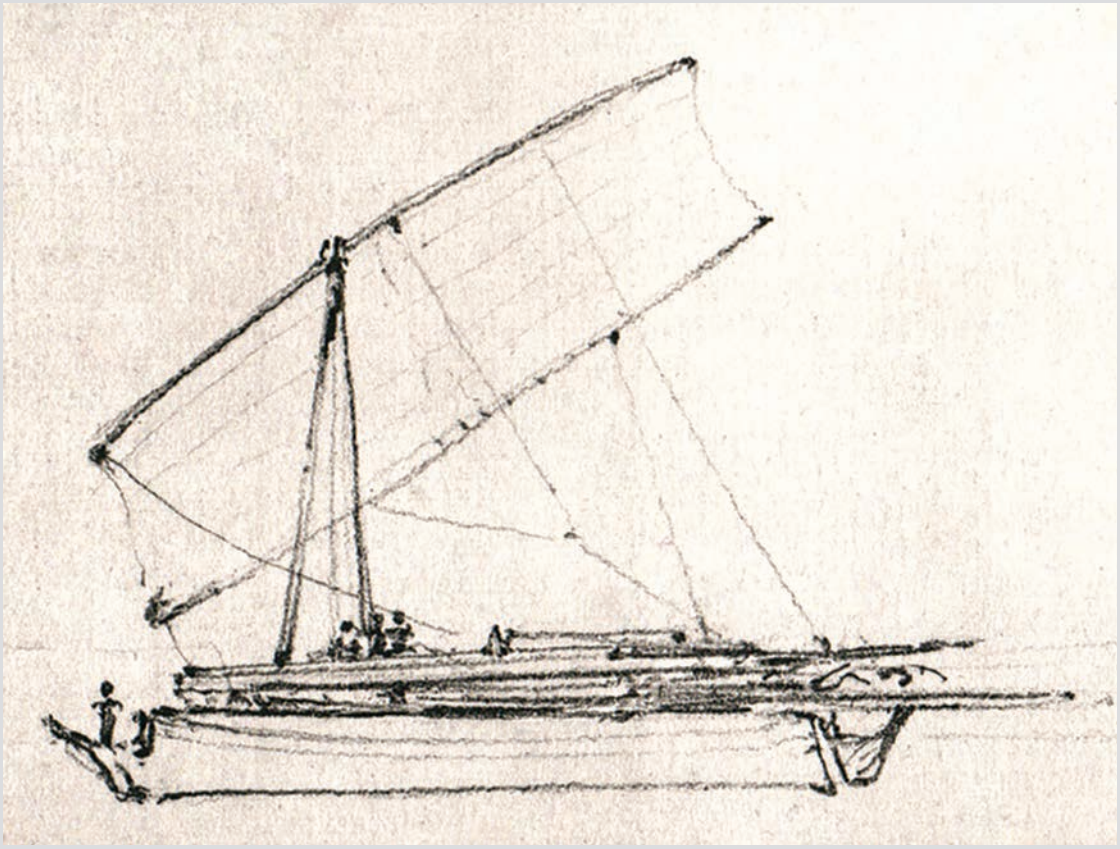
END-OF-SECTION REVIEW 1.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Which story of the Torres Strait described how the island of Mer came to be?
2 Which Aboriginal or Torres Strait Islander peoples lived in the area that is now called Melbourne?
3 What is the name of the creator eagle spirit of the Melbourne region?
4 Which group traded with the Makassans of Indonesia in the 1700s?



▲ **Source 1.39** Makassan pajala-style ship with tripod masts and rectangular sails. William Westall painted this sailing boat off the Arnhem coast in 1803

Interpret

5 How do Aboriginal Australians use the stories of The Dreaming to teach their young people?
6 What do the stone axes from Mount William help us understand about trade between Aboriginal and Torres Strait Islander communities?

Argue

7 Explain how the oral histories of Aboriginal and Torres Strait Islander peoples are useful in understanding Australia's ancient past.

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1.3 How do we know about ancient Australia?

FOCUS QUESTION

How do we know about ancient Australia?

Archaeology

Archaeology is the study of the distant past. In addition to the oral histories of the Aboriginal and Torres Strait Islander peoples, we can study the Earth for clues that the ancient Australians left behind. The people who study layers of the earth for clues about the past are called 'archaeologists'.

Archaeologists plan areas to **excavate** so that they can look carefully at things like the kinds of rocks present and anything that a past community left behind. These areas are known as 'digs' or 'excavation sites'. In their digs, archaeologists try to find artefacts, which are special objects that help us to understand the past. Archaeologists spend a lot of time researching and organising excavation sites in places where they are likely to find artefacts.

Artefacts are like pieces of a puzzle or clues. Each one can tell us something about a past culture or belief, but only if we know how to interpret it. Historians and archaeologists help us to understand what artefacts can tell us about the past. The more artefacts we have, the more likely we can piece together the puzzle for a more complete picture.

Christopher Wilson is a Ngarrindjeri man who is an archaeologist. He worked on a dig in South Australia's lower Murray area and uncovered an 8500-year-old settlement of the ancient Ngarrindjeri people. The site is older than the Egyptian pyramids!

In his work, Wilson completed a **survey** of 30 kilometres of land near the Murray River, between Mypolonga and Monteith. He discovered the remains of fish skeletons, which indicates that the river system 5000 years ago was much bigger than it is today. Wilson's archaeological work included a massive relocation of around 100 **shell midden** sites as well as eight excavations. The National Museum of Australia has included his findings in exhibitions about Aboriginal and Torres Strait Islander peoples' history in South Australia.

KEY TERMS

excavate to carefully dig up or reveal something in the ground

survey a type of physical investigation where an archaeologist carefully collects information about past human activities in a location

shell midden a large pile of seashells that can be the result of being thrown away from human consumption, after they have eaten shellfish

▲ **Source 1.40** This photo shows typical tools that archaeologists use in their digs

▲ **Source 1.41** A shell midden

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Stratification

Different layers of earth are from different time periods. Identifying these is called **stratification**. A 'stratum' is a single layer of the earth, whereas 'strata' is plural and means many layers of earth.

KEY TERM
stratification archaeological term that refers to the different layers of the earth; each layer (or strata) represents a different time period

To keep each stratum separate is important in an archaeological dig. This is because if any artefacts are found, they can be matched to the time period, the strata, they came from. This is particularly important in sequencing events chronologically. Archaeologists are very organised when digging a site. This is so that they can keep careful track of what they find in each stratum.

DEVELOPING HISTORICAL CONCEPTS AND SKILLS 1.3

Analysing an archaeological dig

Look at the illustration that describes the various stratum in an archaeological dig. Then answer the questions that follow.

▲ **Source 1.42** Diagram of an archaeological dig showing various strata

Feature 7 Burial with cremated bones in a funerary urn, funerary offerings

Layer 6 No significant finds

Layer 5 Thick layer of clay associated with flooding

Layer 4 Iron age weapons, shield, building foundations, stone inscriptions in Latin, foreign pottery

Layer 3 Bronze Age weapons, local painted pottery – written cuneiform tablets, gold religious icon of a god

Layer 2 Copper axe, unburied bodies, burnt stones of a collapsed stone building, carved statue of a god, grindstones for milling wheat, primitive pottery

Layer 1 Stone Age tools, flint arrowheads, midden of animal bones, remnants of campfires

1. Which layer is the oldest? Why?
2. The burial pit (Layer 7) was dug by the people from which layer? Explain your answer.
3. Outline the technological developments between Layers 1 and 2.
4. What kind of catastrophe may have occurred in Layer 5? What is the evidence to support this?
5. What do you think the most significant development of Layer 3 is? Explain why you think this.
6. Identify the objects that show development in technology at this site.
7. Why might the inhabitants of Layers 3 and 4 have used different written scripts?
8. What does the presence of foreign pottery in Layer 4 suggest?
9. Explain why the site may have been abandoned.
10. Write a historical account explaining what you think occurred at this site. When you have finished share your story with a partner.

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Amazing but true …

Archaeologists can tell a lot from human poo (called 'coprolites' by archaeologists). You might think looking at human poo through a microscope is disgusting, but this is exactly what some archaeologists do. Archaeologists can tell from coprolites that are thousands of years old what people ate, how they prepared their food, what diseases they may have had and how they lived. This information is very important because it provides us with evidence on how ancient societies lived.

▲ **Source 1.43** A coprolite that is thousands of years old

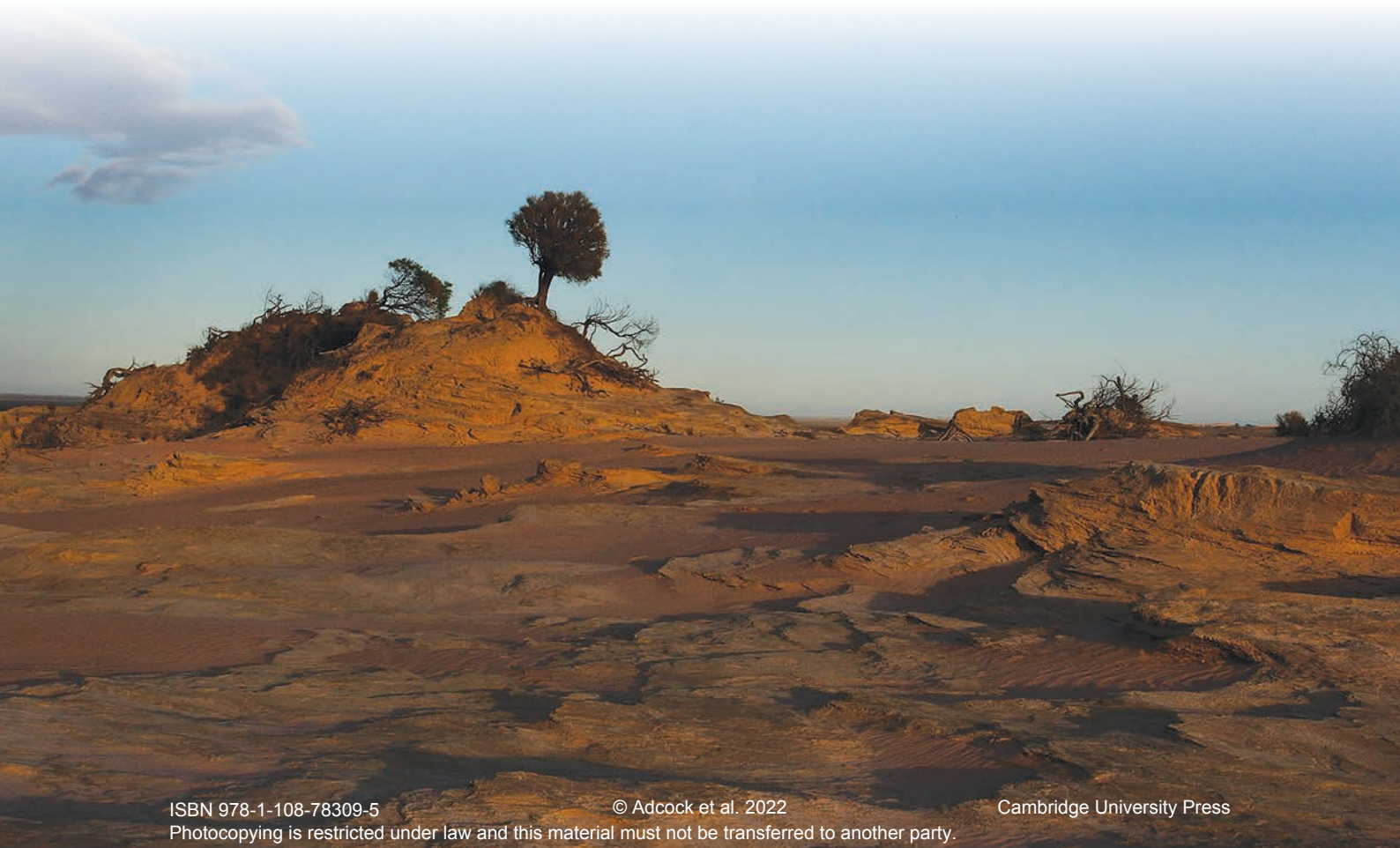
Lake Mungo

One of the most historically significant examples of archaeology in Australia comes from south-western New South Wales. Lake Mungo is a semi-arid desert environment but thousands of years ago it was a lake. The transformation from lake to desert would have ended around 10 000 years ago.

Aboriginal and Torres Strait Islander peoples arrived in the area approximately 40 000 years ago, when the lake was full of water. The water there sustained the Aboriginal and Torres Strait Islander communities, as well as freshwater mussels, fish, small birds and other mammals. When archaeologists began to study the area in the late 1960s and early 1970s they found evidence that people in the region had built fires, made stone tools and used local ochre to paint their bodies.

As the rivers slowly dried up, the communities moved to be closer to fresh water. Today, the region is home to the Paakantji, Mutthi Mutthi and Ngyimpaa peoples.

▼ **Source 1.44** This photo shows the dry sand dunes of Lake Mungo. It is the setting for one of humanity's most significant archaeological discoveries



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Mungo Lady and Mungo Man

In 1968, the geologist Jim Bowler stumbled across human bones emerging from the earth. He returned the following year with Australian archaeologists John Mulvaney and Rhys Jones to excavate the remains. The team took the skeleton that they found to the Australian National University in Canberra so that it could be studied.

They determined that the human bones were female. They named the skeleton 'Mungo Lady' and established that she had been buried in a special ceremony. Mungo Lady had been cremated and her bones crushed before she was buried in the ground. This tells us that the local communities had specific rituals when they buried their dead, which is evidence that they had a belief system about life and death.

The estimated age of Mungo Lady is between 40 000 to 42 000 years old, which makes these human remains the oldest found anywhere in Australia and among the oldest found in the world!

▲ **Source 1.45** Because the archaeologists did not have any other way to transport the remains of Mungo Lady, John Mulvaney used his briefcase to transport Mungo Lady to Canberra in 1969. Mungo Lady was later reburied at Lake Mungo in 1992.

Five years later, in 1974, another set of remains was discovered at Lake Mungo. This time the skeleton was of a man, which the archaeologists named 'Mungo Man'. An analysis of Mungo Man determined that the remains had been buried in a ceremony just like Mungo Lady and were dated as being over 40 000 years old.

The remains of Mungo Man revealed more information about the burial practices of the ancient community that lived in the area. The archaeologists discovered a strange reddish brown substance above the top of the body, which was established as being ochre. The substance is very rare for the region. The body had been covered with over two kilograms of ochre, showing the importance of the burial to the Aboriginal and/or Torres Strait Islander peoples of the region.

Preserving the past and respecting culture

Mungo Lady and Mungo Man are two of the most important artefacts found in the world. They represent some of the earliest examples of what we can identify as modern humans. Their remains must be treated with great care and respect, not only because of the scientific knowledge the artefacts can give us, but because they are the direct ancestors of Aboriginal and Torres Strait Islander communities living in the area today.

The care of these remains is of critical importance to the Paakantji, Muthi Muthi and Ngiyampaa peoples of the Lake Mungo region. The remains of their ancestors are a link to their shared history, so it was crucial that the artefacts were returned to the region to be buried in Country. This occurred in 1992 for Mungo Lady and in 2017 for Mungo Man. The returning of these artefacts marked

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an important step towards **reconciliation** between Aboriginal and Torres Strait Islander peoples and the wider community. The act showed a respect for the traditions and wishes of Aboriginal and Torres Strait Islander peoples.

Balancing the scientific value of remains like Mungo Lady and Mungo Man, and respecting the beliefs of Aboriginal and Torres Strait Islander communities can be a difficult task. The question of who owned the artefacts created a significant debate at the time. The removal of the Mungo Lady and Mungo Man to the Australian National University in Canberra was seen as disrespectful to the local communities.

▲ **Source 1.46** On 17 November 2018 at Lake Mungo, Mungo Man was carried in a casket made from 5000-year-old red gum to his ancestral lands, with Aboriginal Elders leading a ceremony.

▲ **Source 1.47** The ancestors of the Mungo Man were the First Australians of the Willandra area: the Mutthi Mutthi, Ngiyampaa, and Paakantyi peoples, who fought for 40 years until a decision was made in 2015 to repatriate the remains.

Today, archaeologists work with the local communities to ensure that the research conducted across Australia is respectful to their beliefs and wishes.

KEY TERM

reconciliation bringing together Aboriginal and Torres Strait Islander peoples with other Australians to create good relationships

▲ **Source 1.48** The skeleton of Mungo Man as it appeared during the excavation in 1974. The bones spent the next 49 years at the Australian National University in Canberra, until the remains were returned to Country in 2017.

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 1.3

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What do we call objects found in archaeological digs?
2 What is the name for different layers of earth that have built up over time?
3 How old were Mungo Lady and Mungo Man determined to be?

Interpret

4 Explain how stratification can help us to make educated guesses about the ages of the objects we find.

Argue

5 Why is the discovery of Mungo Lady and Mungo Man significant for our understanding of ancient Australia?

Conclusion: why does it matter today?

When we think of the oldest civilisations in the world, many people's minds immediately jump to the pyramids of ancient Egypt or the great civilisations in India and China. But, here in Australia, we live among the oldest continuing civilisation in the world and by an incredibly long period of time. The pyramids of Egypt are just under 5000 years old, but we have evidence of Aboriginal and Torres Strait Islander communities dating back over 65 000 years. That's more than 60 000 years older than the pyramids!

Most importantly, Aboriginal and Torres Strait Islander peoples today are an unbroken link back to these ancient Aboriginal and Torres Strait Islander peoples. The beliefs, histories and practices of ancient Aboriginal and Torres Strait Islander peoples are sacred and precious to the Aboriginal and Torres Strait Islander peoples of today.

We have only just begun to understand the significance of the history that is all around us in Australia. This history stretches back further than nearly anywhere else in the world. Therefore, when we acknowledge the traditional owners of the land, we are showing respect to these communities that carry this living history with them today.

► **Source 1.49** These stencils were made with ochre (a natural clay earth pigment) against the sandstone walls of Carnarvon Gorge within Carnarvon Gorge National Park, Queensland, Australia. These walls have over 2000 engravings, stencils and free-hand paintings. The Dreaming says that Mundagurra, the rainbow serpent, carved out these sandstone channels as he travelled through the creek system. Traditional Custodians recognise the gorge today as a place of learning and an area of great spirituality.

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Follow the flow of main ideas

What have you learned about ancient Australia and Aboriginal and Torres Strait Islander peoples? Copy and complete the diagram and fill it out by explaining your understanding in a few points. (We have done one topic for you.) You can also complete this within the Interactive Textbook.

Arrival of humans in Australia	
How Aboriginal and Torres Strait Islander peoples managed and used the land	
Significant beliefs of Aboriginal and Torres Strait Islander peoples	
Trade in ancient Australia	
Archaeology and ancient Australia	
Significance of Mungo Lady	
Conserving ancient Australia	• Many archaeologists have helped us conserve ancient Australia over the centuries.

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Cambridge University Press

3 Making thinking visible

I used to think that ancient Australia was …

Now I think that …

This exercise in visible thinking asks you to track the difference between what you knew about Aboriginal and Torres Strait Islander peoples and cultures before starting this unit, and what new understandings you have acquired since doing the unit.

Using the stem sentences shown here, write a paragraph explaining what you previously knew about the topic. Then write another paragraph explaining what you now understand about the topic.

1A I used to think that the geography of ancient Australia was important because …

1B Now I understand that the geography of ancient Australia was important because …

2A I used to think that Aboriginal and Torres Strait Islander peoples managed the land …

2B Now I understand that Aboriginal and Torres Strait Islander peoples managed the land …

3A I used to think that the Aboriginal and Torres Strait Islander peoples believed in …

3B Now I understand that the Aboriginal and Torres Strait Islander peoples believed in …

4A I used to think that Mungo Lady is important because …

4B Now I understand that Mungo Lady is important because …

4 Using historical terms meaningfully

As an historian, you will need to confidently and correctly use the terms related to your subject. Write a paragraph in response to the question here, using all the key terms listed. Ensure that your use of these terms shows your understanding of what they mean.

Question: *Explain how Aboriginal and Torres Strait Islander peoples managed their land over tens of thousands of years.*

Use these words correctly in your answer:

- Agriculture
- Fire
- Water
- Astronomy
- Baking
- Significant.

▲ **Source 1.50** Serra Range in Southern Grampians

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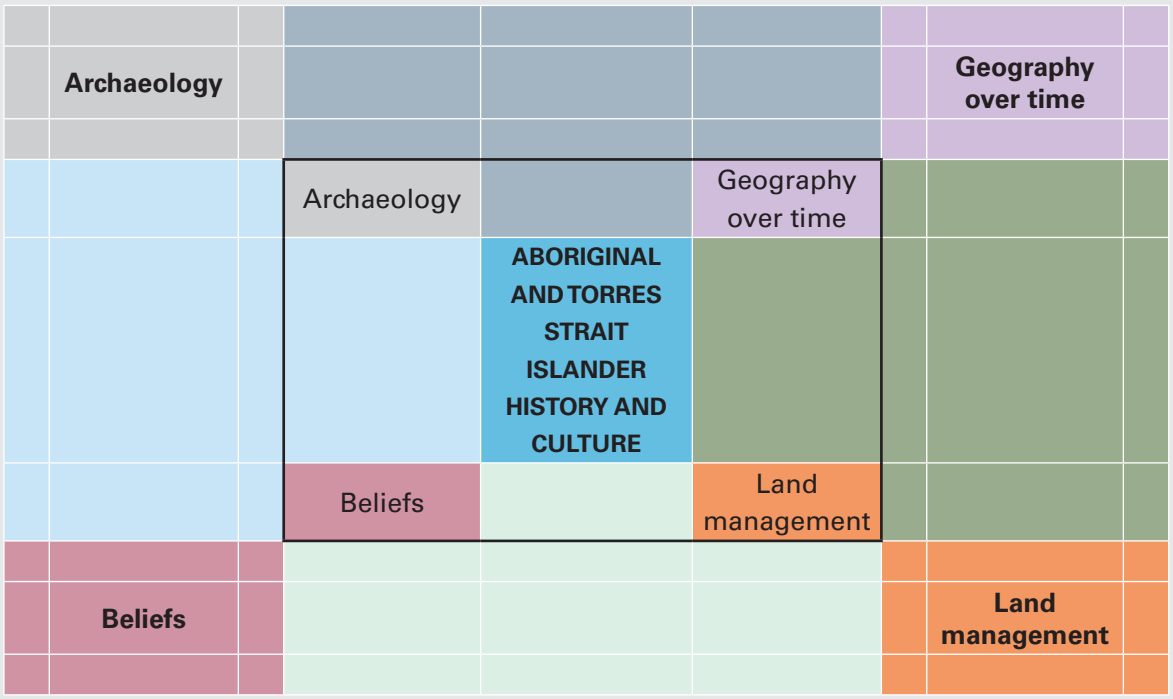
5 Research task

Investigate the different aspects of Aboriginal and Torres Strait Islander civilisation and identify its key elements. Try to find some historical sources for each topic.

Copy the lotus diagram and fill it in with your research. This will build a complete picture of what you have learned in the different learning areas. Two areas have been left blank so that you can add topics of your own choosing.

When you have finished creating your lotus diagram, use it to answer the following question. Your answer needs to be an extended written response.

Aboriginal and Torres Strait Islander peoples cultures had a complex relationship with the land. Explain some of the ways that Aboriginal and Torres Strait Islander peoples interacted with the land and how we know about those interactions.



6 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about the First Australian peoples

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Unit 2

The ancient European and Mediterranean world – 60 000 BCE–650 CE

Overview

Have you ever wondered why we vote or where the idea for the Olympics came from? Many of the traditions and cultural norms in Australia come from the ancient civilisations of Europe and the Mediterranean. Our society and values are based on several of the ideas and skills developed in these ancient societies, which included democracy, architecture, religion and engineering.

The chapters in this unit explore three of the most significant ancient civilisations of the Mediterranean: Egypt, Greece and Rome. You will investigate their physical features, key groups and individuals, beliefs and practices, and key historical events. As you investigate this topic, think about what we do today in Australia that originated in these ancient civilisations.

Learning goals

After completing this unit, you should be able to answer these questions:

- How do we know about the ancient past?
- Why and where did the earliest societies develop?
- What emerged as the defining characteristics of ancient societies?
- What key beliefs and values emerged, and how did they influence societies?
- What were the causes and effects of contact between societies in this period?
- Which significant people, groups and ideas from this period have influenced the world today?

Video
Unit overview

Introducing historical concepts and skills: *Cause and effect*

The chapters in this unit have a special focus on the concept of **cause and effect**. This means you will be developing your ability to explain why things happened in the past and what the results of those events were.

There are many different types of causes and effects. Causes and effects can be political, economic and social. There is also usually more than one cause or effect for an event, so do not fall into the trap of thinking an event only has one trigger or one result. As you read the chapters in this unit, you can look out for opportunities to build your understanding of cause and effect.

► **Source A** Temple of Apollo at Delphi in Greece

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CHAPTER 2

Ancient Egypt

Setting the scene: the mysterious construction of the pyramids at Giza

How the pyramids were built 4500 years ago is one of the world's biggest mysteries. No historian can say for sure how they were made, but they are so large they can be seen from space! The tallest pyramid is nearly 150 metres in height and contains 2.3 million stone blocks. Each stone block is estimated to weigh between 2.5 and 15 tonnes. Even with our modern technology, building the pyramids would have been a difficult task. In 2500 BCE, the workers did not have the help of trucks, cranes or electric tools to cut the huge stones. So, how did the ancient Egyptians organise and construct the pyramids? And why did they do it? The pyramids were tombs and not living spaces like a palace, or a place to store food, so why did the ancient Egyptians go to all the effort?

▲ **Source 2.1** Pyramids at Giza, Egypt, as they look today

KEY TERMS

pyramid a massive monument of ancient Egypt that has a rectangular base and four triangular faces that finish in a single point; they are built over or around a crypt or tomb

free a term used to describe people in ancient times who were not slaves

Some historians argue that each **pyramid** was constructed by slaves, but there is evidence to suggest that the pyramids were built by **free** workmen from nearby villages. Probably both slaves and free workers were involved in the building. Some of the biggest arguments between historians are about how the ancient Egyptians transported the stones from the quarries, and how they lifted the stones to create the high pyramids.

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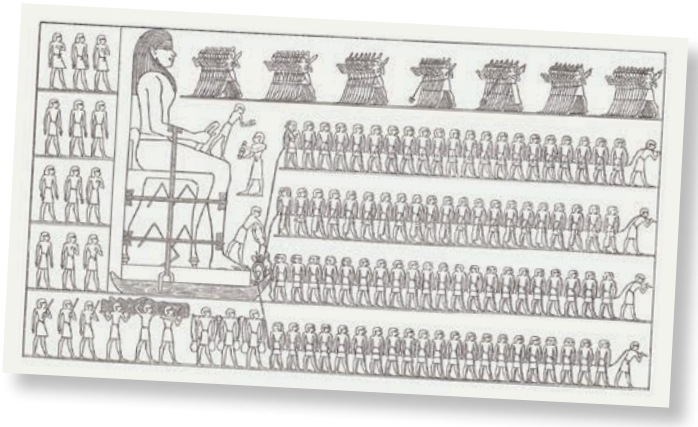
The internal walls of the pyramids are covered with engravings showing ancient Egyptian life. These pictures are some of the best sources of information we have about how ancient people lived in Egypt and how they understood the world. For example, the engravings include images of rulers, gods, farming, social rules and rituals.

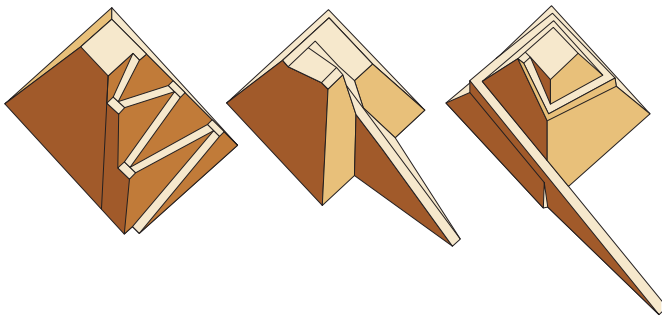
Every historian would like to know how the ancient Egyptians lifted the stones of the pyramids into their final positions – sometimes the placement of the stones is over 140 metres high. Generally, historians agree that a ramp of some kind must have been used, but the details are not known. Did long straight ramps reach out from each side of the pyramids? Did the ramps spiral around the sides of the pyramids like a coiled snake? Perhaps the ramps zigzagged up the pyramids' sides? Some even argue that ramps were built inside the pyramids! The truth is, we cannot yet say for certain how ramps were used because there is not enough evidence for one way over another.

Regardless of how the stones were lifted into place, we do know that the pyramids required a huge amount of work. Just looking at them can raise many other questions. For example:

- How did a harsh desert environment support so many workers?
- How was ancient Egyptian society organised to make this possible?
- What did this society believe to lead them to create such spectacular tombs?
- How did the rulers wield such power?



▲ **Source 2.2** A drawing of an engraving from the tomb of Pharaoh Djehutihotep. It shows 172 figures pulling an enormous statue on a sledge. Is this how the Egyptians hauled the stone for the pyramids?



▲ **Source 2.3** This illustration shows the competing theories of ramps in the pyramids' construction. Looking from above, the first drawing shows a ramp zigzagging down the side of the pyramid ramp, the second drawing shows a straight ramp and the third drawing shows a spiralling ramp around the pyramid. Which do you think makes the most sense?

MAKING THINKING VISIBLE 2.1

Think, puzzle, explore

You may already know a thing or two about the ancient Egyptians before you read this chapter. Use 'think, puzzle, explore' to put your knowledge to work.

1. What do you *think* you know about ancient Egypt?
2. What question or *puzzle* do you have?
3. What do you want to *explore* about ancient Egypt?

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Chapter overview

Introduction

Have you ever wondered what is inside the pyramids or how people were mummified? These are among the many secrets of ancient Egypt. The ancient Egyptians were one of the world's earliest human civilisations. They were among the first people to organise themselves into a large society that included a government, religious beliefs and unique cultural practices.

There are a lot of things about Egypt that are similar to today, but there is also a lot that is very different and unique. Learning about ancient Egypt will help you to gain a better understanding about why Australia, and a lot of the world, works the way it does today.

Learning goals

After completing this chapter, you should be able to answer these questions:

- How did geography affect how ancient Egypt developed?
- How was ancient Egyptian society organised?
- What changes took place in ancient Egyptian society and what impact did these changes have?
- What were the significant beliefs, values and practices of the ancient Egyptians?
- Why was Cleopatra a significant figure in ancient Egypt?
- How do archaeologists and historians uncover information about ancient Egypt?
- Why do we conserve the remains of ancient Egypt and how do we do it?

Historical skills

After completing this chapter, you should be able to:

- Explain what **cause and effect** means in the study of history
- Understand the role of historians and archaeologists in uncovering the past
- Develop historical empathy with people in the past
- Interpret primary sources in both print and visual form
- Evaluate the reliability of primary sources
- Correctly use special terms specific to the topic under study
- Use factual evidence (dates, statistics, examples) to substantiate an argument.

► **Source 2.4** The Great Sphinx of Giza in front of the Great Pyramid

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Cambridge University Press

Timeline of key events

What came before this topic?

- **c. 3500 BCE** People arrived in Egypt and settled along the Nile river valley

Are these people bathing in the River Nile like the ancient Egyptians did?

Hieroglyphic script from a wall in the Teti pyramid in Giza

c. 3100 BCE
King Narmer becomes the first pharaoh when he unites Upper Egypt and Lower Egypt

Unification period

Early dynastic period

c. 3000 BCE
Hieroglyphic script is developed

c. 2670 BCE
The first stone pyramid is built at Saqqara

Early dynastic period

The step pyramid of the Djoser is the oldest Egyptian pyramid and the world's oldest stone building

Old Kingdom period

c. 2613–2181 BCE
The great pyramids at Giza are built

c. 2040–1640 BCE
The high point of ancient Egyptian art and architecture

Middle Kingdom period

New Kingdom period

c. 1336 BCE
Tutankhamun becomes pharaoh of Egypt

Timeline questions

1 Use the timeline to list some of the well-known individuals who lived in ancient Egypt. What did these people do?
2 Research and write about one of the significant events shown on the timeline. Describe the *causes* of this event as well as its *effects*.

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What came after this topic?

- **30 BCE** After Queen Cleopatra VII's death, Egypt becomes part of the Roman Empire

The Colosseum is an oval amphitheatre in the centre of Rome

Ptolemy I ruled Egypt from 305–283 BCE

Late period

747–332 BCE
The Nubian, Assyrian and Persian armies conquer Egypt

305 BCE
Ptolemy I becomes pharaoh of Egypt

30 BCE
Cleopatra VII, the last pharaoh, commits suicide after failing to prevent a Roman invasion of Egypt

1279 BCE
Ramses II (The Great) becomes pharaoh of Egypt

332 BCE
Alexander the Great conquers Egypt

196 BCE
The Rosetta Stone is carved

New Kingdom period

Ramses II, who reigned until 1212 BCE

The Rosetta Stone in the British Museum

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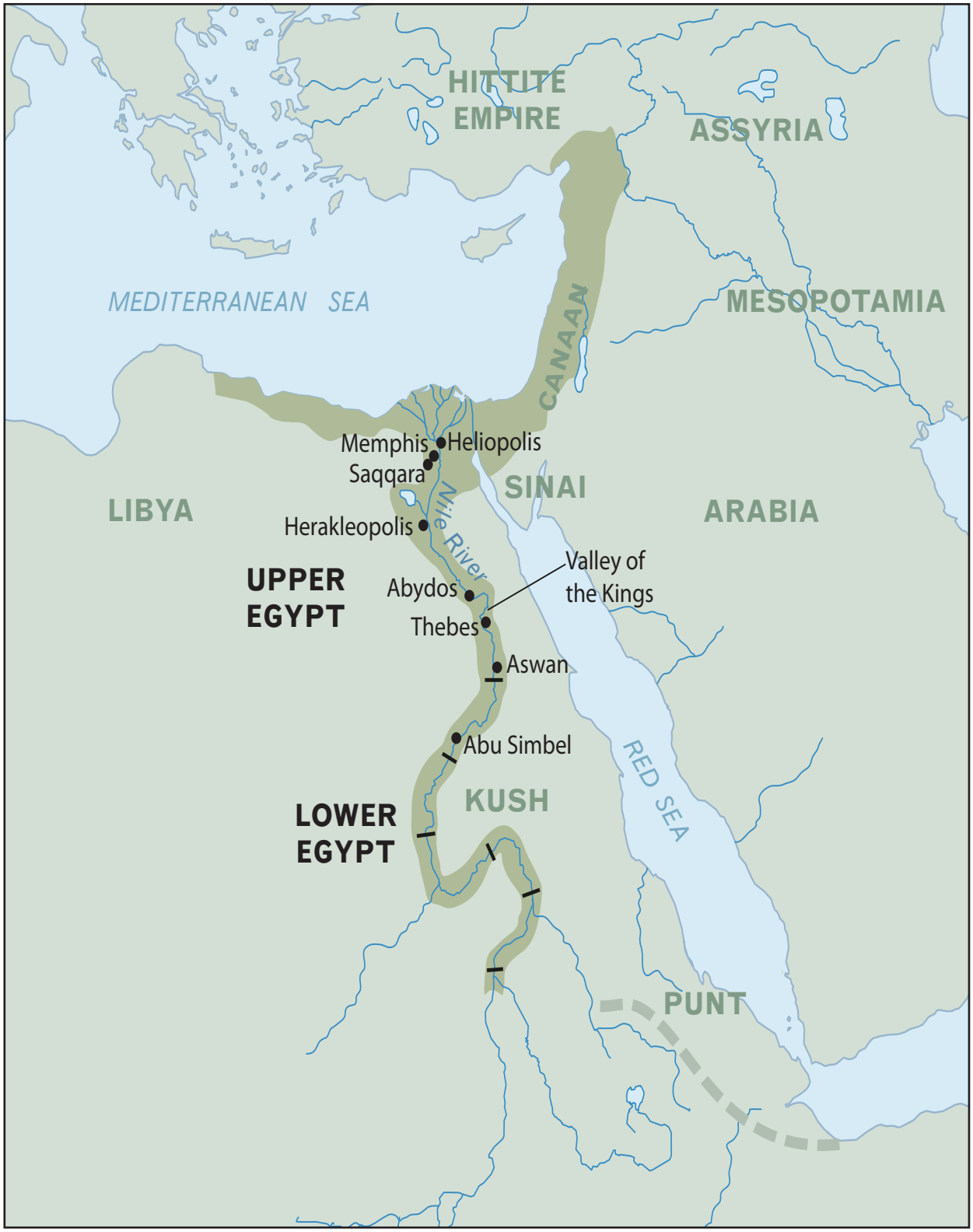
2.1 How and where did ancient Egyptian civilisation first develop?

FOCUS QUESTION

How did geography affect how ancient Egypt developed?



▲ **Source 2.5** Ancient Egypt (c. 5000–3000 BCE)

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Climate and geography

Positioned in the North of Africa, Egypt sits along the **Nile River** in the Sahara Desert. Egypt has only two seasons: a hot summer between May and October, and a mild winter from November to April. Temperatures range from very hot during the day to very cold at night-time and sometimes it snows in the south nearer the mountains. There is little rainfall for most of the year and people rely on the Nile as a source of fresh water.

When we look at an aerial photograph of Egypt (see Source 2.6), we can see the dark, fertile soil that surrounds the Nile. The lush green stands out next to the harsh yellow sand of the Sahara Desert. As the Nile River flows from the mountains in the south to the Mediterranean in the north, it creates a long, narrow strip of fertile farmland, which weaves through the desert like a ribbon.

Villages on the Nile

The Nile River was central to the development of Egyptian **civilisation**. Around 8000 years ago, groups of ancient peoples started settling along the Nile, coming from lands to the north-east in search of good land for hunting and farming. The dark soil on the riverbanks supported the villages that gradually established as the population grew. The people planted crops – mostly grains like wheat and barley – and raised animals along the river.

The farming settlements changed the way these early peoples lived. While hunters had to move around to follow herds of wild animals for food, farmers had to stay where they were to look after their crops. The early villages and cities were very primitive compared to today's villages and cities. The settlements began as small farms, gradually became villages and then turned into towns as the population grew. Around five thousand years ago, the different tribes and villages united to make the city of Memphis their capital.

▲ **Source 2.6** The Nile River, as seen from the space shuttle *Columbia* in 1996. You can see how the regions immediately surrounding the river are a rich and fertile green.

Inundation

Following the winter rains each year, the Nile would flood. The water level would begin to rise in June and peak in August, before returning to its lowest point in May. Every year the **inundation** would be slightly different, so Egyptians watched and measured water levels very carefully. Typically, water levels would rise over 12 metres at Thebes and 7 metres at Cairo. A large inundation would mean flooding that could destroy whole villages. A small inundation would mean there was not enough water for the farms, resulting in failed crops and thirsty animals. Without enough water, people would certainly go hungry. For the best harvest, the water levels would need to rise around seven metres, but no more than eight and no less than six.

KEY TERMS

Nile River the main river running through Egypt

civilisation a society that has developed an organised system of government, social customs and religious beliefs, as well as forms of technology that include writing and the arts

inundation the yearly flooding of the Nile River

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KEY TERMS

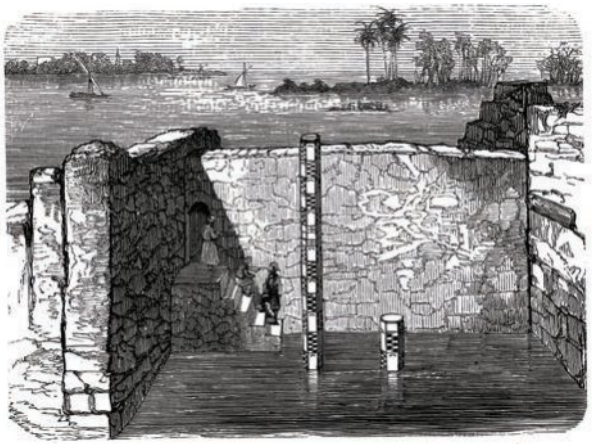
representation the way that someone or something is shown or described

silt rich, fine soil carried in the waters of a river

When a river as powerful as the Nile River flows down steep mountain slopes, it digs out soil and carries it along with it. Towards the bottom of the slope – as the land becomes flatter – the water slows down and spreads out, sometimes flooding the land near the riverbanks. The soil and minerals carried by the river settle and leaves thick layers of **silt**, which act as a fertiliser.

Black and red lands

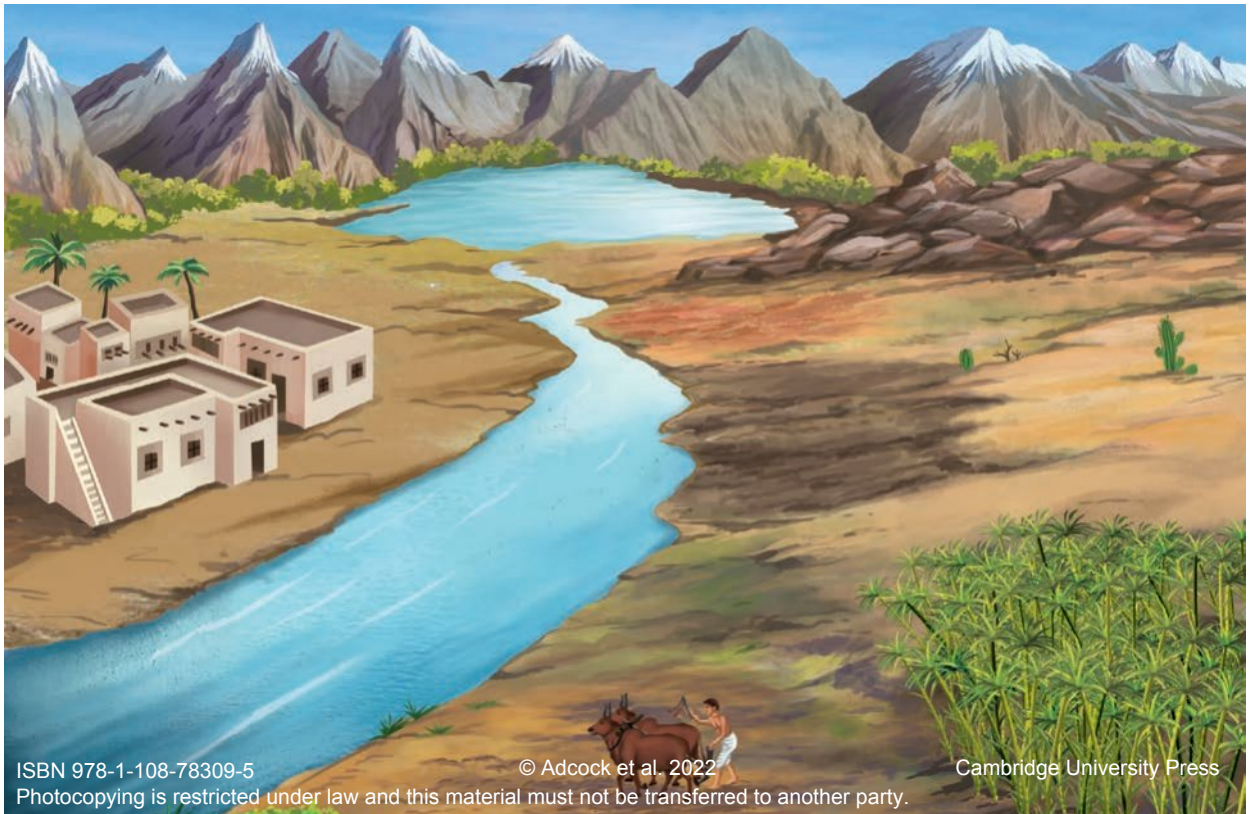
Every year when the flood waters receded, a layer of thick black dirt was left behind. The silt carried by the inundation was very fertile – full of rich vitamins and minerals – and blackened the areas near the Nile. The colour difference can be clearly seen in modern satellite images (see Source 2.6). Most people lived near this area, called the Black Land, as it was the best place to grow crops and farm animals. The rocky, sandy desert lands farther away from the Nile River were known as the Red Land, because of the colour of the soil. There was little rain in the Red Land, making it harder for plants and animals to grow, so fewer people settled there.



▲ **Source 2.8** This is a sketch of an ancient Nilometer that was drawn by a European visitor to Egypt in 1895 CE. The markings on the shaft indicated how the flood would behave.

▲ **Source 2.9** A common measurement of water levels seen today, based on the design principles of the Nilometer

▼ **Source 2.7** A modern artist's **representation** of life on the Nile in ancient Egypt



Amazing but true …

Each year, the inundation was measured with specially designed 'Nilometers' that measured the rise and fall of the waters. If the water level was low, there would be **famine**. If it was too high, the flood would be destructive. There was a specific mark that indicated how high the flood should be if the fields were to get good soil. The Nilometer was such a useful, yet simple, device that many variations can still be found around the world today.

DEVELOPING HISTORICAL CONCEPTS AND SKILLS 2.1

Using historical sources as evidence

The writings of the ancient Egyptians help us to understand what they thought and felt, and what their lives were like. These **primary sources** are the first and most important sources of information for historians. The document in Source A is a hymn, or song of praise, which the ancient Egyptians sang to their river when the inundation started. It tells us that they recognised the river as the most important thing in their lives. Examine the two sources here and then answer the questions that follow.

KEY TERMS

famine when there is not enough food for everyone in society

primary sources documents or artefacts that were created at the time of the historical event or era

SOURCE A

Praise to you, O Nile, that comes from the earth, and comes to nourish Egypt. He that spills out, giving the fields water to drink and making the people strong. He makes one man rich and loves the other. He that waters the meadows, he that Ra created to feed all cattle. He that gives drink to desert places which are far from water. He that makes barley and wheat, so that temples can keep festivals. Beloved of the corn god Keb. Helper of Ptah, god of all workshops and craftsmen. He that makes trees grow, so that men may have wood. The ship is built by his power.

If the inundation is poor, then men can no longer live and breathe, and all men are poor. The foods of the gods are short, and millions of men will die. When the river rises, the whole land is joyful, all jaws begin to laugh and every tooth is shown.

When the Nile floods, offerings are made to you, cattle are slaughtered for you, birds are fattened for you, prayers are said for you. You are fruitful, O Nile, you are fruitful, He that makes man to live on his cattle, and his cattle on the meadow. You are fruitful, O Nile, you are fruitful!

▲ **Source 2.10** A plain language adaptation of *The Hymn to the Nile Flood*, 19th dynasty (c. 1292–1190 BCE)

SOURCE B

◄ **Source 2.11** A writing board with lines from *The Hymn to the Nile Flood*, 19th dynasty (c. 1292–1190 BCE). The writing is inscribed in black and red ink on a board created from gesso on linen.

Responding to the sources

1. Who do you think would make a hymn praising the Nile River?
2. How many different types of food are identified in the hymn as being grown with the help of the Nile? List them.
3. How do you think that the Nile helped craftsmen in their workshops?
4. What were the results of a bad year of inundation?
5. How did the ancient Egyptians pay back the Nile for what it gave them?

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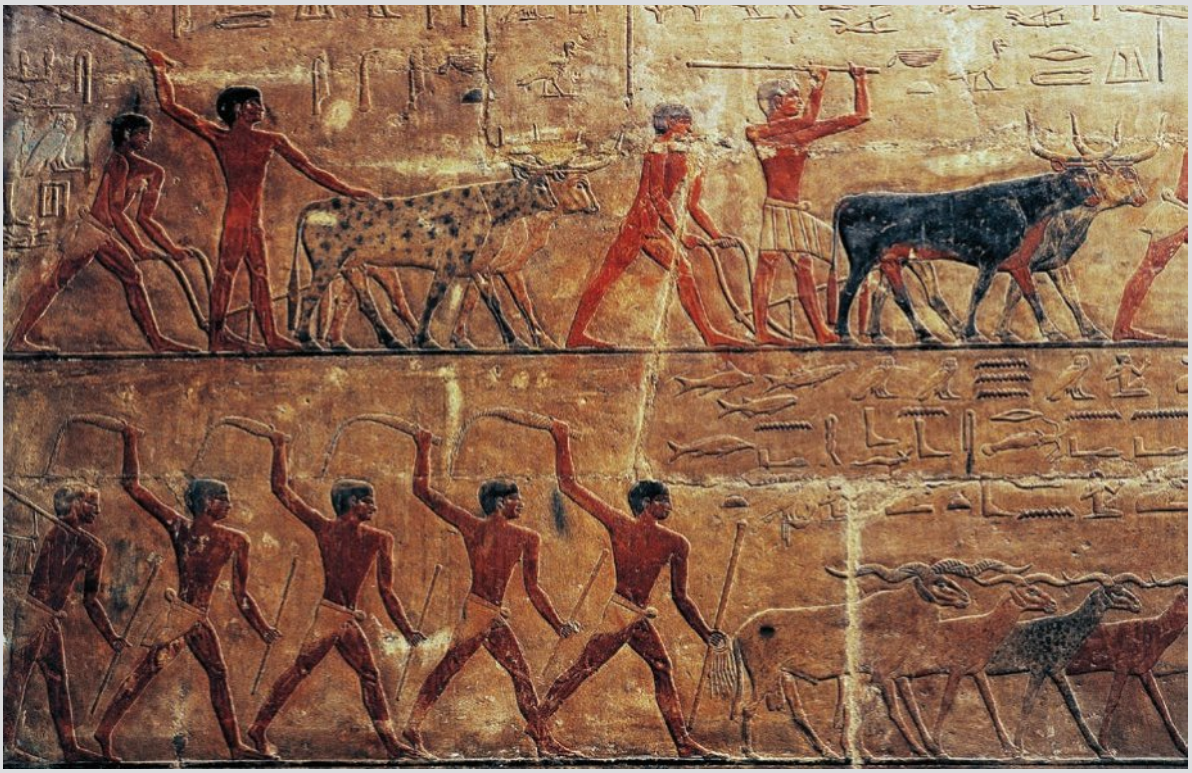
DEVELOPING HISTORICAL CONCEPTS AND SKILLS 2.2

Analysing cause and effect

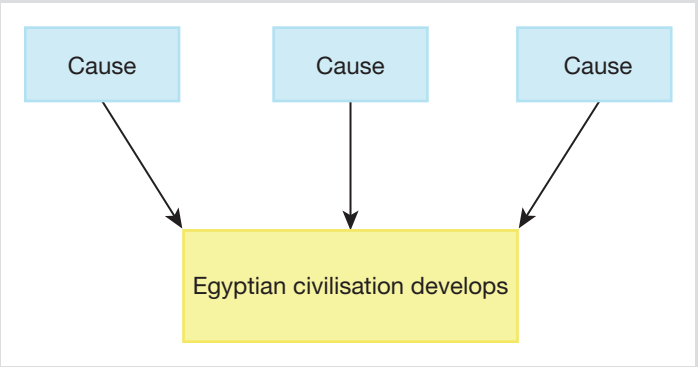
1 Every historian needs to be able to identify chains of cause and effect to examine how and why things happened in the past. *Causes* are events, people or conditions that lead to something happening (an effect). *Effects* are the changes that result from that thing happening.

Consider how Egypt's geography allowed civilisation to develop and flourish. Create a diagram that shows the causes of this and why they were significant. You can refer to Source 2.12 to help you get started. You can also refer back to the text you have read, as well as the information in the timeline from the start of the chapter.



▲ **Source 2.12** The Egyptians used the land around the Nile for many agricultural purposes. Pictured is an example of an agricultural scene, chiseled from limestone into a tomb wall, at the Saqqara Necropolis in Memphis, Egypt, discovered in 1979. How did geography and human development help this civilisation to grow?

Use the following example of a graphic organiser to help you.



2 Use the knowledge in your graphic organiser to write a paragraph that explains how ancient Egyptian civilisation developed. In your response, be sure to mention cause and effect.

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END-OF-SECTION REVIEW 2.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 How long is the Nile River?
2 What kinds of crops did farmers plant along the edge of the Nile River?
3 What term is used to describe the annual flooding of the Nile River shown in Source 2.13?

▲ **Source 2.13** Henry Noel Shore painted *The Pyramids During the Nile Flood, Egypt* in 1888 CE

4 What device did the ancient Egyptians use to measure the rise and fall of the flood waters of the Nile?
5 Explain what is meant by the terms 'black land' and 'red land'.

Interpret

6 Explain why the inundation was important to the ancient Egyptians.
7 Why is the *Hymn to the Nile Flood* an important primary source?

Argue

8 Explain why the Nile River was important to the development of civilisation in ancient Egypt.

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2.2 Life in ancient Egypt, and changes in society and their effects

FOCUS QUESTIONS

- How was ancient Egyptian society organised?
- What changes took place in ancient Egyptian society and what were the impact of those changes?

Unification

Egypt was a large land, and very long in shape. Before 3100 BCE, it consisted of a series of villages along the Nile. As these towns grew, two larger groups emerged in the north and in the south, known as 'Lower Egypt' and 'Upper Egypt'. These groups occupied very different places: Lower Egypt was warmer and flatter with fertile soil, whereas Upper Egypt was rockier and cooler. As the two groups grew, so did the tensions between them.

Kingdoms

The **unification** of Egypt under King Narmer is considered the start of ancient Egyptian civilisation. For most of this time, Egypt was ruled by a **pharaoh** who controlled and organised people all along the Nile River. To understand how society changed over this time, it can be broken down into smaller time periods. In ancient Egypt, we call these periods 'kingdoms'. Kingdoms were longer time periods when Egypt was generally stable and united under a **dynasty** or line of dynasties. The shorter periods of time in between the Old Kingdom, Middle Kingdom and New Kingdom are known as the 'intermediate periods', when Egypt was divided into competing groups with no single powerful ruler.

KEY TERMS

unification the process of combining things or people

pharaoh divine ruler of ancient Egypt; the term meant 'the one from the palace'

dynasty a succession of rulers from the same family; in ancient Egypt and China some dynasties included rulers that were not related to the ruling family

chariot a two-wheeled vehicle that was used in ancient times for racing and fighting; it was pulled by a horse or horses

Pharaoh or king?

'Pharaoh' was a term used for the rulers of ancient Egypt during the New Kingdom (1539–1292 BCE). Before this time, the Egyptians referred to their rulers as 'kings'.

Old Kingdom

During the Old Kingdom (3rd to 6th dynasties), Egypt was rich and powerful. It traded with neighbouring countries such as Punt and Nubia. This was also the age of the building of the great pyramids at Saqqara and Giza.

Middle Kingdom

During the Middle Kingdom (11th to 13th dynasties), the government was strengthened and Egypt became wealthy again. The capital was moved to a new site near the Fayum oasis, where it was possible to control Egypt better. Trade began again and the Egyptians even started to take over Nubia.

New Kingdom

During the New Kingdom (18th to 20th dynasties), the ancient Egyptians were confident, and played a greater role in trade and warfare in their region. Armed with a new weapon – the horse-drawn **chariot** – they conquered a large area. This included Nubia in the south, and Syria and Sumer in the north. Money flowed into Egypt which helped to finance the building of the many splendid temples.

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Amazing but true …

King Narmer's unification of Egypt made it the first example in the world of a **nation-state**. This means that one central government ruled an area of land with clear and fixed boundaries. It also means that the people felt themselves to be a part of the same nation and that they obeyed its rules.

ACTIVITY 2.1

Using historical sources as evidence

What evidence do we have about these changing periods? The Narmer Palette tells the story of King Narmer, who unified Upper Egypt and Lower Egypt. One side shows the gigantic figure of the king in battle, lifting his club to kill an enemy. The other side shows dead soldiers lying on the ground in front of the king.

On the side of the king going to battle, the king wears the high crown of Lower Egypt. The falcon that is shown represents the god Horus. The cow shown was the symbol of the goddess Hathor.

On the other side, there are rows of headless bodies and soldiers carrying military standards. There are two long-necked lions joined together, possibly representing Upper Egypt and Lower Egypt. At the bottom of the scene, the king is shown as a powerful bull attacking a fortress.

Historians say that the palette shows King Narmer conquering Lower Egypt and uniting the two lands under one strong ruler. Having one powerful ruler stabilised the ancient-Egyptian civilisation and ended the warring between the tribes.

▲ **Source 2.14** In this scene on the Narmer Palette, King Narmer wears the crown of Upper Egypt. He holds an enemy by the hair and is about to strike a blow. The scene is carved on a palette, which was a flat stone sheet used to mix cosmetics. It was probably made about the time of the unification of Upper Egypt and Lower Egypt in about 3100 BCE.

King Narmer was thought to have lived around 3100 BCE. He is sometimes referred to as King Menes. King Narmer ruled the nation-state from the new capital city, Memphis. From there, he created government departments, known as a **bureaucracy**, to help him rule up and down the Nile. Thus, Narmer was the first pharaoh of a unified Egypt.

Examine Source 2.14 showing the Narmer Palette, then answer the questions that follow.

KEY TERMS

nation-state an area of land ruled by a central government with clear and fixed boundaries

bureaucracy a system for controlling or managing a country, company or organisation that is operated by many officials employed to follow rules carefully

Responding to the source

1. What is a palette?
2. Identify King Narmer's main achievement in unifying ancient Egypt.
3. Describe what is meant by a 'nation-state'. How might it be different to a settlement?
4. What do you think was the overall message of the Narmer Palette? How effective do you think the message was?

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How was society organised in ancient Egypt?

From the start of ancient Egyptian civilisation, around 3100 BCE, the people believed their pharaoh was a god. They thought the pharaoh was descended from the great god Amun-Re and that he was the human form of the god Hathor. They believed that the pharaoh had magical powers and was responsible for keeping the gods pleased with the people of Egypt.

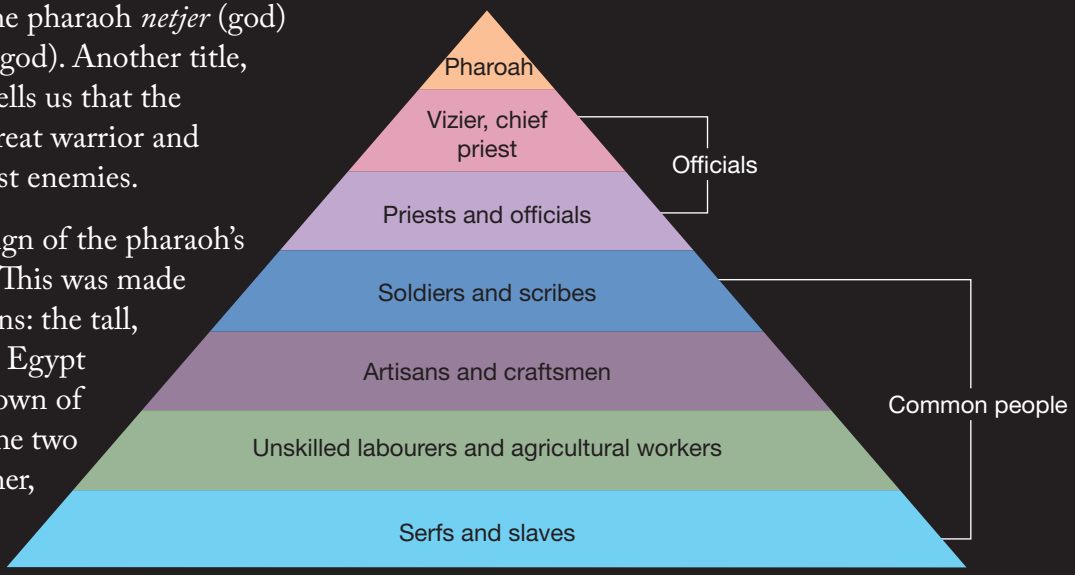
KEY TERM

inscription writing that has been carved into a hard surface, such as solid stone, to help people remember a certain person or event

▲ **Source 2.15** The pharaoh Menes combined the white crown of Upper Egypt (far right) and the red crown of Lower Egypt (middle) as a symbol of his rule over a unified Egypt.

Historians know the Egyptians revered the pharaohs because they have found **inscriptions** calling the pharaoh *netjer* (god) and *nefer netjer* (good god). Another title, *aa netjer* (great god), tells us that the pharaoh had to be a great warrior and to lead his army against enemies.

The most important sign of the pharaoh's power was the crown. This was made up of two earlier crowns: the tall, white crown of Upper Egypt and the shorter red crown of Lower Egypt. When the two crowns were put together, they symbolised the union of Egypt under one ruler.



▲ **Source 2.16** How ancient Egyptian society was structured

◄ **Source 2.17** A triple statue that has King Osorkon II in the centre between Isis (left) and Horus (right). The ancient Egyptians believed that the pharaoh was a god on Earth.

► **Source 2.18** This statue of Hatshepsut (1508–1458 BCE) shows her holding a flail and a crook. Hatshepsut was a female pharaoh during the New Kingdom (18th dynasty).

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Amazing but true …

The Egyptians believed that their male gods all had beards, so pharaohs wore strap-on beards to show that they were gods as well. This symbol was so important that even the three women who became pharaohs also wore false beards.

The pharaoh was usually shown with at least two important symbols of power. One was the 'flail', which was copied from a farmer's whip and symbolised the pharaoh's authority to make his people obey him. The second was the rounded 'crook', which is used by shepherds to pull sheep back to the herd and symbolised the pharaoh's role in guiding his people. The pharaohs also often wore large, jewelled collars and beautiful headdresses. The headdresses and collars were a sign of great wealth; the gold was valuable as were the semi-precious stones like the brilliant blue lapis lazuli.

As time went on, the idea of the 'warrior pharaoh' became very important. It was typical for Egyptian rulers to show themselves crushing their enemies or demonstrating feats of physical excellence. One king, Amenhotep II, stated that he could shoot an arrow through a copper target that was three centimetres thick!

◄ **Source 2.19** One of the coffins of Tutankhamun, a New Kingdom pharaoh who ruled c. 1334–1325 BCE

FAMOUS FACE

TUTANKHAMUN

Tutankhamun (c.1343–1324 BCE, New Kingdom) is one of the most well-known pharaohs. His name means 'the living image of Amun'. He is known as the 'boy-king', because he came to the throne at the age of nine. Tutankhamun reigned for ten years (1333–1323 BCE).He moved the capital of Egypt back to Thebes, away from his father's city of Akhetaten. Tutankhamun restored temples and statues of the gods of Egypt. He died quite suddenly in 1327 BCE. For some time, historians wondered whether he had been murdered by people who wanted to take over the throne. Recently, though, historians used modern medical machines, such as CT scanners, to look more carefully at his mummified body. In 2010 CE, they found that his left thigh bone had been smashed, perhaps in a hunting accident. This had created a deep wound, which may have become infected, leading to his death.

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ACTIVITY 2.2

Using historical sources as evidence

Examine Source 2.20 and then answer the questions that follow.

Responding to the source

1 What kinds of resources would be needed to build a statue like this in ancient Egypt?
2 How is this statue evidence of the power and authority of the pharaoh?

► **Source 2.20** This statue of Pharaoh Ramses II sits in the Luxor temple, which was constructed c. 1400 BCE

Vizier

The **vizier** was among the most powerful and wealthy of all the Egyptians. Viziers were appointed by the pharaoh and were usually a member of the royal family. It was the vizier's job to oversee the running of the country (much like a modern-day prime minister). The vizier's responsibilities included:

KEY TERMS
vizier the most important adviser and helper of the pharaoh
irrigation the practice of supplying land with water so that crops and plants will grow

- Making sure that there was enough grain
- Supervising **irrigation** projects
- Collecting taxation
- Settling disputes between nobles.

People like tax-collectors, judges, scribes and the treasury all reported to the vizier, who in turn advised the pharaoh.

Amazing but true …

The crocodile was an object of veneration in some ancient Egyptian temples. It was the subject of art (such as in the mosaic Source 2.21) and even the namesake of an entire Egyptian city: Crocodilopolis. However, the species was eventually made extinct along the lower Nile.

▲ **Source 2.21** A detail from the Nilotic mosaic of the flooding of the Nile River in Egypt (1 CE)

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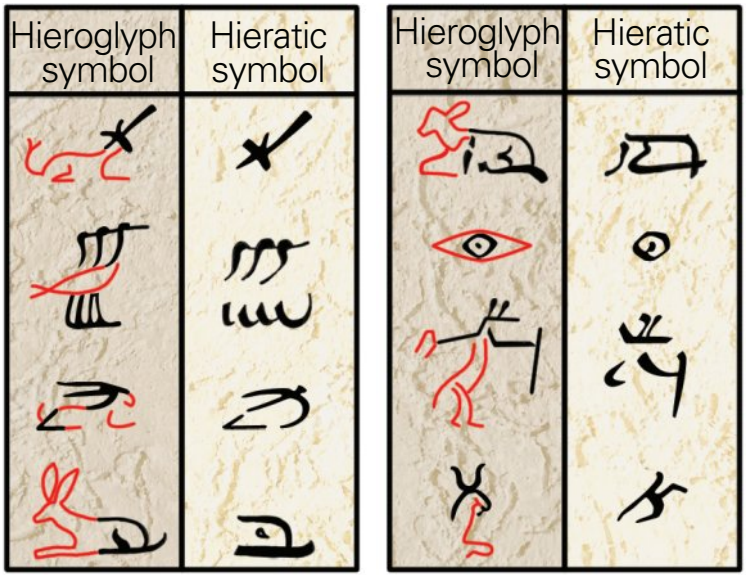
Writing

Hieroglyphs are the most famous form of Egyptian writing, but they were not used all the time. The simpler **hieratic** script was used more for everyday writing. Many symbols of the hieratic script are simplified versions of the more complex hieroglyphic script. Very few people learned to read and write, and it became a specialist job of priests and scribes.



▲ **Source 2.22** Here the hieroglyphic script is shown beside the hieratic script. It is clear that hieratic is just simplified hieroglyphs.

KEY TERMS

hieroglyphs a picture or symbol that represents a word or concept

hieratic a simplified version of the hieroglyphic script intended for everyday use

Scribes

Scribes assisted in the running of the government by keeping written records. Becoming a scribe meant years of training, so the position was highly respected. Only one per cent of the population learned to write. Scribes were all male and from rich families. The scribe Kheti wrote:

> This is the best of all jobs. There is no other position like it in the land. Every other worker has a boss, but the scribe is his own boss. If you can learn how to write, this will be very good for you.

▲ **Source 2.23** A quote ascribed to Kheti (ancient Egyptian treasurer)

Transport

There were not many roads in ancient Egypt, as the river was the main form of transport. Merchants would travel in large ships, full of goods like grain and linen. Builders had huge barges to carry heavy stones and other materials to and from construction sites. Wealthy Egyptians had pleasure crafts that they could take sightseeing or hunting. Boats going north travelled downstream easily in the currents. In contrast, the wind would usually blow in a southerly direction, helping boats using their sails to travel upstream towards the mountains.

▲ **Source 2.24** This frieze on the wall of the Tomb of Menna shows scribes recording information about crops during a harvest. It was painted during the New Kingdom (18th dynasty).

▲ **Source 2.25** This Egyptian tomb wall painting from Thebes (c. 11 BCE) shows rowers on the Nile

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Trade

The land around the Nile provided the ancient Egyptians with many natural resources. The flax plant was used to create linen cloth for clothing. There was copper, which could be used to make weapons and tools. Knives, axes and other tools could also be made from flint (a sharp stone). There was gold to be found in the mountains near the source of the Nile, which was used to make jewellery and decorative ornaments. All of these were traded along the Nile River, allowing Egyptians to sell and obtain items from afar. As Egyptian society prospered, trade routes became more sophisticated, and people came to rely on them for everyday items like cooking utensils, clothing and ornaments.

KEY TERM

shaduf hand-operated device for lifting water from rivers, used in ancient Egypt from 2000 BCE to irrigate the land

Irrigation

As ancient Egyptian civilisation prospered, more and more people relied on access to the water of the Nile. Over time, trenches and dams were built to store and share water across wider tracts of land. Canals allowed them to raise water from the Nile River and increase the amount of land available for farming. Dams allowed the Egyptians to save water for the drier months before inundation.

At first, farmers lifted the water by hand. During the Old Kingdom, they developed a ***shaduf***, a wooden arm with a counterweight on one end and a bucket on the other. The *shaduf* was operated by hand to lift water out of the Nile to water crops. Source 2.26 shows a copy of a painting from an ancient Egyptian tomb of a man operating a *shaduf*. Over time, more sophisticated systems were

▼ **Source 2.26** A scene of gardener using a *shaduf* from the Tomb of Ipuy at Deir-el-Medina

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developed by engineers and architects. Their jobs included making predictions about the timing and height of inundation, planning irrigation works, and organising people to work on the land after inundation.

Food

The main crops were wheat and barley, which were used for making bread and beer. Leeks, garlic, melons, squashes, lettuce, dates, grapes, pomegranates and olives were also grown. As there was only one harvest season, fresh food was only plentiful once a year. For the rest of the year the ancient Egyptians relied on salted or dried food. Animals such as goats, pigs, cattle and sheep were raised, and fish or ducks and geese could be caught in the marshes or bought from fishermen. The average Egyptian could not afford to eat meat, but instead used blood from their animals to thicken their stews and provide some protein. Animals were also kept for their wool, hides or milk.

Clothing

As Egypt was hot and dry, Egyptians generally wore clothes made of linen, which was cool and lightweight. Men wore kilts that went from waist to knee, while women wore shifts from chest to knee. Sometimes, farmers are shown wearing loin cloths. In winter, woollen cloaks were worn during the evening for warmth.

Men and women of all classes wore jewellery. Amulets depicting the gods were commonly carried to ward off evil, disease or other undesirables. The status of the person determined whether the jewellery was made of gold or bronze and if it contained semi-precious or glass beads. Typical jewellery items were armlets (worn on the upper arms), pectorals (large necklaces worn on the collarbone), earrings or cuff bracelets.

Children were often shown naked and with their heads shaved. Egyptians prized children, and they are often represented in art. Wealthier boys could learn to read and write, while girls would learn to manage the household. Sons of artisans would follow in their fathers' footsteps, while both boys and girls could help run the family businesses.

▼ **Source 2.27** Ancient Egyptian clothing from around 2200 BCE (the time of the Old Kingdom). The two figures to the right show the type of clothes Egyptian royalty would have worn, and the two figures to the left show the type of clothes the average Egyptian would have worn.

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Housing

Most ancient Egyptians houses, even palaces belonging to the pharaohs, were made of mud brick. The Nile's clay provided the building materials for these brick houses. Such constrictions were seen as temporary dwellings, as opposed to their tombs which were for eternity.

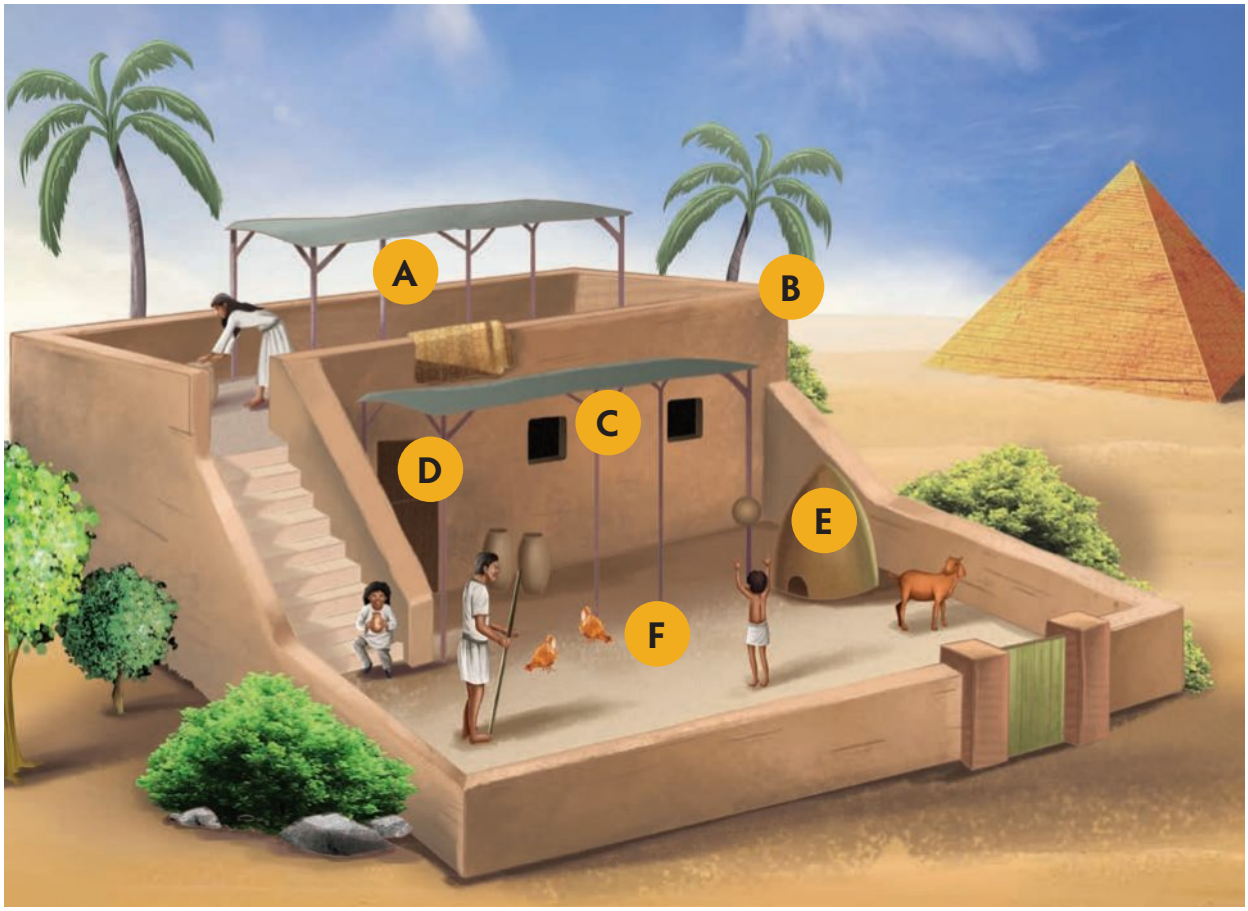
KEY TERM
frescoes pictures painted directly onto fresh plaster

There is more on tombs and the afterlife later in the chapter.

Housing for commoners were often two-roomed dwellings with a roof, on which the family slept at night. The kitchen was usually a wood fire in the rear yard of the house. Bathrooms, as we know them, did not exist. People used pots as toilets and washed either in rivers or with water channelled from them. Furniture was minimal, except for stools, as wood was scarce.

Wealthier housing was located close to the floodplain, so that the occupants could enjoy any breeze available from the water. These houses often had water features or ponds containing fish. They were usually decorated with **frescoes**. There would have been more furniture, such as beds with headrests, in the houses of the wealthy.

▼ **Source 2.28** A typical ancient Egyptian family at home



A The flat roof was often used for eating and sleeping

B Most Egyptians built their homes with bricks made of sun-dried mud from the Nile River

C Small windows let the little light, keeping the house cool

D Inside was an entrance hall, a room for social activities, a bedroom, a kitchen and storage space. There was little furniture

E Grains were stored for making bread or beer

F Animals were kept in an enclosed yard

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Health and medicine

Human remains from ancient Egypt tell us a lot about the health of the people who lived at the time. If you were a woman and made it past childhood, you could expect to live to the age of 30, unless you died giving birth first. If you were a man you could expect to live until the age of 34. It was rare to live past 40, and only possible if you could afford the best medical treatment. Many ancient Egyptians had ground down teeth from the sand that got into their food. Artists and craftsmen who worked in the Valley of the Kings had a high rate of arthritis in their knees and ankles from climbing up and down the mountain where the tombs were located.

A papyrus from around 1550 BCE, known as the Ebers Papyrus (after Egyptologist Georg Ebers), contains some medical advice that is quite accurate. It tells people to shave, keep clean, eat carefully and avoid raw fish. There is other evidence that the ancient Egyptians knew how to surgically remove tumours, as well as set broken bones and treat burns.

► **Source 2.29** This papyrus drawing of a fresco from the 14th dynasty shows an eye doctor treating a patient

END-OF-SECTION REVIEW 2.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 What was the name of each period of ancient Egyptian history?
2 Who controlled the large bureaucracy and reported directly to the pharaoh?
3 What was the name of the simpler form of hieroglyphics?
4 What natural resources were used for trade?
5 What was a *shaduf* used for?
6 What was the average life expectancy for men and women?
7 Why might Egyptians sometimes sleep on the roof?

Interpret

8 How did the Nile River help transportation in ancient Egypt?
9 How did the climate affect food, housing and clothing?
10 How were Egyptian houses built to make the most of the hot climate?

Argue

11 A strong centralised ruler allowed Egypt to build a mighty civilisation. Do you agree? Why or why not?
12 Explain how the features of ancient Egyptian houses reflected the geography and climate.

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2.3 Significant beliefs, values and practices of the ancient Egyptians

FOCUS QUESTION

What were the significant beliefs, values and practices of the ancient Egyptians?

Egyptian beliefs

Humankind has long used religion to help understand the mysteries of the world. The geographical features of Egypt were so important that many ancient Egyptian gods were partly inspired by the geography and animals of the region. Numerous gods are represented by some aspect of the environment, such as the rising of the Nile, the dangers of the desert or particular animals.

▲ **Source 2.30** A reconstruction of a fresco from a tomb at Thebes. The drawing shows the creation of the world. The sky-goddess Nut, covered with stars, is generated by Geb, god of the Earth.

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Gods

The ancient Egyptians were **polytheistic**, and the different gods they believed in had different roles and responsibilities. This made some gods more important than others. The ancient Egyptians worshipped their gods by singing hymns, writing poetry, and making sacrifices to them at temples and in their own homes. Sometimes they would pray to particular gods depending on their needs, such as praying to the Nile flood god, **Hapi**, to bring fresh waters for a good harvest. Gods this important were worshipped officially by the pharaoh and by priests in special temples devoted to each, whereas 'local' gods could be worshipped in particular towns and villages.

▲ **Source 2.31** A **bas-relief** of Hapi, god of the Nile in Flood at the Temple of Khnum in Esna. Hapi can be seen carrying produce such as grain. Why do you think this detail is important?

KEY TERMS

polytheistic believing in many gods

Hapi (or Hapy) the god of the annual flooding of the Nile in ancient Egyptian religion

bas-relief a sculpture where the figures project slightly from the background

ankh a symbol like a cross with a loop (an oval shape or circle) at the top, used in ancient Egypt to mean 'life'

was-sceptre a stylised animal head at the top of a long, straight staff with a forked end; it was an ancient Egyptian religious symbol

Worship

Ordinary ancient Egyptians did not practise their religion in the same way that people today might go to a church or a mosque. The temples were special places where priests took responsibility for praying to the gods and leaving offerings to make them happy. The pharaoh was the highest priest in the land, so could enter temples to talk to the gods who lived there. Ordinary people could give offerings and donations, as well as attend public ceremonies and events for their favourite gods. The pharaoh was thought to be somewhere between a representative of the gods and an actual god. Therefore, it was important that the pharaohs were in good health, well looked after and replaced quickly when they died.

The afterlife

Ancient Egyptians believed in a cycle of life, death and rebirth. Every evening, they saw the sun 'die' in the west, go through a period of rejuvenation only to be 'reborn' the following morning in the east. They believed that after death, they would journey through the underworld to be reborn in the afterlife. Many tombs contain everyday items like hairbrushes and water jugs; this suggests that they thought daily life would continue in much the same way as their normal life.

▲ **Source 2.32** The pharaoh was considered to be the god Horus on Earth. Horus was the son of Osiris and Isis. He was usually shown as having a male body with a falcon head. As shown here, Horus wore the double crown of Upper Egypt and Lower Egypt. He carried an **ankh**, which is a symbol of eternal life, and the **was-sceptre**, which is a symbol of his power.

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▼ **Source 2.33** The main gods of ancient Egypt

Atum God of the sun, who emerged from the sea and created all the other gods.

Tefnut Goddess of rain, often shown as a woman with the head of a lioness and a disc representing the sun.

Shu God of peace, lions, air and wind. Often depicted with feathers on his head, representing dry, warm air.

Geb God of the Earth, vegetation and snakes.

Nut Goddess of the sky, usually depicted with a water pot on her head.

Seth God of chaos, violence, deserts and storms. The Egyptians did not have an idea of good and evil, but rather order versus chaos. Represented as a male body with the head of an unknown animal – a curved snout and blunt ears. It has been argued that he resembles a camel, a donkey or an aardvark.

Osiris God of fertility, agriculture and chief judge in the afterlife. Often shown with green skin, representing the green of the Nile Valley and as partially mummified. When the pharaoh died, he ascended into the heavens to become united with Osiris.

Nephthys Goddess of death and the home, normally shown with a headdress shaped like a house and a basket.

Isis The wife of Osiris, and goddess of motherhood and magic. Sometimes worshipped as a sky goddess as she could transform into a bird. Usually represented as a woman wearing a sheath dress with a throne-style headdress and sometimes shown with wings.

Thoth God of wisdom, writing and medicine. Usually depicted with a male body and the head of an ibis (a sacred bird in Egypt). His long beak resembled the scribe's pen and he recorded judgements of people in the afterlife.

Amun-Re A god that became popular in the New Kingdom, due to his association with the pharaohs of the 18th and 19th dynasties. Amun was originally the god of air, but he was combined with the sun god, Re. Usually shown as a male wearing a golden double plume headdress.

Anubis God of embalming and the dead. Represented as a male body with a black jackal head, carrying an ankh.

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ACTIVITY 2.3

Using historical sources as evidence

The wooden model in Source 2.34 shows a funeral procession bearing gifts. The model was discovered in the early twentieth century in a hidden chamber in the tomb of a royal chief steward known as Meketre. The two men and two women probably represent Meketre's sons and daughters. They are walking in step on a narrow base. The base is yellow, which suggests that they are in the desert and on their way to their father's tomb. Together, the group is shown to be equipped with all the essentials for a proper burial and funeral ritual.

Examine the source and then answer the questions that follow.

◄ **Source 2.34** This ancient Egyptian wooden model shows a funeral procession bringing offerings for use in the afterlife. It was carved around 1981–75 BCE.

Responding to the source

1. What are the objects being carried?
2. How do we know this is a funeral procession?
3. Why do you think this model was hidden in Meketre's tomb?

Burial practices: Mummification

Some societies bury their dead in coffins, while others cremate them in fire. The ancient Egyptians did far more. When a person died, their body was taken to an embalmer, who would help to ensure that their body would last forever. They preserved the body so that it would not decay, giving them somewhere to live in the afterlife. Without an appropriate burial, the ancient Egyptians believed that a person's soul or life force would not reach the afterlife.

Amazing but true …

The ancient Egyptians created the domestic cat by taming the North African wild cat. Cats were called 'protectors of the grain' because they killed mice and rats. They were also trained to swim so they could pick up any birds that fell into the water during a hunt. Cats were worshipped in ancient Egypt and were even mummified so that they could accompany their owners in the afterlife.

▲ **Source 2.35** A mummified cat from ancient Egypt

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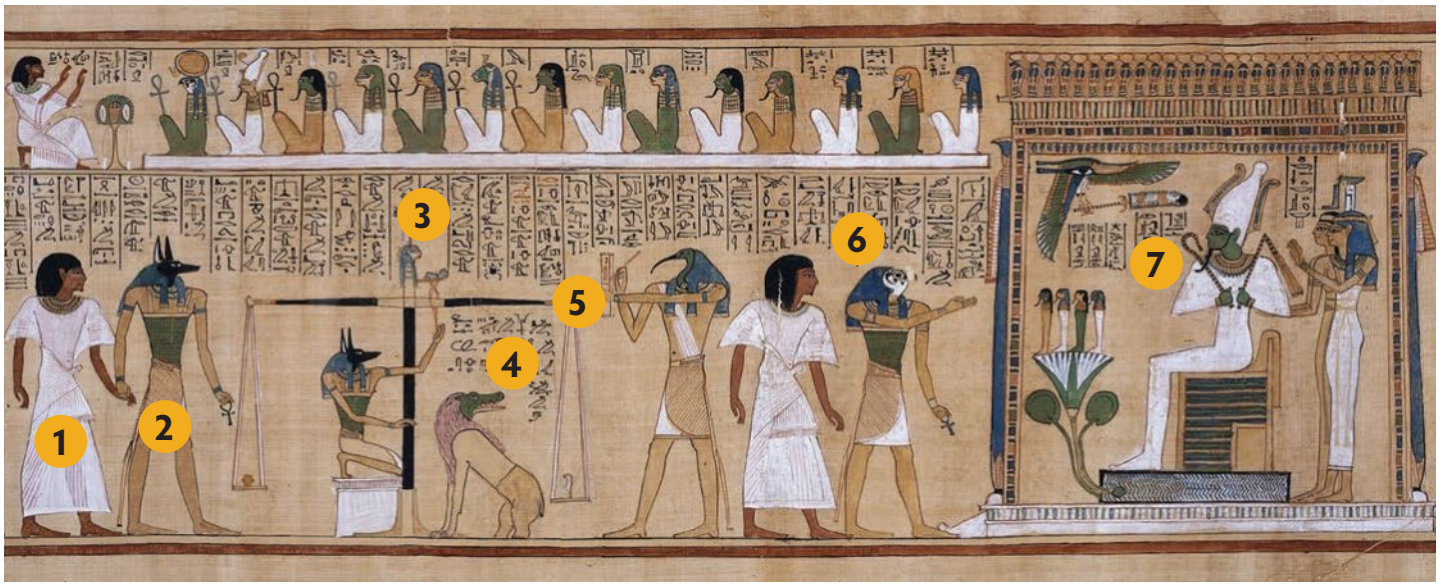
▼ **Source 2.36** An ancient drawing of someone who has died being judged in the presence of Osiri. Historians refer to it as the 'Judgement of Hunefer'.



1 **Hunefer** is the dead person in this image. He is being led into the judgement hall by Anubis. Hunefer was a royal scribe and the Book of the Dead was produced for him.

2 **Anubis** leads Hunefer into the hall. This jackal-headed god is the god of embalming and the dead. He was thought to oversee the process of mummification. In fact, many priests would wear a mask of Anubis during mummification ceremonies. A smaller Anubis can be seen weighing the heart.

3 **Ma'at** is the small figure atop the scales. We can recognise her by her ostrich feather, which represents truth. But Ma'at was more than just a god – it was also a concept; Ma'at was the ethical principles ancient Egyptians lived by, such as honour and truth.

4 **Ammit** will consume Hunefer if his heart is too heavy with sin. Ammit, 'the Devourer', is depicted here as a fearsome beast. He is part crocodile, part lion and part hippopotamus. Once consumed by Ammit, the dead cease to exist.

5 **Thoth** is to the right of the scales. Thoth is ibis-headed and records the results of the weighing. It is said that Thoth gave written language to the Egyptians so many scribes took him as their patron. Thoth is a god of equilibrium and balance, so it is not surprising to see him associated with Ma'at (divine balance).

6 **Horus** is the falcon-headed god and can be seen leading Hunefer. If Hunefer has told the truth, Horus will lead him forward to the throne of Osiris to worship the god of the underworld.

7 **Osiris** is seated under the canopy. He is with his sisters Isis and Nephthys. Among other titles, Osiris is Lord of the Underworld and Judge of the Dead. Once Hunefer has been proven righteous before Osiris, he can pass through to eternity in the Field of Reeds.

MAKING THINKING VISIBLE 2.2

What makes you say that?

Look closely at Source 2.36, then answer the following questions.

1 Who is Hunefer?
2 What is happening in this picture?
3 Why are some people shown twice?
4 What do you think might be happening at the very top of the picture?

Many of the Egyptian gods were influenced by their landscape, so it is no surprise that their burial practices were influenced by it too. There is a chance that **mummification** was discovered by accident in the hot Egyptian sun. The ancient Egyptians became so good at their craft that many mummies found today are in excellent condition.

KEY TERM

mummification a method of preserving a dead body by removing the internal organs and drying out the body

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▼ **Source 2.37** The process of mummification for a wealthy person in ancient Egypt

The body is laid out and washed. Any missing body parts are replaced with wooden substitutes.

The internal organs, except for the heart and kidneys, are removed. These organs are placed in **canopic jars**. The brain is removed through the nose, using a long hook, and the body is packed with natron.

The wrapped body is placed in a decorated wooden sarcophagus. The sarcophagus was decorated elaborately depending on how wealthy the person was.

There is a procession led by people wailing and crying (some of them official mourners paid to cry). The body crosses the Nile River in a boat, landing on the western side of the river. This symbolises the journey into the afterlife. Prayers are read by the priest and animals are sacrificed.

The sarcophagus is taken to the tomb, where the priest performs an important ceremony called 'The Opening of the Mouth'. Offerings are made to the deceased to keep the person nourished in the afterlife. Ancient Egyptians would often mummify animals, such as cats or birds, to protect and comfort the deceased.

KEY TERM

canopic jars jars for preserving the internal organs of the deceased, as part of the process of mummification; different jars were made for different organs

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Burial practices: tombs

As ancient Egypt became more prosperous, so did the pharaohs. In order to show their respect to the gods, the pharaohs built bigger and more complex tombs. These tombs had features like dead ends to guard against graverobbers, who might try to steal treasure.

The great pharaoh Tutankhamun is famous for his tomb. All pharaohs were buried with many treasures so they could use the objects in the afterlife, but most tombs were later robbed. The entrance to Tutankhamun's tomb was accidentally covered over by the building of a worker's hut. This kept the entrance hidden until the British archaeologist Howard Carter discovered it in 1922. For the first time, historians could see a complete royal burial. You can see Tutankhamun's treasure in the Egyptian Museum in Cairo.

▲ **Source 2.38** This mummy is on display at the Philadelphia Academy of Natural Sciences. You can see the painted **sarcophagus** in the background.

KEY TERM

sarcophagus a stone coffin decorated with sculpture or inscriptions

▼ **Source 2.39** This replica of inside Tutankhamun's tomb shows how some of the objects were arranged. We can see the beds and furniture Tutankhamun wanted to take with him into the afterlife!

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Amazing but true …

Ancient Egyptian tombs are one of the most common examples of tomb or grave robbery. Most of the tombs in Egypt's Valley of the Kings were robbed within one hundred years of their sealing. This includes the tomb of the famous King Tutankhamen, which was raided at least twice before it was discovered in 1922. Luckily for us today, ancient Egyptian pharaohs often kept records of the precious items in their tombs. This is useful because archaeologists can do an inventory check for any missing items from a tomb. Famously, the pharaohs left warnings in the tombs to caution intruders of the calamities and curses that would befall anyone who touched the treasure or the bodies. These warnings did little to put off grave robbers.

▲ **Source 2.40** An illustration from the early twentieth century is an imagined representation of tomb raiders at work

Pyramids

The most famous tombs of ancient Egypt are the Pyramids of Giza, but there are many more. Most were built to the west of the Nile River, where the sun sets, as this location was thought to be closer to the resting place of the gods. The most well-known pyramids were all built in the Old Kingdom period. The Middle Kingdom and the New Kingdom did not build pyramids in the same style as the Old Kingdom and they were not as large.

Amazing but true …

Cleopatra is closer in time to us today that she was to the building of the great pyramids of the Old Kingdom!

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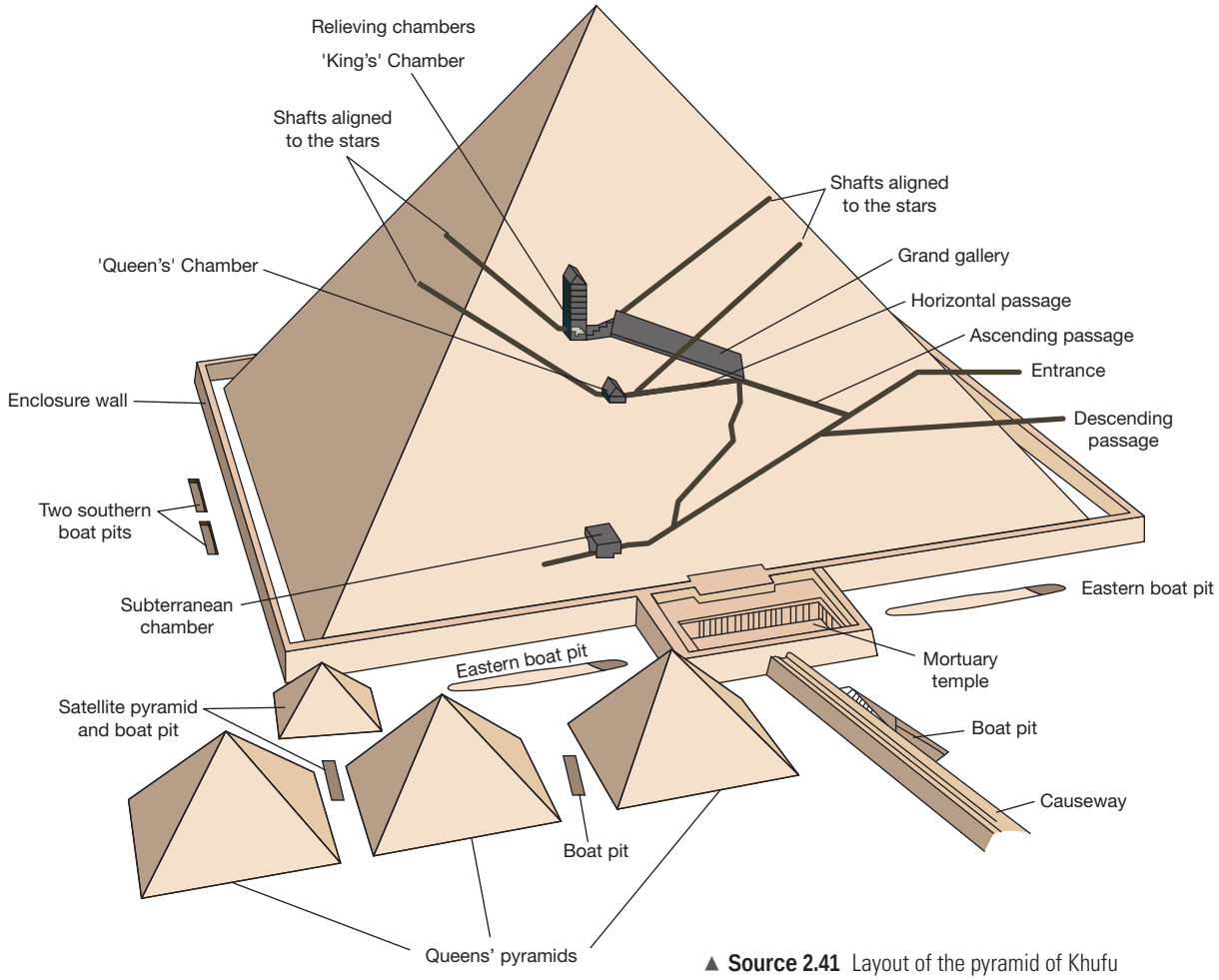
The pyramid of Khufu

The pyramid of Khufu, sometimes referred to as the Great Pyramid of Giza, is the largest pyramid of three built by the pharaoh Khufu. It was constructed during the Old Kingdom and has three main chambers. Source 2.41 shows the layout of the buildings and the Great Pyramid's interior.



▲ **Source 2.41** Layout of the pyramid of Khufu

END-OF-SECTION REVIEW 2.3

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Which ancient Egyptian god was the god of the sky?
2 Which ancient Egyptian god represented the Nile River?
3 Anubis was responsible for what aspect of existence?

Interpret

4 Why did the ancient Egyptians mummify bodies?
5 Explain what the purpose of the pyramids were and how they were used.

Argue

6 What do the ancient Egyptian gods tell us about how the natural world influenced what they believed? Provide specific examples in your response.

Digital quiz
Please see the Interactive Textbook to access digital activities

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2.4 Contact and conflict with other societies

FOCUS QUESTION

How did ancient Egyptian society interact with other civilisations at the time?

The Battle of Kadesh

Ancient Egypt was not an isolated kingdom. It had a lot of contact with other civilisations in the Mediterranean region. Much of this contact was peaceful trade, but there were times of conflict as well. One of the most famous battles was the Battle of Kadesh. Studying this battle tells us a great deal about ancient Egyptian society.

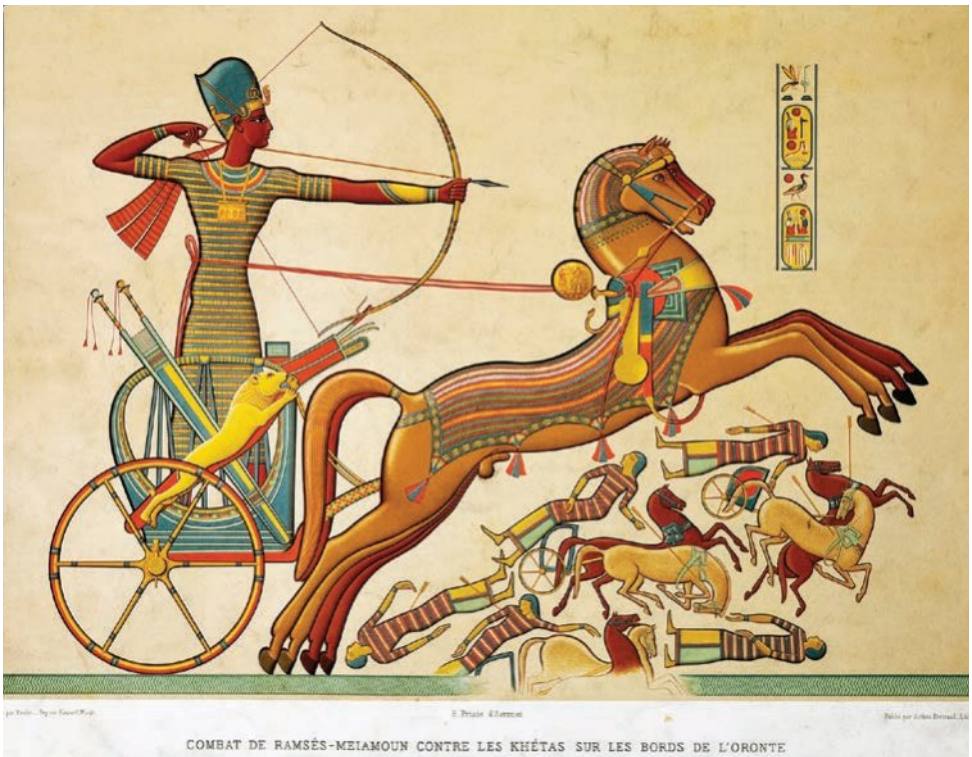
Causes

The Battle of Kadesh took place in 1274 BCE, during the reign of Pharaoh Ramses II. Egypt and a group called the Hittites had been enemies for a long time. Ramses II was young, ambitious and keen to prove that he was a great pharaoh. He wanted to claim Kadesh, controlled by the Hittites, for Egypt. This takeover of land would give more trade to Egypt, while also driving away the Hittites and expanding Egypt's territory. To achieve this, Ramses II set out to Kadesh with over 20 000 soldiers, including 2000 chariots, to conquer the Hittites.

Events

As Ramses II's army neared the city of Kadesh, his men captured two nomads who told Ramses II that the Hittites had retreated and that Kadesh was unprotected. Ramses II continued to advance with just his personal guard and set up camp not far from the city, leaving the majority of his army behind. Little did Ramses II know, he had walked into a trap. The truth was revealed when two Hittite spies were captured. They were beaten until they confessed that the Hittite army was actually nearby. Ramses II ordered his vizier to quickly bring up the rest of his army.

▼ **Source 2.42** A coloured engraving of a bas-relief depicting Ramses II going into battle at Kadesh. The image was created in the late nineteenth century.



One of Ramses II's main army divisions was crossing a river when they were attacked by Hittite chariots. They were not in battle formation and were quickly overwhelmed. Many of the soldiers in Ramses II's army dropped their weapons and ran away. The Hittite chariots then rounded and headed for the camp where Ramses II was stationed.

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Ramses II was now trapped between the Hittite army, with only a quarter of his forces available to fight. The odds were not in his favour. Ramses II's personal guard formed a shield wall around the camp, which was smashed by the Hittite chariots. However, once the Hittites were in the camp, the heavy, clumsy chariots were slowed by many obstacles, such as tents. Ramses II mustered his courage and prayed to Amun for help.

The Hittites were overconfident in their victory, so they stopped to plunder gold and other Egyptian treasures in the camp. Ramses II knew he had to fight out of the bad position he was in. He led a successful counterattack and broke through the Hittite ranks to reach the approaching remainder of his army.

> *There was no officer with me, no charioteer, no soldier. My infantry and my chariotry had run away before the enemy and no one stood firm together with them.*

With the remainder of his army, Ramses II managed to force the Hittites back towards a river. Supposedly, many of the Hittites drowned in the river as they desperately tried to escape. The remaining Hittites who had not yet joined the battle were forced to retreat behind the walls of Kadesh. Ramses II, unable to support a **siege**, was also forced to retreat. He did not attempt to capture Kadesh. Interestingly, both sides of the battle claimed a decisive victory!

KEY TERM

siege surrounding a place with an armed force in order to defeat those defending it

ACTIVITY 2.4

Using historical sources as evidence

The following is an account of the battle attributed to pharaoh Ramses II himself.

> There was no officer with me, no charioteer, no soldier. My infantry and my chariotry had run away before the enemy and no one stood firm together with them. I prayed: 'What is happening, Amun my father? Is it right for a father to ignore his son? Are my deeds something for you to ignore? … I know that Amun charioteers, more than ten thousand brothers and sons …'
>
> Although I prayed in a distant land my prayer was heard in Thebes. Amun came when I called to him; he gave me his hand and I rejoiced … I found that my heart grew stout and my breast swelled with joy. Everything which I attempted I succeeded … I was before the enemy like Seth in his moment. I found the enemy chariots scattering before my horses. Not one of them could fight me. Their hearts quaked with fear when they saw me and their arms went limp so they could not shoot. They did not have the heart to hold their spears. I made them plunge into the water like crocodiles. They fell on their faces, one on top of another. I slaughtered them at my will … Those who fell down did not rise …
>
> I raised my voice to my soldiers, 'Be of brave heart, my troops. Behold I am victorious; me alone! For Amun is my helper, his hand is with me … But you have all been cowards. Not one of you has stood fast by my side as I fought …'

▲ **Source 2.43** Stories from the battle of Kadesh, in the words of Ramses II, quoted in Joyce Tyldesley, *Ramses II: Egypt's Greatest Pharaoh*, Penguin Books, 2000, pp. 70–1

Responding to the source

1. At what point in the Battle of Kadesh does this account fit?
2. Do you believe Ramses II's account given here? Why or why not?
3. Why might Ramses II have written this account?

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Effects

As Ramses II had caused the enemy to retreat, he went back to Egypt to tell of his victory in battle. This helped to solidify his power, because the people perceived him to be a powerful leader. Ramses II had many images of his 'victory' carved into temple walls so that every Egyptian knew of how he 'defeated' the Hittites in battle. This helped Ramses II to be seen as a great and powerful pharaoh.

Egypt's ongoing war against the Hittites would ultimately end in what is considered to be the world's first peace treaty. The treaty was set for 90 years of peace between the two civilisations, and allowed for an increased trade and sharing of technological advancements.

◄ **Source 2.44** The remains of a copy of the Treaty of Kadesh, which historians consider to be the world's first peace treaty

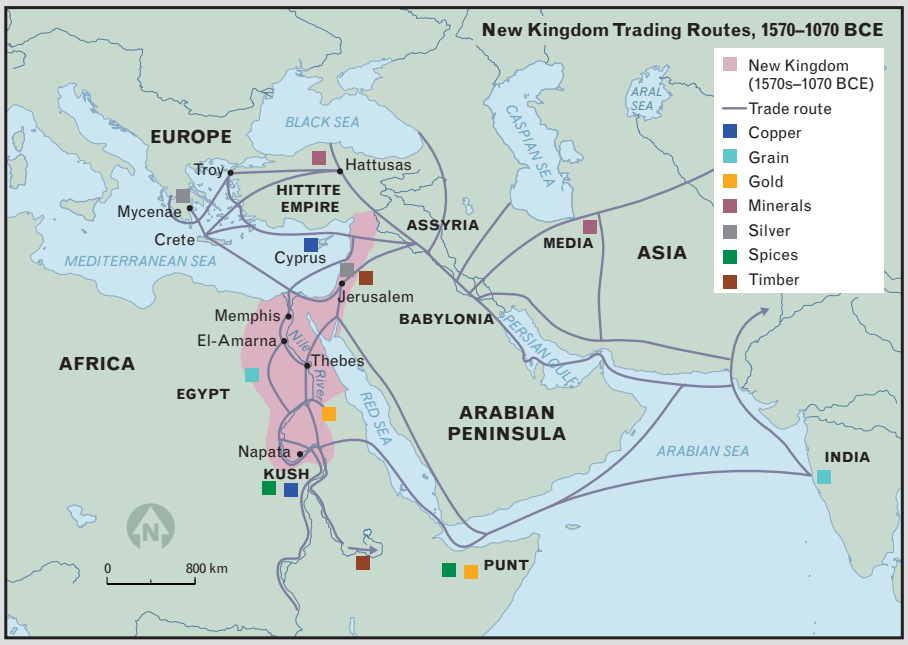
DEVELOPING HISTORICAL CONCEPTS AND SKILLS 2.3

Interpreting maps

Maps are used in everyday life for a variety of reasons, including travel. They are also a crucial tool in the study of history. Maps give us a geographic context for the information we learn about. They present information about the past in a visual way, which sometimes is a more powerful and engaging way to deliver information than the written word.

Interpreting the map

1. Examine Source 2.45. Where did ancient Egypt source gold?
2. How do you think gold was transported from Nubia to Egypt?
3. What goods do you think ancient Egypt exported or traded?



◄ **Source 2.45** The New Kingdom's trading partners as well as some of their imports and exports during 1570–1070 BCE (you can zoom in on this map in the digital versions of the book)

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Trade

The wealth created by the prosperity of the ancient Egyptians meant that they could produce more than they needed to survive. They were able to trade their surpluses for other goods from other civilisations. Ancient Egypt had many things to offer, including gold. Gold was already considered to be a precious metal at that time and there was much of it to be mined in the mountains to the south.

Ancient Egypt's prosperity meant that some people were wealthy and did not have to work in the fields to grow food. They were able access education and train to be scribes or builders. Soon, specialist trades arose and the ancient Egyptians became skilled in science, mathematics and the arts. The capital, Alexandria, in the New Kingdom was known as a centre of learning and wisdom.

▲ **Source 2.46** Tutankhamun's golden death mask weighed over 10 kilograms. The mask lay on top of the shoulders of the mummy, which was then encased in an inner coffin of solid gold.

The end of Egypt

Ancient Egypt came to an end when it was conquered by the Roman Empire in 30 CE. Egypt continued to be an important region, providing a significant amount of food and resources to the Roman Empire, but it lost its independence and became a province of the Romans.

END-OF-SECTION REVIEW 2.4

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Which city did Ramses II fail to capture?
2 What resources did Egypt regularly trade?
3 Which people did Ramses II fight against at the Battle of Kadesh?

Interpret

4 How did Ramses use the Battle of Kadesh to strengthen his position in Egypt?
5 How did Egypt's wealth of natural resources affect what jobs people could do?

Argue

6 The Battle of Kadesh was a great victory for Ramses the Great. Do you agree? Why or why not?

Digital quiz
Please see the Interactive Textbook to access digital activities

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2.5 The role and achievements of a significant individual: Cleopatra

FOCUS QUESTION

Why was Cleopatra a significant figure in ancient Egypt?

Cleopatra

Cleopatra (69–30 BCE) is one of the most famous historical figures of all time. The last of the pharaohs, Cleopatra VII was the final ruler of the Ptolemaic dynasty and ruled Egypt from 51–30 BCE. She is celebrated today for her alleged beauty. Her love affairs with both Julius Caesar and Mark Antony of the Roman Empire are the stuff of legend. However, Cleopatra was an intelligent and skilled politician, who oversaw a difficult time in Egypt's history, and brought peace and prosperity to her people.

To learn more about ancient Rome, see Chapter 4.

A female pharaoh

Cleopatra was born around 69 BCE. When her father, Ptolemy XII, died in 51 BCE, 18-year-old Cleopatra became **co-regent** with her 10-year-old brother Ptolemy XIII. To uphold an Egyptian **tradition**, Cleopatra was then married to her brother. Though this sounds unusual to us today, back then new leaders frequently ruled alongside a sibling or cousin to preserve their bloodline. Sometimes this was complicated and the couples feuded over who was in charge.

KEY TERMS

co-regent a joint ruler

tradition a belief, principle, or way of acting that people in a particular society or group have continued to follow for a long time

Pharaohs were usually male descendants, but there were seven female pharaohs during the ancient Egyptian period. The most well-known female pharaohs are Nefertiti, Hatshepsut and Cleopatra. Although there were not many female pharaohs, women were often able to exert their influence in the domestic sphere. However, often we can only see their influence by reading between the lines of the evidence of ancient history that survives today.

Cleopatra and the Romans

In 48 BCE, Egypt became embroiled in the conflict in Rome between Julius Caesar and Pompey. Pompey fled to the Egyptian capital Alexandria, where he was murdered on the orders of Ptolemy. Caesar followed, and he and Cleopatra became lovers. Cleopatra, who had been exiled by her brother, was reinstalled as queen with Roman military support. Ptolemy was killed in the fighting and another brother was made Ptolemy XIV. In 47 BCE, Cleopatra bore Caesar a child – Caesarion – although Caesar never publicly acknowledged him as his son. Cleopatra followed Caesar back to Rome, but after his assassination in 44 BCE, she returned to Egypt. Ptolemy XIV died mysteriously at around this time and Cleopatra made her son Caesarion her co-regent.

In 41 BCE, Mark Antony, at that time in dispute with Caesar's adopted son Octavian over the succession to the Roman leadership, began both a political and romantic alliance with Cleopatra. They subsequently had three children – two sons and a daughter.

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In 31 BCE, Mark Antony and Cleopatra combined armies to take on Octavian's forces in a great sea battle at Actium, which is on the west coast of Greece. Octavian was victorious, and Cleopatra and Mark Antony fled to Egypt. Octavian pursued them and captured Alexandria in 30 BCE. With his soldiers deserting him, Mark Antony took his own life. Cleopatra also committed suicide; she died on 12 August 30 BCE. Egypt then became a province of the Roman Empire.

Cleopatra and Julius Caesar

Julius Caesar, who is one of the most well-known leaders of ancient Rome, came to Egypt just as the Roman Empire was beginning to grow in power. Cleopatra was at war with her brother; he had recently put her in **exile** because he was threatened by her power. To meet Caesar and convince him that she should rule, Cleopatra famously snuck into the royal palace at Alexandria rolled up in a rug. A courier then presented the rug to Caesar, who was impressed with her intelligence and supported her as the ruler of Egypt. It was rumoured that Cleopatra and Caesar then developed a romantic relationship.

Cleopatra and Marc Antony

After the assassination of Julius Caesar in Rome, a power struggle took place between his successor, Caesar Augustus, and Julius Caesar's old friend and general, Marc Antony. The romance between Cleopatra and Marc Antony is famous; they had a family together. However, Marc Anthony stabbed himself after hearing that Cleopatra had committed suicide rather than be defeated by Caesar Augustus. Marc Antony was still alive when he was carried to join Cleopatra in her tomb. Afterwards Egypt was brought directly under the control of the Roman Empire, which meant that Cleopatra was the last pharaoh of Egypt.

KEY TERM

exile the condition of someone being sent or kept away from their home, especially for political reasons

▼ **Source 2.47** A modern artist's representation of Cleopatra, the last of the Egyptian pharaohs

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ACTIVITY 2.5

Using historical sources as evidence

Often famous events of the past have been understood differently by different audiences. The legend of Cleopatra has been shown many times in plays, paintings and films over the years. Each representation emphasises a different aspect of her rule and actions, according to how the creators of each artwork understood her.

Examine the following sources and then answer the questions that follow.

SOURCE A

◄ **Source 2.48** This statue of Cleopatra from 1 BCE shows her in the Egyptian style. In the power struggle with her brother, she needed to show the ancient Egyptians that she was a powerful and the rightful pharaoh, and made in the image of the gods.

SOURCE B

◄ **Source 2.49** This source shows two sides of a Roman coin dated to 32 BCE. One side bears the image of Cleopatra, while the other shows the Roman ruler Mark Antony. Cleopatra was ruler in Egypt just as the Roman Empire was becoming more powerful, and the Egyptian civilisation weaker. Egypt relied on trade with Rome to survive, and the deals struck by Cleopatra helped the Egyptian people avoid open battle with the Romans. In this image, Cleopatra is shown in the Roman style, to help persuade the people using the coins that she was a friend of Rome.

SOURCE C

◄ **Source 2.50** *The Banquet of Cleopatra*, which was painted in 1743 by Italian artist Giambattista Tiepolo. *The Banquet of Cleopatra* depicts the world's most expensive wager. Found at the National Gallery of Victoria International in Melbourne, it shows Cleopatra and Marc Antony at a banquet in their finest clothes. All of the lines on the floor as well as the eyes of the onlookers point towards the glass she is holding. According to legend, they were having a contest where each tried to have a more lavish and expensive feast than the other. Cleopatra is shown placing a priceless pearl earring into a glass of vinegar to drink, winning the bet.

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SOURCE D

◄ **Source 2.51** Actress Elizabeth Taylor portraying Cleopatra in the 1963 Hollywood film, *Cleopatra*

Responding to the sources

1 Describe the way Cleopatra is represented in each of the sources.
2 Explain why Cleopatra is represented the way she is in each source.
3 What do you think the effects of Source A were on the ancient Egyptians?
4 What do you think the effects of Source B were on the ancient Romans?

END-OF-SECTION REVIEW 2.5

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Who ruled ancient Egypt at the time of the Roman conquest?
2 Which two Roman rulers was Cleopatra romantically involved with?
3 When was ancient Egypt eventually conquered by the Roman Empire?

Interpret

4 Why would Rome produce a coin with Cleopatra's face on it?
5 Why do you think Cleopatra was represented in different ways during her lifetime?

Argue

6 Why was Cleopatra a significant individual in Egyptian history?

Digital quiz
Please see the Interactive Textbook to access digital activities

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2.6 The process and importance of conserving the past

FOCUS QUESTIONS

- How do archaeologists and historians uncover information about ancient Egypt?
- Why do we conserve the remains of ancient Egypt and how do we do it?

Archaeology in Egypt

The ancient Egyptians were very good at keeping records and preserving important information. One of the best sources of information about ancient Egypt is the walls of the pyramids and other tombs. These kinds of sources are known as primary sources, as they were created at the time we are studying.

Not everything is easy to understand right away. The meaning of many hieroglyphs confused historians for a long time. In 332 BCE, Egypt became a part of the empire of Alexander the Great, and Greek became the official language. By 400 CE, the Egyptian language was forgotten and, after several hundred years, the hieroglyphs were a complete mystery to the whole world.

People who visited Egypt were frustrated to see thousands of written signs everywhere, obviously full of information, but they had no idea what they meant. For archaeologists, it was urgent to find the 'key' to unlock the signs.

In 1799, a soldier digging a trench at the town of Rosetta, uncovered a stone engraved with the same text written in three different languages. French leader Napoleon Bonaparte's scholars identified that the Rosetta Stone, as it was called, contained Greek and Coptic, which scholars could read, and Egyptian hieroglyphs. Years later, the English archaeologist Thomas Young began to translate the signs, which he passed on to the French historian and scholar Jean-François Champollion.

After years of study, Champollion realised that a hieroglyph could mean either a word, a part of a word or a sound. This created so many possibilities that the case seemed hopeless. However, he guessed that the signs contained in a box (a cartouche, as he called it) might be a name. He looked for a familiar name, and quickly found the pharaoh Ptolemy in the Greek text. Because Champollion also spoke Coptic, he guessed that the Egyptians might have said this name with an 'S' on the end. He looked for the same name in hieroglyphs. He found seven signs and tested whether they could have spelled out 'PTOLMYS'. He then compared this with the known cartouche of the late Queen Cleopatra. The hieroglyphs of her name spelt out 'KLIOPADRA'. There were three letters that were the same hieroglyph in both: 'P', 'O' and 'L'.

▲ **Source 2.52** Jean-François Champollion, the French historian who deciphered Egyptian hieroglyphs and unlocked many of ancient Egypt's secrets

In guessing how the two names sounded, Champollion had correctly identified twelve hieroglyphs. He then went through hundreds of other names of known pharaohs, and from them he worked out the entire Egyptian alphabet. The alphabet he created was almost completely accurate, although other discoveries have been made about some of the finer points of hieroglyphic writing.

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In this case, an important archaeological discovery helped to unlock many of the secrets of ancient Egypt! The Rosetta Stone is obviously a very helpful discovery, but every artefact found can ultimately tell us something about life in ancient times.

Recent discoveries

The ancient Egyptians were so good at hiding their secrets that many discoveries are still being made today. For example, in November 2018, archaeologists announced the discovery of a large tomb at the Saqqara **necropolis**. The tomb belonged to well-connected man named Wahtye whose titles, etched in the stones above the door, included 'royal purification priest', 'royal supervisor', and 'inspector of the sacred boat'. The discovery was significant for the many carvings and etchings, which are extremely well preserved considering the tomb is 4400 years old.

Methods of conservation

Evidence of the ancient Egyptians can be found in many places around the world, mostly in museums. Their history is so interesting and colourful that artefacts from their world are still very popular in galleries and exhibitions globally. Over time, however, disputes have developed over who has the right to keep and display the objects from ancient Egypt.

We have already looked at the Rosetta Stone, which has been kept at the British Museum in London since 1802. However, many Egyptians are requesting that the stone be returned to its home in Egypt. This raises tricky questions about how we treat discoveries from ancient times.

Do these artefacts belong to the people who found them? Or should they be kept in their countries of origin, out of respect for their heritage and national identity? Who gets to decide these things? These are questions that go far beyond the case of the Rosetta Stone. Many ancient artefacts were given as gifts long ago. Can Egypt reclaim the gifts given by their predecessors? Further, some objects are stolen! Unfortunately, there is a large market for stolen ancient artefacts. In 2010, U.S. customs seized a 3000-year-old sarcophagus at Miami airport. After some debate, the sarcophagus was returned to Egypt.

KEY TERM
necropolis an ancient cemetery

◄ **Source 2.53** These photographs give two different views of the Rosetta Stone (196 BCE). If you look carefully you can make out the hieroglyphic text carved into the stone. You can zoom in on this image in the digital versions of the textbook.

▲ **Source 2.54** This recently discovered tomb shows etchings of the priest Wahtye with his family members

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 2.6

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What discovery led to the deciphering of hieroglyphs?
2 What is a necropolis?
3 Who was the main historian who deciphered hieroglyphs?

Interpret

4 Why was the Rosetta Stone such an important discovery?
5 Why are many modern museums hesitant to return artefacts to their original home?

Argue

6 Explain if you think ancient Egyptian artefacts should be returned to Egypt or kept in their current location.

Conclusion: why does it matter today?

Geography has a big influence on history. The nature of any land will affect the sort of society that develops there. In the case of Egypt, most of the land – the desert – worked against human life. Just one aspect, the Nile River, made it possible for humans to survive, and even live very well, in its fertile valley. As they settled down, they were able to build houses, then villages and cities. The rich mud of the river and the burning sun gave them everything they needed to make mud bricks for thousands of buildings.

Settlement in Egypt grew very quickly. Once people had discovered how many resources the river gave, they learned to keep farm animals and to plant crops. However, the Egyptians quickly found that they only needed some people to grow enough food for everybody. They were the first to use sickle blades or use oxen to drive ploughs, which revolutionised farming. This meant that others were free to take up other jobs and become expert in them. Some became priests, some architects and builders, some scribes and artists. Others became governmental authorities.

Egypt was unusually big: it covered a vast area and had a large population of five million people. One of the secrets of the Egyptians' success was that they developed a powerful ruler, the pharaoh, who was backed by many officials helping the pharaoh lead.

Initially, the ancient Egyptians were organised in smaller tribes, which then joined together until the country was ruled by a King of Upper Egypt and a King of Lower Egypt. King Narmer finally brought them together in one country in about 3100 BCE. To rule Egypt, it was important to have a way of giving people orders, telling them of new laws and recording the taxes they paid.

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Thus, writing became a crucial tool for organising the country. The Egyptians were probably the first in the world to use paper – an invention still in use today!

Ancient Egypt had a strong social system. People obeyed the laws and knew their place in society. Historians know a lot about groups of people who were rich and powerful, and who could pay for works of art and good tombs. Ancient Egypt is famous for its complicated system of religion. The ancient Egyptians believed that it was possible to survive death and to go on to the afterlife, providing the body was preserved so that the soul could return to it. This belief inspired great buildings, such as the pyramids for the pharaohs, and the many beautiful painted tombs found in the Valley of the Kings and elsewhere.

As with other ancient societies, we owe a debt to the ancient Egyptians. They pioneered revolutionary farming techniques and learned how to organise a large country, using a system sharing similarities with our own today. Their systems of writing and paper production would change the course of history and allow us to learn more about them today. Their achievements in art, metalwork and construction still inspire awe – consider how iconic the pyramids are. Ultimately, understanding the origins and cultures of the past helps us to understand the reasons why the world is the way it is today. After all, the present is built on the past.

▼ **Source 2.55** The great carving at the entrance to the Temple at Abu Simbel. Today's societies still create large buildings to celebrate what they think of as important symbols, like the Sydney Harbour Bridge or the Eiffel Tower. What other examples can you think of? What do they represent or celebrate?

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Making thinking visible

I used to think that ancient Egypt was …

Now I think that …

This exercise in visible thinking asks you to track the difference between what you knew about ancient Egypt before starting this chapter, and what new understandings you have acquired since reading the chapter.

Using the stem sentences, write a paragraph explaining what you previously knew about the topic. Then write another paragraph explaining what you now understand about the topic.

1A I used to think that the geography of ancient Egypt was important because …

1B Now I understand that the geography of ancient Egypt was important because …

2A I used to think that ancient Egyptian society was organised like …

2B Now I understand that ancient Egyptian society was organised like …

3A I used to think that the ancient Egyptians believed in …

3B Now I understand that the ancient Egyptians believed in …

4A I used to think that ancient Egypt related to their neighbours by …

4B Now I understand that ancient Egypt related to their neighbours by …

3 Using historical terms meaningfully

As an historian, you will need to confidently and correctly use the terms related to your subject. Write a paragraph in response to the question here using all the key terms listed. Ensure that your use of these terms shows your understanding of what each term means.

Question: *Explain why the Nile River was important to ancient Egypt.*

Use these words correctly in your answer:

- Nile
- Hapi
- Inundation
- Agriculture
- Pharaoh.

◄ **Source 2.56** The Nile crocodile was a dangerous but sacred animal in ancient Egypt

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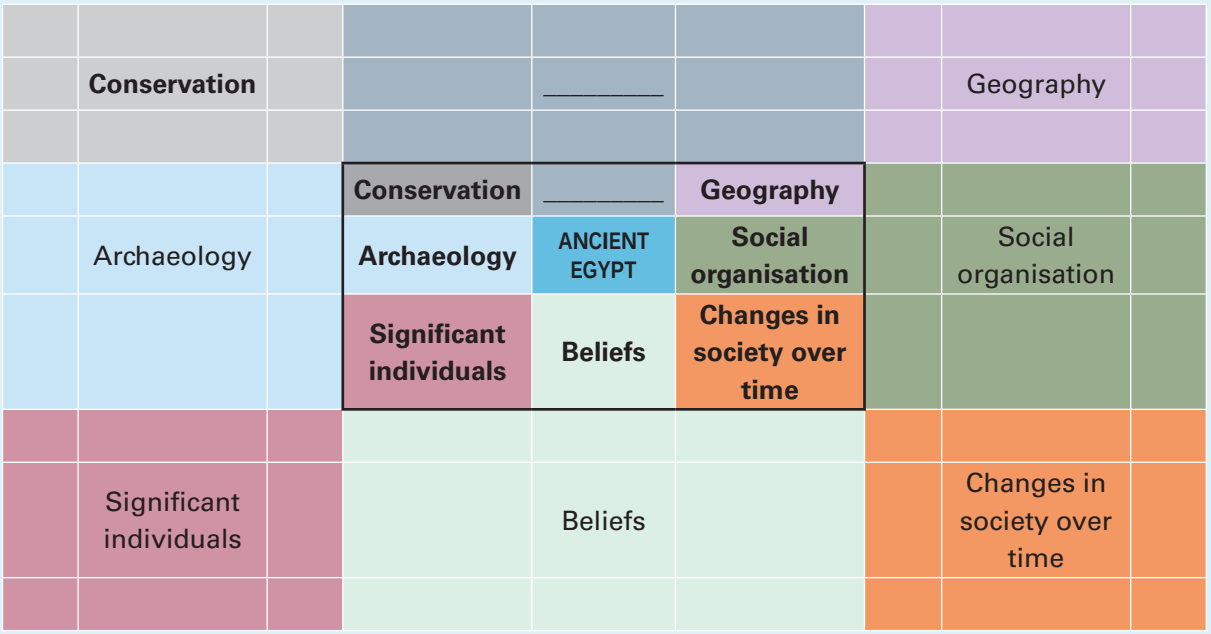
4 Research task

Investigate the different aspects of ancient Egyptian civilisation and identify their key elements. Try to find some historical sources for each topic.

Copy the lotus diagram and fill it in with your research. This will build a complete picture of what you have learnt in the different learning areas. Two areas have been left blank so that you can add topics of your own choosing.

When you have finished creating your lotus diagram, use it to answer the following question. Your answer needs to be an extended written response.

Explain how different elements of ancient Egyptian society was influenced by the geography of Egypt itself.



5 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about ancient Egypt

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CHAPTER 3

Ancient Greece

Setting the scene: the trouble with oracles

The **oracle** of Apollo at Delphi was famous throughout the ancient Greek world and even beyond. The oracle was known as the Pythia, which means 'high priestess'. She was thought to have the power to predict the future because she was guided by the gods, who spoke directly to her. Visitors who wanted advice about their future would come to her for guidance. The process of the Pythia's predictions was long, taking a full 24 hours, and was only carried out on specific days of the year.

KEY TERM

oracle a person who is guided by the gods to answer a question about the future

First, the oracle would perform purifying actions such as burning laurel leaves, washing in a nearby spring and drinking holy water. Next, an animal, such as a goat, was sacrificed. The person seeking advice would offer a gift of pie-like food, known as *pelanos*, before being allowed into the inner temple where the Pythia resided. The oracle would then give her prediction, which was often unclear and cryptic. She freely gave guidance to leaders of city-states and individuals, as the following story shows.

Croesus, King of Lydia, needed advice. He wanted to know if he should go to war with Persia, which was a neighbouring empire quickly rising in power and threatening his lands. Only the oracle of Delphi could give Croesus the advice he needed because only the Pythia could tell the future.

Croesus sent a question to the Pythia, which was read out to her. She was seated on a tripod seat, deliberately breathing in the gasses that arose from the earth. The priests and priestesses who served at the temple listened carefully for the oracle's answer to send back to Croesus.

◄ **Source 3.1** A nineteenth century representation of the Pythia making a prediction in the Temple of Apollo. The oracle often made her pronouncements in a state of ecstasy, which were caused by a natural gas that acted like a drug.

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The Pythia said, 'If Croesus goes to war, he will destroy a great empire'.

This message was sent back to Croesus and he confidently declared war on Persia. Croesus believed that the Pythia had predicted his victory in destroying the Persian Empire.

But prophecies are tricky things. Croesus assumed that the great empire to be destroyed would be Persia and not his kingdom. When Croesus went to war, he was defeated by Persia. His great empire was destroyed and never rose again. The Pythia had predicted accurately, but not in the way Croesus had thought.

▲ **Source 3.2** *Croesus receiving a tribute* was painted in 1629 by the French artist Claude Vignon.

Croesus was not the only leader who took the Pythia's predictions seriously. Many leaders from different regions placed great importance on her prophecies. They made their plans according to how she answered their questions. Later, when the Greeks fought the same Persians who defeated Croesus, the Greek leaders consulted the oracle to help them decide on what to do. They asked the Pythia for advice as they prepared to face the Persians off the island of Salamis.

'Blessed Salamis, you will be the death of mothers' sons', the oracle replied.

This did not sound like a positive prediction for the Greeks. But the Greek leaders ignored the doubters and decided this was their last chance to beat back the invading Persian forces. Despite being outnumbered and the Pythia promising nothing but death, the Greek navy defeated the Persian forces. This helped them to push the Persians out of Greece and keep the area free from invasion.

The oracle of Apollo at Delphi usually did not give clear answers. Croesus believed that the Pythia promised him victory but he was defeated. The Greeks at Salamis believed that they faced death yet they won.

The trouble with prophecies is that they sometimes do not mean what you think they do!

MAKING THINKING VISIBLE 3.1

Question starts

Based on what you have read so far, brainstorm a list of questions about ancient Greece. You can use some of these question stems to help you.

1. *Why ...?*
2. *How would it be different if ...?*
3. *What are the reasons ...?*
4. *Suppose that ...?*
5. *What if ...?*
6. *What if we knew ...?*
7. *What is the purpose of ...?*
8. *What would change if ...?*

Come back to these questions as you finish each section of the chapter. Which questions can you answer now? Would you update questions based on your new knowledge?

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Chapter overview

Introduction

The ancient Greeks believed many different things. Some of what they thought is similar to what we believe now, while other beliefs seem strange and even weird. For example, today's leaders do not usually consult oracles before they act, and although we know a lot about ancient Greek gods and goddesses, we do not worship them or believe they exist. Zeus, Athena and Poseidon have inspired modern movies and stories, but no one today goes to a temple to worship them.

Some of the beliefs and traditions of ancient Greece, such as democracy, are part of our everyday life in Australia. But much has changed since the time of ancient Greece. Ancient Greece is therefore both familiar and strange to us, which is why this area of study is interesting and popular.

Learning goals

After completing this chapter, you should be able to answer these questions:

- How did geography affect how ancient Greece developed?
- How were different Greek city-states organised?
- What were the significant beliefs, values and practices of the ancient Greeks?
- How did ancient Greek city-states interact with other civilisations and one another?
- Why was Pericles a significant individual in ancient Greece?
- How do archaeologists uncover information about ancient Greece?
- Why do we conserve the remains of ancient Greece and how do we do it?

Historical skills

After completing this chapter, you should be able to:

- Explain what **cause and effect** means in the study of history
- Understand the role of historians and archaeologists in uncovering the past
- Develop historical empathy with people in the past
- Interpret primary sources in both print and visual form
- Evaluate the reliability of primary sources
- Correctly use special terms specific to the topic under study
- Use factual evidence (dates, statistics, examples) to substantiate an argument.

► **Source 3.3** Greece is full of ruins from its ancient civilisation. The Parthenon in Athens is one of the most famous ancient buildings in the world.

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Timeline of key events

What came before this topic?

c. 4000–3000 BCE Early forms of farming begin in Mesopotamia

c. 3100–2686 BCE Farming societies in early Egypt develop along the Nile River

c. 3000–1450 BCE Greek-speaking tribes enter Greece

Carving from 645 BCE of ancient Mesopotamian irrigation channels for farming

Reconstruction of the 'bull-leaping' fresco from the Minoan royal palace at Knossos

c. 3000–1600 BCE
The Minoan civilisation develops in Crete; it is one of the earliest organised societies in Europe

c. 2000 BCE
The beginning of the Mycenean era; organised cities spread across the Greek mainland

c. 1400 BCE
The city of Athens is founded

c. 1100 BCE
The Trojan War is fought; the city of Troy is destroyed by the Greeks

c. 1100–900 BCE
Greece enters a time when written records disappear (little is known about this period)

Relief of Trojan and Greek soldiers in the Trojan War

Timeline activity

1 Use the timeline to identify some of the famous individuals associated with ancient Greece. What are these people known for?

2 Research and write about what happened during the Trojan War. What is the most famous event in this conflict?

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What came after this topic?

c. 336–323 BCE Reign of Alexander the Great

c. 27 BCE Beginning of the Roman Empire

1 CE Birth of Christ

Roman copy from 1 CE of Alexander the Great

The Acropolis of Athens is a symbol of democracy around the world

c. 700 BCE
Homer writes *The Iliad* and *The Odyssey*, two famous stories that survive today

c. 750–550 BCE
Early forms of democracy emerge throughout Greece

c. 490–479 BCE
The period of the Greco–Persian Wars; Greece prevents a Persian invasion by defeating the Persians at the Battle of Salamis and the Battle of Marathon

c. 460s BCE
Greece enters a 'classical age' and Pericles implements a radical form of democracy in Athens

c. 431–404 BCE
The Peloponnesian War; Athens and Sparta go to war, which brings the classical age to an end

Roman copy of lost Greek bust of Homer, 2 BCE

Statue of Leonidas on a monument for the Battle of Thermopylae

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3.1 How and where did ancient Greek civilisation first develop?

FOCUS QUESTION

How did geography affect how ancient Greece developed?

KEY TERM
city-state a city that rules itself and the area immediately surrounding it

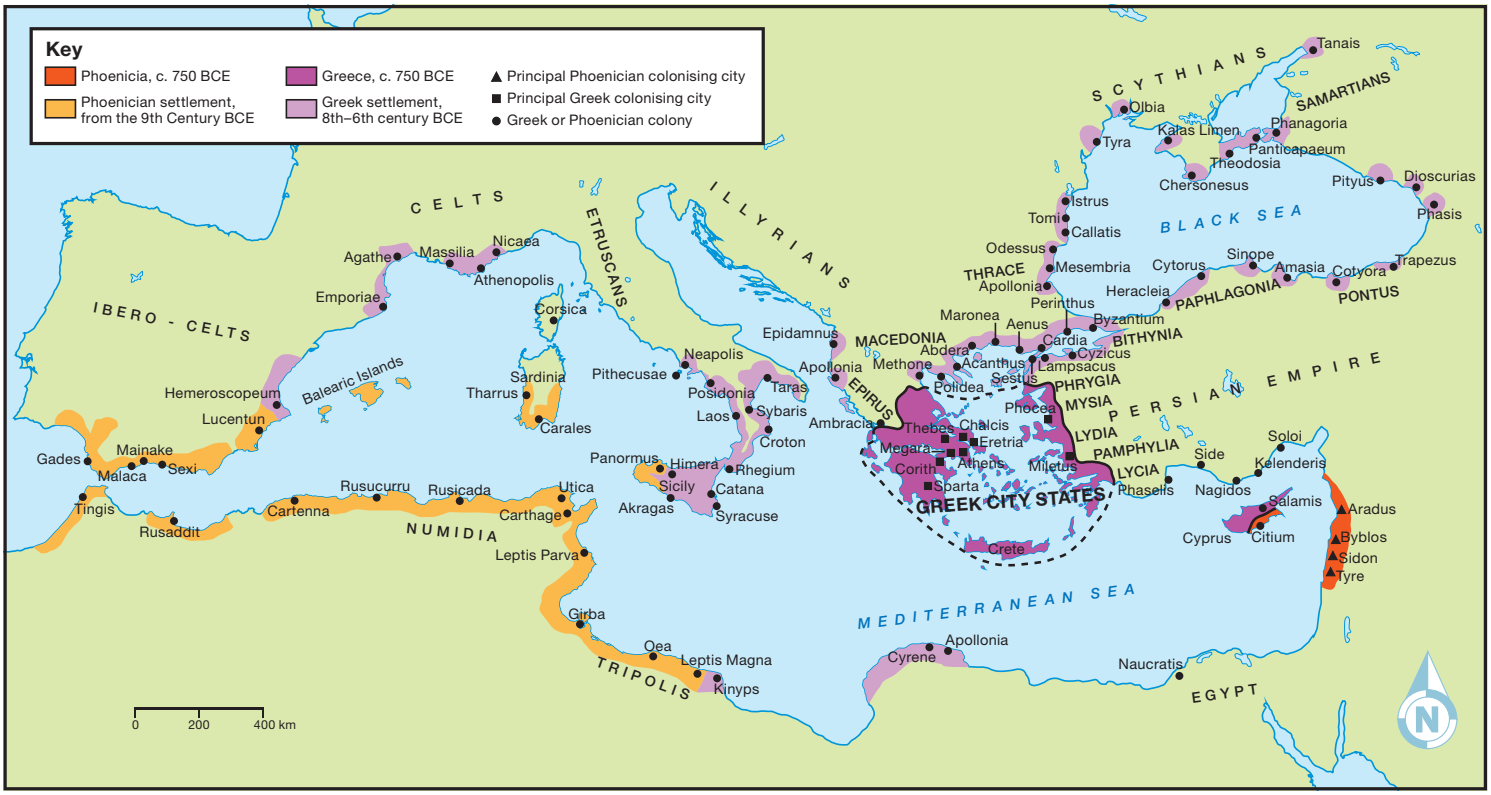
Ancient Greece developed as a series of independent cities called **city-states**. It was not a large kingdom like ancient Egypt or ancient China. Instead, each city-state (also called a *polis*) controlled the area that immediately surrounded it. Greece's landscape is very mountainous so city-states found controlling more than the area directly around them challenging. The geography of Greece influenced how ancient cities like Athens, Sparta and Corinth developed politically, economically and socially.

Location and climate

Greece is in south-eastern Europe. It is surrounded by the Aegean Sea, Mediterranean Sea and Ionian Sea. Africa lies to Greece's south and Asia is to its east. Thousands of small islands exist off the Greek mainland. Many of these were home to Greek communities during ancient times.

The Greek mainland is a rugged, mountainous and rocky environment. The climate changes depending on your location and the time of year. In the mountains, the winters are cold, while the plains in summer are extremely hot. The soil is shallow and not

▼ **Source 3.4** The Mediterranean Sea and the Greek city-states in 9–6 BCE



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suitable for growing large crops for farming. This meant that the city-states could not easily grow crops like wheat or barley to feed their populations.

Impact of the environment

The rugged environment made transport and trade by road difficult. To overcome this, most communication and transport was done via the sea. The landscape kept city-states separate, which meant they ruled themselves and were independent from one another.

The mountainous **terrain** provided the city-states natural protection and defence. Large armies had difficulty moving across the landscape. An example of this is when a small number of Greeks held off a large Persian army at Thermopylae by fighting in a narrow mountain pass. The separateness of the city-states made their relationships with one another competitive. This sometimes caused conflict and meant that uniting against common enemies, like the Persians, was hard to achieve.

Greece's mountainous terrain had a significant impact on the types of food that could be produced. The Greek mainland was unable to grow large **grain crops**, which is what helped sustain other ancient civilisations. Therefore, the ancient Greeks had to import much of their food from other lands such as Egypt and southern Italy. The ancient Greeks were able to trade the olives and grapes they grew in the Greek rocky soil for the extra grain they needed.

The ancient Greek city-states mostly developed along the coastline because of the countryside and their need to trade. These societies were reliant on the sea. As a result, ancient Greeks became expert sailors and navigators. They explored far beyond Greece and developed trade relationships with other ancient civilisations. Despite their lack of accurate navigation tools, like a compass, Greek sailors explored around the eastern Mediterranean. They were able to use the stars to help them navigate across open water. Through their exploration, they developed relationships with ancient Egypt and Asia Minor (modern-day Turkey). The ancient Greeks, particularly the Athenians, also developed large navies that helped them to defend their cities.

KEY TERMS

terrain the landforms of a particular area

grain crops plants used to grow grain to use in making food like bread

▼ **Source 3.5** Olive trees growing in the mountainous Greek terrain

ACTIVITY 3.1

Using historical sources as evidence

Examine the following sources and then answer the questions that follow.

SOURCE A

▲ **Source 3.6** A detail from a painting on a black-figure *krater*, which is a water pot. The detail shows a *trireme* (an ancient Greek battle ship) on its inner rim. When the *krater* was full, it looked like the ship was sailing on the water. The *krater* is from Thira and dated 6 BCE. It is held at the Archaeological Museum in Santorini, Greece.

SOURCE B

◄ **Source 3.7** The geography in Rethymno, Greece

Responding to the sources

1 Examine Source A.
   - **a** Who created this object?
   - **b** When was it made?
   - **c** What has been painted on the side of the object?

2 Examine Source B.
   - **a** Where was this photo taken?
   - **b** What are some key characteristics of the landscape?

3 Use Sources A and B to explain how we know the ancient Greeks were reliant on the sea.

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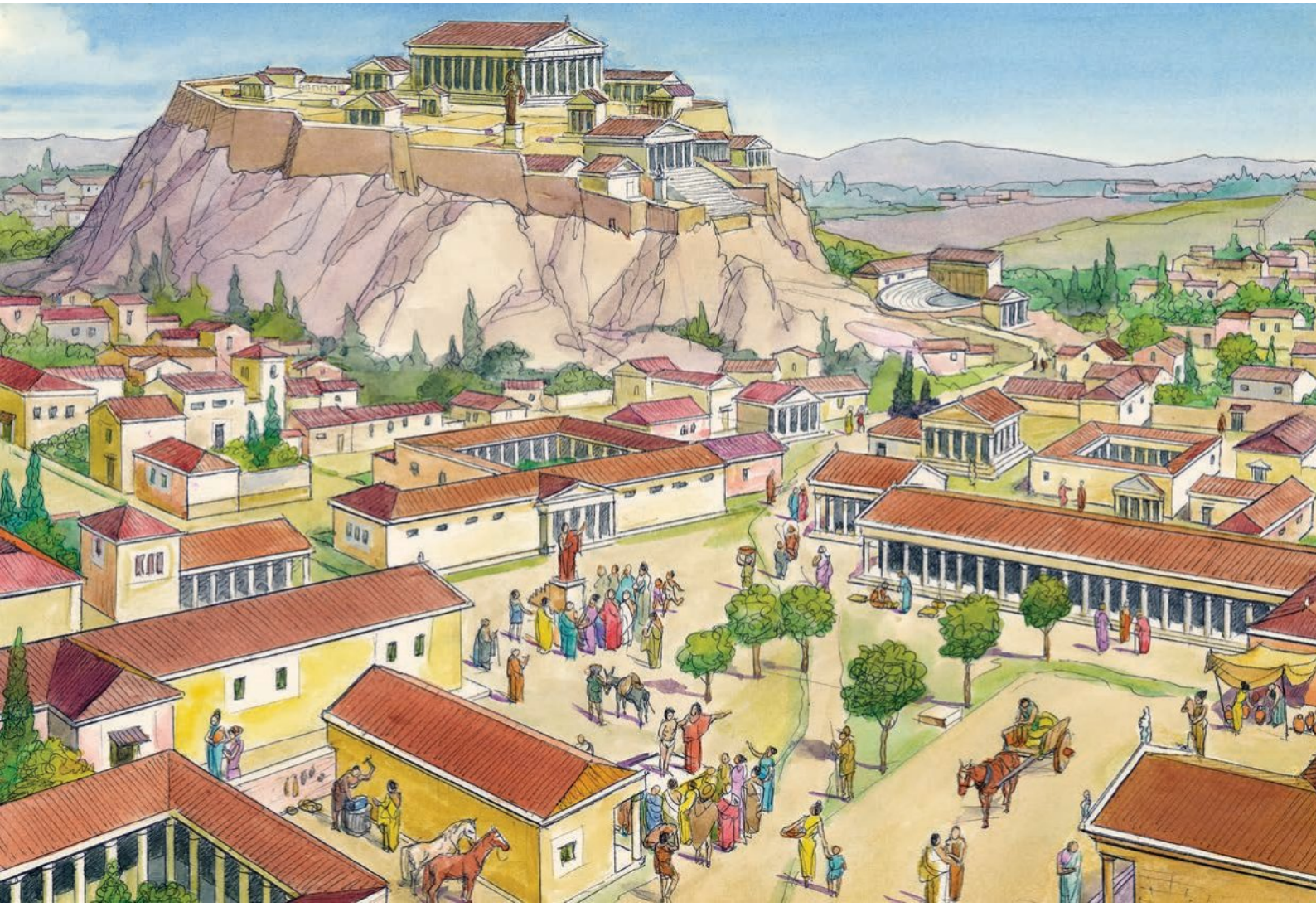
The geography and climate of Greece affected how the ancient Greeks lived from day to day. Most of the year they spent outdoors because of the warm climate. As a result, Greek cities developed large marketplaces called ***agora***. People would meet in the *agora* to enjoy the warm sun and discuss current events. The *agora* was surrounded by long verandas called *stoas*. The *stoas* provided shade, and were places for traders and merchants to set up stalls to sell goods. Unlike people in colder climates, the ancient Greeks did not spend a lot of time inside to keep warm. Usually they met outdoors in large, open public spaces. During the winter months, most ancient Greek sailors returned home because of the rough winter seas. Armies would also usually stop fighting.

KEY TERM

agora an open public space used for markets or assemblies

▲ **Source 3.8** The archaeological site of Messene gives us an excellent idea of the way of life in an ancient Greek city-state. Shown here are the ruins of the town's *agora*.



▲ **Source 3.9** A modern artist's representation of a street scene in Athens

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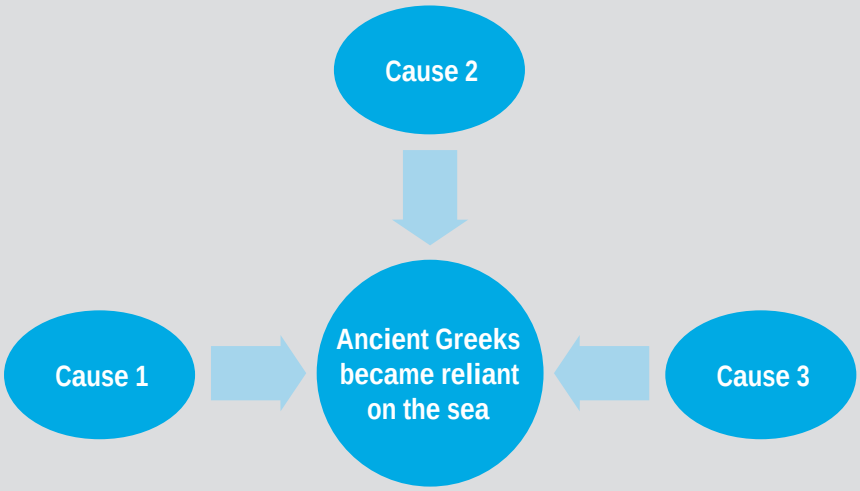
DEVELOPING HISTORICAL CONCEPTS AND SKILLS 3.1

Cause and effect

One of the most important ways of thinking in history is to understand *cause and effect*. Events do not happen without a reason. Historians can explain what causes an event and what the effects of an event were. Most historical events have more than one cause and more than one effect.

Based on the reading in this section, create a graphic organiser like the example here to show the causes of ancient Greece's reliance on the sea.



1 Out of the causes you have identified, which do you think was the most significant? Why do you think that?

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 3.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What were the small, independent cities called that developed in ancient Greece?
2 The varied climate made it difficult for the ancient Greeks to grow a particular type of crop. What type of crop was difficult to grow?
3 In which regions did the ancient Greeks develop their trading relationships?

Interpret

4 What effect did the climate have on ancient Greek cities and the way they were designed?
5 What caused the ancient Greeks to become expert sailors and navigators of the sea?

Argue

6 Explain the significance of the landscape and climate in influencing how ancient Greece developed as a society.

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3.2 Life in ancient Greece, and changes in society and their effects

FOCUS QUESTION

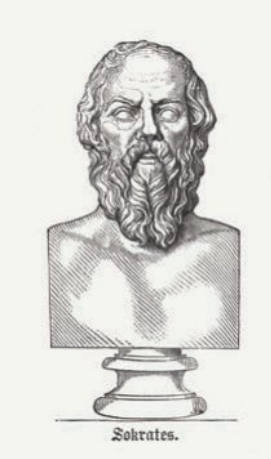
How were different Greek city-states organised during the classical age?

Daily life in ancient Greece depended on which city-state you lived in. But we can get a good idea of some of the key aspects of everyday life by looking at Athens and Sparta. Athens and Sparta were the two most important Greek cities of the classical period. These cities show us that life in ancient Greek cities was similar in some ways, but very different in others. Athens and Sparta were fierce rivals, and eventually went to war with each other at the end of the classical era.

FAMOUS FACE

Socrates

Socrates (469–399 BCE) was a Greek philosopher who is considered to be the father of Western philosophy. He taught other famous Greek philosophers like Plato, who would go on to teach Aristotle. When Socrates' friend Chaerephon asked the oracle of Apollo at Delphi if there was anyone wiser than Socrates, her response was, 'None'.



Athens

Athens was one of the leaders of Greece during the **Greco-Persian Wars**. The city also fought against Sparta in the **Peloponnesian War** that followed. Athens is most commonly associated with a form of government known as democracy (although democracy was only used in Athens for a short time and other city-states used it as well).

Athens was home to most of the great writers and thinkers of ancient Greece. Aristotle and Socrates came from Athens.

Sparta

Sparta was an interesting and unique city of ancient Greece. Sparta had a different kind of society to the rest of Greece because it was a **military state**. The city did however have some elements of democracy like the other city-states. Sparta had a brutal education system, but it allowed women more freedom and economic power than anywhere else in ancient Greece. Therefore, Sparta was a city of contradictions, which is why it is an interesting example of Greek society.

KEY TERMS

Greco-Persian Wars a series of conflicts between the ancient Greek city-states and the Persian Empire

Peloponnesian War a series of conflicts between Athens and Sparta, and their allies

military state a society that is organised around the military

How city-states made laws

A significant feature of ancient Greek society was how city-states made their laws. The process differed from city to city. In Athens, each eligible male citizen was able to contribute in making decisions through attending 'the assembly'.

To learn more about democracy, see Chapter 13.

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▲ **Source 3.10** The Athenian assembly originally met on the Pnyx, a hill in Athens. Every month the assembly discussed the city's defence and the state of its corn reserves. Meetings of the assembly began early in the morning and could continue until dark. They were often rowdy. Eventually there were three or four meetings a month.

Around 300 BCE the meetings took place in the Theatre of Dionysus which could hold around 6000 citizens. Only a small percentage of the total population was eligible to take part because a person had to be male, over 18 and a citizen to participate. This added up to less than 30 per cent of the total population, which is very different from how we think of democracy today.

Sparta also had an assembly to debate and pass laws but, unlike Athens, it also had two kings who oversaw the whole process.

Athenian society vs Spartan society

Looking at a comparison between Athenian society and Spartan society can give us an understanding of daily life in ancient Greece during the classical period. Table 3.1 outlines the structure and features of the two ancient societies. It describes who ruled each society and what their rights were, how women were viewed and how non-citizens were treated.

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▼ **Table 3.1** Comparison of the social structures in Athens and Sparta

Athens		Sparta	
Who ruled in this society and what rights did they have?			

Citizens	• Only free men
	• Must be 18 years of age and have served two years in the military
	• Could speak in the assembly
	• Gained extra rights after turning 30, including:
	  • Could serve as a magistrate or juror
	  • Free from direct taxation
	  • Had the right to own land
	  • Could bring lawsuits
		Spartiates (*homoioi*)	• Only free men
			• Small in number, never more than 10000
			• Full-time soldiers
			• Held all the political power
			• All equal under the law
			• Lived by a strict code of honour

How were women treated in society?			
Athenian women	• No political rights at all • Legally they are under the control of men • Generally, they had no rights to own property • Expected to spend their time at home managing the household	**Spartan women**	• Mingled freely with men • Legally equal to men • Were not allowed to vote • Did not engage in any economic activity (spinning, weaving, etc) because it was viewed as work for slaves
How were non-citizens treated?			
Metics	• Name means 'one who lives with us' • Foreigners, living in Athens • Needed an Athenian to sponsor them • Expected to fight for Athens in times of war • Were not allowed to own property • Were generally craftsmen and tradesmen • Could be made a citizen if they did something special for the city	***Perioeci***	• Name means 'the ones who dwell around' • Lived in scattered communities around Sparta • Allowed to run their own communities but had to obey Spartan orders • Were farmers and tradesmen • Served as soldiers in war time

		Inferiors	• Neither slaves nor citizens
			• Could be:
			  • Illegitimate offspring
			  • Freed slaves
			  • *Spartiates* who lost their citizenship
			  • *Helot* children adopted as playmates of Spartan boys

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▼ **Table 3.1** (*Continued*)

Athens		Sparta	
How were slaves treated?			
Slaves	• Property of citizens • Had no legal or political rights • Could be born a slave or be made one in wartime • Not allowed to marry • Could buy their own freedom in some circumstances	***Helots***	• Slaves owned by the government • Came from lands conquered by Sparta • No legal or political rights • There were 20 times more *helots* than *Spartiates* • Would act as servants in war (carrying weapons, etc.) • Allowed to live with their families

ACTIVITY 3.2

Similarities and differences

Use a table like the one here to identify the similarities and differences between Athenian society and Spartan society.

Similarities	Differences

▼ **Source 3.11** This nineteenth-century engraving shows the Athenian statesman Demosthenes (384–322 BCE) delivering a speech.

Athenian government vs Spartan government

Athens and Sparta had similar political structures. Table 3.2 outlines their governments.

▼ **Table 3.2** The features of the governments in Athens and Sparta

Athens		Sparta	
Ten generals	• Led the Athenian military • Directly elected by the assembly (only area of society where this was possible) • Assembly could fine, exile or execute them	**The dual kings**	• Commanders of the military • If one king was leading an army, the other would stay in Sparta • Religious leaders • Could be deposed by the people
Council (*boule*)	• Had 500 members chosen by lot (50 members from each tribe) • Any citizen over 30 was eligible • Prepared legislation for the assembly • Supervised magistrates • Responsible for meeting foreign ambassadors • Served for one year	**Council (*gerousia*)**	• Had 28 members in addition to the two kings • Only Spartans over 60 were eligible • Held office for life • Elected by the assembly • Prepared bills for the assembly • Could overrule a vote by the assembly • Also acted as a court for criminal trials
Magistrates	• Served for one year • Chosen randomly • Could serve only once in each role (most citizens became magistrates at some point) • Each board of 10 magistrates administered the city	***Ephorate***	• Board of five *ephors* • Administered the city • Any Spartan over 30 could stand for election (the assembly voted) • One-year term
Assembly (*ecclesia*)	• All Athenian citizens • Met 40 times a year • Voted on legislation • Minimum of 6000 citizens needed to attend for a vote to be valid	**Assembly (*ecclesia*)**	• All *Spartiates* over 30 • Met once a month • Voted on legislation

Amazing but true …

In ancient Greece, salt was so valuable that it was frequently used to make payments. Often, people used salt to buy slaves. This is where the expression 'not worth his salt' comes from.

► **Source 3.12** This cup from c. 470–460 BCE shows a slave on the far right carrying offerings for the gods.

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ACTIVITY 3.3

Similarities and differences

Use a table like the one here to identify the similarities and differences between the Athenian and Spartan governments.

Similarities	Differences

Amazing but true …

For many years, historians thought that the ancient Greeks did not like bright colours and preferred their marble statues to be white. However, archaeologists found several ancient Greek statues in the second half of the nineteenth century that had bits of colour left on them. There were traces of red for lips, traces of black for hair and a whole range of colours for clothing, including gold leaf. The spotless, white marble of ancient Greece is a myth – their statues were multicoloured!

▲ **Source 3.13** Ancient Greek horses from c. 570 BCE

▲ **Source 3.14** An engraving from 1879 imagining the *agora* in the Spartan city of Lacedaemon

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Education in Athens

Education in Athens was only for boys. Learning focused on academics, music and physical education. The discipline in schools was extremely harsh. Students were beaten with a sandal or cane if they lost concentration or made mistakes.

School in ancient Athens did not look like it does today. Boys had only one teacher and they usually learnt in a room at the teacher's house. Teachers were not respected and poorly paid. They were usually foreigners or slaves. The low opinion of teachers is strange considering how important Athenians thought education was.

Girls were expected to stay at home and learn the skills of weaving, cooking and managing the house finances.

Education in Sparta

A unique aspect of Spartan society was the city-state's education system. Boys left home when they were seven years old to live in a **barracks** with other boys the same age.

They were subjected to harsh discipline and were whipped if they did not follow instructions. The boys exercised naked, did all their own housekeeping and were given only small amounts of food. They were trained to be expert soldiers and to obey orders without question.

The education of Spartan girls was similar to Spartan boys but with some important differences. Girls stayed at home and their education focused on preparing their bodies for childbirth. At times, girls would exercise with the boys. There was just as much rivalry among the girls as there was among the boys.

Girls did not bother training for domestic duties, like weaving, as this was seen as trivial and to be done by slaves. Instead, Spartan girls focused on physical activity to improve their bodies.

The Spartan education system made its citizens very loyal to the city-state. However, some historians have said that the system did not allow for Spartans to adapt to change.

ACTIVITY 3.4

Comparing primary and secondary sources

The famous Greek **playwright** Aristophanes was from Athens. In his play *Lysistrata* he makes fun of Spartan women and their constant physical training:

> **Lysistrata:** Welcome Lampito, my dear. How are things in Sparta? Darling, you look simply beautiful. Such colour, such resilience! Why, I bet you could **throttle** a bull.
>
> **Lampito:** So could you my dear, if you were in training. Don't you know I practice **rump jumps** every day?

▲ **Source 3.15** Aristophanes, *Lysistrata*, Penguin Classics, 2015, p. 168

KEY TERMS

barracks a place where soldiers live and train

playwright a person who writes plays

throttle to choke something

rump jumps an exercise that involved jumping up and hitting your behind with your feet

Responding to the source

1. How does Lysistrata greet Lampito?
2. What does Lampito say is the reason for her fitness?
3. What kind of evidence does this source provide?

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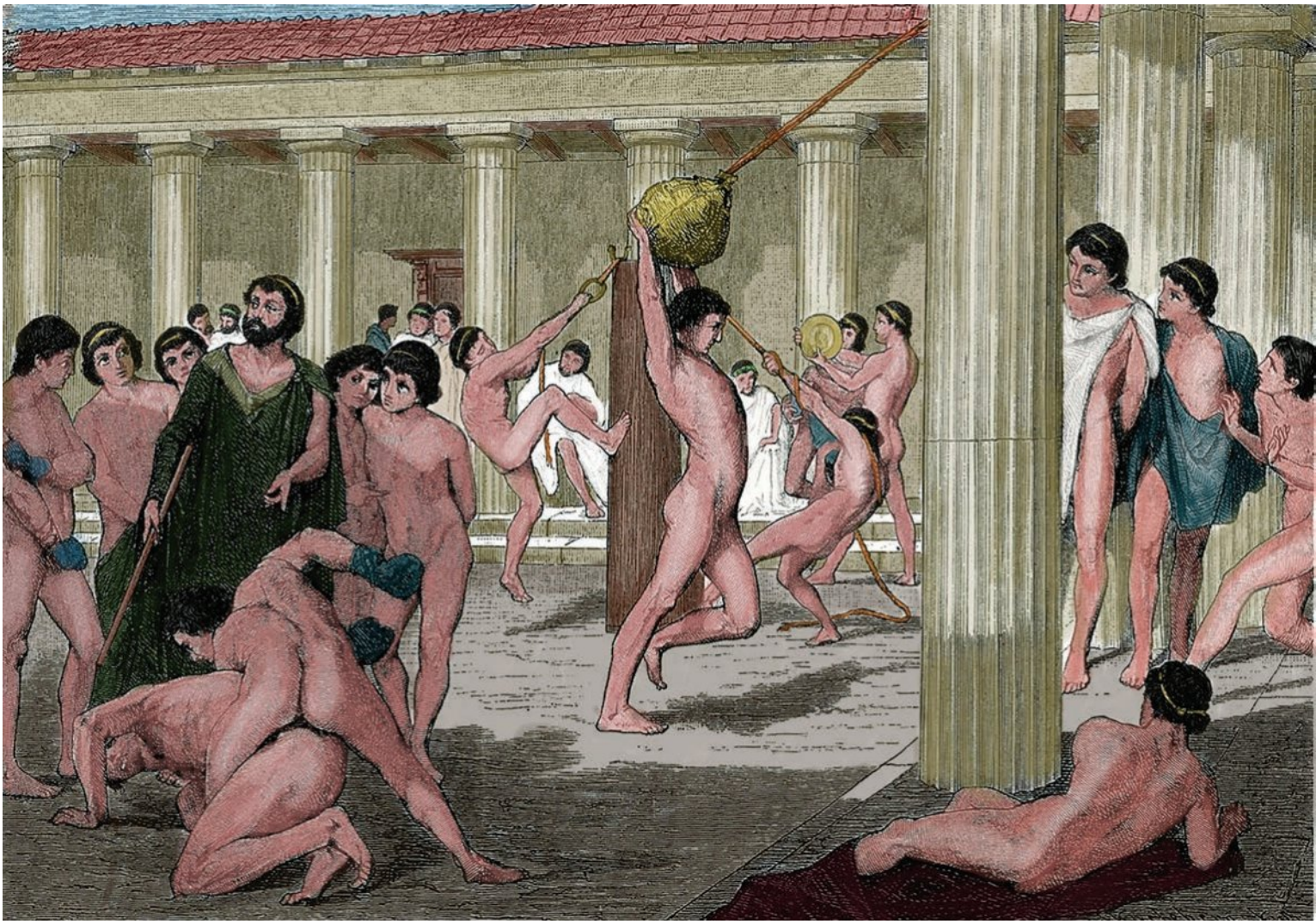

▲ **Source 3.16** An engraving from 1879 imagining the education and training program for male Spartan citizens

KEY TERMS

secondary source a document that provides or discusses information that uses information collected from primary sources

brutalise cause damage to something

abnormal something that is not normal

exertion physical or mental effort

endow to give something to someone

Opinions on Spartan education

Many historians have written about the education system of the Spartans.

Read the opinions provided here and pay attention to when they were written. The first two quotes are **secondary sources**, written centuries after the time of ancient Greece. The third quote is a primary source from 4 BCE, written during the time of ancient Greece.

1) Pamela Bradley, *Ancient Greece: Using Evidence,* 2001, p.66: [The Spartan education system] produced courageous and loyal citizens, but it did not encourage resilience to cope with change.

2) James Renshaw, *In Search of the Greeks,* 2015, p. 373: [The Spartans] introduced a system which would produce outstanding and loyal soldiers … individuality and creativity [were] crushed.

3) Aristotle, *The Politics,* Penguin Classics, 1966, p. 304: The Spartans … **brutalise** their children by **abnormal exertion** which is supposed to **endow** them with courage. In point of fact, however … courage should not be the role or even the principal end of youth training … the Spartans go to work in quite the wrong way.

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ACTIVITY 3.5

Using historical sources as evidence

Create a graphic organiser using the sources in this section as evidence. You can use a system like the one shown here.

Positive element of Spartan education	Evidence from a source	Negative element of Spartan education	Evidence from a source

Family life in city-states

Ancient Greek families generally centred around the household. A typical household consisted of a man, his wife, their children and any slaves the family owned. Sometimes grandparents also lived in the house. The father oversaw the household and made all the important decisions. He also performed all the religious ceremonies. The mother would manage the running of the household, particularly the slaves. In Athens, women generally spent time weaving to make clothes for the family.

END-OF-SECTION REVIEW 3.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 Who could become citizens in Athens?
2 How were magistrates chosen in ancient Athens?
3 How were children punished in Athens if they did not pay attention during their education?
4 What was expected of women in Sparta? What did Spartan women think was most important?

Interpret

5 What could women do in Sparta that was unusual and different from other ancient Greek city-states?
6 What kind of citizens did the Spartan education system create?

Argue

7 How was the structure of Athenian society different from Sparta's society? In what ways was it similar?
8 Do historians prefer primary sources or secondary sources? Give three reasons to support your answer.

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3.3 Significant beliefs, values and practices of the ancient Greeks

FOCUS QUESTION

What were the significant beliefs, values and practices of the ancient Greeks?

Ancient Greek religion was very different from most modern religions. For example, the ancient Greeks were very involved in their daily religious practice. Religious belief affected almost every aspect of ancient Greek life. Religion also unified the ancient Greeks and gave them a common identity.

KEY TERM
pantheon all the gods in a religion or mythology

Gods

The ancient Greeks were polytheistic, which means that they believed in many gods. The most important of these gods were the 12 Olympians, but there were also many others. Each god in the Greek **pantheon** controlled an aspect of the world. Ancient Greeks believed that making sacrifices and praying to their gods would make their lives easier. The gods often made mistakes and intervened in the lives of humans. Sources 3.17, 3.18 and 3.19 show the names, responsibilities and symbols of some of the most important ancient Greek gods.

▼ **Source 3.17** The six Olympian goddesses

Queen of the gods
Responsible for:
- Women
- Marriage

Symbol:
- *Polos* (high cylindrical crown)

Hera

Responsible for:
- Agriculture
- Harvest

Symbols:
- Flowers
- Fruit
- Grains

Demeter

Responsible for:
- Love
- Beauty

Symbol:
- Seashells

Aphrodite

Responsible for:
- Wisdom
- Weaving and crafts
- War

Symbols:
- Owl
- *Aegis* (shield)

Athena

Responsible for:
- Hunting
- The moon
- Childbirth

Symbols:
- Moon
- Bow and arrows

Artemis

Responsible for:
- The hearth

Symbol:
- Fire

Hestia

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▼ **Source 3.18** The six Olympian gods

King of the gods
Responsible for:
- The sky
- Weather
- Travellers

Symbols:
- Throne
- Sceptre
- Thunderbolt

Zeus

Responsible for:
- The sea
- Earthquakes
- Horses
- Bulls

Symbol:
- Trident

Poseidon

Responsible for:
- Fire
- Metalworking craftsmen

Symbol:
- Anvil

Hephaistos

Responsible for:
- War

Symbol:
- Armour

Ares

Responsible for:
- Education
- Music and the arts
- Archery
- The sun
- Prophecy

Symbols:
- Lyre
- Bow

Apollo

Responsible for:
- Messages from the gods
- Travel
- Trade

Symbol:
- Winged sandals

Hermes

▼ **Source 3.19** Other important ancient Greek gods

God responsible for:
- Death
- The underworld

Symbol:
- Pomegranate

Hades

Outsider god, responsible for:
- Drama
- Wine
- Revelry

Symbols:
- Vines
- Ivy
- Animal skins

Dionysus

Nine goddesses responsible for:
- Artistic talents such as music, dance, and song

Muses

Female spirits of vengeance responsible for:
- Punishing those who had done wrong

Furies

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▲ **Source 3.20** Statue of the Athena, the patron of Athens and the goddess of wisdom

Heroes

Aside from gods, the ancient Greeks also worshipped heroes. These heroes were based on myth, although some heroes were historical figures. Achilles and Heracles were **mythological** heroes, although there is evidence to suggest they were originally real-life people. Achilles and Heracles were worshipped and revered in ancient Greece for shaping Greek society.

KEY TERMS

mythological something that is imaginary; from myths or legends

Acropolis the complex of temples and other buildings built on the hill in the centre of Athens

The ten tribes in Athens were named after ten heroes from Athenian history. People visit the tombs of these heroes to worship them. In fact, the ancient Greeks believed that heroes sometimes became gods after they died. This was the case with Heracles, who was regarded as one of the greatest of all Greek heroes. Spartans believed they were directly descended from Heracles – they thought that he was the source of their great strength and skill in battle.

Amazing but true …

The muses were responsible for many of the arts in ancient Greece. They were all women and very beautiful. The names of the muses were Clio, Euterpe, Thalia, Melpomeni, Terpsichore, Erato, Polymnia, Ourania and Calliope. The muses had many temples and shrines in ancient Greece, and they inspired many works in literature, science and the arts.

ACTIVITY 3.6

Gender roles

Consider the different roles of the gods and goddesses by looking at Sources 3.17, 3.18 and 3.19.

1. What kinds of responsibilities did the male gods have?
2. What kinds of responsibilities did the female goddesses have?
3. What does your examination of male and female roles of gods and goddesses tell you about ancient Greek views?

Temples and practices

Greek temples were important public buildings. They showed off a city-state's wealth and culture, and were built to honour the gods. Temples in ancient Greece were seen as the home of the gods. The architecture was intended to make people feel a sense of wonder and awe. The most famous example of an ancient Greek temple is the Parthenon on the **Acropolis** in Athens. The Parthenon was a temple dedicated to the goddess Athena.

Priests would sacrifice animals to the gods in an area in front of the temple. Food and drinks, such as cakes and wine, were also offered to the gods and left on their altars. The ancient Greeks would offer sacrifices to the gods and pray for the gods to favour them in return.

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▲ **Source 3.21** A modern artist's representation of the Acropolis as it probably would have looked in ancient times

Festivals

The ancient Greeks did not have weekends. Instead, most work would stop when they had festival days. The Athenians had over 120 festival days spread throughout the year. Each festival was different, but often a celebration would go for several days and focus on an element of Greek life. Some examples of the festivals from Athens are:

- *Dionysia* was held in spring and was an annual celebration of new life
- *Genesia* was held in September. It was an annual festival to remember and celebrate the dead.
- *Panathenaia* was held in mid-July. It celebrated Athena's birthday and so was the most important festival for Athens. Every four years, the Athenians had a bigger celebration where they played many games.

Sporting events were also important to the ancient Greeks. People came from all over Greece to participate in athletic competitions. The sporting festivals were known as the Panhellenic Games. Some of the most important sporting events in ancient Greece were:

- The Olympic Games – dedicated to Zeus and held every four years at Olympia or Elis
- The Pythian Games – dedicated to Apollo and held every four years at Delphi
- The Nemean Games – dedicated to Zeus and Heracles, and held every two years at Nemea or Corinthia
- The Isthmian Games – dedicated to Poseidon and held every two years at Isthmia or Sicyon.

The afterlife

What happens after you die? Different religions have different answers to this question and the ancient Greeks were no different. The ancient Greeks believed that when a person died, they were sent to the

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KEY TERM
underworld a place where the ancient Greeks believed the soul went when a person died; it was ruled by the god Hades

underworld. The underworld was ruled by the god of death, Hades. People who had lived lives that harmed others were tormented for eternity.

Funeral practice

The ancient Greeks performed complicated rituals when a person died. They believed that these acts would help the soul pass safely into the underworld. If the rituals were not completed, the person's soul would wander aimlessly for all eternity. The ancient Greek funeral practice had five stages:

1 Preparation
2 *Prothesis*
3 *Ekphora*
4 Burial
5 Tending the dead.

▲ **Source 3.22** A carved gravestone of an Athenian solider that fought at the Battle of Marathon, c. 510–500 BCE

Preparation
- Only women could prepare the body for burial
- The body was cleaned and a coin was placed in its mouth
- The coin was for the soul to pay Charon, the ferryman, who would row the soul over the River Styx into the underworld

The *prothesis*
- For two days the body was laid out in a room
- Friends and relatives could come to pay their respects
- The women in the house would cut their hair, mark their head with ashes, and sing a lament or song of sorrow (some families hired professional singers)

The *ekphora*
- The funeral took place before sunrise on the third day
- The body would be carried out from the home to the grave
- Funerals became so extravagant that laws were eventally introduced to limit excessive displays of grief

The burial
- The body was either buried or burned at the burial site
- Families would leave gifts at the grave
- An animal was sacrified to the gods

Tending the dead
- Ancient Greek society believed in respecting and honouring their ancestors
- The period of mourning lasted 30 days
- Relatives would visit the grave every year on the anniversiary of the person's death

▲ **Source 3.23** The five stages of a funeral for the ancient Greeks

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END-OF-SECTION REVIEW 3.3

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 Who was expected to prepare the body of the deceased?
2 What term is used to describe a belief in many gods?
3 Which god has a pair of winged sandals as a symbol?

▲ **Source 3.24** The ancient Greek god with the winged sandals also had a winged helmet

Interpret

4 Explain how the ancient Greeks worshipped their gods.
5 What are the similarities between ancient Greek funerals and Australian funerals in the twenty-first century?

Argue

6 Outline the significant beliefs of the ancient Greeks and how they honoured the gods.

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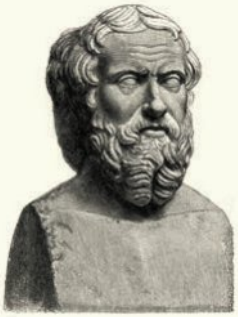
3.4 Contact and conflict with other societies



FAMOUS FACE

Herodotus

Herodotus (c. 484–425 BCE) was a Greek writer who invented what we think of as 'history' – the study of the past. He wrote on the wars against the Persians, and about his travels through Egypt, Africa and Asia Minor. While the events that Herodotus wrote about are generally accurate, many of the details are thought to have been exaggerated to cast the Greeks in a favourable light.

FOCUS QUESTION

How did ancient Greek city-states interact with other civilisations and one another?

The ancient Greek city-states did not exist in isolation. Many other ancient civilisations existed in the Mediterranean region at the same time. The Egyptians, Persians and Greeks had regular contact with one another. Sometimes they also had conflicts.

Trade

The ancient Greeks had a large trading network with other civilisations and societies. They traded with ancient Egypt and communities in southern Italy, especially for food. Ancient Greek pottery can be found all over the eastern Mediterranean region, which shows that the ancient Greeks travelled extensively to trade with their neighbours. They also came into conflict with the Persian Empire, which led to Greco–Persian Wars.

The Greco–Persian Wars

The Greco–Persian Wars (490–479 BCE) were fought between Greece and Persia. The ongoing conflict is one of the most significant in ancient Greek history. We mainly know about these wars from the writings of the ancient Greek historian Herodotus. However, Herodotus' writings were unreliable because:

- His writing has factual errors
- He can be narrow-minded when explaining the causes of the wars
- He is pro-Greek, which means he tends to make the Greeks look better than they were.

Causes

The conflict between Persia and Greece began when the Persian King Darius tried to expand the

▼ **Source 3.25** The Persian Empire 550–530 BCE

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influence of his kingdom into Greece. The Greek city-states were not united and many believed that they had no chance of resisting the enormous Persian Empire's army. King Darius demanded the Greek city-states surrender and many did. However, there were some city-states that refused to submit to the Persians. The most important of these Greek city-states were Athens and Sparta.

Events

The following timeline shows the major events of the Greco–Persian Wars.

- **491 BCE Messengers from Persia:** Darius sends messengers into Greece demanding they all submit to Persian rule. Some city-states submit, believing it would be pointless to fight, but others resist. Athens and Sparta are the most aggressive in their refusal. Sparta throws their Persian messenger into a well and Athens throws their Persian messenger into a pit.
- **490 BCE Battle of Marathon:** A vastly outnumbered Athenian army manages to defeat a Persian army sent to subdue Greece. According to Herodotus, over 6400 Persians are killed but only 192 Athenian die because of their superior **phalanx** tactic.
- **481 BCE Xerxes and the Hellenic League:** After Darius dies, his son Xerxes personally leads his army to conquer Greece. According to Herodotus, the army has more than 5 million soldiers. Modern historians think it was more likely to be around 80 000 soldiers. The Greek city-states that resist Persia form an alliance called the Hellenic League, which is led by Sparta.
- **480 BCE Battle of Thermopylae:** Three hundred Spartans heroically resist the massive Persian army at the pass of Thermopylae. However, they are betrayed by one of their own.
- **480 BCE Battle of Salamis:** The Athenian navy defeats the Persian navy off the island of Salamis. Xerxes, King of Persia, returns to Persia.
- **479 BCE Battle of Plataea:** The largest gathering of Greeks in history deals a massive defeat to the Persians, thereby ending the Greco–Persian War.

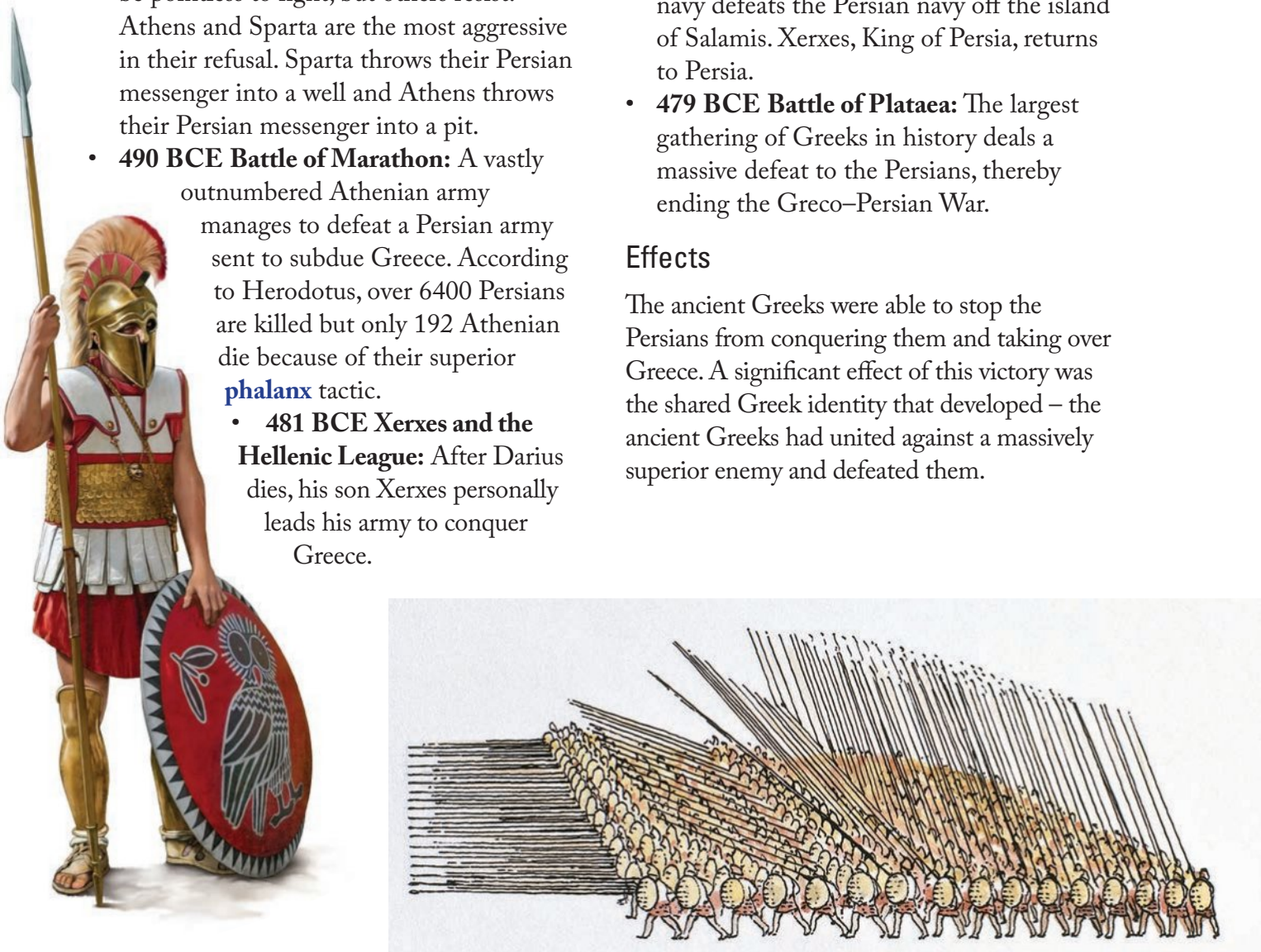
KEY TERMS

phalanx an ancient Greek military tactic that involved densely packed soldiers fighting with long spears and interlocking shields

hoplite ancient Greek citizens who were also soldiers in city-states; they fought with spears and wore bronze armour

Effects

The ancient Greeks were able to stop the Persians from conquering them and taking over Greece. A significant effect of this victory was the shared Greek identity that developed – the ancient Greeks had united against a massively superior enemy and defeated them.



▲ **Source 3.26** An Athenian **hoplite** warrior (left) and a diagram of the famous phalanx formation (right)

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Artemisia

Artemisia (c. 450 BCE) was the ancient Greek warrior-queen who ruled the city of Halicarnassus during the Greco–Persian Wars. She sided with the Persians to fight against the Greeks. Artemisia was the only woman among Xerxes' commanders. She led a squadron of Persian ships at the Battle of Salamis. The Greeks had a reward of 10 000 drachmas (Greek currency) on her head, but she was never captured.

Another significant effect of the Greek victory was the emergence of Athens and Sparta as two of the most powerful city-states. For Athens, victory brought about the peaceful 'classical age', which was a time when their power and influence in Greece was mostly unmatched. Athens created an alliance of cities, called the Delian League that did not include Sparta. Over time, the Athenians tended to see the league as their empire, which worried the Spartans.

ACTIVITY 3.7

Using historical sources as evidence

Here is Herodotus' account of the Battle of Marathon.

> ... the Athenians in close array fell upon them, and fought in a manner worthy of being recorded ... There fell in this battle of Marathon, on the side of the barbarians, about six thousand and four hundred men; on that of the Athenians, one hundred and ninety-two. Such was the number of the slain on the one side and the other.

▲ **Source 3.27** Herodotus, *The Histories*, Book 6, Penguin Classics, 2003, pp.110–17

Responding to the source

1. How does Herodotus make the Athenians look?
2. Given that Herodotus was not at the battle and was writing many years after the event, how reliable is this source?

▲ **Source 3.28** The Athenians were greatly outnumbered at Marathon by the invading Persians, but they finally overcame their more lightly armed foe.

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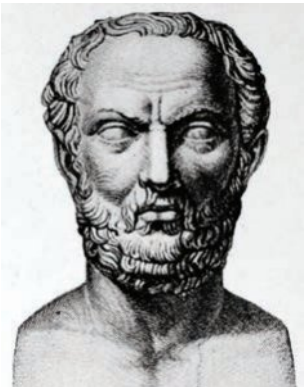
The Peloponnesian War

Causes

Greece entered a period of peace after the Greco–Persian Wars. During this classical age, many of the ancient Greek theories and concepts we know about and use today were developed. This includes ideas about democracy, drama, philosophy and mathematics. Athens was at the centre of this cultural growth. Their power and authority was nearly unmatched elsewhere in Greece. But, the Delian League that they formed began to resemble an 'Athenian Empire' and other ancient Greek city-states were increasingly forced to do what the Athenians wanted them to do.



FAMOUS FACE

Thucydides

Thucydides (460–400 BCE) was an Athenian general who lived through the Peloponnesian War. He wrote *History of the Peloponnesian War*, one of our main historical sources from this period. Thucydides is often seen as the first historian to use research techniques similar to those of modern historians, including using eye-witness accounts as sources. Some modern historians have questioned how reliable Thucydides' accounts are, but he remains one of the most important sources of the ancient Greek world that we have today.

ACTIVITY 3.8

Using historical sources as evidence

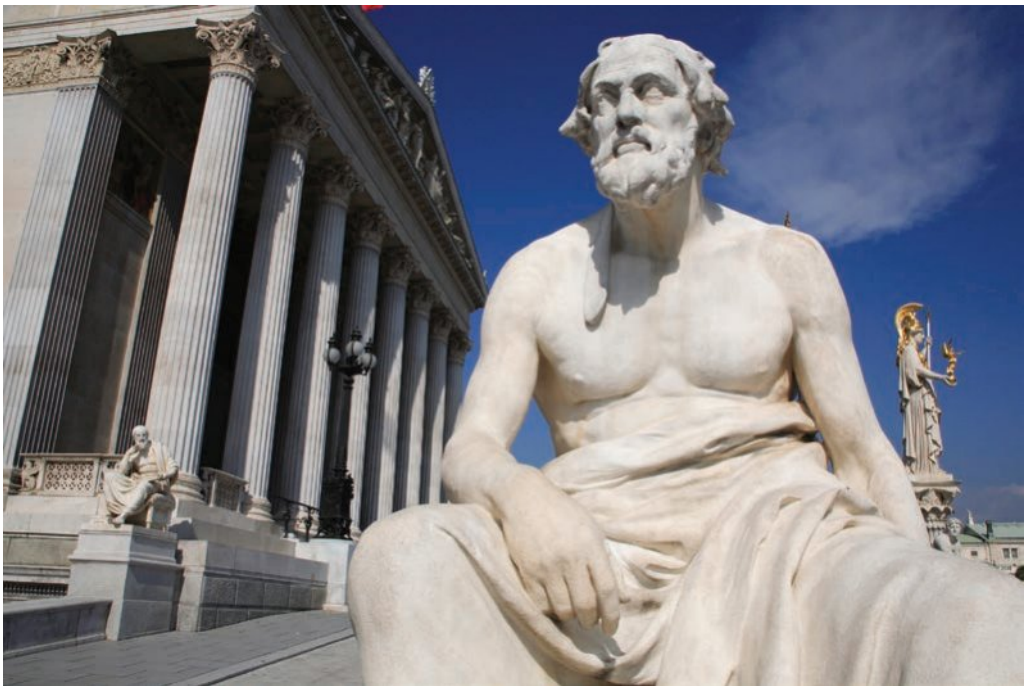
The ancient-Greek historian Thucydides wrote about the Athenians' arrogant attitude towards their neighbours. Here he writes about what an Athenian ambassador said to the Spartans in 431 BCE.

> We have done nothing extraordinary, nothing contrary to human nature in accepting an empire when it was offered to us and then in refusing to give it up. Three very powerful motives prevented us from doing so – security, honour and self-interest. And we were not the first to act in this way. Far from it. It has always been the rule that the weak should be subject to the strong.

▲ **Source 3.29** Thucydides, *The History of the Peloponnesian War*, Book 1, Penguin Classics, 1963, p. 76

Responding to the source

1 How does Thucydides make the Athenians look in this account?
2 Do you think the Athenian attitude would have worried or reassured the Spartans?



◄ **Source 3.30** This statue of Thucydides is in front of Austria's parliament building in Vienna.

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The Athenians increasingly forced the city-states in the Delian League (their 'allies') to follow their commands. The next activity has an extract from a treaty between Athens and Chalkis, which shows the expectations from Athens.

ACTIVITY 3.9

Using historical sources as evidence

Read the following source and answer the questions that follow.

> That Chalcidians [people from Chalkis] are to swear as follows: I shall not revolt from the people of Athens by any means or device either in word or deed, not shall I obey anyone who does revolt; and if anyone revolts I shall denounce him to the Athenians… and I shall be as good and upright an ally as I can…

▲ **Source 3.31** 'Athenian relations with Chalkis' (446–5 or 424–3 BCE) from Terry Buckley, *Aspects of Greek History*, 1996, p. 191

Responding to the source

1 Does this treaty look like an alliance between equals? Give a reason for your answer.

War eventually broke out between Sparta and Athens. Thucydides thought that war was inevitable between the two city-states. What he said about their relations is shown in the next activity.

ACTIVITY 3.10

Using historical sources as evidence

Read the following source and answer the questions that follow.

> What made war inevitable was the growth of Athenian power and the fear which this caused in Sparta.

▲ **Source 3.32** Thucydides, *The History of the Peloponnesian War*, Book 1, Penguin Classics, 1963, p. 23

Responding to the source

1 What does Thucydides believe is the main cause of the war between Athens and Sparta?

KEY TERM

plague a serious and highly infectious disease that kills many people

Events

The Peloponnesian War had three main phases, each lasting several years.

The Archidamian War (431–421 BCE)

- This war is named after the Spartan King Archidamus II.
- Refugees flee from the Spartan armies to Athens, but a **plague** kills many people.
- Pericles, the Athenian leader, is killed by the plague.
- There are no clear winners, so both sides sign a fifty-year peace treaty known as the Peace of Nicias.

The Sicilian Expedition (415–413 BCE)

- The Peace of Nicias does not hold.
- The Athenians try to conquer Sicily so that they have access to the Sicilians' huge grain supply.

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- The Athenian general, Alcibiades, changes sides to join Sparta.
- The Spartans lend their support to Sicily, which enables the Sicilians to defeat the Athenians.

The Decelean War (414–404 BCE)

- Sparta does a deal with Persia to build a large navy to destroy the Athenian navy.
- The Athenian navy is mostly destroyed or captured.
- Athens surrenders to Sparta.

▲ **Source 3.33** A spearhead from ancient Greece

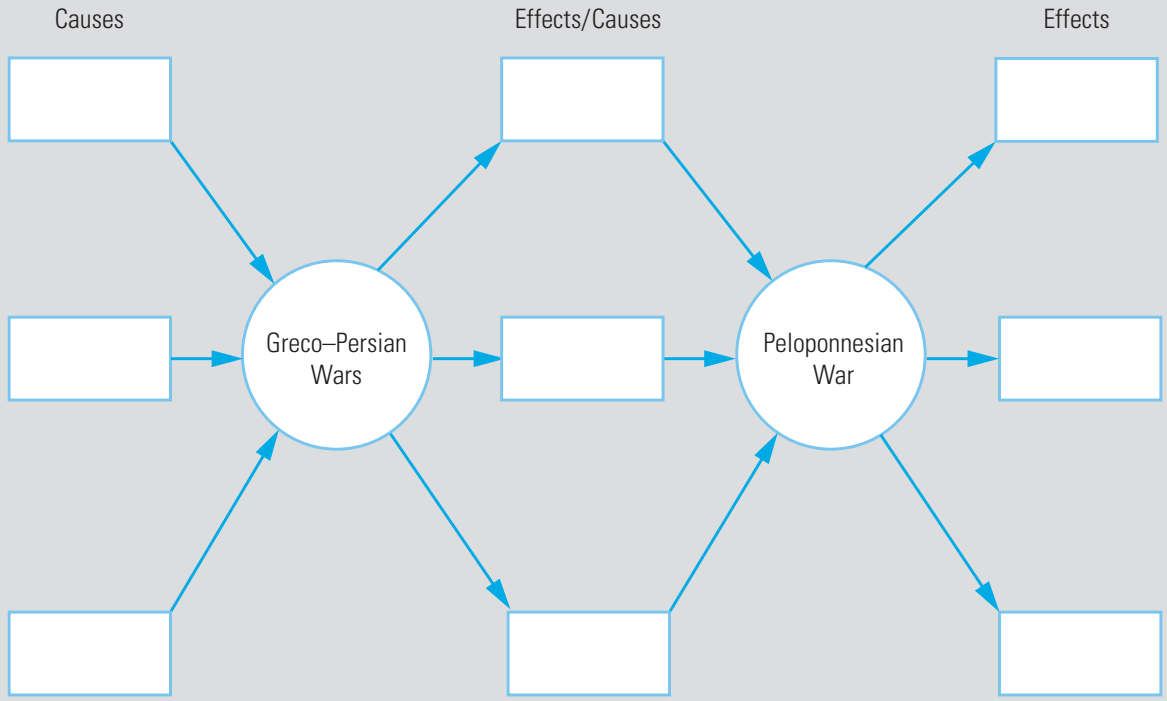
Effects

The Spartan victory in the Peloponnesian War led to the end of democracy in Athens. The Spartans forced the Athenians to be ruled by a group of thirty men, who soon became known as the 'thirty tyrants'. Years later, some democratic ideas returned to Athens, but the Athenians never regained the power they once held.

DEVELOPING HISTORICAL CONCEPTS AND SKILLS 3.2

Cause and effect

Copy and complete the following graphic organiser to help you make sense of the Greco–Persian Wars and the Peloponnesian War. Placing different events in the graphic will help you to see how these conflicts are connected to each other.



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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 3.4

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Why are Herodotus' writings on the Greco–Persian Wars unreliable?
2 Which two important city-states refused to surrender to the Persians?
3 What was the name of the Athenian alliance that was formed at the end of the Greco–Persian Wars?

Interpret

4 How does Herodotus describe the Greeks in battle against the Persians?
5 What did Thucydides think was responsible for causing the Peloponnesian War?

Argue

6 What is the historical significance of either the Greco–Persian War or the Peloponnesian War for Athens?

▲ **Source 3.34** Herodotus wrote of a long-distance messenger, Pheidippides, who ran a total of 240 km from Athens to Sparta and back to summon their assistance before the battle of Marathon. Another historian, Lucian, writing in 2 CE, confused this story with the messenger sent from Marathon to Athens after the battle to announce victory over the Persians. Lucian called this messenger Pheidippides and reported that he delivered the message with his dying breath. The distance from Marathon to Athens is approximately 40 km and so the distance of the first ever organised marathon at the 1896 Olympic was set at 40 km.

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3.5 The role and achievements of a significant individual: Pericles

FOCUS QUESTION

Why was Pericles a significant individual in ancient Greece?

Pericles

There were many significant individuals throughout the history of ancient Greece. One of the most important was an Athenian general called Pericles. Pericles (also known as Perikles) is the person who is most associated with 'radical democracy'. Radical democracy was where all major decisions were made by all citizens gathered in the assembly. It was implemented in Athens before the Peloponnesian War.

Marble portrait bust of Pericles

c. 495 BCE
Birth of Pericles

472 BCE
Pericles presents the play *The Persians* at the Dionysia, which demonstrates he is one of the wealthy men of Athens

463 BCE
Pericles is the leading prosecutor in the trial of Cimon

462–458 BCE
Pericles and his allies succeed in introducing more democratic practices into Athens

461–429 BCE
Pericles is ruler of Athens and implements radical democracy

429 BCE
Pericles dies from the plague

425 BCE
Kresilas sculpts the famous *Bust of Pericles*

A painting of Pericles talking at the assembly

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KEY TERMS

sophist a teacher in ancient Greece who specialised in philosophy

dramatist an individual who writes dramas

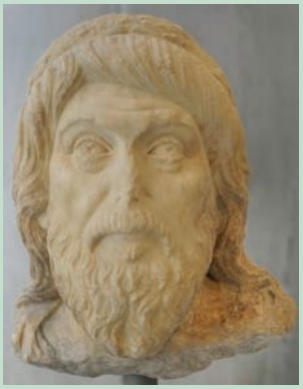
Early life

Pericles was born in Athens to an important family during the Greco–Persian Wars. He was related to famous Athenian politicians and generals, and was influenced by some of the most significant individuals of classical Athens. These people included:

- Anaxagoras – a great thinker that taught Pericles to ignore superstitions
- Damon – Pericles' music teacher that sparked his interest in politics and philosophy
- Protagoras – a renowned **sophist** thinker
- Sophocles – an accomplished **dramatist**
- Phidias – an excellent sculptor.

FAMOUS FACE

Plutarch



Plutarch (45–125 CE) was a Greek writer and philosopher. He has become a hugely influential writer and is one of our main sources on ancient Greek and Roman societies. While he wrote about Pericles and the ancient Greeks more than 500 years after they had existed, he remains one of the main historical sources we have of these civilisations. Plutarch has remained a hugely popular historian for nearly two thousand years and there is barely a time in history where he has not been widely read and studied.

Skills

The ancient writers Plutarch and Thucydides described Pericles as intelligent with great speaking and debating skills. Plutarch and Thucydides also said Pericles was determined, and had a sense of justice and integrity. He showed firm leadership and loved Athens. In his early years, Pericles served in the Athenian navy and spoke in the assembly in support of democratic ideas. He quickly became one of the most influential speakers in the assembly because of his skills. Eventually Pericles took a position of leadership in Athens.

ACTIVITY 3.11

Using historical sources as evidence

Plutarch wrote about Pericles, stating:

> His teacher in music … was Damon … it was he who trained Pericles for his political contests …
>
> Pericles also studied under Zeno the Eleatic… Zeno had perfected the technique of cross-examination, which enabled him to corner his opponent by the method of question and answer.
>
> … But there was one man more closely associated with Pericles than any other … This was Anaxagoras of Clazomenae, whom men of the time used to call Intelligence personified …

▲ **Source 3.35** Plutarch, *The Rise and Fall of Athens: Nine Greek Lives*, Penguin Classics, 1964, p. 168

Responding to the source

1 How does Plutarch portray Pericles in this source?
2 Does Plutarch's writing create a positive or negative image of Pericles?

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Rise to power

Pericles became a key leader of Athens in the period following the Greco–Persian Wars. He was elected as one of the ten generals to implement the decisions of the Athenian assembly. Pericles had to win the support of the people to be elected to this position, which he did fifteen times in a row. His success in being re-elected so many times gives us a good understanding of his popularity, as well as his speaking and debating skills.

Significant achievements

Pericles had many significant achievements while he was a ruler of Athens. He helped implement a radical form of democracy by:

- Introducing pay for some government jobs
- Making the role of chief **archonships** open to lower economic classes
- Restricting citizenship to a smaller group of people.

KEY TERMS

archonship high offices in command of important jobs in the city-state of ancient Athens

garrison a group of troops stationed in a town or city

These changes made it possible for Athenians who did not have much money to take a bigger role in the management of the city. This is because government work was no longer limited to the wealthy as some jobs in government were now paid employment.

MAKING THINKING VISIBLE 3.2

Headlines

If you worked for a newspaper in ancient Greece and were asked to write a headline for one of Pericles' significant achievements, what would it be? (*Hint*: make sure you capture the most important aspect of his achievement in your headline.)

Pericles expanded the Athenian Empire by setting up **garrisons** and democratic governments in allied cities. He also signed treaties with cities outside of the control of Athens, and spread Athens' influence across Greece.

◄ **Source 3.36** The Athenian Empire during 465–434 BCE

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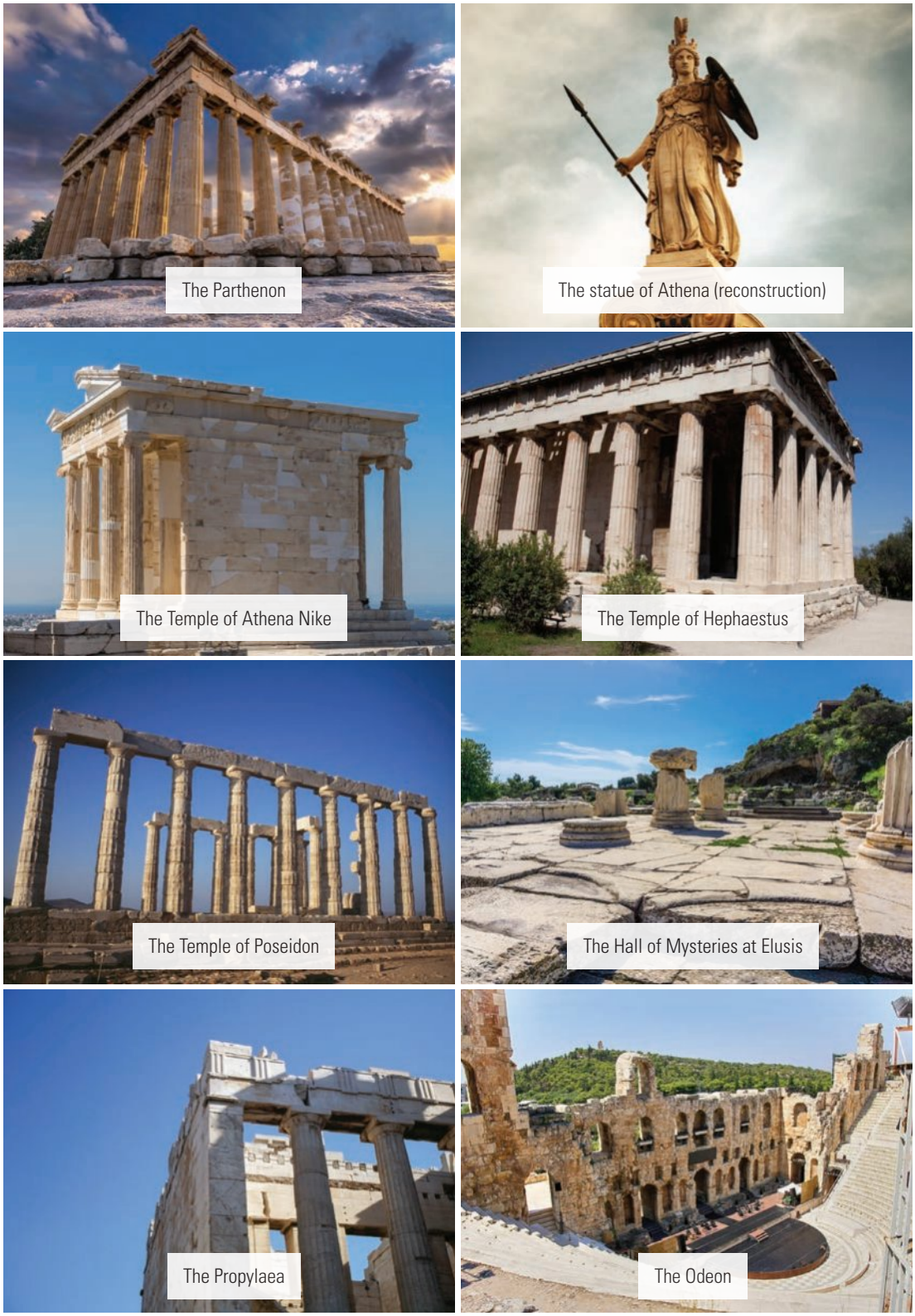
In addition, Pericles presided over the construction of many of ancient Greece's famous buildings. These buildings include:

- The Parthenon
- The statue of Athena
- The Temple of Athena Nike
- The Temple of Hephaestus
- The Temple of Poseidon
- The Hall of Mysteries at Elusis
- The Propylaea
- The Odeon.



▲ **Source 3.37** Some of the buildings constructed under Pericles' leadership are the most famous of ancient Greek constructions

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Opinions on Pericles

We can look at historical sources to gauge the opinions people had of Pericles. Activity 3.12 shows us what Thucydides' opinion was of this Athenian leader.

ACTIVITY 3.12

Using historical sources as evidence

An interesting opinion on Pericles comes from the ancient historian Thucydides. He describes Pericles in the following way.

> Indeed, during the whole period of peacetime, when Pericles was at the head of affairs, the state was wisely led and firmly guarded, and it was under him that Athens was at her greatest …
>
> The reason for this was that Pericles, because of his position, his intelligence, and his known integrity, could respect the liberty of the people and at the same time hold them in check. It was he who led them, rather than they who led him, and since he never sought power from any wrong motive, he was under no necessity of flattering them: in fact he was so highly respected that he was able to speak angrily to them and to contradict them … So, in what was nominally a democracy, power was really in the hands of the first citizen.

▲ **Source 3.38** Thucydides, *History of the Peloponnesian War*, Book 2, Penguin Classics,1974, p. 163

Responding to the source

1 In what ways is Thucydides making positive comments about Pericles?
2 Do you think Thucydides makes any negative comments about Pericles?

END-OF-SECTION REVIEW 3.5

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 In what period did Pericles grow up?
2 Name some of the people who influenced Pericles.
3 How many times was Pericles re-elected a general?
4 What famous buildings is Pericles responsible for building in Athens?

Interpret

5 How did Pericles make it easier for poorer Athenians to be involved in government?
6 What did Thucydides think of Pericles' leadership of Athens?
7 Why does Thucydides say that power was in Pericles' hands even though Athens was a democracy?

Argue

8 Why Pericles was a significant individual in ancient Greece?

Digital quiz
Please see the Interactive Textbook to access digital activities

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3.6 The process and importance of conserving the past

FOCUS QUESTION

How do archaeologists uncover information about ancient Greece?

Archaeology and its methods

Archaeology today is a scientific and precise process, but this has not always been the case. In the late nineteenth and early twentieth centuries, archaeology was a new idea so the people practising it did not know how to preserve and protect **excavated** remains. Some archaeologists did enormous damage to the sites they were uncovering and could have accidentally destroyed artefacts that would have given us new understandings about the past. However, today we have technologies like ground-penetrating radar and satellite imagery, which help us to carefully uncover historical remains.

KEY TERM

excavate to carefully dig up or reveal something in the ground

▲ **Source 3.39** When archaeologists undertake a dig today, they follow careful rules and minimise any chance of damaging ancient remains by mistake.

Choose a site

- Lots of factors help an archaeologist determine a site to dig.
- Geography, ancient texts, the work of other archaeologists and local myths can all help

Assemble a team

- A team can include:
  - A director
  - Diggers
  - Recorders
  - Local guides

Process what is found

- There can be lots of remains and data to go through which can include:
  - Scientific data like climate, biological remains, metals and so on
  - Artefacts like pottery, house foundations, tools, weapons

Share what is found

- Report back to universities, local government and other organisations about what you found.
- Work with other experts to determine what your findings mean

▲ **Source 3.40** This flowchart describes the overall process of an archaeological dig

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Methods of conservation

Archaeologists use specific methods to **conserve** the remains of the past. They treat the ownership of what they find very carefully. To do this, archaeologists try to work with local communities to uncover and protect what they find. Unfortunately, when archaeologists first developed their skills in the late nineteenth century, they sometimes did not act with the same **ethical understanding** that we have today.

There are many examples of archaeologists removing extremely valuable and significant artefacts from where the objects were originally found. These artefacts are now displayed in museums and private collections around the world. There has been a lot of argument about what to do with these artefacts. Should they be returned to their original homelands or should they stay in the museums they currently occupy? Some argue that these artefacts have been much better preserved in museums than they would have been if they had stayed in their original locations. They say that the museums are keeping the artefacts safe for future generations to see.

▲ **Source 3.41** A small ceramic container shaped as an Athenian hoplite, known as an *aryballos*. It was created around 600–570 BCE and was used to hold perfume or gels.

Controversy: The Parthenon Marbles

One of the biggest controversies involving artefacts from ancient Greece concerns the Parthenon Marbles. The Parthenon Marbles are a set of marble sculptures that were originally part of the Parthenon on the Acropolis in Athens. In the early nineteenth century, Lord Elgin acquired the marbles from the Ottoman government, which controlled Greece at that time. Lord Elgin transferred the marbles from their home at the Acropolis to Great Britain, where they came into the possession of the British Museum. They are still on display at the British Museum today.

Greece regained its independence from the Ottoman Empire in 1832 and began to focus on restoring the remains of its ancient past. Greece has asked for the return of the Parthenon Marbles from the United Kingdom but so far this request has not been met. The Trustees of the British Museum's official position is as follows:

> The British Museum tells the story of cultural achievement throughout the world, from the dawn of human history over two million years ago, until the present day. The Parthenon sculptures are a significant part of that story. The Museum is a unique resource for the world: the breadth and depth of its collection allow a global public to examine cultural identities and explore the complex network of interconnected human cultures. The Trustees lend extensively all over the world and over 3.5 million objects from the collection are available to study online. The Parthenon sculptures are a vital element in this interconnected world collection. They are a part of the world's shared heritage and transcend political boundaries.

▲ **Source 3.42** The position of the Trustees of the British Museum is available on the museum's website

KEY TERMS

conserve to protect something so that it is not damaged or destroyed

ethical understanding to consider different perspectives on what is morally right

FAMOUS FACE

Lord Elgin

Lord Elgin (1766–1841 CE) was a Scottish nobleman, who was responsible for removing the Parthenon Marbles from Greece and transporting them back to the United Kingdom. The cost of removing the marbles was significant. Once the marbles were in the United Kingdom, they were eventually purchased by the British Museum. The marbles are sometimes referred to as the Elgin Marbles.

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Other historians and public figures have a very different opinion on this issue:

> These nations have a right to their own heritage and should not have to prove their capacity to care for it to satisfy any foreign museum. To hide behind outdated treaties signed by long-vanished empires does not address the moral issue of one nation generating income from the display of treasures taken from another.

▲ **Source 3.43** Jonathon Downes, 'Losing "Our" Marbles', *History Today*, 2010, p. 19

The debate on whether Britain should give back the Parthenon Marbles is complex. If every museum had to give back every piece they had acquired, there would not be much left in the museums to show. If the marbles had never been taken to Britain, they might not have been preserved as well as they are now. Passionate views are held on both sides of this ethical debate. Many Greeks see the marbles as a significant part of their history and cultural identity.

▲ **Source 3.44** The Parthenon Marbles are on display in the British Museum

MAKING THINKING VISIBLE 3.3

Tug of war

Identify the factors that 'pull' at each side of the dilemma about the Parthenon Marbles, then answer the questions here.

1. What are the reasons that support the British Museum keeping the Parthenon Marbles?
2. What are the arguments for the Parthenon Marbles to be returned to Greece?
3. What do you think about this dilemma?
4. What do you suggest would be a good way to resolve this tug of war?

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END-OF-SECTION REVIEW 3.6

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Why are so many artefacts from ancient Greece in museums outside of Greece?
2 Who removed the Parthenon Marbles from Greece and took them to the United Kingdom?
3 Who ruled Greece when the Parthenon Marbles were taken?

Interpret

4 How are methods of archaeological excavation today different from those of early archaeologists?
5 Why do some historians believe removing ancient artefacts and putting them in museums is positive?

Argue

6 Do you think the Parthenon Marbles should be returned to Greece? Support your argument with reasoning.

Digital quiz
Please see the Interactive Textbook to access digital activities

FAMOUS FACE

Alexander the Great

Alexander the Great (356–323 BCE) was also known as Alexander of Macedon. Alexander the Great led the Greek armies to conquer most of the known world of the time. He was crucial in uniting the Greek city-states and spreading Greek ideas far and wide. He became one of the most successful military commanders of all time. Many leaders throughout history have tried to emulate his success but few have equalled him.

Conclusion: why does it matter today?

Ancient Greece was the beginning of many of the big concepts that we take for granted today such as 'democracy', 'drama' and 'voting'. There are also plenty of other concepts that had their beginnings in this amazing society.

After the time of Pericles and the Peloponnesian War, ancient Greece began to change. Specifically, a 'Greek identity' spread throughout Greece. Alexander the Great was able to use the idea of Greek identity to create a unified empire, which went on to become a major world power.

Ancient Greek ideas spread around the Mediterranean and the Near East, including Egypt, Italy and Mesopotamia, and even as far as India.

Ancient Greek mythology has inspired stories for thousands of years, many of which are still enjoyed today. The influence of ancient Greece runs deep in our society and has influenced much of how Australia works. We might not realise the extent of this influence unless we study the incredible achievements of these intriguing ancient peoples.

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Follow the flow of main ideas

What have you learned about ancient Greece? For this activity, copy the diagram and fill it out by explaining your understanding in a few points. (We have done one topic for you.)

Geography of Greece	
Structure of Greek society	
Significant beliefs in ancient Greece	
Conflict in ancient Greece	
Pericles	
Archaeology and ancient Greece	
Conserving ancient Greece	• Many archaeologists over the years have helped us to conserve the past of ancient Greece • Some archaeologists have used controversial methods to preserve precious artefacts • The Parthenon Marbles are a famous example of artefacts that have been removed from their original location • There is much debate about whether Britain should give the Parthenon Marbles back to Greece

3 Making thinking visible

I used to think that ancient Greece was …

Now I think that ancient Greece …

This exercise in visible thinking asks you to track the difference between what you knew about ancient Greece before starting this chapter, and what new understandings you have acquired since reading the chapter.

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Using the stem sentences here, write a paragraph explaining what you previously knew about the topic. Then write another paragraph explaining what you now understand about the topic.

1A I used to think that the geography of ancient Greece was important because …

1B Now I understand that the geography of ancient Greece was important because …

2A I used to think that ancient Greek society was …

2B Now I understand that ancient Greek society was …

3A I used to think that ancient Greeks believed in …

3B Now I understand that ancient Greeks believed in …

4A I used to think that ancient Greeks fought …

4B Now I understand that ancient Greeks fought …

▲ **Source 3.45** A reconstruction of the statues above the western door of the Parthenon. The statues were created from a detailed, early twentieth-century drawing.

4 Using historical terms meaningfully

As an historian, you will need to confidently and correctly use the terms related to your subject. Write a paragraph in response to the question using all the key terms listed. Ensure that your use of these terms shows your understanding of what each term means.

Question: *Explain the practices of ancient Greeks that are still followed today in Australia.*

Use these words correctly in your answer:

- Democracy
- Election
- Citizen
- Drama
- Education
- Philosophy.

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5 Research task

Investigate the different aspects of ancient Greek civilisation and identify their key elements. Try to find historical sources for each topic.

Copy the lotus diagram provided and fill it in with your research. This will build a complete picture of what you have learnt in the different learning areas. Two areas have been left blank so that you can add topics of your own choosing.

When you have finished creating your lotus diagram, use it to answer the following question. Your answer needs to be an extended written response.

Explain how different elements of ancient Greek society were influenced by Greece's geography.

	Conservation			_____			Geography	
			Conservation	_____	**Geography**			
	Archaeology		**Archaeology**	**ANCIENT GREECE**	**Social system**		Social system	
			Pericles	**Conflict**	**Beliefs**			
	Pericles			Conflict			Beliefs	

6 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about ancient Greece

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Unit 3

The ancient Asia-Pacific world – 60 000 BCE–650 CE

Overview

Powerful ancient societies did not just exist in Europe and the Mediterranean; the Asia–Pacific world was home to the ancient civilisations of India and China during the same period. The cultural beliefs and practices of these unique civilisations have helped shape a region of the world that is close to and important for Australia today. The ancient past of our neighbours has impacted us in ways we often do not realise.

The chapters in this unit explore the histories of ancient India and ancient China. The content investigates these country's physical features, and the key groups and individuals, beliefs and practices, and major events in these civilisations' histories. As you investigate the ancient Asia–Pacific world, think about the similarities and differences between ancient China and ancient India, and the other ancient civilisations you have studied so far.

Learning goals

After completing this unit, you should be able to answer these questions:

- How do we know about the ancient past?
- Why and where did the earliest societies develop?
- What emerged as the defining characteristics of ancient societies?
- What key beliefs and values emerged and how did they influence societies?
- What were the causes and effects of contact between societies in this period?
- Which significant people, groups and ideas from this period have influenced the world today?

Video
Unit overview

Introducing historical concepts and skills: *Continuity and change* and *historical significance*

Throughout the chapters in this unit, there will be a special focus on the concepts of **continuity and change** and **historical significance**. This means you will develop your ability to explain what changed and what stayed the same over time, as well as know what the most significant aspects of ancient civilisations were.

Identifying continuity and change is a key skill to have when you are studying history. This unit will help you to develop your ability to identify when things change and why, which groups are involved, and what types of things in a culture stay the same and are long-lasting. Determining historical significance is also a crucial skill to develop so that you can study history well. So much happened in the past that you need to be able to identify what is important and what is not. You can look for opportunities throughout this unit to develop both of these important skills in history.

► **Source A** This photograph shows the sun rising over the Great Wall of China as it looks today

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CHAPTER 5

Ancient China

Setting the scene: how did an engineer become a king?

Around 4000 years ago during the **Neolithic period**, the people in China decided they no longer wanted to roam the land. The idea of having a stable place to call home was appealing and the banks of the mighty Yellow River seemed like an ideal location to start a civilisation.

However, there was a significant problem for the growth of communities along the river. Frequent flooding damaged crops and property, and sometimes the water swept away citizens. But living near the river was vital to the future of the **fledgling** civilisation. The Yellow River was necessary for trade and agriculture, so a solution needed to be found to manage the river's unpredictability and its destructive power.

A man named Gun was chosen to fix the problem. Gun's solution was to use soil to build **embankments** and **levees** that would protect the farms from rising water. But the strength of the Yellow River's floodwaters proved to be too strong. After nine years of attempting to hold back the water, a devastating flood broke through the embankments, which wiped out crops, buildings and many people. Gun was dismissed from his post (possibly executed) and his son Yu was appointed to find a permanent solution.

Yu worked tirelessly for thirteen years to protect the people and their farms from the devastation of another flood. He redirected the waters

KEY TERMS

Neolithic period an era of change when people who used stone tools moved away from hunting and gathering to settle in an area to farm animals and crops

fledgling something that is new or young and without much experience

embankments ridges of earth or stone walls used to hold back water

levee earth embankments built along riverbanks to prevent flooding

▲ **Source 5.1** A painting from the Shang dynasty of King Yu

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out towards the sea by using a combination of levees and **canals**. Yu worked so diligently during this period that stories say he never found time to go home to visit his wife and children, and only passed their door three times. This dedication to his work and the ultimate success of his plans was so appreciated by the people that the then ruler, King Shun, passed the throne on to Yu, rather than his own son. This is how Yu became the first ruler of the Xia dynasty.

▲ **Source 5.2** These drummers are part of a recent celebration of the birth of Yu the Great. Why do you think people still celebrate the life of someone who lived so long ago that many people believe them to have been mythical?

Yu the Great, as he became known after his death, has been revered throughout Chinese history as an ideal ruler. He is referred to as a **sage-king**. There has long been doubt, however, on whether Yu was an historical figure or a mythological king designed to promote the values of a good ruler. There is no written record that exists from the time of Yu or any artefacts that can be directly linked to him. Further, many of the stories that explain Yu's exploits include an array of mythical creatures. For example, Yinglong the dragon who helpfully used his tail to direct flood waters towards the sea.

KEY TERMS

canals channels dug to carry water

sage-king is a ruler in ancient China known for being very wise and having good judgement

Nevertheless, a recent scientific study of the Yellow River basin has found physical evidence of significant flooding around 1920 BCE. This evidence matches the era identified in later historical writings, which suggests that there may be more to the story of Yu than an educational myth.

MAKING THINKING VISIBLE 5.1

Think, puzzle, explore

Reflect on what you have just read about how ancient Chinese civilisation began and the skill of Yu the engineer. Use 'think, puzzle, explore' to put your knowledge to work.

1. What do you *think* the story of Yu tells us about ancient China?
2. What question or *puzzle* do you have about what you have read?
3. How can you *explore* your question further?

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Chapter overview

Introduction

Ancient China had three thousand years of nearly uninterrupted imperial rule, which means that China can claim to have had one of the world's oldest, continuous civilisations. The many legacies of ancient China have had an enduring effect on the land and on the Chinese people today.

In the modern world, China occupies a significant area of over 9.5 million square kilometres in East Asia, and the country is home to more than 1.4 billion people. This makes China the world's largest country by population and third or fourth in terms of land mass. Currently, China boasts the second-largest economy and is one of Australia's most important trading partners. China has become an influential player in global politics and is emerging as a superpower. But what are modern China's foundations?

Learning goals

After completing this chapter, you should be able to answer these questions:

- How did the geographical features of China shape the development of the ancient Chinese civilisation?
- How did the ancient Chinese develop and structure their society?
- What do we know about early cultural practices in ancient China?
- How did rulers gain and hold power in ancient China?
- What did the people of ancient China believe?
- How did contact with the outside world shape the society, economy and political structures of ancient China?
- Who were the significant individuals of imperial China and what were their key achievements?
- How do historians and archaeologists use technology to find out about the people of the past?
- What responsibility do we have to the conservation of the past and how should it be undertaken?

Historical skills

After completing this chapter, you should be able to:

- Explain what **continuity and change** and **historical significance** means in the study of history
- Understand what the term 'historical interpretation' means
- Understand the role of historians and archaeologists in uncovering the past
- Develop historical empathy with people in the past
- Interpret primary sources in both print and visual form
- Evaluate the reliability of primary sources
- Correctly use special terms specific to the topic under study
- Use factual evidence (dates, statistics, examples) to substantiate an argument.

► **Source 5.3** Spirals of incense burn inside Man Mo temple, Hong Kong

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Timeline of key events

What came before this topic?

Stone age and Neolithic China where people lived as hunter-gatherers and early farmers began to domesticate animals and plant crops.

Jade axe c. 4500–2300 BCE

2123–2025 BCE
Lifespan of Yu the Engineer

2070–1600 BCE
The Xia dynasty rules part of north-eastern China

1600–1046 BCE
The Shang dynasty rules north-central China

c. 1200 BCE
Life of Lady Fu Hao, an important consort and Shang general

1046–256 BCE
The Zhou dynasty defeats the Shang and rules north-central China

551–479 BCE
Life of Confucius, an important Chinese philosopher

771–475 BCE
Spring and Autumn period after the Zhou lose control over the western regions

475–220 BCE
The *Warring States period* where Zhou rule begins to crumble and many states break away to govern themselves; the first parts of the Great Wall are built

Bronze *zun* (wine container) shaped like an elephant from the Shang dynasty, c. 1600–1046 BCE

Bronze-ring handle with mask from the Zhou dynasty, c. 1046–771 BCE

Timeline questions

1 What does the information in the timeline indicate about the way ancient China was ruled?
2 Who was Cai Lun and what did he do? Research him and write a short summary of his contributions to ancient Chinese culture.

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What came after this topic?

Imperial China continued through several more dynasties, including the Mongolian Yuan dynasty, the powerful Ming dynasty and the Manchu Qing dynasty. The dynasties lasted until the removal of the child emperor Pu Yi in 1912 CE.

Detail of a decorated vase from the Ming dynasty

Terracotta warrior from Emperor Qin Shi Huangdi's tomb

221 BCE
Qin Shi Huangdi, who was King of the Qin, conquers the last of the warring states and becomes the first emperor of a unified China

221–206 BCE
The Qin dynasty rules China

206 BCE – 220 CE
The Han dynasty rules China

50–121 CE
Lifespan of Cai Lun, reputed inventor of paper

c. 145 CE
Sima Qian, author of Shiji (the *Historical Records*) is born

220–589 CE
The *six-dynasties period* where there was some breakup of the Chinese state and six short lived dynasties ruled from the capital of Jiankang

581–618 CE
The Sui dynasty rules China for a short but significant period; the north and south of China are reunified

618–907 CE
The Tang dynasty rules China; many historians regard this period as a golden age of civilisation in China

627 CE
Wu Zeitan, China's only female emperor is born

Chinese pronunciation

Chinese words can be tricky for English speakers to pronounce, as the Chinese language uses unfamiliar sounds and tones. Also, Chinese is written in characters rather than with letters, so a system called 'pinyin' was designed to translate characters into the Roman alphabet. For example, the Chinese character 天, meaning heaven or sky, is written as *tiān* in pinyin. English speakers can often sound out words written in pinyin as most of the vowels represent similar sounds to those in English. However, some of the consonants are very different. Here is a quick guide to help you with some of the differences.

c 'ts' as on lots

j 'j' as in jet

q 'ch' as in chop

r 'z' as in haze

x 'sh' as in lesion

zh 'j' as in job

z 'ds' as in woods

So, the Zhou dynasty is pronounced 'Joe' dynasty, while the Xia is 'Shaa' and the Qin is 'Chin.'

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5.1 How and where did ancient Chinese civilisation first develop?

FOCUS QUESTIONS

- How did the geographical features of China shape the development of ancient Chinese civilisation?
- How did the ancient Chinese develop and structure their society?
- How can we find out about early cultural practices in ancient China?

Geography

China is a land of many different climates and terrains. It is also a large and populous country, but it was not always so.

▼ **Source 5.4** The geographical features and borders of modern China

1. The core of ancient Chinese culture and civilisation grew in the flat, fertile plains of the country's north-eastern regions. Only later did the Chinese Empire's power grow and expand the country to its current size.
2. The Tibetan Plateau covers a wide western area of modern China. It consists primarily of a vast plateau that rises around 4.8 kilometres above sea level and is bound by the Himalayan mountains to the south-west. China first claimed ownership of this land during the Yuan dynasty in the thirteenth century CE.
3. To the far north-east of China are the Manchuria plains. This area was a conquest of Genghis Khan who was the grandfather of Kublai Khan. Kublai Khan became the first ruler of the Yuan dynasty.
4. To the north and north-east of the Tibetan Plateau lies the Tarim Basin containing the Taklamakan Desert. The Tang dynasty of the seventh century was the first to establish control in this region. It was through this region that the main paths of the important trade route, the Silk Road, were travelled.

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5 The central and eastern regions of China include: the Loess Plateau 5A and the Chinese plain 1 to the north; and the Sichuan Basin 5B and southern hills to the south 5C.

6 The earliest civilisations in China developed along the banks of two key rivers: the Yellow River 6A and the Yangtze River 6B. Both of these rivers emerge from the heights of the Tibetan Plateau.

7 The Yellow River heads north-east towards the plains and plateaus of Northern China in wide sweeping loops, until it passes through the North China Plain and empties into the Bohai Sea.

▲ **Source 5.5** The Yellow River winds its way through the Tangke grasslands of Sichuan province

8 The Yangtze wends its way south-east through mountainous terrain. It cuts through the Sichuan Basin and carves out the Three Gorges, eventually ending in the East China Sea.

▲ **Source 5.6** The Yangtze River flows through Yunnan Province

MAKING THINKING VISIBLE 5.2

What makes you say that?

Look closely at the map and information in Source 5.4, then answer the following questions.

1 Why do you think civilisations develop around rivers?
2 Why did the Yellow River become the centre of ancient Chinese civilisation? What evidence or reasoning can you provide to support your claim?
3 What other factors might be important in the establishment of a civilisation? How could you find out?

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Early civilisation in China

In around 8000 BCE, China's hunter-gatherer societies began to plant and grow grain, which mostly consisted of millet and rice. This development of agriculture meant that the ancient Chinese could create a stable food supply, which allowed them to establish permanent settlements. Farming meant that fewer members of a community needed to work on finding food, and they could instead spend time in developing crafts or being soldiers. Before agriculture developed fully, the Neolithic societies used stone, horn and bone tools. They wore fabric clothing and animal skins, and had developed increasing complex pottery designs. The cultivation of silkworms possibly also began in the Neolithic period.

The Yangshao culture was one of the many communities that sprung up along the Yellow River between 4700 and 3600 BCE. In the 1950s CE, workers digging the foundations for a new factory discovered the remains of a large Yangshao village. This site is now called the 'Banpo archaeological site' and is located in the Yellow River valley, which is a few kilometres east of the city of Xi'an.

KEY TERMS

kilns ovens for drying or baking mud and clay

osteoarchaeologist an archaeologist who specialises in the study of bones

▲ **Source 5.7** A decorated pot from the Yangshao culture (4700–3600 BCE). What do you think this pot might have been used for?

▲ **Source 5.8** A food vessel made from black pottery found in Yangshao (4700–3600 BCE). What bird do you think it is shaped like?

Banpo archaeological site is a rich source of evidence about the lives of the people of Yangshao, their technology and social structures. In addition to the over 10 000 stone tools and other artefacts found, archaeologists have discovered the foundations of almost 100 buildings, as well as a long ditch surrounding the village that may have served as a moat. Six large **kilns** were discovered at the edge of the village, which suggests there was a large-scale production of pottery at that time.

Yangshao tombs

Tombs are an excellent place for historians and archaeologists to look when they want to find out about the way cultures lived in the past. We can learn about the roles of men and women from tombs. We can find out which people had power, and what they thought was important in life and in death.

The 250 tombs that have been uncovered at the Yangshao village have provided historians with information about the health and daily life of the Neolithic peoples in China. Research by **osteoarchaeologists** reveals that life expectancy for both men and women was around 36 years. Women began to give birth to children when they were about 14 or 15; they had between two and seven children.

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There are an equal number of graves for women as there are for men at the Banpo archaeological site, and the graves contain similar amounts and quality of **grave goods** like jewellery, tools and pots. There are also several women's graves containing more and better-quality items. This suggests that these women had some higher status or rank in society.

There is disagreement among historians about how to interpret the tombs at the Banpo archaeological site. Some believe that the graves are evidence of a **matriarchal society**, where women controlled and ran the communities. Others argue that the evidence of the graves is not enough to support this interpretation, and that the types of goods in the tombs demonstrate gender divisions. For example, women were more likely to be buried with stone **querns** for grinding grain, while men possessed more farming tools.

Whichever interpretation is correct, it does appear that there was a level of equality between men and women in these early societies. However, the graves of later Neolithic communities and the early Bronze Age demonstrate a slow decline in the status of women. As time went on, there were fewer graves created for women, and their grave goods became less valuable in comparison to men's graves. There is even evidence of human sacrifice by the late Neolithic period, with women being found folded into positions like servants in the graves of men.

KEY TERMS

grave goods items buried alongside a body; usually personal possessions or items to help their journey to the afterlife

matriarchal society a society ruled by women

querns stone tools used for grinding grain

DEVELOPING HISTORICAL CONCEPTS AND SKILLS 5.1

Examining historical interpretations

Have you ever had a disagreement with a friend at school? If a teacher had to intervene, they might have asked you each to tell your side of the story. If so, were these sides exactly the same? Probably not. Even though both of you were part of the same event, it is likely that you interpreted it differently. Otherwise there may not have been a disagreement in the first place!

While historians are always trying to find the truth of the past, even when there is lots of information available, people can disagree about what really happened. The further back we try to look, the less information there is to work with. This means an even wider range of interpretations is possible. As historians, our job is to weigh the evidence carefully and develop an interpretation that fits the facts. We must also be willing to reassess when new information is discovered that affects our interpretation.

Refer to the information that you have just read and follow these steps to create an historical interpretation.

1. Why do historians disagree about the meaning of the evidence found at Banpo?
2. Decide which interpretation of Banpo you think is most likely. What evidence or reasoning can you provide to support your claim?
3. What other factors might be important in understanding why historians may have different interpretations? How would you find out?

▲ **Source 5.9** This photograph shows the Banpo archaeological site with some of the pottery pieces found that date from around 4700–3600 BCE. How important are tombs in understanding past cultures?

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 5.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Where did the first civilisations in ancient China begin?
2 What types of tools did Neolithic people use?
3 Where does the Yangtze River end?

Interpret

4 What evidence found at the Banpo archaeological site suggests developments in ancient Chinese civilisation?
5 Why do archaeologists and historians disagree about the interpretations of tombs in Banpo?
6 Why do you think that women were sacrificed by being placed in the graves of men by the late Neolithic period?

▲ **Source 5.10** This double-cup from the Yangshao culture (c. 2500 BCE) includes a hollow tube between its two containers that allows liquid to flow from one cup to the other

Argue

7 Were men and women equal in Yangshao society? Provide evidence to support your opinion.
8 Look at Source 5.10. In what situation do you think a double-cup like this would be used?

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5.2 Life in ancient China, and changes in society and their effects

FOCUS QUESTIONS

- How did the ancient Chinese develop and structure their society?
- How did emperors gain and hold power in ancient China?

The Xia dynasty: myth or reality?

For many years, the stories of the Xia dynasty were considered to be more myth than reality. Almost everything that we know of the Xia comes from records written during the later Shang and Zhou dynasties, since no writing from the Xia era has been discovered. According to these later records, the Xia were the first to establish a government and begin the use of a **dynastic succession** to maintain power. Some historians believed that the Xia were invented to add legitimacy to the Zhou dynasty's rise to power. The Zhou used the overthrow of the Xia dynasty by the Shang as an example of how earlier dynasties had to be replaced when they became immoral and corrupt. In this way, the Zhou justified their own overthrow of the Shang dynasty.

However, archaeological digs of the late twentieth century have uncovered physical evidence that a society more sophisticated than Neolithic communities had existed before the Shang. In 2011, the foundations of a large palace was excavated by Chinese archaeologists at the Erlitou Bronze Age dig site in Henan province, which is near the Yellow River. The palace was dated, through radiocarbon dating, to be from around 1700 BCE and covered 2100 square metres. It was built with rammed earth walls and based around three main courtyards.

KEY TERM

dynastic succession a process of passing power and authority from one person to a family member, traditionally often father to son

A structure this large and elaborate suggests the existence of a ruler with the wealth and power to command many workers. The site is believed, by some archaeologists, to have been the capital during the Xia dynasty. There are many tombs and, most importantly, many bronze items have been discovered near where later records suggested they would be. Despite this, some historians are not convinced that there was a Xia dynasty. They argue that the evidence for the dynasty is inconclusive and believe that the Erlitou culture was an early part of the Shang dynasty, rather than a society in its own right.

Whether the society found at Erlitou was the first dynasty or not, the dig site does mark a transition between the Neolithic societies and the early Bronze Age.

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KEY TERM
smelting a process of heating rocks and sediment to extract metals

Neolithic societies relied on stone tools, whereas societies during the Bronze Age produced harder and more durable metals like bronze by **smelting** copper and tin alloys. These new metals proved invaluable in the development of new technologies and improved weaponry.

MAKING THINKING VISIBLE 5.3

Perspectives

The work of an historian is to gather evidence and interpret it to develop an understanding of our past. Sometimes they need to draw conclusions when there is a limited amount of evidence and this can lead to differences in interpretation between historians.

1. How do we know about the past?
2. How do we evaluate conflicting evidence or interpretations?
3. Is there enough evidence to confirm the existence of the Xia dynasty?
4. If not, what more would need to be found?

◄ **Source 5.11** The oldest bronze items found in China have all been excavated from the Erlitou ruins in Henan province. This three-legged bronze vessel is believed to be between 3500 and 3800 years old. It is called a *ding* and was probably used to cook food or burn incense. Why do you think this vessel has three legs rather than four?

► **Source 5.12** This bronze *jue* is attributed to the Xia dynasty. A *jue* was a type of container used to serve warm wine.

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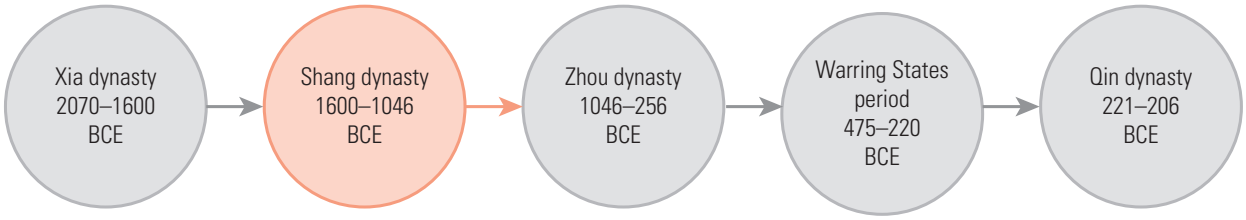
The Shang dynasty

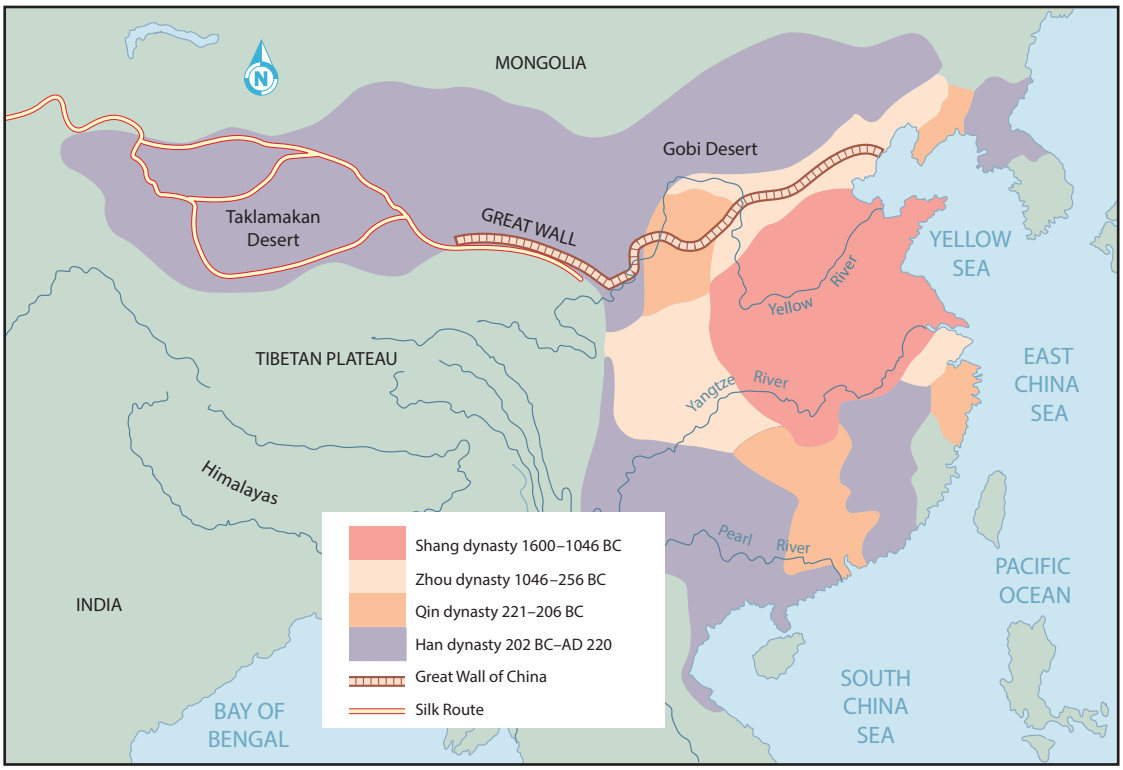
The Shang dynasty began around 1600 BCE after the Xia tyrant, Jie, was overthrown in a rebellion by the Shang leader, Tang. The stability of the Shang rulership over the next 600 years led to numerous advances in science and culture. The ancient Chinese developed sophisticated bronze-casting techniques and moved away from using stone tools. Shang craftsmen became skilled in working with jade, bone and silk. The improvements in agricultural practices during the Shang dynasty meant that less labour was required to produce more food. Workers were freed up to undertake other tasks such as building cities and elaborate tombs, and digging canals to link rivers. Writing was developed and used in religious ceremonies, where fortune tellers asked the **ancestors** for advice. The ancient Chinese also created a calendar based on the phases of the moon during the Shang dynasty.

KEY TERM

ancestors people you are descended from like a parent, grandparent, great-grandparent, great-great-grandparent and so on

◄ **Source 5.14**
An owl-shaped, Shang-era, *zun*, which is a bronze wine vessel. Compare this vessel to the ones of the Xia dynasty. How is this vessel different to those in the Xia dynasty? What do these differences suggest about Shang culture and craftspeople?





◄ **Source 5.13**
The territory controlled by the ancient Chinese dynasties (each new dynasty incorporates the earlier one)

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The Mandate of Heaven and the Zhou dynasty

The Shang dynasty finally came to an end in 1046 BCE when King Wu of Zhou overthrew the last Shang king at the Battle of Muye. The Zhou accused the Shang dynasty of immoral conduct and corrupt rule, which justified the removal of the Shang as rulers. Zhou historical records suggest that the Shang people were so unhappy with their king that they, and many Shang soldiers, laid down their weapons and welcomed the Zhou.

When the Zhou overthrew the Shang dynasty, the Zhou established the principle of the Mandate of Heaven (*Tiānming*). Essentially, the Mandate of Heaven is the divine right to rule the Chinese people. Heaven (*Tiān*) chooses who has a right to rule, and can take away this right if a ruler behaves in an unacceptable way. The mandate means then that if any dynasty or ruler is overthrown by another, the very fact of it being overthrown is proof that the previous ruler has lost the Mandate of Heaven. Zhou scholars explained that this was what happened when the Shang overthrew the Xia. The Mandate of Heaven became a very important principle because it gave divine authority to all of the dynasties that followed.

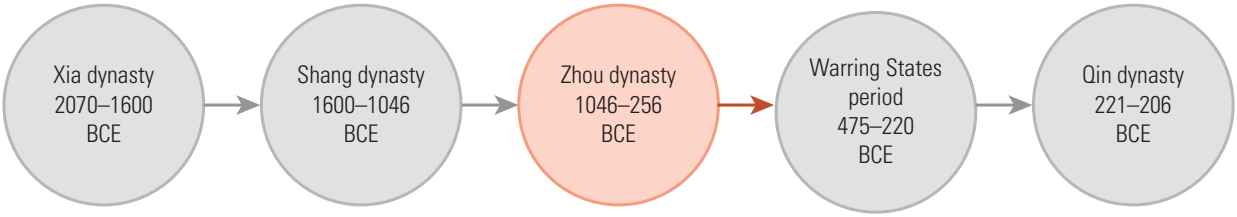
KEY TERMS

feudal a societal structure based on rank where higher ranks owe protection to lower ranks; lower ranks give a tribute in return, usually agricultural goods

tribute a payment or gift provided to a king

The Zhou dynasty lasted nearly 800 years and is officially the longest dynasty in Chinese history. During this time, culture in ancient China continued to develop. Peasants in the countryside farmed the land using what was called the 'well-field system'. Under this system, areas of land were divided into nine sections. Eight of these sections were farmed individually by different families, while one section was farmed collectively for the lord who owned the land. Ancestor worship continued to be important to the Zhou, but they focused more on family lines and inheritance than the Shang had done.

While the Zhou was still the ruling dynasty of China until 2056 BCE , in practice they had lost control of most of the country long before then. The Zhou had ruled the large kingdom by establishing a network of **feudal** states, where regions were ruled by local lords who paid **tribute** to the Zhou king. However, over time some of these local lords felt that



MAKING THINKING VISIBLE 5.4

Explanation game

Refer to what you have just read and Source 5.15 to answer the following questions.

1. What do you notice about how the Mandate of Heaven came about?
2. Why did the Mandate of Heaven happen that way?

► **Source 5.15** This photograph shows a Mandate-of-Heaven seal or stamp to acknowledge the emperor's mandate. It is from the Qin dynasty (18 CE).

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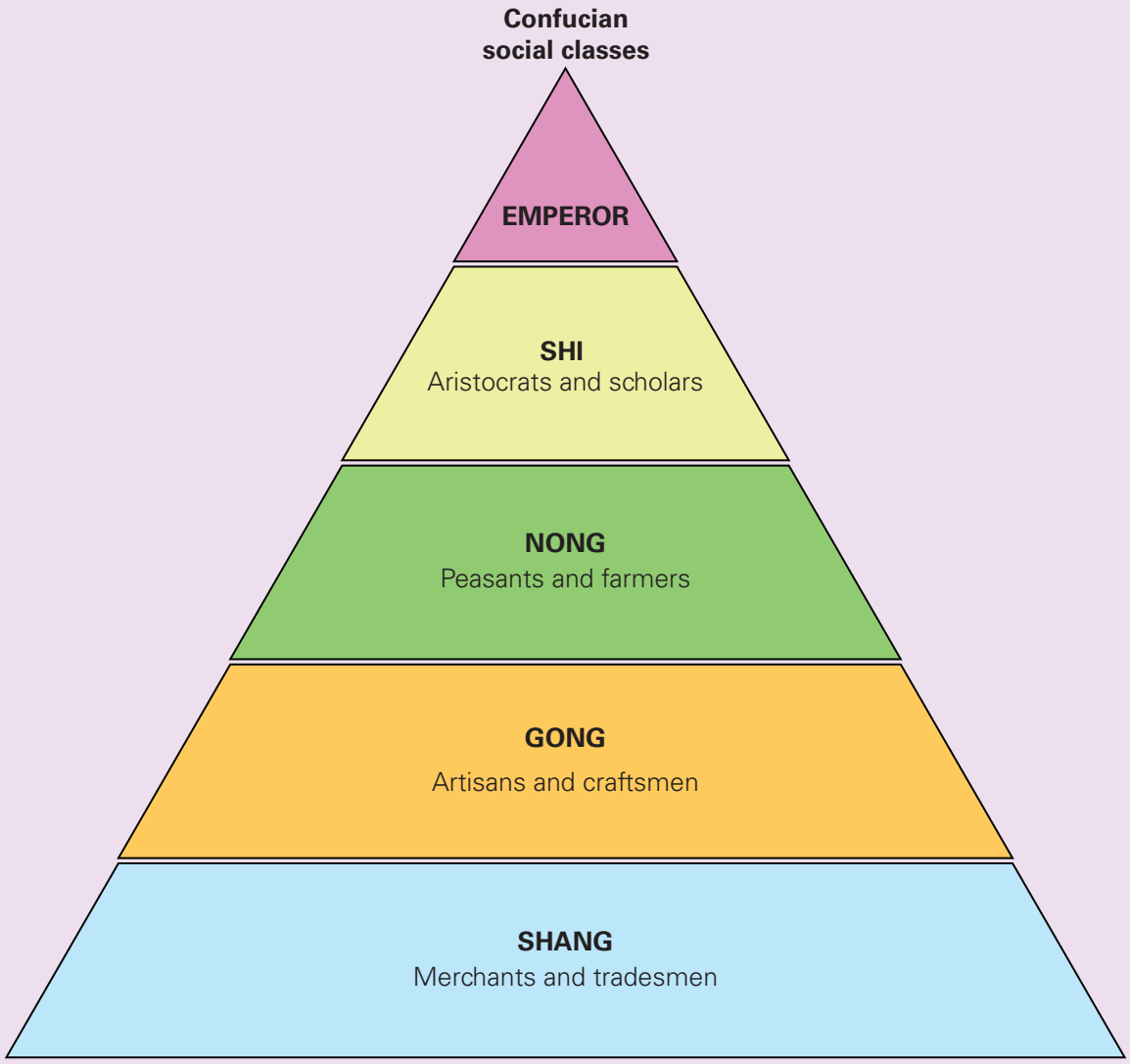
they no longer needed to recognise the Zhou king and so began to break away. Some of the lords even began to challenge Zhou rule. In 771 BCE , the Zhou capital was attacked and the king was killed, which forced the Zhou to retreat east and continue the dynasty from what is now called Henan province.

Social structure in ancient China

Society in ancient China was traditionally separated into four classes. These were described by the philosopher Confucius as the natural organisation of a just and moral society. At the top of the social structure, just below the emperor, were the Shi. The Shi were the aristocrats and members of the imperial court and included scholars (who were called 'the literati') and bureaucrats. Next in order of status were the Nong, who were peasants and farmers. They were the largest group in society. Although they were not wealthy, the Nong were well respected in ancient Chinese society as the producers of food. Under the Nong came the Gong, who were artisans and craftsmen. Beneath them were the Shang or merchants. The merchants were lowest in ancient Chinese social ranks because they produced nothing but acted as go-betweens, so their contribution to society was considered less significant than either the Nong or the Gong. In practice, many Shang people became much wealthier than their higher-class counterparts.



▲ **Source 5.16** The basic social structure of ancient China

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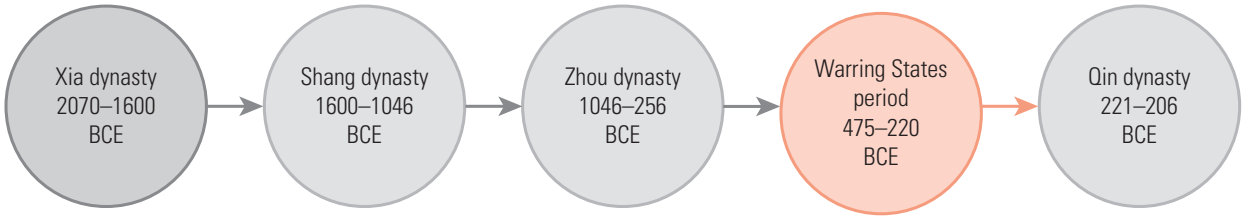
The Warring States period

The time after the Zhou moved the capital to the east is known as the Spring and Autumn period. It was a time of almost constant conflict, but also a time when philosophy and culture flourished. Two of the key ancient Chinese belief systems, Confucianism and Daoism, emerged at this time.

As the conflict between peoples grew more intense, the period became known as the Warring States period. The various Chinese states fought among themselves in a bitter struggle for control that lasted over 200 years. The Jin defeated the Chu, but their power was broken by internal fights and they split into three states: the Han, the Wei and the Zhou. The state of Wu became powerful, only to fall to the Yue, who were then defeated by the Chu. One of the most important campaigns of this time was the Battle of Changping, which lasted from April 262 BCE to July 260 BCE . In this battle, the state of Qin attacked the states of Han and Zhou over the border-province of Shan Dong. The Zhou army was larger and constructed fortifications to protect their land, but they were ultimately defeated by the Qin.

The Qin became the ultimate victors of the Warring States period when they defeated the last two states of Qi and Chu. In 221 BCE, the Qin king unified China under a new dynasty and declared himself the first emperor.



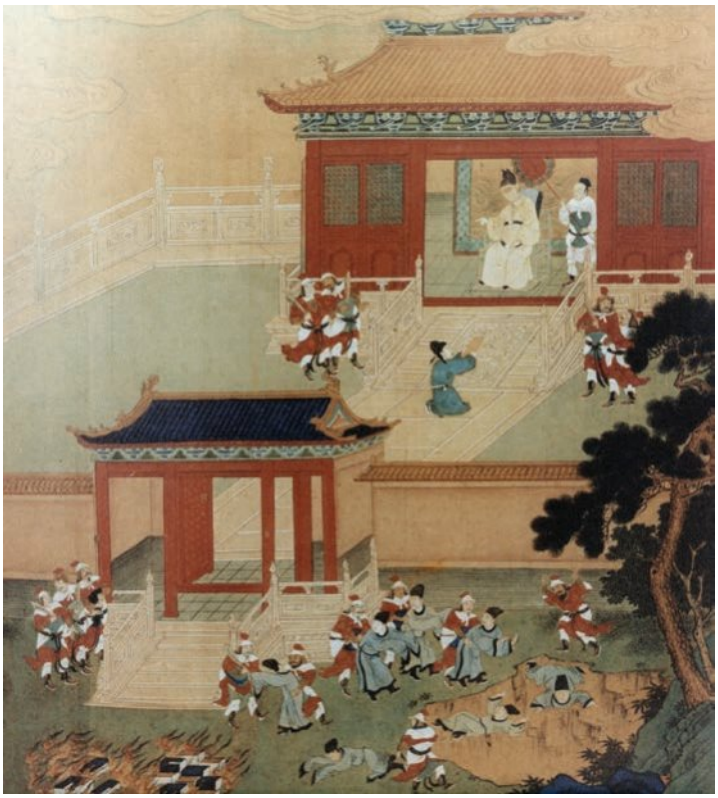
▼ **Source 5.17** Constructing a barrier to be placed in a shallow river to divert the water flow for irrigation or flood control. Logs are roped together into tripods called *macha* and they are weighed down with *zhulong*, woven bamboo baskets containing large pebbles. Once placed in the river, more *zhulong* are added to create a dam. This technology was invented in 256 BCE during the Warring States period to irrigate fields and is still in use in some parts of China today

The Qin dynasty

The Qin dynasty was very short compared to the Zhou dynasty it replaced. While the dynasty lasted only 15 years, it was a time of great change. For 11 of those years the first emperor, Qin Shi Huangdi, ruled with an iron fist and began an ambitious plan to reshape the country. He divided up the land into 40 different states and appointed governors who were loyal to him to run them. In order to control the leaders of the conquered states, they were all required to live in the Qin capital. This limited their ability to oppose his authority.

Not everyone was happy about Qin Shi Huangdi's way of ruling, so in 213 BCE a group of scholars tried to convince Qin Shi Huangdi to give the states more **autonomy**. Rather than give in to this request, Qin Shi Huangdi ordered that all books that were not written about practical topics like medicine or agriculture must be burned. He also ordered that any scholars who disobeyed him would be executed. He believed that the scholars were using history to criticise him, so it was necessary to eliminate any history that did not support his ideas. Overall, 460 scholars were said to have been buried alive.

Not all of Qin Shi Huangdi's changes were brutal. Some of his reforms had long lasting benefits for Chinese society. Qin Shi Huangdi created a set of standards for weights to ensure that all merchants and craftsmen were using the same measurements. He rewrote the laws to make them consistent throughout the country, and he made taxes uniform. To replace the many different kinds of money being used, he adopted a single type of coin: round with a square hole in the centre.



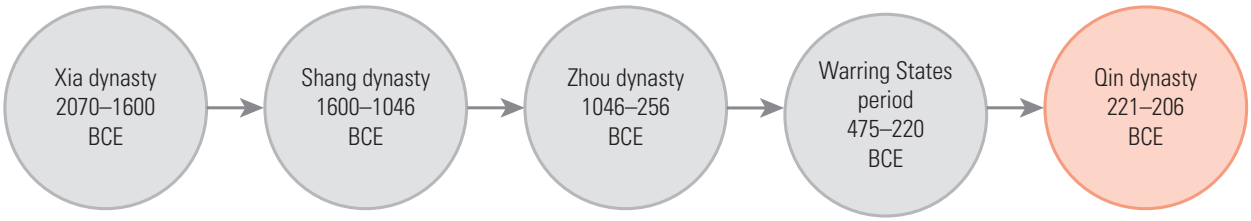
▲ **Source 5.18** An eighteenth-century painting called *Killing the scholars and burning the books*. What details do you notice? How does this make you feel about Qin Shi Huangdi?

KEY TERM

autonomy the right to rule or live independently

These coins could be threaded on to rope or a ribbon to be kept safe. They continued to be used until the modern era. The writing system was also standardised during Qin Shi Huangdi's rule, so that all states used the same characters. These kinds of changes created consistencies between the various states which unified China as an empire.

After the death of Qin Shi Huangdi, the empire rapidly fell to pieces as none of his successors had the power to hold it together. In 202 BCE, Liu Bang, the leader of the Han, declared himself emperor and the Han dynasty began.



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FAMOUS FACE

Qin Shi Huangdi

Qin Shi Huangdi (259–210 BCE) was born in the state of Qin, which was a **vassal** of the Zhou dynasty at the time. He became King Zheng of Qin in 238 BCE at the age of 21. He completed the job of conquering the other states that had been begun by Shang Yang, a previous powerful ruler of the Qin. In 221 BCE, he gave himself the title of *Shi Huangdi*, which means 'first emperor'. In this way, he styled himself as being the first emperor of China since the mythological Yellow Emperor, Huangdi, who, according to mythology, founded the first centralised Chinese state several centuries before the Xia Dynasty, and in the same area.

KEY TERMS

vassal a person or state that must pay tribute to a king in return for protection

elixir of immortality a potion or medicine to keep you alive forever

Qin Shi Huangdi was known as a ruthless and arrogant leader, who was very concerned with preserving his own life. He was superstitious and spent a great deal of time and money attempting to find an **elixir of immortality** so that he could live forever. He was told by a group of magicians that there were Daoist immortals living on the Penglai Islands, so he made multiple trips to the coast looking for them. In 211 BCE, Qin Shi Huangdi spent eight months touring the country after being told that the omens were bad, hoping to find an elixir. Instead he became ill and died. He was 48 years old.

While Qin Shi Huangdi had been attempting to find a way to live forever, craftsmen and labourers had been working hard under his orders to create the most elaborate tomb that could be made. In addition to the massive burial chamber, with an immeasurable wealth of grave goods, he was sent to his final resting place with an army of over 8000 terracotta warriors buried in pits surrounding his tomb. The famous terracotta army was uncovered more than 2000 years later when some farmers digging a well came across the first of the buried warriors.

DEVELOPING HISTORICAL CONCEPTS AND SKILLS 5.2

Identifying continuity and change

To make sense of the past, an important historical concept to understand is continuity and change. This refers to the ability to understand the importance – the *significance* – of events, ideas, people and groups.

Historians must identify when a change occurred or when things continued unchanged. Keeping this in mind, complete the following.

1. Make a list all the significant ideas and events from Qin Shi Huangdi's reign from the information on these pages.
2. Which of these ideas and events do you think were positive for China?
3. Which of these ideas and events do you think were not positive for China?
4. To what extent did Qin Shi Huangdi's reign change China for the better? Discuss your opinion with a partner, remembering to use evidence to support your argument.

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END-OF-SECTION REVIEW 5.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 How do we know how old the Erlitou dig site is?
2 What types of items did Shang craftsmen make in bronze?
3 How was ancient Chinese society structured?
4 Who won the Battle of Changping?

Interpret

5 Why is there doubt about the existence of the Xia dynasty?
6 How did Qin Shi Huangdi maintain power during his lifetime?
7 Examine the image of the terracotta warriors shown in Source 5.19. What were they supposed to do for the emperor? How do you know this?

Argue

8 Why do you think the Mandate of Heaven was such a long-lasting idea? Provide evidence to support your opinion.

▲ **Source 5.19** Some of the 8000 terracotta warriors buried in Qin Shi Huangdi's tomb

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5.3 Significant beliefs, values and practices of the ancient Chinese

FOCUS QUESTION

What did the people of ancient China believe?

Early religious practices

Religious practices and spiritual beliefs existed in China long before the teachings of Confucius or the arrival of Buddhism from India. Early Chinese societies believed in a pantheon of gods with a supreme deity (*Shàng Dì*) or heaven (*Tiān*). They believed in the existence of an afterlife, and the tombs they created for their dead reflect the need to honour and provide for their ancestors. Ancestor worship was an important aspect of ancient Chinese religious belief, because they thought that they could connect with the gods through ancestors who had died.

Oracle bones

One method of contacting the gods through the ancestors, which was particularly significant during the Shang era, was using oracle bones. These bones, usually the shoulder blades of oxen or the flat underside of turtle shells, were used in **divination**. Shang diviners (fortune tellers) would ask the spirits of the ancestors to predict future events by inscribing questions on the bones and then using a hot poker to crack them. The cracks would then be interpreted as positive or negative answers to the question.

KEY TERM

divination the practice of foretelling the future through supernatural means

The diviners were very good record keepers and inscribed both the answers and the outcomes of the predictions on the bones. This is helpful to modern archaeologists and historians because the records help them to learn a great deal about what the Shang were interested in and the issues they considered important.

Most oracle bones were used by wealthy people and rulers, as only they were able to afford the bones and the services of fortune tellers. The wealthy and rulers would ask many types of questions such as whether family members would recover from illnesses, the likelihood of good crops and the outcome of wars. Sometimes, the same question was asked many times and the prediction was based on the answer that came up most often.

▲ **Source 5.20** This oracle bone is made from plastron, which is the flat underside of a turtle's shell. It was created during the Geng reign of the Shang dynasty. What types of questions did people ask the oracle bones? What would you have asked?

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ACTIVITY 5.1

Using historical sources as evidence

Examine the following historical source and then answer the questions that follow.

Crack-marking on *jiashen* [day 21]

Que divined: 'Lady Hao [a **consort** of Wu Ding] will give birth and it will be good.'

The king read the cracks and said: 'if it be on a *ding* day that she give birth, it will be good. If it be on a *geng* day that she give birth, it will be prolonged auspiciousness [good luck for a long time].'

[Verification:] After thirty-one days, on *jiayin* [day 51], she gave birth. It was not good. It was a girl.

▲ **Source 5.21** Oracle bone inscription in Patricia Buckley Ebrey, *Chinese Civilization: A Sourcebook*, 1993, p. 4

KEY TERM
consort a wife or companion of a ruler

Responding to the source

1 In what way do you think the birth could have been 'not good'?
2 What does this tell us about what the Shang people thought was important?
3 What does this source tell us about the role of religious belief in ancient Chinese society?

Daoism

Daoism (also spelled 'Taoism') emerged some time in or before the sixth century BCE in the province we today call Henan. The exact circumstances surrounding the start of Daoism are unclear, although Laozi is usually identified as the first Daoist philosopher. Dao literally means 'the way,' but can be interpreted as 'path or road' or 'doctrine'. It refers to the force that shapes all things in heaven and nature. There are still 12 million Daoists today.

Following Daoism is an attempt to be one with the way by avoiding conflict and finding peace. It requires constant adjustment to find balance between the two halves of life: the yin and the yang. Daoist religious practices are concerned with honouring ancestors, purifying spaces and having a reverence or admiration for nature. Private altars are common in Daoist households and individual worship is encouraged. Festivals are held where Daoists can perform rituals together under the guidance of a grand master. These festivals can go for weeks and are often very elaborate.

▲ **Source 5.22** This photograph shows a ying–yang symbol (the black and white motif in the centre) in front of the Qingyang Gong Daoist temple in Chengdu

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ACTIVITY 5.2

Using historical sources as evidence

Zhang Zhou was a Daoist philosopher who became known as Zhuangzi. He lived during the Warring States period. His written work, *Zhuangzi*, is one of the main texts of Daoism and has inspired many beautiful poems and paintings. Examine the following sources and answer the questions that follow.

SOURCE A

Once Zhuang Zhou dreamed he was a butterfly, a fluttering butterfly. What fun he had, doing as he pleased! He did not know he was Zhou. Suddenly he woke up and found himself to be Zhou. He did not know whether Zhou had dreamed he was a butterfly, or a butterfly had dreamed he was Zhou. Between Zhou and the butterfly there must be some distinction. This is what is meant by the transformation of things.

▲ **Source 5.23** Zhuang Zhou, *Zhuangzi*, in Patricia Buckley Ebrey, *Chinese Civilization: A Sourcebook*, 1993, p. 30

SOURCE B

▲ **Source 5.24** A mid-sixteenth century Ming-dynasty silk painting, which shows Zhuang Zhou dreaming of being a butterfly

Responding to the sources

1 What does Zhuang Zhou perceive in this tale?
2 What might Zhuang Zhou know about or believe after this incident?
3 What might Zhuang Zhou care about after this?

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Confucianism

Confucianism was an ancient Chinese belief system that emerged during the Zhou era. It is still important in China today. Confucianism is more a philosophy or way of life than a religion. It was based on the teachings of Confucius during the Spring and Autumn period, when Zhou rule was beginning to weaken.

Confucius is believed to have been born around 551 BCE in the city of Qufu. He worked as a government official for the prince of Lu, but was not particularly successful in his political career. He travelled widely throughout China explaining his political philosophy to various courts, but eventually returned to Qufu to establish a school. He is credited with having written or compiled several classic Chinese texts, and many of his teachings were recorded in books such as the *Analects* and the *Doctrine of the Mean*. Confucius claimed that his principles were not ones that he had invented, but rather they had been distilled from the wisdom of the ancients.

Many of Confucius' teachings were focused on the creation of a just and moral society. He believed that in order to create this, all relationships must be well regulated. Family loyalty was of utmost importance, particularly the respect and obedience children must have for their parents. Ancestor worship was an essential part of regulating relationships. Only if family relationships were solid could the state work effectively. Confucius was a strong advocate for the Mandate of Heaven, where rulers needed to govern effectively and act in the best interests of their people or otherwise lose their power to those who could rule better.

▲ **Source 5.25** A statue of Confucius

◄ **Source 5.26** This Song-era silk painting shows Confucius teaching students about the importance of respect and loyalty to their parents. This virtue was known as 'filial piety'.

ACTIVITY 5.3

Using historical sources as evidence

Here is a piece of writing from Confucius. Read what he says and answer the questions that follow.

> The duties of universal obligation are five and the **virtues** by what means they are practised are three. The duties are those between **sovereign** and minister, between father and son, between husband and wife, between elder brother and younger, and those belonging to the association of friends. Those five are the duties of universal obligation. Knowledge, **magnanimity**, and energy, these three, are the virtues universally binding.

▲ **Source 5.27** Confucius, *The Doctrine of the Mean*, c. 500 BCE

Responding to the source

1 What are the five duties of universal obligation?
2 What are the three virtues?
3 What is Confucius suggesting about the importance of relationships?

KEY TERMS

virtues qualities of goodness or moral excellence

sovereign a king or ruler who has total and permanent authority

magnanimity the quality of being highly moral in forgiveness and overlooking insults from others

bodhisattvas a follower of Mahayana Buddhism who is able to reach nirvana (a state without suffering) but delays doing so out of compassion for the suffering of others

Buddhism

Buddhism originated in India about 500 years before it arrived in China during the Han dynasty (206–220 CE). The form that became popular in China was Mahayana Buddhism, which developed into several schools including Pure Land Buddhism. A combination of Buddhism and Daoism was adopted by many people in ancient Chinese society, whereby the practitioners continued to pay respect to their ancestors. Buddhism became an official religion during the Sui era and was an important feature of the Tang dynasty.

Mahayana Buddhists believe in spirits, ghosts and gods, and worship the qualities of Buddha and **bodhisattvas**. A Buddha in Mahayana Buddhism is any person who has attained enlightenment by perfecting every virtue and removing all negativities. Ultimately, Mahayana Buddhists believe that they themselves can become a Buddha through developing qualities to replace harmful ways of thinking and acting. They want to become Buddhas so that they can help others to also become Buddhas and escape the suffering of rebirth. This wish is what makes them a Mahayana Buddhist.

Buddhists believe that everybody is reborn after they die – sometimes as humans but also as animals or insects, or even ghosts or gods. Unfortunately, these rebirths are without end and only result in suffering. The only way to escape this situation of continuous rebirths is to attain enlightenment.

► **Source 5.28** This standing bodhisattva is from the Sui dynasty during the late sixth to early seventh century BCE. It is carved from stone and originally was painted in bright colours with gold gilt.

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▲ **Source 5.29** These statues are part of the Longmen Grottoes. There are tens of thousands of statues of the Buddha and his disciples carved into the limestone cliffs, which surround the Yi River near Luoyang in Henan province. Some, like those pictured, are many metres tall, but others are no more than an inch high.

Therefore, each human life provides an opportunity for the Mahayana Buddhist to come closer to developing good qualities and overcoming negativities. When enlightenment is attained through this process over many lifetimes, there is no further need for rebirth as the practitioner has become a Buddha.

To learn more about the Buddha, see Chapter 6

MAKING THINKING VISIBLE 5.5

Connect, extend, challenge

Think about what you have read so far in this section and answer the following questions.

1. *Connect*: How are Daoism, Confucianism and Buddhism connected to what you already know about ancient Chinese history?
2. *Extend*: What new ideas did you get that extended or pushed your thinking in a new direction?
3. *Challenge*: What is still challenging or confusing for you? What questions do you have now?

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The teachings of Buddhism came from an Indian prince named Siddhartha Gautama, who lived in the sixth century BCE. He rejected a life of wealth and luxury to focus on attaining spiritual qualities. When Siddhartha achieved enlightenment, he became known as the Buddha. The Buddha's teachings, known as Dharma, are the basis of all forms of Buddhism.

Death and burial

Many ancient Chinese people believed that the afterlife was a continuation of life on Earth. The wealthy prepared for death by arranging tombs. It was very important to them that all the things they needed were buried with them in their tombs. Some people had objects made especially for this purpose.

The powerful and wealthy of ancient China had their tombs furnished with very fine objects made from the very best materials. They had large sets of ritual vessels in their tombs so that they could continue to make offerings to their ancestors in the afterlife. They often had weapons buried with them to use and show their power.

Jade played an important role in ancient Chinese burials. Jade objects were placed on top of and around the body of the person who had died. The ancient Chinese believed that jade had the power to protect the bodies. Royal tombs, from the Han dynasty onwards, contained bodies wearing burial suits made from jade to protect the corpses from decay.

The *Book of Later Han*, which was the official history of the Han dynasty written in the fifth century BCE, says that the type of wire used in a jade suit depended on the status of the person buried:

- Emperors used gold thread
- Princes and princesses used silver thread
- Sons or daughters of those that used silver thread used copper thread
- Lesser aristocrats used silk thread.

Aside from those listed above, all other people were forbidden to be buried in jade burial suits. However, examination of the suits that have been found today has revealed that these rules were not always followed. Considering the vast size of the country, and the relatively slow means of spreading information, it is not surprising that the materials and techniques used in a jade burial suit occasionally differed from the official guidelines.

A jade burial suit was extremely expensive to create; only wealthy aristocrats could afford to be buried in them. Additionally, the process of manufacturing a suit was labour-intensive and is estimated to have required several years to complete a single suit.

Amazing but true …

The jade burial suits of the Han dynasty were made from up to several thousand jade pieces, which were sewn together by gold or silver wire.

▲ **Source 5.30** Jade burial suit from the Han Dynasty, located today in Xuzhou Museum, Xuzhou, China

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▲ **Source 5.31** Visitors at the National Museum of China looking at a jade burial suit from the Han dynasty

END-OF-SECTION REVIEW 5.3

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 What was an oracle bone made from?
2 Who did the Shang believed answered their questions on the oracle bones?
3 How did Buddhism come to China?

Interpret

4 What does the yin and yang represent in Daoist philosophy?
5 What did Confucius think was necessary to create a just and moral society?
6 Why might Buddhists choose to be kind to animals?

▲ **Source 5.32** Yin–yang symbol

Argue

7 Of Daoism, Confucianism and Buddhism, which do you think has had the most long-lasting impact on Chinese society? Why do you think this? Search online to find out how many people in China today still follow these teachings.
8 The jade burial suit tells us a lot about the priorities of the ancient Chinese. Discuss whether you agree with this statement. Provide an explanation and examples to justify your opinion.

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5.4 How did contact and conflict with other societies change ancient China?

FOCUS QUESTION

How did contact with the world shape the society and development of ancient China?

▲ **Source 5.33** This mural, found in the tomb of Li Xian from the Tang era (618–907 CE), shows ambassadors from Korea and the west being received at court

Early contact and conflict

Ancient China had contact with foreigners and outside powers from the time of the Qin dynasty, possibly earlier. From the second century BCE, Chinese diplomats were sent into parts of central Asia, looking for allies against the nomadic tribes who threatened their northern borders. Later, diplomatic relations were established with other nearby societies like the Koreans, Japanese and Vietnamese peoples. Religious ideas, like Buddhism from India, arrived in China during the Han dynasty, while the philosophies of Confucius were passed on to other Asian societies.

When contact became dangerous or unprofitable, most notably with the nomadic tribes of the northern regions, the ancient Chinese built fortifications to protect their society. The Great Wall of China is not one wall but many sections, which are not all connected. The first sections of the wall were built as early as the seventh century BCE. However, Qin Shi Huangdi was responsible for greatly enlarging and connecting those parts. Many of the dynasties that followed

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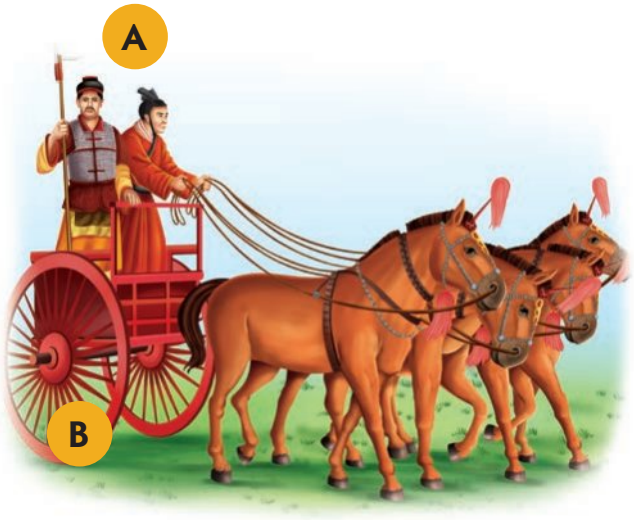
▲ **Source 5.34** The Jinshanling section of the Great Wall

maintained and repaired the wall as well as built new sections. The Great Wall protected China from intruders and invaders, and was also a way for the ancient Chinese to control trade at the border. They were able to impose duties or taxes on goods brought into China from outside.

▼ **Source 5.35** An artist's representation of the construction of a section of the Great Wall of China

Amazing but true …



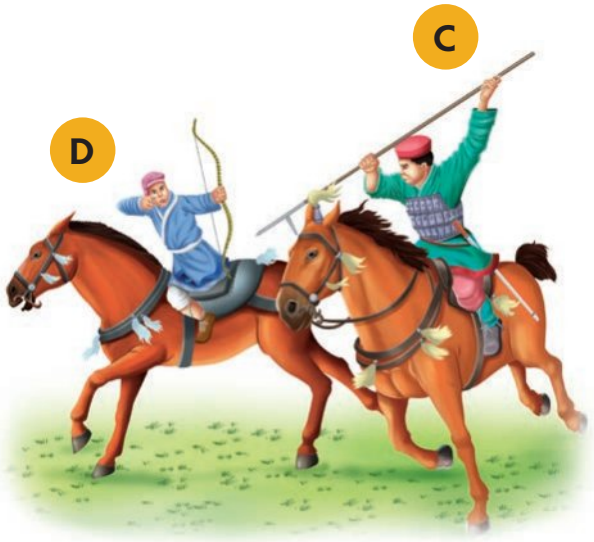
A Early hand-held weapons included daggers, spears, axes and halberds (a combination of a long-handled spear and an axe). Swords were introduced from 500 BC, made originally from bronze and then from iron or steel.

B Chariots were first used as a status symbol, then as an important weapon for fast attacks. Different versions were pulled by two, three or four horses. The chariot was quite large and carried the rider, bowman and spearman.

C Soldiers on horseback (cavalry) were more mobile and faster than chariots. When saddle technology improved, cavalry used bows, halberds and swords, and became an important part of the army. The northern clans greatly influenced the development of new skills and technology.

D Bows were the most common and most prestigious weapon in ancient China. They were used by infantry as well as cavalry. Archers were often used in armies to protect the sides (flanks) of the infantry troops.

The crossbow was an important technological development from the fifth century BC. It could be used by individual soldiers, but they were also built as huge weapons to defend forts and cities from the tops of walls.



E Starting in the Han period, simple catapults were used to throw stones. Gunpowder was not used in warfare until after AD 900.

F Helmets were designed to protect the head, ears and back of the neck. They were originally made of leather, then bronze was used. They were sometimes decorated with plumes.

G Body armour started as hardened leather as protection against arrows. During the Zhou dynasty, more flexible armour was made from interconnected pieces of lacquered leather or bronze.

H Shields were originally made from bamboo and leather. In later periods bronze, and later iron, was used for greater protection, even though this made the shields heavier.

▲ **Source 5.36** An artist's representation of members of the imperial army during the Han Dynasty

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ACTIVITY 5.4

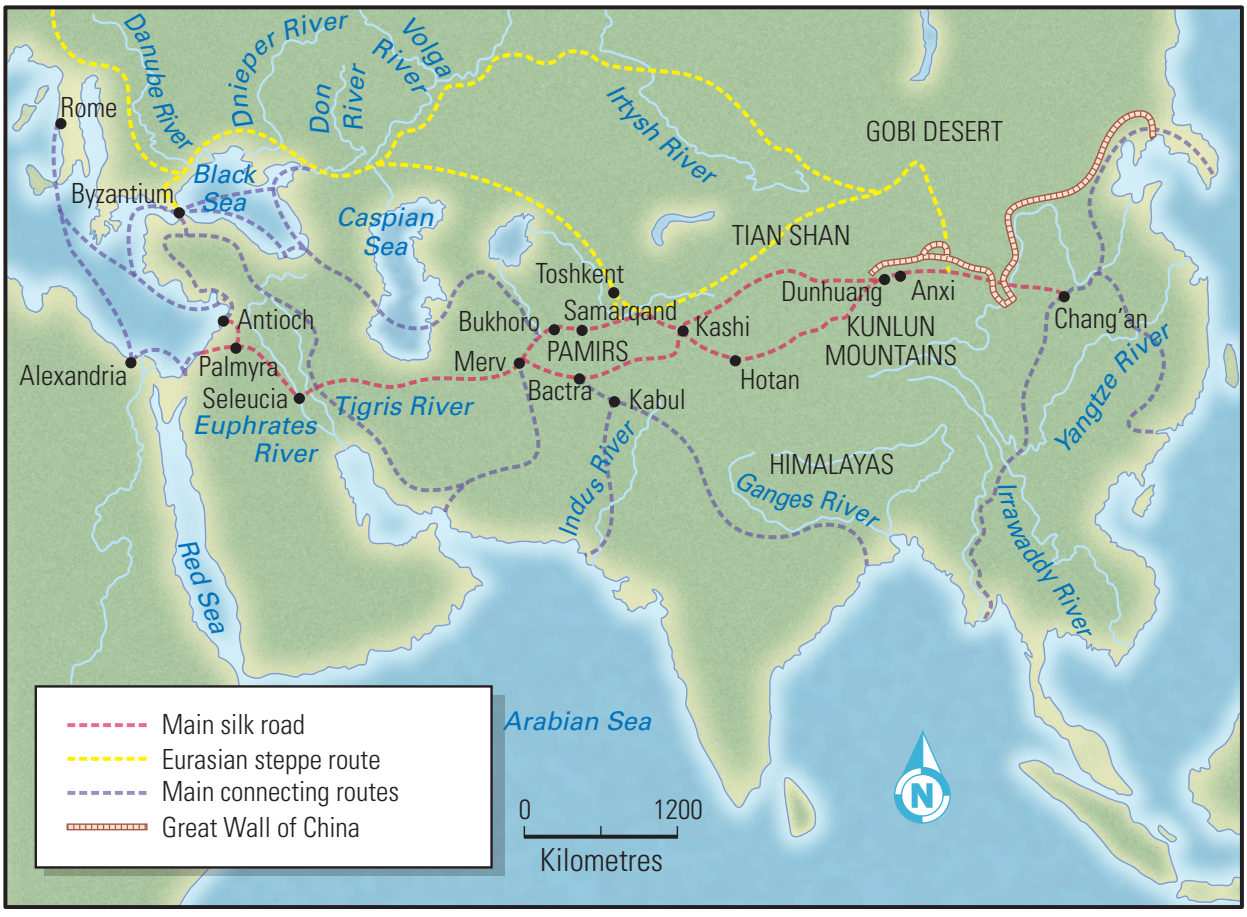
Research task

Research the development of the crossbow in China. Use at least three different sources to support your research.

1. Before you start, write out five questions you want to answer with your research.
2. Write a short report that answers your questions and includes additional information. Make sure you have some sketches or images in your report.
3. Add a bibliography at the end of your report that lists the resources you used. Ask your teacher for help in citing your resources properly.

The Silk Road

Ancient China first made contact with more distant civilisations, like those in Europe, through trade. The Silk Road was not a single road, but a series of overland tracks that wound from the heart of China, through the Middle East and into Europe. Many goods were bought and sold along these trade routes, including olive oil and wine from Italy, cotton and peppercorns from India, ivory from east Africa, and spices from Arabia. Ancient China exported jade and iron, but its most significant product to trade was silk.



▲ **Source 5.37** Routes that made up the Silk Road in ancient China

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Silk is a natural fibre produced by silkworms that live only on the leaves of the mulberry tree. The silk thread is formed by the caterpillars as they make their cocoons in preparation for transformation into moths.

There is evidence of silk being produced in ancient China as far back as 5000 years ago; the first written reference to silk we have is from the Shang era. The secret of silk production was kept very carefully by the ancient Chinese for many centuries, as it was such a lucrative product. As well as being beautiful, the fabric made from silk is strong and lightweight, and cool in summer and warm in winter. People outside of China were willing to pay very high prices for silk, so it was for this reason that the trade routes became known as the Silk Road.

▲ **Source 5.38** The silkworm creates a cocoon of raw silk, produced by its salivary glands, then emerges from the cocoon as a moth

KEY TERM
bolt a large roll of cloth

Very few, if any, merchants travelled the whole length of the Silk Road; instead, they travelled back and forth over different sections, buying and selling goods as they went. A **bolt** of silk purchased in Xi'an could be bought and sold several times on the long road to Italy. It would increase in price at every step until it was finally sold to a noble lady in ancient Rome. Silk clothing was extremely popular amongst the wealthy of ancient Rome. The use of the fabric was a sign of a family's power and status.

Amazing but true …

A Chinese legend says that it was the wife of the mythological Yellow Emperor who taught the Chinese people the art of silk production. Throughout ancient Chinese history, Empress Si Ling-Chi (also known as Xilingshi or Lei-tzu) has been credited with discovering silk-making itself as well as the weaving of silk thread into fabric.

Empress Si Ling-Chi is on this book's cover

◄ **Source 5.39** A detail from an illustrated map showing European merchants travelling along the Silk Road

ISBN 978-1-108-78309-5

▲ **Source 5.40** Yueyaquan, or Crescent Moon Lake, lies on the western edge of the Gobi Desert seven kilometres from the centre of Dunhuang. It was a strategic location on the crossroads of two major Silk Road trading routes.

ACTIVITY 5.5

Using historical sources as evidence

The following text extract about the silk trade in ancient China is written by modern historian Peter Frankopan. After you read what he says, answer the questions that follow.

> Silk performed a number of important roles in the ancient world apart from its value to nomadic tribes. Under the Han dynasty, silk was used alongside coins and grain to pay troops. It was in some ways the most reliable **currency**: producing money in sufficient quantities was a problem, as was the fact that not all of China was fully **monetised**; this presented a particular difficulty when it came to military pay since theatres of action were often in remote regions, where coins were all but useless. Grain, meanwhile, went rotten after a time. As a result, bolts of raw silk were used regularly as currency, either as pay or, as in the case of one Buddhist monastery in Central Asia, as a fine for monks who broke the foundation's rules. Silk became an international currency as well as a luxury product.

▲ **Source 5.41** Peter Frankopan, *The Silk Roads: A New History of the World*, Vintage Books, 2017

KEY TERMS

currency any type of item used in trade; often coins or notes, but it also can be items of high value like gold, gems or silk

monetised to have a currency, usually in the form of coins

corroborate to support or confirm an idea or claim with evidence

Responding to the source

1. According to this historian, what problems did the empire encounter when attempting to pay soldiers who were fighting in distant parts of China?
2. What were the benefits of using silk as currency?
3. Why was silk was so valuable?
4. As this information is written by an historian, it is a secondary source. Is a secondary source likely to be more or less reliable than a primary source? Why or why not? Test your theory on this source by searching for information in the library or online to **corroborate** or contradict the information here.

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▲ **Source 5.42** *Left:* A silkworm. *Centre:* Silkworm cocoons are boiled to kill the caterpillars inside and loosen the thread for spinning. *Right:* An artist in Nanjing practises the ancient art of silk weaving.

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 5.4

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What philosophies or religions travelled between China and other places?
2 What was the Silk Road?
3 What types of goods did ancient Chinese people buy from Silk Road merchants?

Interpret

4 Why did so few merchants travel the whole length of the Silk Road?
5 Why was the Great Wall of China built?

Argue

6 Why do you think silk has continued to be such a valuable material? Provide evidence to support your answer.

▼ **Source 5.43** This painting from the Song dynasty (960–1279 CE) shows ladies preparing a panel of newly woven silk. The painting is attributed to Emperor Hui-Tsung.

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5.5 Why was Fu Hao a significant individual in ancient China?

FOCUS QUESTION

Who was a significant individual of ancient China and what did that person achieve?

Fu Hao

Lady Fu Hao was a consort of Wu Ding, the twenty-second king of the Shang dynasty. She is one of the most famous women in ancient Chinese history. Her tomb was discovered by archaeologists in 1976, and is the only Shang tomb found that had not been looted by grave robbers. Historians estimate that she died in around 1200 BCE.

A huge number of grave goods were discovered in Fu Hao's tomb, including: 468 bronze objects, 755 jade items, 61 ceramic or pottery objects, over 6000 seashells, and a variety of other items made out of gems, bone and ivory. At least 109 items from the tomb have Fu Hao's name engraved on them, clearly marking this as her final resting place. Less happily, 16 humans and 6 dogs were also entombed with Fu Hao to join her on her journey into the afterlife. There is evidence that a **shrine** was built on top of the tomb where her relatives could pay respect to her spirit.

However, Fu Hao is not just famous for her tomb; she was a clan leader and landowner whose property lay beyond the area directly controlled by the king. This land gave her wealth and power, but also the duty to pay tribute. Fu Hao spent much of her time at court performing religious rituals, including sacrifices for ancestors and gods. She had several pregnancies though it is not clear how many surviving children she had with the king.

KEY TERMS

shrine a place used for religious rituals

military campaign a series of conflicts or battles that are aimed at reaching the same goal

Probably the most notable aspect of Fu Hao's life was that she led soldiers into battle on more than one occasion. Women did not commonly go to war but, as the head of a clan, she was responsible for her army. During her lifetime she participated in every significant **military campaign** and at one stage led a force of 13 000 soldiers into battle, which is the largest army recorded at any time during the Shang era.

Fu Hao was a successful general with many significant victories to her name, including the defeat of the Tu Fang. It was after a long drawn out campaign against the Ba, however, that Fu Hao became ill and died. Her military service is acknowledged in her grave goods, as many of the bronze items are weapons like axes, knives and arrowheads.

◄ **Source 5.44** A modern artist's representation of Lady Fu Hao holding her ceremonial *yue*

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◄ **Source 5.45** Jade monkey from the tomb of Fu Hao

▲ **Source 5.46** Dagger-axe from the tomb of Fu Hao

◄ **Source 5.47** Bronze, owl shaped *zun* (wine vessel) from the tomb of Fu Hao

▲ **Source 5.48** Bronze *zun* from the tomb of Fu Hao

◄ **Source 5.49** Bronze *fang-ding* (food vessel) from the tomb of Fu Hao

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Cambridge University Press

MAKING THINKING VISIBLE 5.6

Creative questions

1. Examine Sources 5.45 to 5.49 and brainstorm a list of questions about them.
2. Look over your list and transform some of the questions into queries that challenge your imagination. You can do this by using the following question stems:
   - **a** What would it be like if …?
   - **b** How would it be different if …?
   - **c** Suppose that ...?
   - **d** What would change if ...?
   - **e** How would it look differently if …?
3. Then, choose a question to explore using your imagination. Think about all its possibilities. You can try one of the following: write a short story or play, draw a picture, invent a game, or conduct an imaginary interview.
4. Now reflect: what new ideas do you have about Fu Hao and the Shang burial customs that you did not have before?

ACTIVITY 5.6

Using historical sources as evidence

Here is a text extract from modern historian Barbara Bennet Peterson about Fu Hao. Read what she says and then answer the questions that follow.

> Wu Ding knew of his wife's capabilities and was persuaded, after consulting with Fu Yue, to grant Fu Hao a bronze *yue*, a symbol of empowerment for a military campaign. A diviner, brought in to see whether the omens were favourable, wrote questions on tortoise shells and they were answered in the affirmative. Fu Hao was commissioned to fight. Marching with her troops northward to battle the Tu Fang, she fought at the head of her troops. Off the battlefield, she nursed the wounded and raised morale. The Tu Fang were badly beaten and would never again challenge the Shang's military power.

▲ **Source 5.50** Barbara Bennett Peterson, *Notable Women of China: Shang Dynasty to the Early Twentieth Century*, 2015, p.14

Responding to the source

1. What did the bronze *yue* represent?
2. What attributes or qualities does this source suggest Fu Hao had?
3. What does this source tell us about the role of women during the Shang dynasty?

▲ **Source 5.51** A bronze *yue* from the tomb of Fu Hao

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MAKING THINKING VISIBLE 5.7

Claim, support, question

Use 'claim, support, question' to develop your historical thinking and arguments.

1. *Make a claim*: What do you think the life of Fu Hao can tell us about society and the role of women during the Shang era?
2. *Support*: What evidence or reasoning can you provide to support your claim?
3. *Question*: What other factors might be important in Shang society? How would you find out?

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 5.5

Review questions

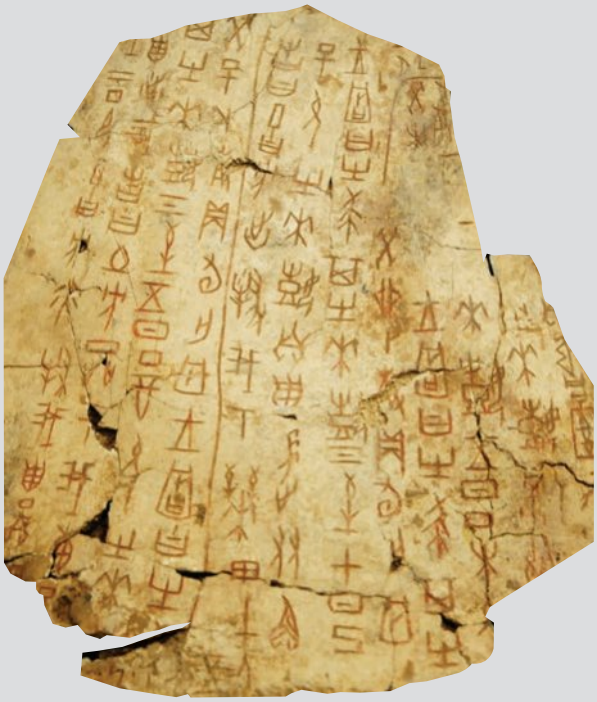
Answer these questions on paper or in the Interactive Textbook.

Recall

1. What was Lady Fu Hao best known for?
2. How many items were found in her tomb?
3. What items from Fu Hao's tomb show that she was a military leader?

Interpret

4. Why was a shrine built on the top of Fu Hao's tomb?
5. What do you think the seashells might have been used for?
6. Why are oracle bones such useful sources for historians?



◄ **Source 5.52** A Shang oracle bone similar to those on which Lady Fu Hao's life was recorded

Argue

7. Explain why you think human and dog sacrifices were included in Fu Hao's tomb.

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5.6 The process and importance of conserving the past

FOCUS QUESTIONS

- How do historians and archaeologists use technology to find out about the people of the past?
- What responsibility do we have to conserve the past and how should it be undertaken?

What science can do for history

Historians find out about the past in different ways. We often think that historians sit in dusty libraries surrounded by piles of ancient books and crumbling scrolls. But this image ignores the array of other techniques that are available to historians and archaeologists to study history. These techniques are particularly useful when exploring ancient societies, because there are few or no written texts. Studying objects therefore is an important method of finding out about the past.

Scientific techniques continue to be developed to assist our understanding of past societies. For example, methods like radiocarbon dating are used to find out how old organic items are, and ground-penetrating **radar** is employed to find out what is below the surface of the Earth and identify the most suitable locations for archaeological dig sites. Chemical analysis of artefacts can sometimes provide very specific information about the life of past societies. For example, the analysis of tooth enamel can identify the location a person grew up. It does this by matching the chemical profile of the tooth's enamel to that of the water available at the location. Chemical analysis can also be used to discover what items are made of and how they were constructed.

KEY TERMS

radar a device using very high frequency radio waves to identify objects, materials and their location

pigments dry substances that can be mixed with liquid to become coloured paints

▲ **Source 5.53** A close-up of a terracotta soldier from the army of Qin Shi Huangdi. It has traces of paint still visible

Scientific investigations into Han purple

One area where chemical analysis has become useful is the investigation of ancient paint. The ancient world was much more coloured than we usually imagine. What remains of statues and pottery is often only the base stone or terracotta, as the paint has faded or flaked off.

Painters of the ancient world had a variety of natural **pigments** to use that could produce many colours. The colours ranged from earthy yellows and reds made from ochre, to blues and greens from minerals like azurite and malachite. There were limitations, however. The full spectrum of colours was not available to the painter of the ancient world as it is to a

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KEY TERMS

synthetic made through a technical process by humans rather than by nature

dye a solution that can stain or colour material by chemically binding to it

painter today. Modern painters have access to a much wider range of colour, because chemists are now able to create **synthetic** pigments.

Only in the late twentieth century, was it discovered that synthetic pigments were not entirely unknown in ancient China. Elisabeth FitzHugh, a conservator at the Smithsonian Institute in the United States, analysed chips of purple paint from several artefacts from the Han dynasty. She found that the pigment used was not natural.

How exactly Chinese craftsmen were able to create this synthetic pigment is unclear. It is a barium copper silicate compound, which must be heated to about 1000˚C for long periods. The colour was named 'Han purple' by FitzHugh and has only been found on artefacts dating between around 221 BCE to 220 CE. At some point, after the Han dynasty fell, the knowledge of how to make it disappeared and was not discovered again for another 1700 years.

Han purple was a much stronger and more vibrant purple than any of the other purples of the ancient world. Tyrian purple, which was made from sea snails, was a valuable **dye** much loved by the ancient Romans, but not a pigment and most other natural purples were really more reds.

The discovery of Han purple is important because it tells us a great deal about the technological abilities of ancient Chinese society. It is evidence of innovation and a focus on improving art, science and technology in ways that are similar to how we live today. It is only modern scientific processes that allow us to recognise the historical significance of evidence like Han purple.

▲ **Source 5.54** Han purple was a rich and vibrant synthetic colour. What do you think its presence on 2000-year-old pottery tells us about the development of technology in ancient China?

▲ **Source 5.55** A section of a mural from the tomb of Zhucun of the Han dynasty, located in Luoyang, Henan province. It includes use of the synthetic Han purple pigment.

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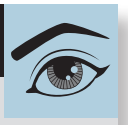
MAKING THINKING VISIBLE 5.8



Think, puzzle, explore

Reflect on what you have just read about scientific investigations to learn more about ancient civilisations. Use 'think, puzzle, explore' to expand on your knowledge and ideas.

1. What do you *think* you know about the scientific techniques historians and archaeologists use to find out about the past?
2. What question or *puzzle* do you have about these methods?
3. What can you do to *explore* this topic further?

Conserving the past: our duty

Asking 'why it is important to conserve artefacts of the past?' is really the same as asking 'why is history important?' We can only understand the world that we live in and the people that we are if we have a knowledge of our shared past. Understanding where we have come from is important, especially if we are to make informed and positive decisions about where we are going.

The reason why people become emotional when historical artefacts and sites are destroyed is because they represent a physical link with the past. Artefacts and sites remind us of how fragile human achievements can be. The deliberate destruction of the sixth-century Bamyan Buddhas in Afghanistan in 2001 and the demolition of the Roman ruins at the ancient trade city of Palmyra in Syria in 2015 by religious extremists was designed to erase a history that the destroyers did not want to be recognised. Many other significant sites around the world are at risk of damage or destruction because they exist in war zones or regions where the people who live there are unable or unwilling to protect them.

Preserving the terracotta warriors

Not only deliberate acts destroy our heritage. Even just being exposed to air and light can be enough to damage some very fragile artefacts. Conservation and **preservation** are expensive processes that can require a lot of technical and scientific skill, as well as money.

The terracotta army is one of the most significant archaeological finds from ancient China. Discovered by three farmers in 1974 in Shaanxi province, the thousands of life-size clay statues of warriors and horses form part of the burial complex for Qin Shi Huangdi. After Shi Huangdi unified China at the end of the Warring States period, his reign was short. But in that time he oversaw the building of sections of the Great Wall, created a standard for coins, weights and measures, and organised a royal palace and equally royal **mausoleum** for himself.

Since the discovery of Qin Shi Huangdi's tomb, four pits have been partially excavated. The single warrior uncovered by the farmers turned out to be one of at least eight thousand individual soldiers. Every terracotta warrior is unique with different facial features, hair styles and positions. There are officers, archers, foot soldiers, charioteers and the horses to go with them. These warriors, which would have taken decades to make, were created to be included in Qin Shi Huangdi's mausoleum to accompany and protect him in the afterlife.

A dilemma has arisen for archaeologists and conservators attempting to excavate the tomb. While everybody is keen to uncover as much as possible, there have been serious difficulties in looking after the items that have already been found.

KEY TERMS

preservation to prevent decay or damage to historical artefacts and sites

mausoleum a very large and expensive grand tomb

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▲ **Source 5.56** A photograph of the repaired terracotta warriors from Pit 1 in Xi'an, Shaanxi province, China

▲ **Source 5.57** A close-up of one of the terracotta army warriors

Almost all of the terracotta warriors were broken when they were discovered, so Chinese archaeologists have spent decades piecing them back together again. Most of the warriors that you can now see on display are the smooth sandy colour of terracotta, but when they were first entombed, each one was brilliantly painted. Over the centuries, the paint has become fragile and unstable. Exposure to the air causes much of it to immediately shrink and flake from the outside of the warrior. Scientists have worked to develop methods of uncovering new warriors and preserving the paint before it can disintegrate, but so far this has only been partially successful. So, every time a new artefact is uncovered, it is at risk of immediate damage by exposure to air and light.

▼ **Source 5.58** In 2009, more than thirty years after they were first discovered, Chinese archaeologists continue to work on carefully excavating the terracotta warriors

MAKING THINKING VISIBLE 5.9

See, think, wonder

Look carefully at the images of the terracotta army and then answer the following questions.

1. What do you *see* in these images?
2. What do you *think* about the things that you see?
3. What does it make you *wonder* about the terracotta army and the conservation of historical artefacts?

▲ **Source 5.59** This photograph shows terracotta warriors and horses

Future excavations of Qin Shi Huangdi

Is it right that archaeologists should continue to excavate items that they are not fully able to protect yet? The central tomb, where Shi Huangdi himself is buried, has not yet been opened. The problem with conservation is one of the main reasons why. Even though historians have known the approximate location of the Qin Shi Huangdi tomb for over 40 years, there will be no excavation until archaeologists and scientists are sure they can open it and preserve the artefacts without any damage. In the meantime, work to preserve and maintain the already uncovered artefacts continues.

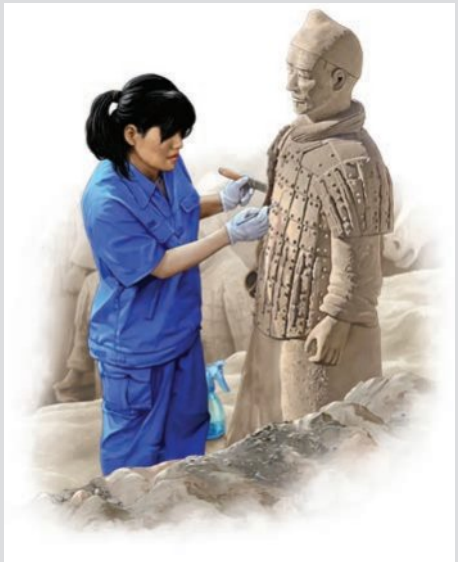
DEVELOPING HISTORICAL CONCEPTS AND SKILLS 5.3

Determining historical significance

'Historical significance' means something that we, as historians, have decided was important in the past. According to the Victorian Curriculum:

> To establish the historical significance of a trend, an event, an idea, an individual or a group, students use questions or criteria such as:
>
> How important was it to people who lived at that time?
>
> How many people were affected?
>
> How were people's lives changed?
>
> How long lasting were the consequences?
>
> What is its legacy?

1. With these questions in mind, what do you think was the significance of the archaeological discovery of the terracotta warriors?



► **Source 5.60** A modern artist's representation of an archaeologist at work on one of the terracotta warriors

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 5.6

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What are some of the scientific methods used to find out about the past?
2 What is the difference between a natural and a synthetic pigment?
3 When and where were the terracotta warriors first uncovered?
4 Who found the terracotta warriors?
5 What are some of the problems archaeologists have faced when excavating the terracotta army?

Interpret

6 How you think the Han dynasties first invented a synthetic purple pigment? Do a search online to find more evidence.
7 What was the purpose of the terracotta army? Why were they buried in the first place?
8 Why was the terracotta army such an important discovery?

Argue

9 Synthetic purple tells us a lot about the technology and culture of ancient China. Discuss whether you agree with this statement. Use evidence to support your argument.
10 Who is responsible for ensuring historical artefacts are preserved? Is it more important to find out about the past than it is to preserve the original artefacts? Use evidence to support your argument.

Conclusion: why does it matter today?

From the small beginnings on the banks of the Yellow River to the society that developed, ancient China was astounding for its strength, sophistication and longevity. The people of ancient China were skilled artisans and productive farmers. They lived and worked under strictly ordered dynasties, which were replaced when they were no longer fit for purpose. Rulers came from engineers like Yu, as well as from those who had military power; the ancient Chinese demonstrated great respect for knowledge and wisdom. They lived active, spiritual lives and ordered their communities on Confucian, Daoist and Buddhist values.

The dynastic system of rulership in China lasted long beyond what we call the ancient world. Through the Middle Ages and into the early modern world, dynasties came and went as they gained and lost their Mandate of Heaven. This is a level of continuity that no other empire can match. The last dynasty fell just over 100 years ago, in 1911. The lives and achievements of ancient China are no less relevant now than when Yu first became determined to hold back the floods.

What do you think Yu the engineer would have thought of China today in the modern world?

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Making thinking visible

Circle of viewpoints

Claim: *We should excavate the tomb of Qin Shi Huangdi*

Discuss this claim with others in the class. In what kind of situation would a claim like this be made? What is the claim asking us to do? What problems might the excavation of the tomb cause?

Brainstorm the claim. Make a list of all the different points of view of this. Who might agree or disagree with this claim? Why?

Dramatise. Choose a viewpoint and imagine the stance a person from this viewpoint would be likely to take. Would they think the claim is wrong? Right? Uncertain? Why? Write a short speech from the perspective of this person. Use the following sentence stems:

- My viewpoint is ...
- I think this claim is wrong/right/uncertain because ...
- What would convince me to change my mind is ...

Share your viewpoint with the group and listen to other people's viewpoints.

Stand back. Look at all the viewpoints you have heard and brainstormed. What is your conclusion or stance? What new ideas or questions do you have?

3 Using historical terms meaningfully

As an historian, you will need to confidently and correctly use the terms related to your subject. Write a paragraph in response to the question below using all the key terms listed. Ensure that your use of these terms shows your understanding of what each term means.

Question: *How did the people of ancient China develop a long lasting and sophisticated empire?*

- Neolithic
- Matriarchal society
- Empire
- Agriculture
- Qin Shi Huangdi
- Mausoleum
- Fu Hao
- The terracotta army
- Mandate of Heaven
- Han purple.

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4 Research task

Investigate the significance of a dynasty in the overall context of ancient China. First, choose one of the dynasties of ancient China and do some research to find out more information about it.

Explain the importance of this dynasty in shaping ancient Chinese culture and society. In your answer, describe the society before this dynasty took over, explain how they took over from the previous dynasty and summarise the key features that made this dynasty so important.

In your response, support your argument by providing key names, dates and facts.

▲ **Source 5.61** Spring Dragon Day is held on the second day of the second lunar month in order to bring the rains. Here, the twenty-first century celebrations in Gansu province still follow many of the customs begun centuries earlier.

5 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about ancient China

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2

Geography

What is geography?

What do you think are the most important challenges facing our world today? Geography is a fascinating subject for anyone who is curious about how the world works. It can improve the lives of people and their environments. Geography involves the study of Earth's *physical environment* and *human activities*, and how these two areas affect each other. Table A shows some of the topics that geographers study.

Figure A shows the devastation caused by a tsunami that hit Indonesia in 2018.

▼ **Table A** Areas of study for geographers

Physical environment	Human activities
• Landforms (such as beaches, volcanoes and mountains) • Bodies of water (such as oceans, seas and lakes) • Climate and weather • Plants and animals	• Land use (such as farms and cities) • Culture, architecture, religion and language • Population growth and decline • The movement of people from one place to another

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▲ **Figure A** This photograph shows the resulting damage of the tsunami that hit coastal regions in Java and Sumatra, Indonesia, in 2018

Geographers studied the area's physical environment and discovered that an unusual natural process had occurred to cause the tsunami shown in Figure A. They found that the eruption of the Anak Krakatau volcano triggered an underwater landslide that then created the tsunami. Also, by studying the human activities in the area, geographers discovered why so many people were affected.

The tsunami in Indonesia struck popular tourist beaches during peak season when hundreds of tourists were there for the Christmas and New Year holiday. Tsunami warning systems had not worked for six years because they had been damaged and vandalised. Furthermore, the warning systems that were in place only activated when an earthquake was detected, not when there was an underwater landslide. Many locals considered an earthquake to be a sign for people to move to higher ground, but they did not have a strong education on how volcanic activity causes tsunamis and the risks involved.

By studying the relationship between humans and the environment, geographers are able to understand why people would risk living in dangerous areas. In the case of Java and Sumatra, where the tsunami hit in Indonesia, the natural environment provides locals with healthy soil to grow crops and the ocean to provide them with seafood. The tropical **climate** and beaches also supply those who live there with a source of income from the tourist industry. The land near volcanoes is often cheaper and many cannot afford to move further away. Often, the locals would not want to move because the area is their home.

KEY TERM

climate the long-term trends in the weather conditions of a place such as its average rainfall and temperature

The study of geography finds solutions to important challenges. For example, geographers used sonar surveys to map the sea floor beneath the Anak Krakatau volcano in order to understand how the landslide caused the tsunami.

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They also educated people about the warning signs of a tsunami when it is triggered by a volcano.

There is no doubt that geographers can be game-changers and life savers, but to perform their important role, geographers need to rely on geographical concepts and skills.

Introducing geographical concepts and skills

Geographical concepts and skills help to guide the way you question and think about an issue. The seven concepts that are used in the following chapters on geography are: place, space, environment, interconnection, sustainability, scale and change.

Geography is a process of questioning, discovering and communicating what you have learned. This process of enquiry involves the following geographical skills:

- Being motivated by an issue or curious about a **phenomenon**
- Asking questions that relate to geographical concepts
- Researching a topic by collecting primary and secondary data (see Table B)
- Analysing information to come up with conclusions and to gain an understanding of a topic
- Evaluating what is being done in response to an issue or phenomenon by seeing if a response is successful
- Presenting information in ways that help people, governments and the media understand an issue
- Suggesting or creating solutions based on the research and evidence.

KEY TERMS

phenomenon an occurrence or observable fact

fieldwork gathering information and data about a natural or human environment outside the classroom

To give you an example of geographical concepts and the skills in action, a geographer looking at Figure B might ask the following questions:

- How has this volcano changed?
- What is the scale and distribution of this change?
- What interconnections between factors caused the change?
- What impacts have these changes had on the environmental, social and economic sustainability of the region?

You will learn more about geographical concepts and skills in the following chapters. In Chapters 7, 8 and 9 you will study the topic of water. These chapters describe how water connects people and places, how hydrological hazards occur and what their impact is on people, and how water use is managed. Chapter 10 looks at place and liveability. You will learn what makes a place a good area to live, how a person's town

▼ **Table B** Primary and secondary data in Geography

Primary data	Secondary data
Primary data is data that you collect specifically to help you answer an enquiry question. This data is collected during **fieldwork**.	Secondary data is data that was created by someone else for a different reason. However, the information can still help you answer your own question.
Examples: • Photographs • Collecting samples • Interviewing people	Examples: • Published statistics • Satellite imagery • Online interactive maps

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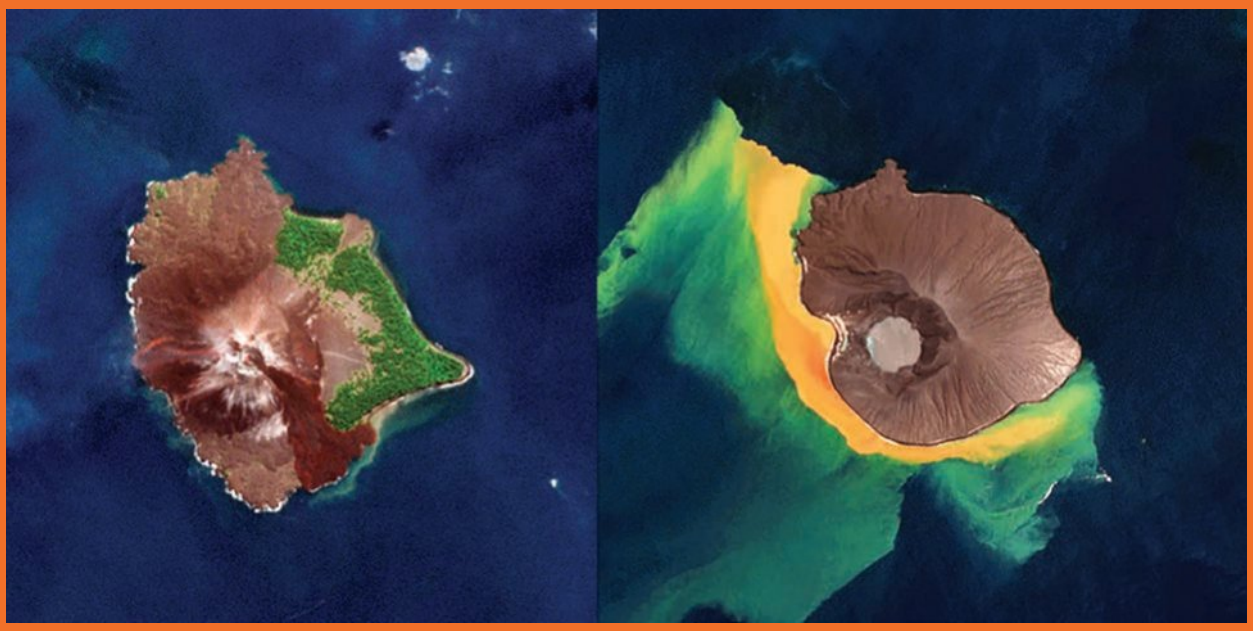

▲ **Figure B** These satellite images were taken when the volcano on Anak Krakatau before erupting (left) and after erupting (right). The most obvious change that the eruption had to the region is that a large part of the southern flank of the volcano slid into the ocean, which has changed Anak Krakatau's shape and size.

can impact their life, and how geographers can make places safe, healthy and inspiring environments for people to thrive in.

The work of geographers has been, and will always be, important. In the past, geographers have helped to determine the circumference of the Earth, how and where to grow food, and how to reduce the damage caused by natural disasters. Today, and into the future, the discoveries geographers make will help us overcome modern challenges, such as climate change, the extinction of species and the sustainable use of resources such as water.

Geography is an empowering and forward-thinking subject. It requires an open mind to consider many questions and perspectives. A geographer also has to be sharp enough to understand the information that is collected and to create a future that is better than the present. Who knows where your study of geography will take you? The possibilities are endless!

▼ **Figure C** Anak Krakatau erupting in 2018. The unusual interconnection between this eruption and the following tsunami launched geographers into a new area of research, in the hope that we can stop such tragedies from happening again.

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Unit 1

Water in the world

Overview

Water is the most precious resource we have. We use it every day in our homes, as well as to grow food, make energy and products, and move people and goods all over the world. Water is a finite, renewable resource. This means that there is the same amount of water on Earth today as there was when the Earth was formed and, if managed well, it can be re-used forever. In fact, the water you drink today could contain molecules that dinosaurs and cavemen drank well before your time!

Video
Unit overview

▼ **Figure D** This photograph shows waste water undergoing treatment at the Beenyup plant in Perth before it is returned to the city's water supply. In Perth, climate change and population growth are putting pressure on the city's ability to provide water. This has encouraged creative solutions to address the serious problem of water scarcity in the city.

Every day there are more people using the water on Earth, but only 2.5 per cent is drinkable. So, how we treat this precious resource has never been so important.

As our use of water increases, we have come up with clever ways to access freshwater. In Perth, 10 per cent of the water flushed down the toilet and sink is recycled into drinking supplies. In Kuwait, almost 100 per cent of drinking water comes from desalination plants that turn salt water into fresh water. However, there are also ways that we mistreat or waste water.

Water is part of an interconnected system called 'the water cycle'. This means that the pollutants we put into the soil and sky can contaminate our water, and reduce the amount of clean water that we can use.

In this unit, you will investigate what water means to Australians and peoples around the world. Understanding the connections between water, people and places is an essential part of your study. This unit will help you to interpret your natural environment and the natural processes that shape it. By looking at the way water is used, you will learn how this resource is treated with respect and ways that it is not. You will also look at water in its wildest forms, such as in storms and floods, and learn how people can be prepared to handle hazards of this kind.

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Learning goals

After completing this unit, you should be able to answer these questions.

Chapter 7:

- What is an environmental resource?
- How can water be classified as an environmental resource?
- How do people manage water resources?
- What role does water play in connecting environments and places?

Chapter 8:

- How are water resources distributed around the world?
- How do Australia's water resources compare to other countries?
- What is water scarcity and what factors lead to it?
- How is water scarcity managed?
- How is water managed in Australia's Murray–Darling Basin?
- How can desalination, water recycling and efficient irrigation help to manage water scarcity?
- What role does water play in the spiritual, economic and cultural life of people in Australia and around the world?

Chapter 9:

- What are floods?
- Why do floods occur?
- Where do floods occur?
- What are the social, economic and environmental impacts of floods?
- How do people respond to floods to minimise their impacts?

Introducing geographical concepts

In this unit, you will have many opportunities to practise geographical concepts.

The concept of **place** involves the physical location of an area, and the meaning that the location has for individuals, communities and cultures.

Space refers to the spatial distribution of places and their characteristics. We use maps and spatial technology to examine, monitor and compare spatial distributions so that we can assess and manage changes.

Scale refers to how big something is compared to something else. This can be represented on maps using a linear scale, or when considering whether an impact will affect a small area, an entire country or the whole world.

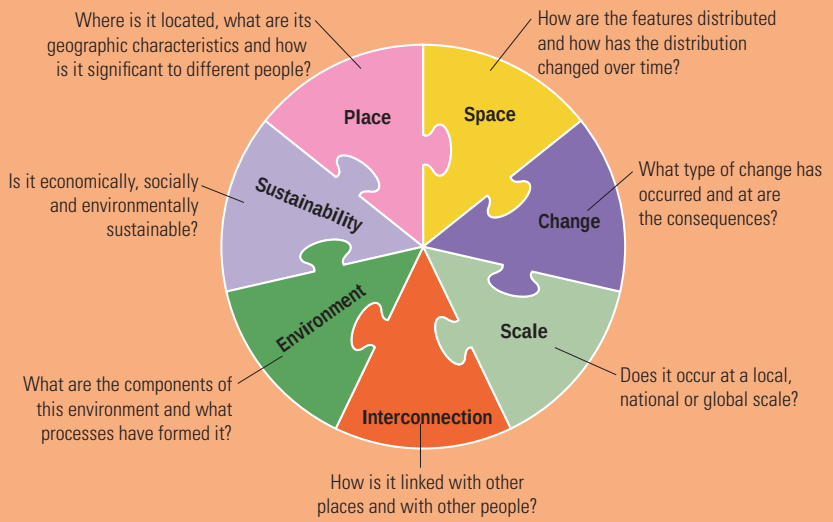
When geographers look at **change**, they investigate the type of changes that have occurred. They also look at when, where and why change has happened.

The **environment** in geography refers to the characteristics of an environment, how an environment supports life, and the connections between an environment and people.

Interconnection involves the links between places and the ways that people influence or are influenced by the characteristics of places.

Sustainability refers to whether a place or environment can maintain its current needs without affecting the ability to meet the needs of future generations.

Geographical concepts



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CHAPTER 7

Water as an environmental resource

Setting the scene: water is an essential part of human existence

Water is essential to all life on Earth. A person can only survive without it for about three days. Throughout history, people have used water to not only survive, but to thrive. It is needed for drinking and to grow food, and it is a source for transport and to create electricity.

Water is a significant part of Aboriginal and Torres Strait Islander peoples' cultures in Australia. The power of water is represented throughout Dreamtime stories. An example of this is the rainbow serpent. The story of the rainbow serpent tells of how a serpent travelled through the land creating river channels, which were then filled with water from the stomachs of frogs. This water transformed the landscape because vegetation began to grow and animals thrived. The rainbow serpent then created mountains and turned some of the animals into humans.

Aboriginal cave paintings sometimes show the rainbow serpent with a crocodile or kangaroo head, or with a crocodile or kangaroo tail. As Figure 7.1 shows, the rainbow serpent had a snake's body, and was decorated with rainbow shapes and designs. The rainbow on the serpent's body meant that it was travelling, and keeping the waterholes full and flowing. The rainbow serpent could also be destructive, and cause storms and floods when it was angry.

KEY TERMS

sediment a small, soft material that is moved by rivers and deposited in a new location

floodplain an area of flat land near a river that is often flooded when the river becomes too full

See Chapter 2 for more information about the Nile River and its importance to the ancient Egyptians.

▲ **Figure 7.1** A cave painting of the rainbow serpent in Mount Borradaile, Awunbarna, which is in Arnhem Land in the Northern Territory

Water was also central to civilisation in ancient Egypt. The Nile River flows 6650 kilometres in length from Uganda to the Mediterranean Sea in northern Egypt. The river was the religious, cultural and economic centre of ancient Egyptian life. It would flood annually, leaving fertile **sediment** along its banks. This sediment allowed people to grow enough crops to support themselves. Figures 7.2 and 7.3 show the lush vegetation still growing along the Nile River's banks, and the surrounding **floodplain**. Without the floodplain of fertile land, this area would be part of the desert.

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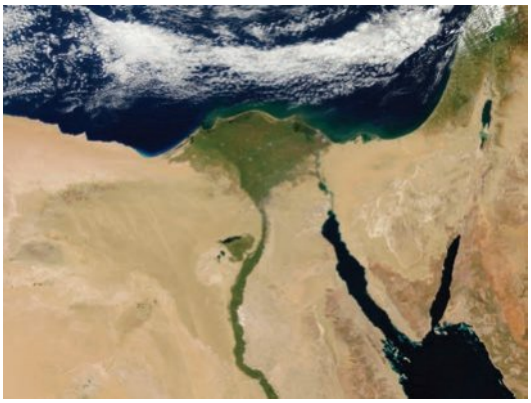
▲ **Figure 7.2** A present-day photograph of the Nile River valley in the Minieh region of Egypt



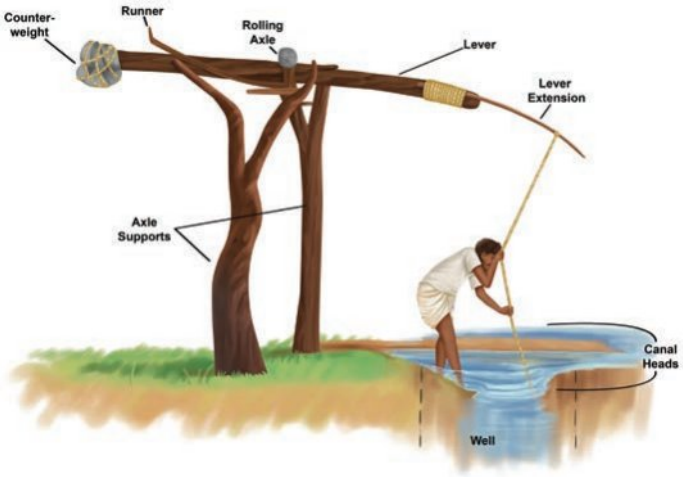
▲ **Figure 7.3** This satellite image shows the lush vegetation of the Nile River surrounded by desert

As described in Chapter 2, the people of ancient Egypt expressed how much they relied on the Nile River through religious rituals and hymns (songs of praise). They and their priests sang verses like:

> Hail to thee, O Nile! Who manifests thyself over this land, and comes to give life to Egypt! Mysterious is thy issuing forth from the darkness, on this day whereon it is celebrated! Watering the orchards created by Re, to cause all the cattle to live, you give the earth to drink, inexhaustible one!

▲ **Figure 7.4** *Hymn to the Nile,* c. 2100 BCE, Ancient History Sourcebook, Fordham University website

The river was so vital to the ancient Egyptians' survival that they invented ways to move water from the river to their crops. Although the *shaduf* shown in Figure 7.5 might be considered primitive by modern standards, the concept of using river water for watering crops within naturally dry regions is a fundamental part of agriculture in many regions of Australia.



▲ **Figure 7.5** The *shaduf* is a hand-operated device for lifting water. It is still used in some countries to water crops. It moves water from the river, over the bank and into drains that are dug along and through the fields.

MAKING THINKING VISIBLE 7.1

Think, pair, share

Many cultures from the ancient past as well as today have a deep connection with water. Answer the following questions, before sharing your responses with a partner. Then discuss your answers with the rest of the class.

1. List all the ways you use water in your life. Consider how water is used at home and at school. Also think about the water that might be needed to produce items that you purchase or consume.
2. What are your experiences with water in the landscape? Consider water that is near your home, a place you visit regularly or somewhere you have been to on a holiday.
3. How do you think water supplies and water in the landscape might change or be impacted on in the future? Consider environmental damage, population growth and changes to the climate.

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Chapter overview

Introduction

Water is one of our most important environmental resources. This chapter explores the ways in which water can be classified as a resource and the different types of water resources that are available. It also looks at the different ways water is used in agriculture and our homes. The chapter considers the value of water, and the way it connects people, places and environments in the landscape.

Learning goals

After completing this chapter, you should be able to answer these questions:

- What is an environmental resource?
- How can water be classified as an environmental resource?
- How do people manage water resources?
- What role does water play in connecting environments and places?

Geographical skills

After completing this chapter, you should be able to:

- Explain processes that influence the characteristics of places
- Identify, analyse, and explain spatial distributions and patterns, as well as identify and explain their implications
- Identify, analyse and explain interconnections within places and between places, and identify and explain changes resulting from these interconnections
- Analyse maps and other geographical data and information, using digital and spatial technologies as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology.

▼ **Figure 7.6** Some of the most spectacular places on Earth were formed by water, including Iceland's Gljufrabui waterfall that is shown here

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7.1 Environmental resources

FOCUS QUESTION

What is an environmental resource?

What is an environmental resource?

Resources are used by people to satisfy a need. A need could be something like constructing a building, generating electricity or earning money. **Environmental resources** are those that are found naturally in the Earth's **environment**. They include things like light, wind, heat, water, plants, trees, animals, soil, rocks and minerals.

When we speak about the environment, we are referring to all the features that make up our surroundings and make it possible to live on the Earth. The features of the environment can be divided into four spheres:

- The *atmosphere*, which includes the air we breathe and the sunlight we feel
- The *hydrosphere*, which is all of the water found on Earth, including the oceans, rivers, lakes
- The *lithosphere*, which includes all of the rocks and soil
- The *biosphere*, which is all of the living things on Earth, including plants, animals and people.

Different parts of these four spheres interact with each other. For example, rain that falls from the atmosphere might flow into a river, the hydrosphere. This river might cut through soft soil on a river bank, the lithosphere, and provide a water supply for local animals, the biosphere. The interactions between different parts of the environment are known as **geographical processes**.

KEY TERMS

environmental resources resources that are from the natural environment such as water and wood

environment the air, water and land of a particular area, which contains people, animals and plants

geographical processes a series of events or actions that change environments, spaces and places

renewable resources resources that can be produced as quickly as they are used

ACTIVITY 7.1

Features of the environment

Read about the features that make up an environment and then complete the following.

1. Draw a diagram showing how the four spheres of the environment interact with each other.
2. Provide an example of an environmental resource for each of the four spheres that make up the environment.

Renewable and non-renewable resources

A common way to classify environmental resources is based on whether they are renewable. **Renewable resources** are those that can naturally replenish themselves at a rate that is faster than what people use them. Table 7.1 describes three examples of renewable resources.

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▼ **Table 7.1** Examples of renewable resources

Source	Explanation	Collection
Solar energy	Solar energy is used to generate electricity using solar panels. Solar energy is also essential in the growth of plants and trees.	 ▲ **Figure 7.7** A large-scale solar panel project in the United States
Wind energy	Wind can be used to generate electricity through wind turbines. The wind spins each turbine like a fan. This then turns a generator, which creates electricity. An average onshore wind turbine can generate enough power to supply 1500 households with electricity.	 ▲ **Figure 7.8** Electricity generating windmills in Britain
Trees	Wood from trees is used for a variety of purposes, such as construction and fencing. Wood is used for producing everything from paper to pianos. The process of cutting down forests is known as deforestation.	 ▲ **Figure 7.9** Harvesting pine trees in Toolara State Forest in Queensland

KEY TERMS

harvest to pick and collect crops, or to collect plants, animals or fish to eat

species a group of plants or animals that are classified as having the same characteristics

Some resources are renewable, but if they are used at a rate that is quicker than the rate they renew themselves, then they can eventually run out. For example, if people choose to **harvest** trees from a forest, they might grow back naturally or they could be replanted by people. However, depending on the **species** of the tree and the climate, it might take each tree 30 years to grow back to a mature height. This means that if trees are harvested too quickly, the supply can run out faster than it grows back, even though they are a renewable resource.

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In geography, we use the concept of **sustainability** to describe whether the use or modification of an environment can continue at the same rate into the future, without leading to negative impacts. In the example just given, sustainable forest management and timber harvesting would involve logging trees at a rate that would allow a forest to **regenerate** to a point where the forest could be logged again. Logging at an unsustainable rate would mean forests are not left to regenerate. Instead, the size of a forest would continue to get smaller and smaller until timber could no longer be harvested because no trees would be left.

Non-renewable resources are those that cannot be replaced once they are used. **Fossil fuels** are a common example. Fossil fuels are produced from buried deposits, which are formed from layers of decayed plants and animals (fossils). Over millions of years, the layers of organic remains have been exposed to intense heat and high pressures. These geographical processes have changed the organic remains into fossil fuels. Fossil fuels include:

- Crude oil
- Coal
- Natural gas.

Crude oil, when extracted, can be refined into oil, grease and petroleum. Technically, new fossil fuels are being created following the same processes that formed them in the first place. However, this does not occur at a time scale that makes them renewable for use. For example, it will take 300 million years for new coal to form from the current dead plant material!

KEY TERMS

sustainability the wise use of resources so that they are available into the future

regenerate to grow again

non-renewable resources resources existing in limited quantities that cannot be replaced after they have all been used

fossil fuels fuels that were formed underground from plant and animal remains millions of years ago; examples include gas, coal and oil

ore a type of rock or soil that can be mined to obtain metal

Nuclear energy is another example of a non-renewable resource. The process of creating nuclear energy requires the use of uranium **ore**. An ore is material from which a metal or valuable mineral can be extracted. Uranium ore is mined from rock deposits in different parts of the world, including Australia. Nuclear energy is created by splitting uranium atoms in a process called 'fission'. The splitting of the atoms generates heat to produce steam, which is then used to turn turbine generators that create electricity.

▼ **Figure 7.10** These scientists are working in a nuclear reactor, which produces and controls the release of energy from splitting the atoms of uranium ore

KEY TERMS

infinite resources resources that are without limits

finite resources resources that have a limit or end

Finite and infinite resources

Some renewable resources will never run out. These are known as **infinite resources**. Scientists predict that the Sun will last for another 6.5 billion years. Although this technically is not infinite, this time span is much longer than the amount of time that the Earth has existed, and is therefore considered to be renewable. Resources that have a limited supply, such as non-renewable resources, will eventually run out. Every time they are used, there is less of the resource remaining. These types of resources are known as **finite resources**.

▼ **Figure 7.11** Coal is a non-renewable fossil fuel that is mined in Australia and exported around the world for the production of electricity.

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 7.1

Classification

An important role of a geographer is to classify the world around them. This helps them to understand features of the Earth and how the features interact with each other. Geographers classify species of plants and animals, as well as different types of rocks, rivers and mountains.

Based on the information here about environmental resources, classify the following resources as either renewable or non-renewable. Also classify each resource as either finite or infinite. Write a sentence justifying why you have classified each resource the way that you have.

- Native animals hunted as a food source
- Saltwater from the ocean that is converted into fresh water
- A forest that is used to harvest individual trees and then left to grow back
- A forest where all the trees are harvested so that the land can be turned into a farm.

You may wish to use the table template shown here to help set out your classifications.

Resource	Renewable or non-renewable	Finite or infinite	Justification

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END-OF-SECTION REVIEW 7.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 Define the following terms:
   - **a** Resource
   - **b** Environment
   - **c** Geographic process
   - **d** Sustainability.

2 List the four spheres that make up an environment and write one sentence summarising what is found in each one.

3 List three examples each of a renewable resource and a non-renewable resource.

Interpret

4 Describe the difference between a renewable and a non-renewable resource. Use examples in your explanation.

5 Explain why an environmental resource might run out even if it is a renewable resource.

Argue

6 The logging of all native forests in Australia should stop immediately to protect the environment. Explain whether you agree or disagree with this statement. Consider:
   - How forests are classified as an environmental resource
   - The sustainability of logging forests
   - The positive and negative effects of logging forests
   - The consequences of stopping all logging operations in Australia.

▼ **Figure 7.12** Although wood is a renewable resource, supplies can run out if it is not managed sustainably.

7.2 Water as an environmental resource

FOCUS QUESTION

How can water be classified as an environmental resource?

How much water is there on Earth?

Water is one of the most abundant resources on Earth. In fact, it is estimated that the Earth contains 1260 quintillion litres. That's 1 260 000 000 000 000 000 000 litres! Approximately 97.5 per cent of this water is saltwater. It is found in oceans, which cover 71 per cent of the Earth's surface. This leaves 2.5 per cent as **freshwater**.

KEY TERMS

freshwater water with less than 0.5 per cent of dissolved salts

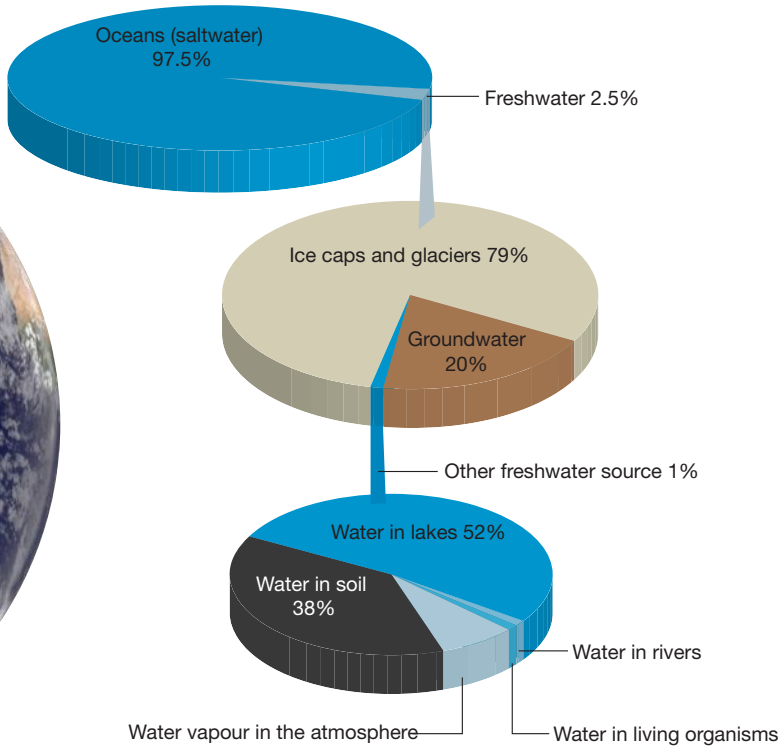
glaciers large masses of ice that move slowly; they are frozen rivers of ice that form when snow accumulates and is compacted

ice caps a thick layer of ice that permanently covers an area of land

Freshwater supports all life on land, including people. Though the usage varies depending on location, the average individual in Australia uses 340 litres of water per day. This does not include all the water used to grow crops. On top of this total, additional water is needed for drinking, cooking and washing.

Although freshwater is a small percentage of the total water on Earth, if this 2.5 per cent was readily available then it would be a plentiful supply. However, 79 per cent of all freshwater is frozen in **glaciers** and **ice caps**, such as those covering Greenland and Antarctica (see Figure 7.14). A further 20 per cent is located underground in the groundwater supply. In fact, just over 0.5 per cent of all the freshwater on Earth is available in lakes and rivers.

▲ **Figure 7.13** Oceans cover 71 per cent of the Earth's surface



▲ **Figure 7.14** Although the Earth contains a very large amount of water, only a very small percentage is available as freshwater

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The natural water cycle

All of the water on Earth is constantly changing form through the processes involved in the natural water cycle (see Figure 7.15). Due to the warmth of the sun, the surface water in rivers and lakes turns water into water vapour. This process is known as **evaporation**. Similarly, water in plants and trees undergoes **transpiration**. As water cools in the atmosphere, clouds form and the water condenses. From this **condensation**, water droplets and ice crystals form. When clouds grow large enough, the water falls as **precipitation**, such as rain and snowfall. When this falls on the land, some of the water absorbs into the soil and is added to the groundwater supply. This **infiltration** eventually flows underground into rivers, lakes or to the coast. Water that does not infiltrate into the soil flows over the land and into rivers. This is known as **runoff**. This water eventually makes its way into river systems and flows back out into the ocean where the cycle repeats itself.

KEY TERMS

evaporation the process of a liquid changing to a gas, especially by heating

transpiration the process of losing water through the surface or skin of a body or a plant

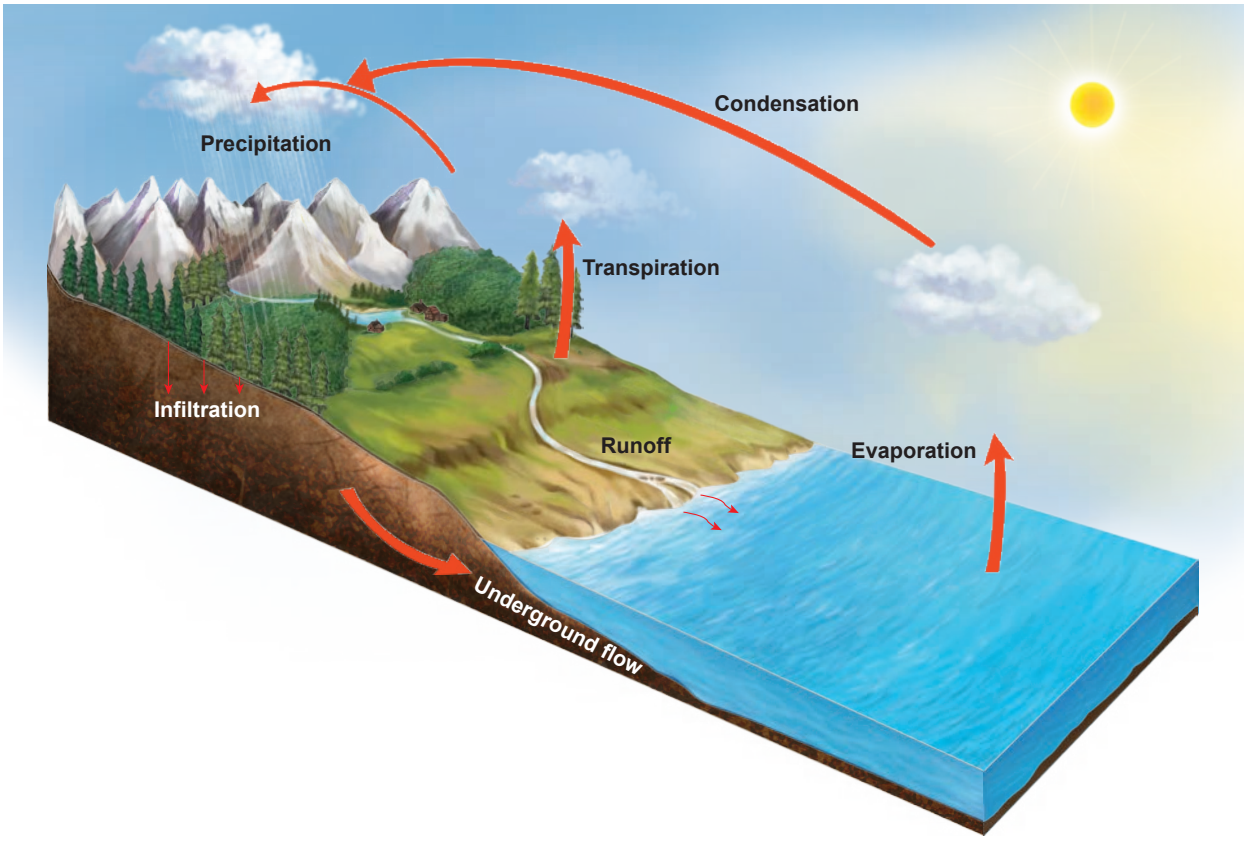
condensation the process by which water vapor in the atmosphere cools and changes into liquid water

precipitation water that falls from the clouds towards the ground, especially as rain or snow

infiltration the process by which water is absorbed into the ground

runoff water that is not absorbed by the land and flows from high areas to low areas

▼ **Figure 7.15** The different processes involved in the natural water cycle



Amazing but true …

Most of Melbourne's drinking water comes from forests in the Yarra Ranges. This area is called a catchment because it acts like a giant bucket. It catches all of the water from rainfall, runoff and infiltration. The water from the Yarra Ranges eventually finds its way into rivers and is piped into reservoirs that store it so that it can be used by people who live in Melbourne.

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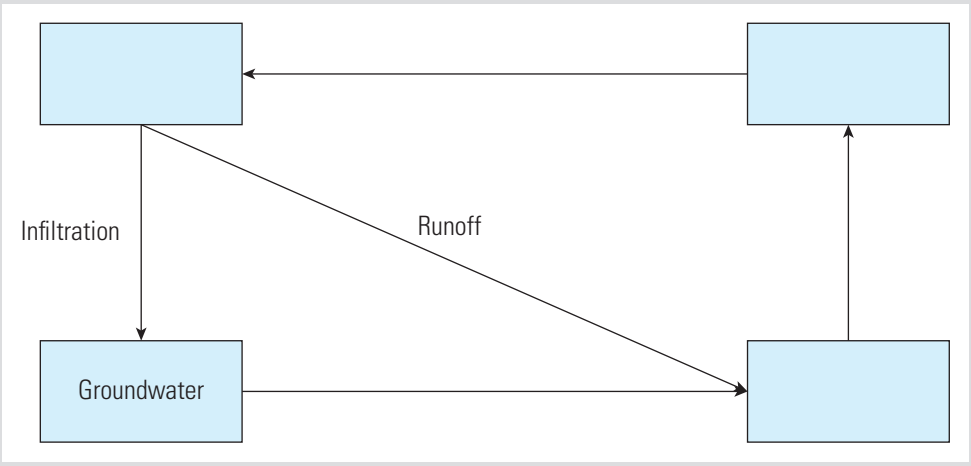
DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 7.2

Drawing a concept map

Concept maps are a type of diagram that are used to show processes. They include terms inside boxes, with arrows linking the boxes to demonstrate the steps of a process.

A concept map can be used to summarise the processes within the water cycle and the different forms of water found in the cycle. Copy and complete the concept map here to summarise the water cycle.



How is water used?

Water is considered an environmental resource because it has a wide variety of uses. These include use in the following areas:

- *Domestic* – used in the home for flushing toilets, showers, cooking and cleaning
- *Agriculture* – used to grow crops and raise animals
- *Industry* – used to manufacture and transport products
- *Environment* – used to maintain the health of natural and human environments
- *Recreation* – used in community swimming pools, and to maintain parks, ovals and golf courses.

What kind of resource is water?

Since water is constantly undergoing different processes in the water cycle, it can be described as a renewable resource. Many communities around the world rely upon regular rainfall to renew their water supply. This includes large cities such as Melbourne. Although rainfall and river flows are usually regular and therefore renewable, these processes can reduce or stop completely during extended dry periods. In these cases, water is temporarily non-renewable.

Despite constantly changing between a solid, liquid and gas, the total amount of water on Earth never changes. This means that the overall supply of water is finite. However, in areas that receive high and regular amounts of rainfall, the resource can certainly seem infinite. In other places, supplies are constantly monitored and the use might need to be restricted if the finite supplies run low.

Available water resources

Available water resources are those that can be accessed relatively easily and cheaply. This includes the water found in rivers, lakes and groundwater.

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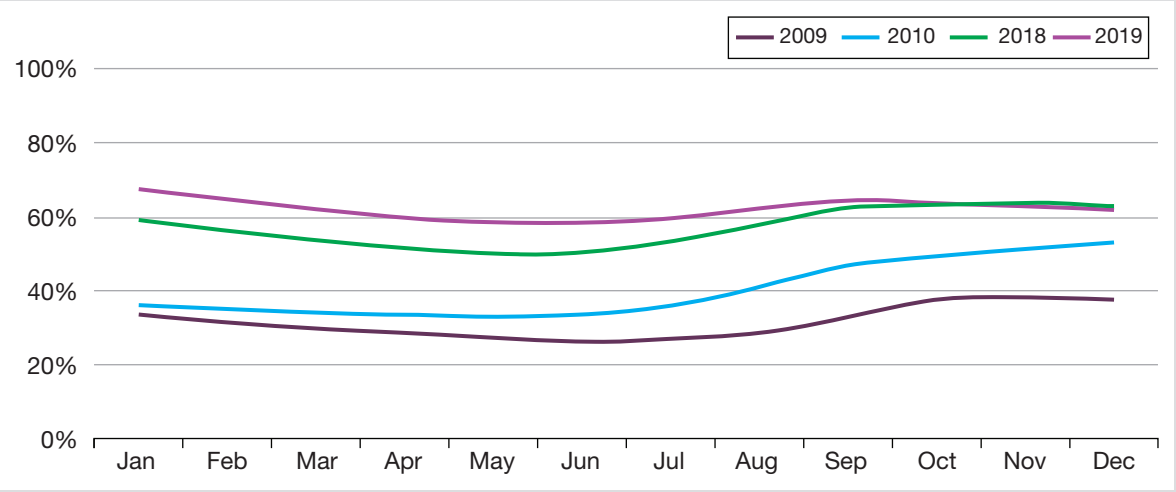
DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 7.3

Describing changes using a line graph

Line graphs are used to show changes over time. The bottom of the graph shows the movement of time and is often divided into years or months. The quantity that is changing is measured along the side of the graph.

Figure 7.16 shows how Melbourne's water supply has changed each month over four different years. The values shown on the left of the graph are how full Melbourne's water storages were during different years. Examine the graph and answer the questions that follow.



▲ **Figure 7.16** The changes in Melbourne's water supply during 2009, 2010, 2018 and 2019

1. During which year and month were water storages the highest? Approximately how full were they?
2. During which year and month were water storages the lowest? Approximately how full were they?
3. Which year had the biggest change in storage levels? What was the lowest and highest level during that year?
4. What do you think might have been the cause for the low storage levels in 2009?
5. Research the millennium drought, and write a short summary that includes timelines, weather conditions and impacts.

Surface water

As the name suggests, surface water is water located on the surface of the Earth. This includes rivers, lakes and wetlands, such as swamps. Most major cities are built near a reliable supply of surface water because it is easy and cheap to access and use.

In some cases, surface-water resources are **perennial**, which means that they are permanent. Perennial resources are lakes that always contain water and rivers that flow all year round, such as the Glenelg River in Victoria. In drier areas, surface-water resources are often **ephemeral**, which means they are semi-permanent. Ephemeral resources dry up during seasons with low rainfall. This is a common occurrence in many **arid** places in Australia, such as the Flinders Ranges in South Australia.

KEY TERMS

perennial something that happens repeatedly or all the time

ephemeral something that happens only for a short time

arid very dry, often without rainfall to support plants

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▲ **Figure 7.17** The Glenelg River is a perennial river in Victoria

▲ **Figure 7.18** This dry river bed in the Flinders Ranges, South Australia, is an example of an ephemeral resource

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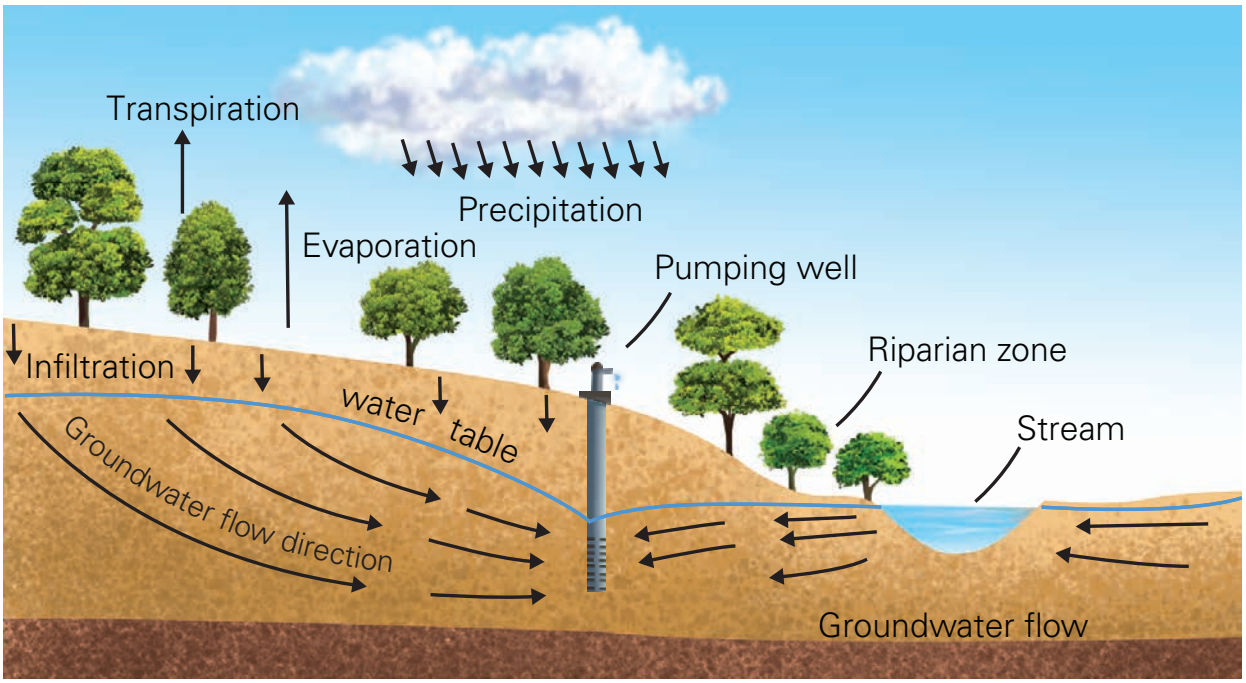

▲ **Figure 7.19** Groundwater comes from rainfall that infiltrates into the soil layer

Groundwater

Groundwater is water that is located below the Earth's surface. It comes from rainfall that has infiltrated into the ground, and has been absorbed by soil and **porous** rocks. The boundary between groundwater supplies and the drier soil above it is called the water table.

Australia has a large system of groundwater basins, which stretch under about 60 per cent of the continent. The Great Artesian Basin is the largest of these; it is estimated to hold around 8700 **megalitres** of water. Many people living in dry areas are reliant on groundwater supplies, especially when rainfall is erratic or during extended periods of drought. During these periods, water is pumped to the surface using **bores**. Although groundwater supplies are finite, they are replenished during periods of high rainfall.

Potential water resources

Potential water resources are those that are not as easy to obtain. They include saltwater, ice, water vapour and waste water. Accessing these resources require complex and expensive extracting and filtering technologies.

As populations grow, many places are forced to use these types of resources to ensure their water supply is renewable.

KEY TERMS

porous something that has many small holes so liquid or air can pass through, especially slowly

megalitre a metric unit of capacity equal to a million litres

bores holes drilled into the ground to access underground water resources

Saltwater: desalination

Desalination is the process of removing salt and other minerals from water. This can turn water from the ocean or underground sources into water that is safe for human consumption. Given the size of the ocean, water from desalination is a very reliable resource, particularly useful in coastal areas that have low or inconsistent rainfall. However, desalination plants are expensive to build and maintain. The cost to build a single plant in Australia is more than $1 billion dollars and this does not include the ongoing maintenance costs on the equipment. Desalination plants also require a very large amount of energy to run. Despite the costs, desalination plants have been built in Melbourne, Sydney, Adelaide, Perth and the Gold Coast.

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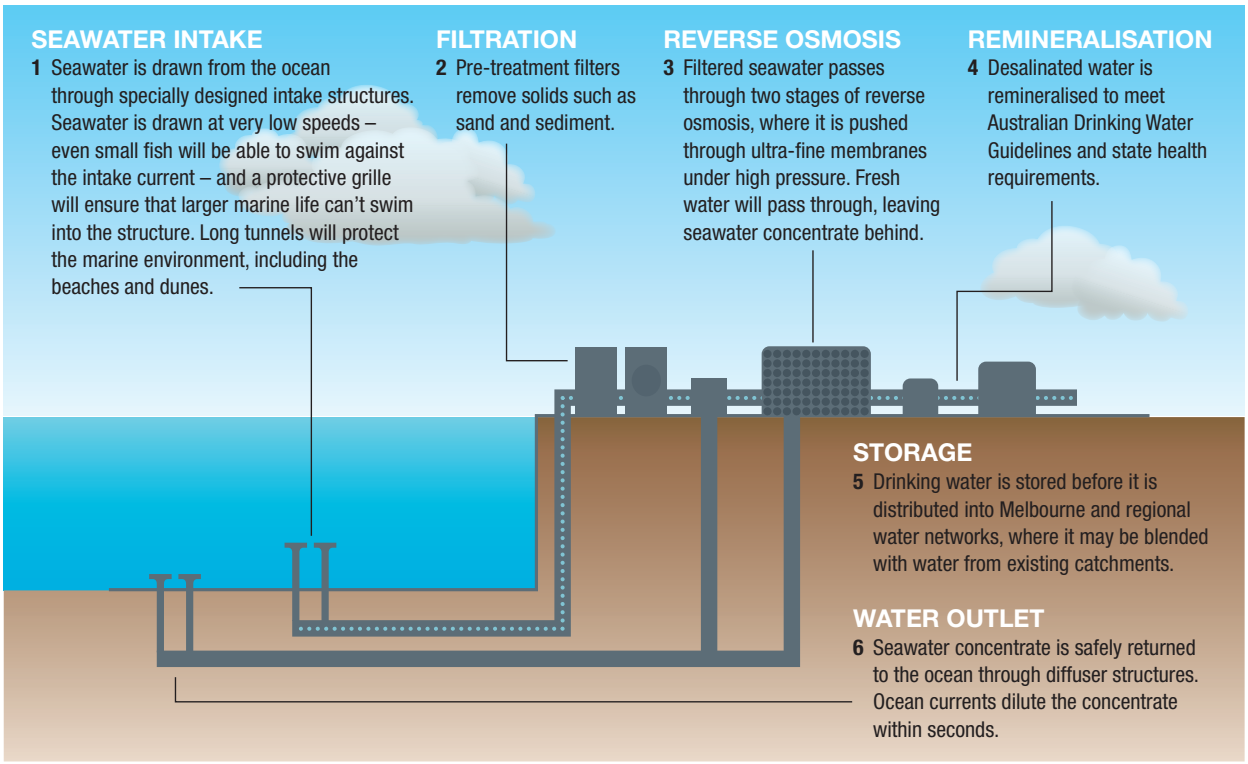

▲ **Figure 7.20** The process involved in desalination to create drinkable water

Amazing but true …

Desalination is an ancient technology! The ancient Romans used early forms of desalination to ensure that their soldiers did not get dehydrated when they were in areas without a consistent supply of freshwater. The ancient Romans used clay filters to trap salt, which allowed their soldiers to keep on the move when they were away from freshwater sources.

► **Figure 7.21** This stone carving from 2 CE shows Roman soldiers building a campsite. Their camp would have included set-ups for desalination.

Waste water: water recycling

KEY TERMS

sewage waste matter such as human urine or solid waste

potable water that is clean and safe to drink

filtered the process of removing solids and impurities from water

purified the process of removing dirty or harmful substances from water

Water recycling involves re-using treated wastewater, such as **sewage**. Recycled water can be used to water crops on farms, flush toilets and replenish groundwater supplies. If waste water is treated thoroughly, it can even be used for drinking. Water that is suitable for drinking is called **potable** water.

The process of water recycling involves transporting water to a wastewater treatment plant, where it is **filtered** and **purified**. In California's Orange County, there is a plant that recycles sewage to make it potable and then returns it to the groundwater supply. It recycles enough water to supply the needs of 850 000 people.

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Amazing but true …

In 2018, the Orange County Water and Sanitation District was awarded a Guinness World Record for recycling 100 million gallons (378 million litres) of wastewater into potable water in 24 hours.

▲ **Figure 7.22** This photograph shows the pressure vessels that are used to purify wastewater in Orange County, California

While the use of recycled water is not yet widespread in Australia, wastewater in New South Wales' Goulburn Valley is recycled and returned to the Goulburn River. It is then processed to be safe for drinking. In the future, Perth hopes to recycle all of its sewage to contribute to the city's water storages. Although many people may find the idea of drinking recycled sewage difficult to swallow, there have not yet been any cases of human health problems associated with the consumption of recycled water.

Amazing but true …

Colour terms are often used to help define different types of water resources. *Blue water* is water found in rivers, lakes and dams. *Green water* is water that is stored in the soil and used by plants during their growth. *Grey water* is waste water that comes from household uses, such as baths, sinks, washing machines and dishwashers. It is not safe to drink but can be re-used to water the garden. *Black water* is sewage and waste water that contains everything that we flush down the toilet.

ACTIVITY 7.2

Positives and negatives

In a table, summarise the positives and negatives of surface water, groundwater, saltwater and recycled water as water resources. Consider the environmental and economic impacts of using these resources.

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 7.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Define the following terms:
- Freshwater
- Evaporation
- Transpiration
- Condensation
- Precipitation
- Infiltration
- Runoff
- Perennial
- Ephemeral
- Arid
- Desalination
- Potable.

2 How much of the total water on Earth is freshwater?

▲ **Figure 7.23** A large percentage of the Earth's freshwater is found in frozen rivers of ice. This glacier is in Patagonia, which is at the southern tip of South America.

3 List the six processes that water undergoes within the water cycle.

Interpret

4 Explain why water can be described as both a renewable and a finite resource.

5 Describe the difference between available and potential water resources.

Argue

6 Discuss whether you think Australia should increase its investment in recycled water so that all major cities recycle their wastewater as part of their potable water supply. Consider if it would be beneficial, whether there are viable alternatives and if you think people would be happy to consume recycled water.

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7.3 Using and managing water resources

FOCUS QUESTIONS

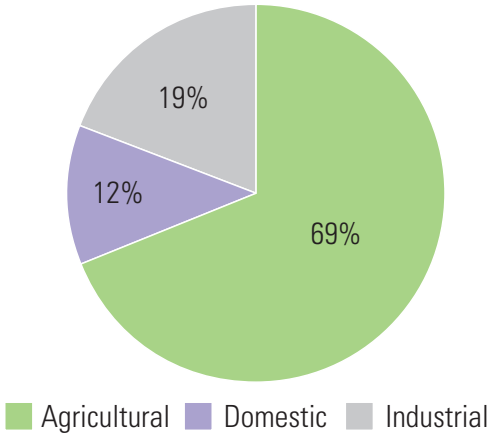
How do people use and manage water resources?

Water use around the world

Approximately 110 000 **cubic kilometres** (km^3) of rain falls on land each year and a further 398 000 km^3 falls over the ocean. To get a sense of scale, this amount of water is the equivalent of 44 billion Olympic-sized swimming pools! This is an enormous amount of water, which is why it is measured in cubic kilometres rather than litres.

Around 61 per cent of rainfall evaporates or transpires. This leaves 39 per cent, 43 000 km^3, to fill rivers, lakes and groundwater. Some of this water is left in the environment to support local **flora** and **fauna**, and some is taken out by people to use as resources. This is known as **water withdrawals**.

Figure 7.24 shows the proportion of the water withdrawals that is used for agricultural, domestic and industrial uses when averaged across the entire world. While agriculture dominates the global use of water resources, Figure 7.25 shows that these proportions vary significantly in different continents.



▲ **Figure 7.24** The proportion of the world's water withdrawals that are used in the agricultural, industrial and domestic sectors

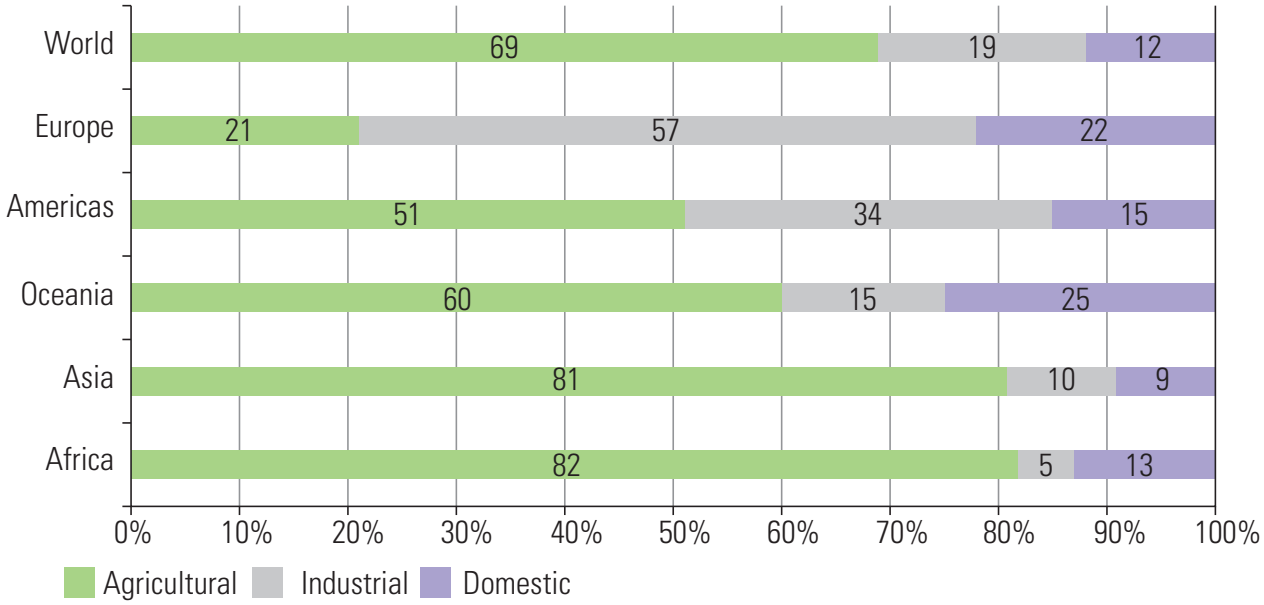
KEY TERMS

cubic kilometres a cubic kilometre is equal to a volume of 1000 × 1000 × 1000 metres; a cubic kilometre is also equal to a teralitre, which is exactly one trillion litres

flora the plants of a particular region

fauna the animals of a particular region

water withdrawals the total amount of water withdrawn from a surface water or groundwater source



▲ **Figure 7.25** The proportion of different water uses by continent compared to world usage

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The amount of water used within a country varies considerably. Table 7.2 shows the 10 countries that use the most amount of water each year. According to this data, India and China use far more water than any other country. This is not surprising since these are the two most **populous** countries in the world. Table 7.3 shows the ten countries that use the most amount of water each day per capita. Per capita means per person. In this case, it refers to the average amount of water that each person uses in these countries every year. It is important to note that this is not only the amount that each person uses in their homes. The figure also takes into account all of the water used for agriculture (to supply the food we eat) and other industries (to supply products that we use).

KEY TERM

populous a place that has a lot of people living in it

▼ **Table 7.2** The ten countries that use the most water every year. Countries with more people use more water.

Country	Total yearly water used (km^3)
India	761
China	598
United States	444
Indonesia	223
Pakistan	184
Iran	93
Mexico	87
Philippines	85
Vietnam	82
Japan	81

Source: Worldometers website

▼ **Table 7.3** The ten countries that use the most water per capita each year

Country	Yearly water used per capita (m^3)
United States	1206.8
Canada	883.5
Belgium	883.49
Turkey	746.8
Mexico	704
Australia	703.12
Spain	670.3
Japan	623.9
Korea	517.4
China	439.7

Source: Statista website

ACTIVITY 7.3

Using information from figures and tables

Read the information about water use around the world and answer the following questions.

1. According to Figure 7.25, which continent uses the highest proportion of their water for agriculture? Which continent uses the lowest proportion for agriculture?
2. Suggest a reason for the differences between countries in the use of water for agriculture. Consider the climate, level of wealth and history of the places involved.
3. Refer to Table 7.2. Why do you think India, China and the United States use so much water each year compared to other countries?
4. Refer to Table 7.3. Where are many of the countries that use high amounts of water per capita located?
5. Why do you think the people in the regions identified in Question 4 use so much water?
6. Based on the differences you see in the lists in Tables 7.2 and 7.3, why is it important to always compare places based on per capita use, rather than just the total amounts that are used?

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DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 7.4

Factors causing a phenomenon

In geography, factors are the causes or reasons why something occurs. Geographers are interested in factors because they can help us to understand why something occurs and to try and predict what might happen in the future.

Factors are often ranked in order of their importance. This helps to determine the primary cause of a change and enables managers to allocate funds or develop strategies to tackle a change that causes a problem.

An example of this approach is bushfire management in Australia. Experts determine the factors that lead to bushfires, the spread of fire and the level of vulnerability for different communities. Governments use this information to determine the best course of action in reducing uncontrolled bushfires.

Figure 7.25, and Tables 7.2 and 7.3 present a variety of information about the use of water resources around the world. Look at this information and then answer the following questions.

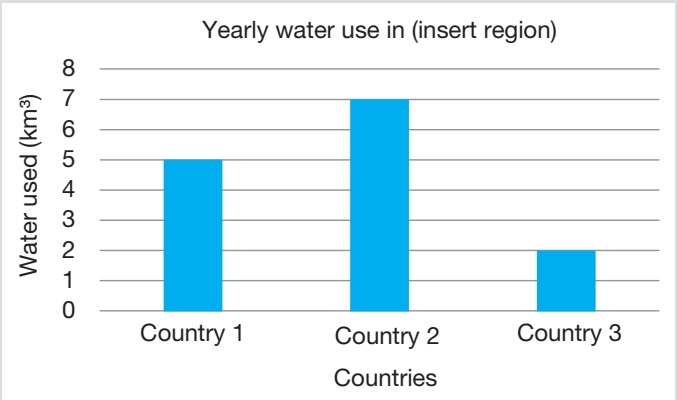
1. Choose one of these sources of information as the focus of this activity.
2. List at least three reasons why you think there might be variation between the places listed.
3. Rank these factors in order of importance.
4. Write a short paragraph justifying the reasons for your ranking.
5. Compare your answer with a classmate.

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 7.5

Drawing a bar graph

Bar graphs are a simple way to display and compare quantities. They allow us to see which values are greatest and how much variation there is between quantities.

The information in Tables 7.2 and 7.3 came from Worldometer and Statista. Look online for these websites (you can search for 'water and Worldometer' or 'water and Statista') and gather the data for all the countries in a region of your choice. For example, all of the countries in South America or Europe.



1. Have a look at the range of values. What are the largest and smallest values? This will help you to determine how high your graph axes have to go.
2. Draw a set of axes and label them. Your countries will go on the horizontal axis and the amount of water they use will go on the vertical axis.
3. Divide your vertical axis into even amounts. These should start from below your lowest value and go to above your highest value.
4. Add the names of your countries to the horizontal axis.
5. Draw your bars ensuring they are an even width and have a gap between them.
6. Add a title and legend to your graph.

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Agricultural water use

In most parts of the world, agriculture uses the most water resources. This is because water is used to grow all of the fruits, vegetables and grains that we eat. Water is also used to grow the food that is fed to animals, such as cows and sheep, and to domestic pets. Table 7.4 shows the amount of litres needed to grow one kilogram of a variety of different foods. Based on this information, it is clear that the food we choose to consume has a very large impact on the amount of water resources that are needed.

KEY TERMS

irrigation the practice of supplying land with water so that crops and plants will grow

pasture grass or similar plants suitable for animals, such as cows and sheep, to eat

infertile land or soil that is not good enough for plants or crops to grow well there

availability how easily people can access a service or facility

▼ **Table 7.4** The amount of water needed to grow one kilogram of different types of food.

Food (1 kg)	Water use (litres)
Bread	1608
Chocolate	17196
Beef	15415
Chicken	4325
Rice	2497
Apples	822
Cheese	3178
Potatoes	287

▲ **Figure 7.26** This photograph shows a very labour-intensive form of irrigation in Nha Trang, Vietnam

Irrigation

Irrigation is defined as the artificial application of water to land for the purpose of agricultural production. In other words, irrigation refers to the watering of crops on a farm. The water used for irrigation is taken from surface water resources, such as rivers, lakes and reservoirs, and groundwater supplies. The benefits of irrigation include the ability to:

- Grow a higher quality and greater quantity of crops and **pasture**
- Choose when and how much water crops are given to maximise growth
- Grow crops even during periods with low or no rainfall
- Use land for agriculture that would have otherwise been too dry or **infertile**
- Stimulate local economies by providing jobs in labour; agricultural science; and the processing, packaging and transporting of products.

There are several different types of irrigation. Some of these are presented in Table 7.5. The choice of irrigation types for farmers will depend on the amount of water available, the amount of water needed, the soil type, the types of crops grown, the shape of the landscape and the local climate. The choice of which irrigation type to use also varies considerably across the world because of the **availability** of technology and money to purchase equipment.

▼ **Table 7.5** Three of the main types of irrigation.

Irrigation type	Description
Furrow	A series of small, shallow channels to guide water down a slope across a paddock
Sprinklers	Sprinkler systems that spray water over the land; some are fixed in position while others are mounted on wheels or a trailer to move across the landscape
Drip	Tubes placed above or below the soil's surface, which have holes that frequently drip small amounts of water onto the soil

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▲ **Figure 7.27** These large sprinkler systems are moving across a farm in Utah, United States

Although irrigated farmland covers less than 1 per cent of Australia, it produces 30 per cent of all of our agricultural products. Irrigated farmland also uses 90 per cent of the total amount of water resources used by agriculture. There are 40 000 farmers who use irrigation and many more employed in related industries. Altogether this contributes to around $10 billion of the Australian economy each year.

Australia's irrigation industry is highly regulated. Farmers are issued with irrigation licenses and are allocated an amount of water that they are able to extract from surface and groundwater supplies. This regulation aims to ensure that irrigation is sustainable.

Impacts of irrigation

Despite the numerous benefits of irrigation and its regulation, there are several negative impacts associated with it. Allocating water resources is a balance between agricultural, domestic and environmental needs. If too much water is extracted for irrigation, less is available for **rural** towns and their domestic needs. Extracting water from river systems can also prevent rivers from supplying water to wetlands, which can lead to the loss of vegetation and damage vital **habitats**.

KEY TERMS
rural an area in the countryside that is not part of a large town or city
habitat the natural environment where an animal or plant usually lives

▼ **Figure 7.28** Irrigation can allow crops to be grown in places that would otherwise be barren, like what is shown here in Wadi Rum, Jordan

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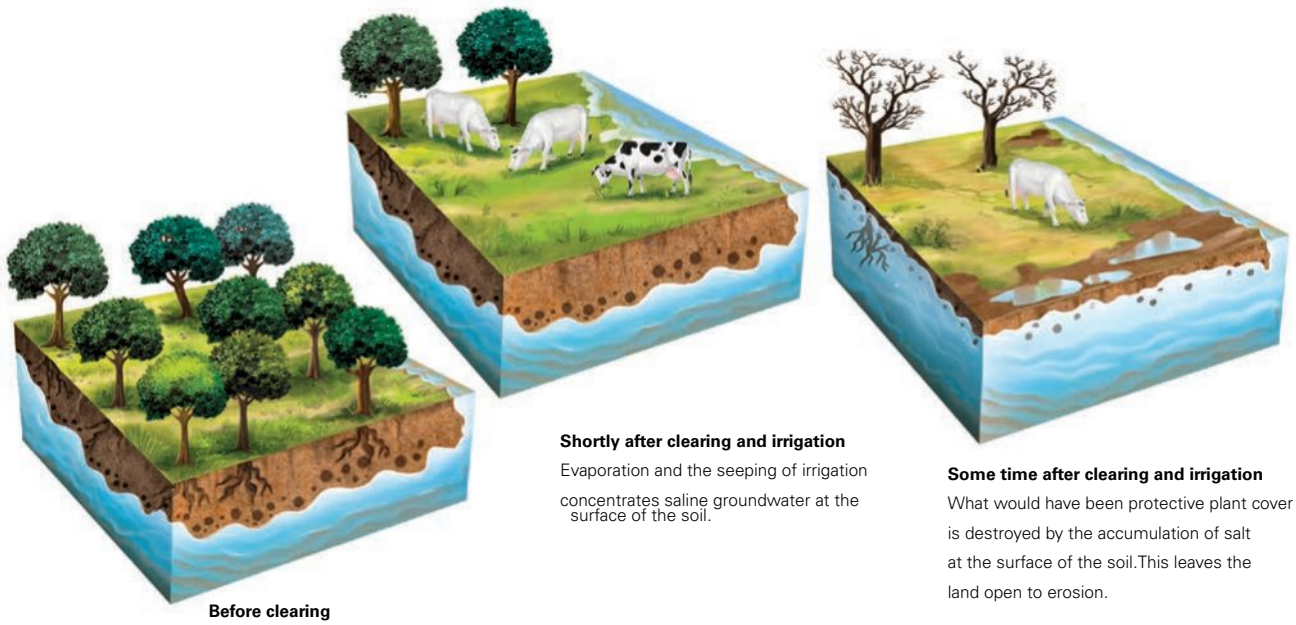


Before clearing
The system is balanced and most of rainwater is used in the spot where it falls.

Shortly after clearing and irrigation
Evaporation and the seeping of irrigation concentrates saline groundwater at the surface of the soil.

Some time after clearing and irrigation
What would have been protective plant cover is destroyed by the accumulation of salt at the surface of the soil.This leaves the land open to erosion.

▲ **Figure 7.29** Excessive irrigation, together with land clearing, can contribute to salinity in the soil

KEY TERMS

salinity the amount of salt contained in something

percolation the process of a liquid moving slowly through a substance that has very small holes in it

topsoil the soil that forms the top layer of ground where plants grow

erosion a process that gradually wears away and removes rock, soil and sediment by wind or water

Another common impact of irrigation is salinity. **Salinity** refers to an increase in the amount of salt that is in soil. Since salt is toxic to most plants, this can kill local vegetation. As shown in Figure 7.29, in a forested area, tree roots soak up groundwater supplies, keeping them at a low level. Removing trees and irrigating the land causes the groundwater level to rise. As water rises, it passes through soil and rock, which is a process known as **percolation**. As it does this, salt that is present in lower levels is dissolved in the water and transported to the surface. This increases the amount of salt in the layer of **topsoil** where crops are grown. As the vegetation dies, the topsoil becomes exposed to **erosion** from wind and rainfall, leading to a loss of topsoil. This process in irrigation can turn a thriving farm or forest into a barren wasteland.

Domestic water use

Domestic water use refers to the ways in which we use water in and around our homes. This includes drinking, cooking, flushing toilets, showering and watering the garden.

▼ **Figure 7.30** The clearing of land to grow wheat has led to salinity in Lake Taarblin in Western Australia

Table 7.6 lists some of the common domestic uses of water and the amount of water each activity consumes.

The amount of water used for domestic purposes per person varies significantly across the world. As shown in Figure 7.31, Australia uses more domestic water per person than anywhere else in the world. This is likely to be because Australia is also the driest inhabited continent.

▼ **Table 7.6** A list of common domestic water uses and the amount of water they consume.

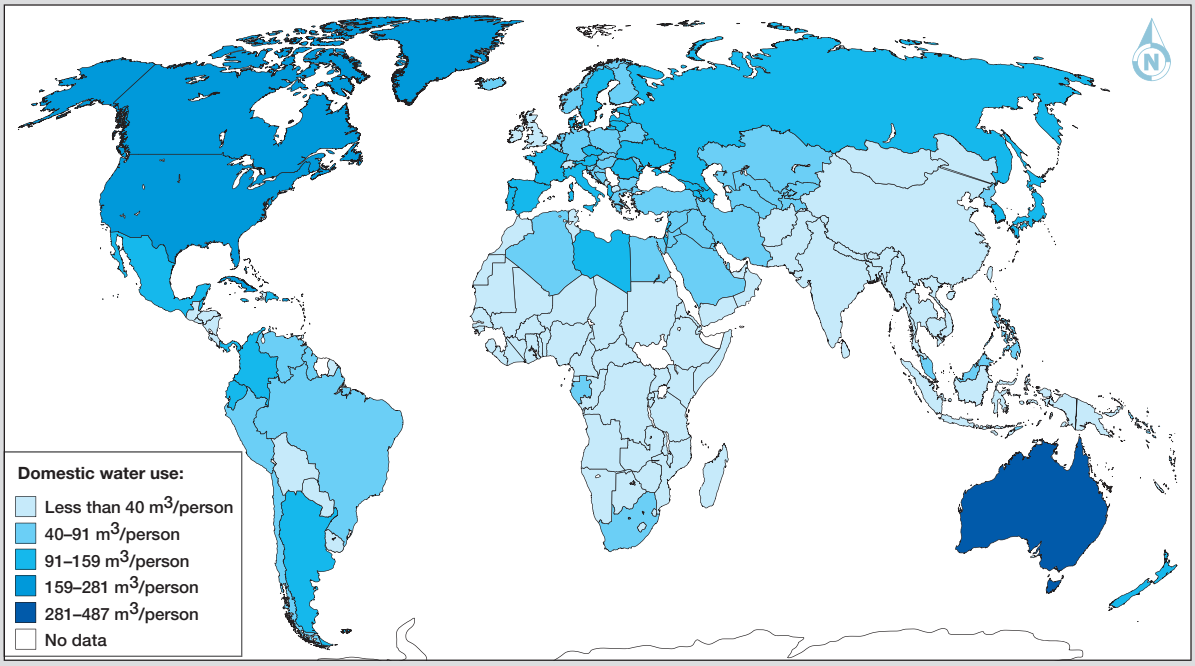
Domestic water use	Water consumed (litres)
Toilet flush	12
Bath	100
Shower (10 minutes)	200
Dishwasher load	50
Washing machine load	150
Brushing teeth with tap running	5
Drinking, cooking and cleaning per day	10
Hand basin per use	5
Garden sprinkler per hour	1000
Car washing with hose	200
Hosing driveway	100

Source: Riverina Water County Council website

ACTIVITY 7.4

Reading information from maps

Refer to Figure 7.31 and answer the questions that follow.



▲ **Figure 7.31** The amount of domestic water use per person across the world by year (this is shown in cubic metres per person)

1 Besides Australia, which region of the world uses the most amount of water for domestic purposes each year?
2 Which region uses the least amount of water?
3 Suggest a reason for your answers to Questions 1 and 2. Consider the region's access to technology, wealth and lifestyles.

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KEY TERM
stormwater excessive water runoff from rain and snow after a storm

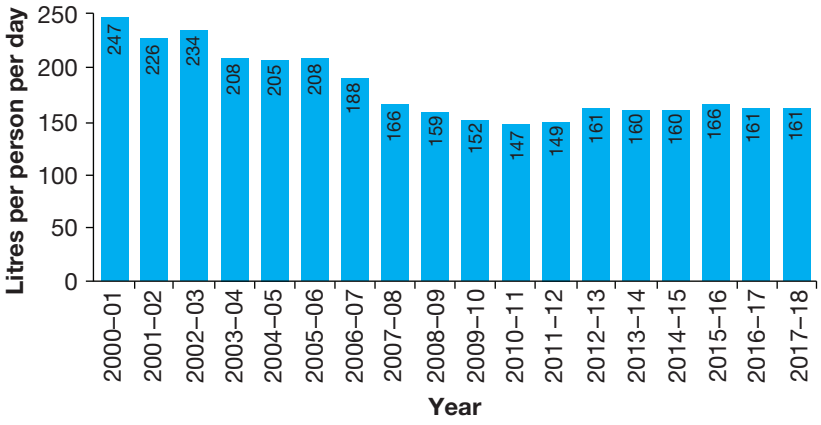
Other factors that determine the amount of domestic water use include the efficiency of appliances, such as washing machines and shower heads. Also, whether alternative supplies of water, such as rainwater, **stormwater** and wastewater, are recycled affects the amount of domestic water that is used.

Target 155

Melbourne Water is a Victorian government authority that manages Melbourne's domestic water supply. The authority also manages sewage, local waterways (such as rivers and creeks) and water works to reduce the impacts of local floods. Melbourne's population is growing at a faster rate than any other place in Australia, so Melbourne Water wants to ensure that its domestic water supply can continue to support the population.

Melbourne Water has developed a program called Target 155, which encourages Melburnians to limit their water consumption to just 155 litres per person per day. As part of this program, Melbourne Water offer suggestions about how to reduce water consumption in all areas of the home. Although this target has not yet been met, the average Melburnian used just 162 litres per day during 2019.

▲ **Figure 7.32** Melbourne Water's Target 155 campaign seeks to ensure Melbourne's water consumption is sustainable



◄ **Figure 7.33** Melbourne's use of water per person (residential, not in business)
Source: Melbourne Water

ACTIVITY 7.5

How to save water

Read the information about domestic water use, then answer the questions that follow.

1. Have a look at one of the water bills for your household. What is your average water use per person?
2. Visit the Target 155 webpage on Melbourne Water's website and click on Smart Water Advice. Which of the suggestions that Melbourne Water gives do you already do in your household? Which of the suggestions do you think you could try in future?
3. Based on the trend shown in Figure 7.33, do you think Melbourne will reach its 155 litre target and, if so, in which year?

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Managing water supplies

To ensure there is enough water to meet agricultural, domestic and industrial needs, water resources require management. This involves the use of technology to access available and potential sources, as well as the construction of reservoirs and dams to store large quantities of water.

Reservoirs and dams

Reservoirs are large natural or **artificial** lakes that are used to store a large quantity of water. In order to store water, the flow of rivers is stopped using a dam. Dams are barriers that prevent the flow of water downstream through the use of a wall. Dams have gates that can be opened to allow excess water to be released. By controlling the flow of rivers, dams can also be used to stop floods and to generate **hydroelectricity**.

Melbourne's largest reservoir is the Thomson Reservoir, which has a capacity of 1068 **gigalitres**. This is tiny compared to the Kariba Dam between Zambia and Zimbabwe, which can store 180 000 gigalitres!

KEY TERMS

artificial made by people, often as a copy of something natural

hydroelectricity electricity produced by the force of fast-moving water such as rivers or waterfalls

gigalitres a gigalitre is exactly one billion litres

Despite their usefulness, dams lead to a number of environmental consequences. They alter the natural flow of rivers and streams, and that impacts on river ecosystems. Fish that need to migrate up and downstream to feed and breed are unable to cross barriers. This has led to the extinction of many species. Altering a river's natural flow can also affect water temperature and water quality. This impacts on food networks, and the growth and reproduction of a variety of plants and animals.

While dams can prevent downstream cities and towns from flooding, they also stop natural flood events, which are an essential process that helps to maintain the health of floodplains, forests and wetlands. Dams also stop small particles known as sediment from flowing downstream, which is needed to maintain downstream habitats.

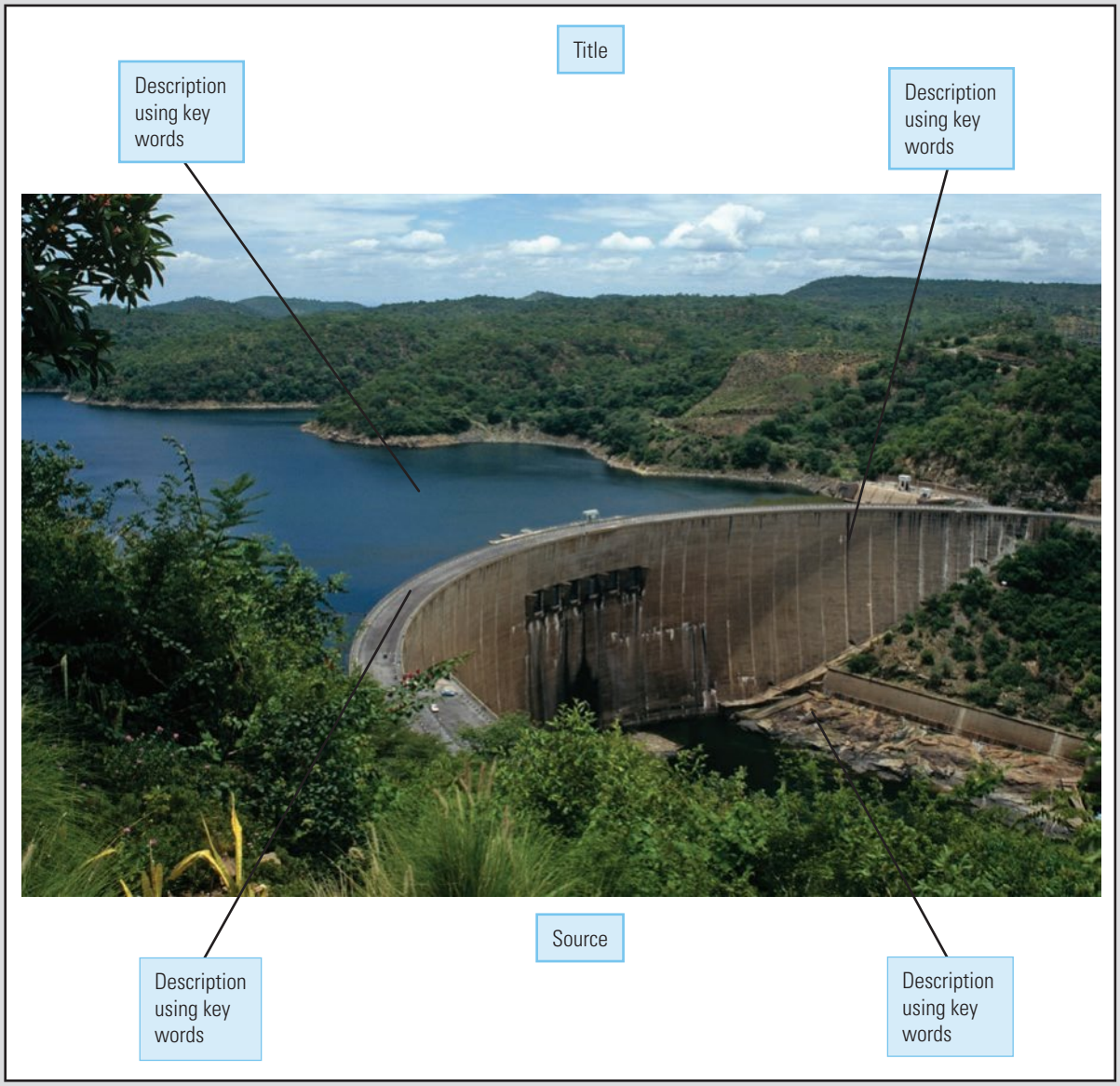
▼ **Figure 7.34** The Kariba Dam is 128 metres tall and 579 metres long

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 7.6

Annotating a photo

An annotated photograph is a photograph that has been labelled with names and descriptions. This can be done by hand or digitally. Geographers use annotated photos to demonstrate their observations from photos taken out in the field. They use annotated photographs to demonstrate specific features, processes or impacts. Create your own annotated photograph by following these steps:

1. Find a photograph of a dam using Google Images.
2. Print your photograph or copy it into a graphics editing program.
3. Add lines leading to specific features of the photograph that you wish to describe. Do not use arrows to label features because arrows indicate movement.
4. Add key words and short descriptions to demonstrate the features and purposes of a dam, as well as some of their environmental consequences.
5. Add a title and source to your annotated photograph.



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END-OF-SECTION REVIEW 7.3

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 Define the following terms:
- Withdrawals
- Agriculture
- Per capita
- Factors
- Infertile
- Irrigation
- Salinity
- Reservoir
- Dam.

2 How much of the rainfall that reaches the Earth flows into rivers and groundwater each year?

3 What proportion of the water in rivers and groundwater is used for agriculture?

4 Explain the difference between agricultural and domestic water use. Provide examples in your explanation.

Interpret

5 Explain why countries where people use the most amount of water per capita are not necessarily the same countries that use the largest amount of water in total.

6 Describe how using too much water for irrigation can lead to salinity.

7 Consider the way water is used in your school and suggest three ways that water could be used more sustainably.

Argue

8 Due to their environmental impacts, the construction of dams is often controversial. Summarise in a paragraph the reasons why dams are constructed and their negative impacts. Based on this information, discuss whether you think Australia should construct more dams rather than using alternative water resources. You can refer to Figure 7.35 in your answer.

◄ **Figure 7.35** Regulating the flow of rivers can be used to generate electricity. The Snowy Mountains Hydro Scheme has 10 turbine generators and each one can generate enough electricity to power 95 000 homes.

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7.4 Water as an interconnection

FOCUS QUESTION

What role does water play in connecting environments and places?

KEY TERM
interconnection the relationship between places and people, and the ways in which they influence each other

In geography, **interconnection** refers to the links and relationships between objects and places. People often play an important role in these links as human activities often impact and change natural processes. As water transforms through the water cycle, it plays a significant role in connecting places and changing a area's characteristics.

The flow of rivers downstream provides important links between places. These connections vary in scale from small urban creeks to rivers that flow across several countries. For example, the Dandenong Creek in Melbourne's east flows from the Dandenong Ranges in Olinda. Then it continues south and south-west for 53 kilometres until it meets the Eumemmerring Creek, which flows into the Patterson River. In contrast, the Mekong River is one of the largest rivers in the world and flows 4350 kilometres through China, Myanmar, Thailand, Laos, Cambodia and Vietnam.

Trade and transport

In larger river systems, rivers have been, and still are, a major source of transport and vehicle for trade. In 1853, paddle steamers became a form of inland transport and trade along the Murray River. While the common cargo was once bales of wool, today these paddle steamers carry tourists up and down the river in places like Mildura and Echuca. The Mississippi River is the second largest river in the world and is a significant part of trade in the United States. The barges there transport items like petroleum, iron, steel, grain, paper and wood to various ports.

Amazing but true …

The Port of South Louisiana ships 500 million tonnes of goods each year!

▼ **Figure 7.36** Paddle steamers, such as the *PS Emmylou*, operate as a tourist attraction in Echuca, which is on the border between Victoria and New South Wales

▼ **Figure 7.37** Oil tankers and barges are essential to the local economy in the Mississippi basin

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Water moving through environments

Water can take many forms as it flows through different environments. In Bhutan, the water source for many villages comes from glaciers located tens or even hundreds of kilometres away. Glaciers are frozen rivers of ice that form when snow accumulates and is compacted. This usually occurs in mountainous regions. When ice from Bhutan's glaciers melts, water flows into rivers and downstream to villages. People then use this water for agriculture, which is the main industry in Bhutan.

▲ **Figure 7.38** Northern Bhutan is dominated by tall mountains and glaciers that make up part of the Himalayas

▲ **Figure 7.39** Ice from Bhutan's melting glaciers flows into rivers

▲ **Figure 7.40** Water from Bhutan's rivers supplies the villages with water to use for agriculture

The amount of water available for people living in downstream regions of a river system depends on the amount extracted from the upstream users. If users upstream withdraw too much water, the quantity of downstream supplies is reduced. Furthermore, if pollution is added to a river upstream, it can damage the quality of downstream supplies. Pollution in this context includes industrial waste from factories or mining operations, and fertilisers and pesticides from farm use, which gets washed into waterways when it rains.

In the case of the Mekong River, the **exploitation** of water resources in upstream countries, such as China and Laos, is causing havoc for Cambodia. Cambodia is heavily reliant on the Mekong River for agriculture, as it provides 85 per cent of the agricultural water supply. The fishing industry, which makes up 12 per cent of Cambodia's economy, also relies on a healthy river flow to support 500 local species of fish.

KEY TERMS

exploitation the use of something in order to get an advantage from it

tributaries rivers or streams that flow into a larger river or a lake

nutrients any substance that plants or animals need in order to live and grow

However, since the 1990s, the river and its **tributaries** have been dammed throughout South-East Asia, largely for the generation of hydropower. These dams have blocked the movement of fish, reduced the amount of **nutrients** in the water, and have made water levels downstream irregular and unnatural. Furthermore, in cases where these dams have collapsed, downstream communities have been flooded. Villagers in Cambodia that rely on the Mekong River are losing their livelihoods and are being forced to change their lifestyles due to the actions of people hundreds of kilometres away.

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▲ **Figure 7.41** Cambodia's fishing industry is in crisis as water levels in the Mekong River have hit record lows

▲ **Figure 7.42** In 2018, thousands of villagers in Cambodia were left stranded when a collapsed dam in Laos sent floodwaters hundreds of kilometres downstream

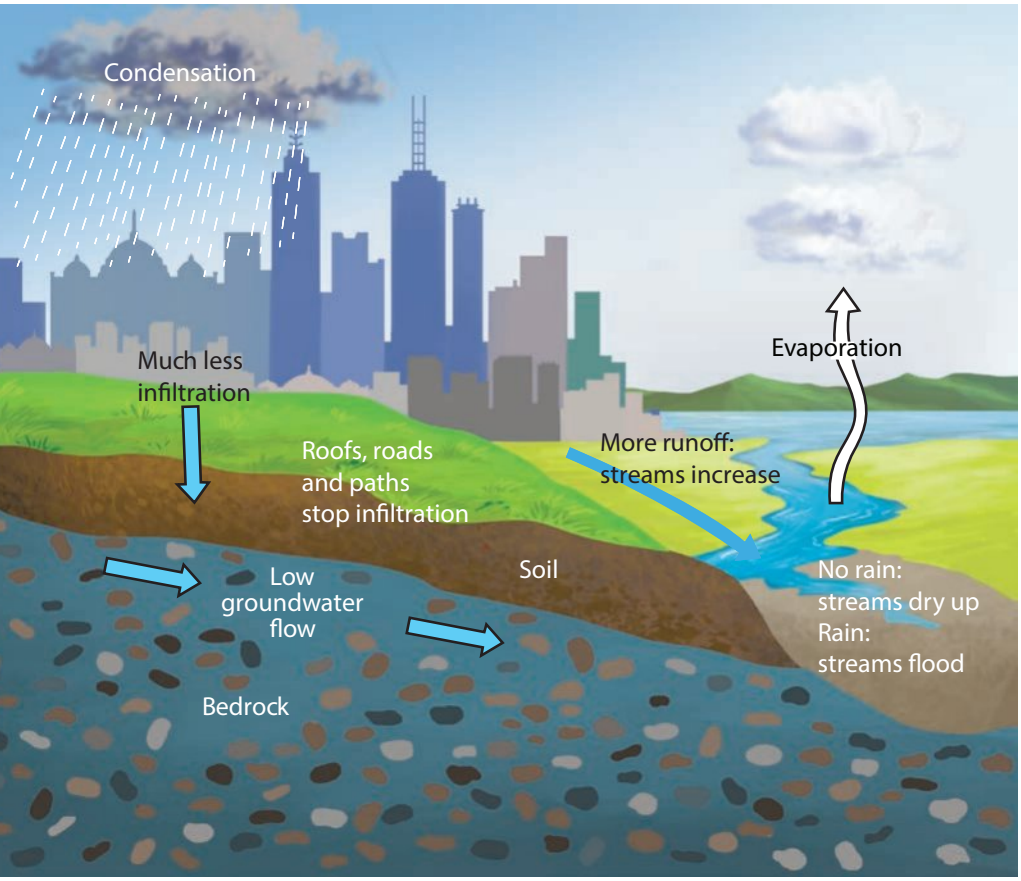
KEY TERMS

urban relating to towns and cities

hard surfaces human-made surfaces, such as concrete, which cover the natural ground and limit the amount of water that can infiltrate the soil to become groundwater

The urban water cycle

The development of **urban** environments involves the change of a natural environment to one that is artificial. This typically involves the removal of trees and other vegetation, as well as the construction of houses, buildings, roads and footpaths. Although this development is necessary to house a growing population, it can completely transform the way water moves through an environment. In these human environments, rather than following the natural water cycle (see Figure 7.15), water follows the urban water cycle (see Figure 7.43).



In the natural water cycle, water infiltrates the soil and maintains groundwater supplies. In urban areas, there is far less exposed soil. The landscape in an urban environment is dominated by **hard surfaces**. These are surfaces like concrete where no water can penetrate. Therefore, much less water infiltrates into the soil and groundwater in an urban environment, and far more flows as runoff. The runoff can lead to increases in flooding and in the amount of pollutants entering local rivers.

◄ **Figure 7.43** The urban water cycle

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ACTIVITY 7.6

The natural water cycle versus the urban water cycle

Compare Figures 7.15 and 7.43, then answer the following questions.

1. What major differences are there between the movement of water in the natural and urban water cycles?
2. What impacts do you think these differences will have on the local environment in an urban area?
3. One way to reduce the impact of urban development on local waterways is to construct raingardens. Visit Melbourne Water's website and learn about the benefits of using raingardens to treat stormwater. Investigate whether or not a raingarden would be suitable to construct outside your home or school.

▲ **Figure 7.44** Stormwater runoff is directed into this raingardens like this one so that water can filter into the ground rather than flooding local creeks

END-OF-SECTION REVIEW 7.4

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1. List two examples of how water is or has been used for trade and transport.
2. Describe the way in which water connects villagers to the glaciers in Bhutan.
3. State some ways in which water use in the upstream countries of the Mekong River have impacted villagers in Cambodia.

Interpret

4. Explain what interconnection means and provide at least two examples.
5. Describe how urban development changes the water cycle and how this can impact on water resources.

Argue

6. Discuss the ways in which water creates an interconnection between places, environments and people. In your discussion, refer to examples provided throughout the chapter or find your own.

Digital quiz
Please see the Interactive Textbook to access digital activities

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Making thinking visible

Circle of viewpoints

Turning wastewater into potable water is seen by some as a necessity and by others as an absolute last resort. Consider a situation where the Victorian Government decided to start recycling Melbourne's wastewater. Choose a perspective from the following list:

- The premier of Victoria
- A government authority, such as Melbourne Water
- The owner of a Melbourne business that needs a large water supply
- A local resident.

Use the following sentence stems to explore this topic.

I am thinking of turning wastewater into potable water from the point of view of …

I think turning wastewater into potable water is …

A question I have from this viewpoint is …

3 Research tasks

Choose one of the examples provided in this chapter to study water as an environmental resource more thoroughly. Develop a research question, and research additional detail and statistics to answer the question. Then, present your findings in a report.

Some ideas are given here:

- Is solar, wind, fossil fuel or nuclear energy a sustainable option for the future of energy production?
- What are the impacts of salinity in Australia? Find out how much of Australia is affected, the main causes of the problem and the ways that Australians are trying to reduce the impacts.
- To what extent are dams in Australia or elsewhere in the world impacting the environment, people and local economies?
- What are some of the specific impacts of the management of the Mekong River in downstream communities? Is this likely to change in the future? How could the river system be managed more sustainably?

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4 Extended-response question

Claim: *Water resources are renewable yet finite. Sustainable management of this environmental resource is needed to ensure that people, the environment and the economy are not negatively impacted.*

Discuss whether you agree with this statement. In your response, refer to the types of water resources in specific places, the impacts associated with water supplies and the ways that water is managed in the area.

5 Problem-solving task

As the global population continues to grow, domestic water use places an increased pressure on water supplies. Either research a modern technology that reduces domestic water use or design your own. Discuss how this technology works and how it could be incorporated into existing houses in Australia.

6 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about water resources

▼ **Figure 7.45** A dam built in Laos in 2019 reduced the flow of the Mekong River in downstream regions, which impacted the lives of local villagers and destroyed the river's diverse ecosystems.

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CHAPTER 8

Some of the places mentioned in this chapter are territories whose control is disputed by Israel and Palestine. No disrespect is intended.

Water scarcity and management

Setting the scene: a human-made disaster leaves a city without water

Chennai is gaining notoriety as the disaster capital of the world – floods one year, cyclone the next and drought the year after.

Nityanand Jayaraman, BBC

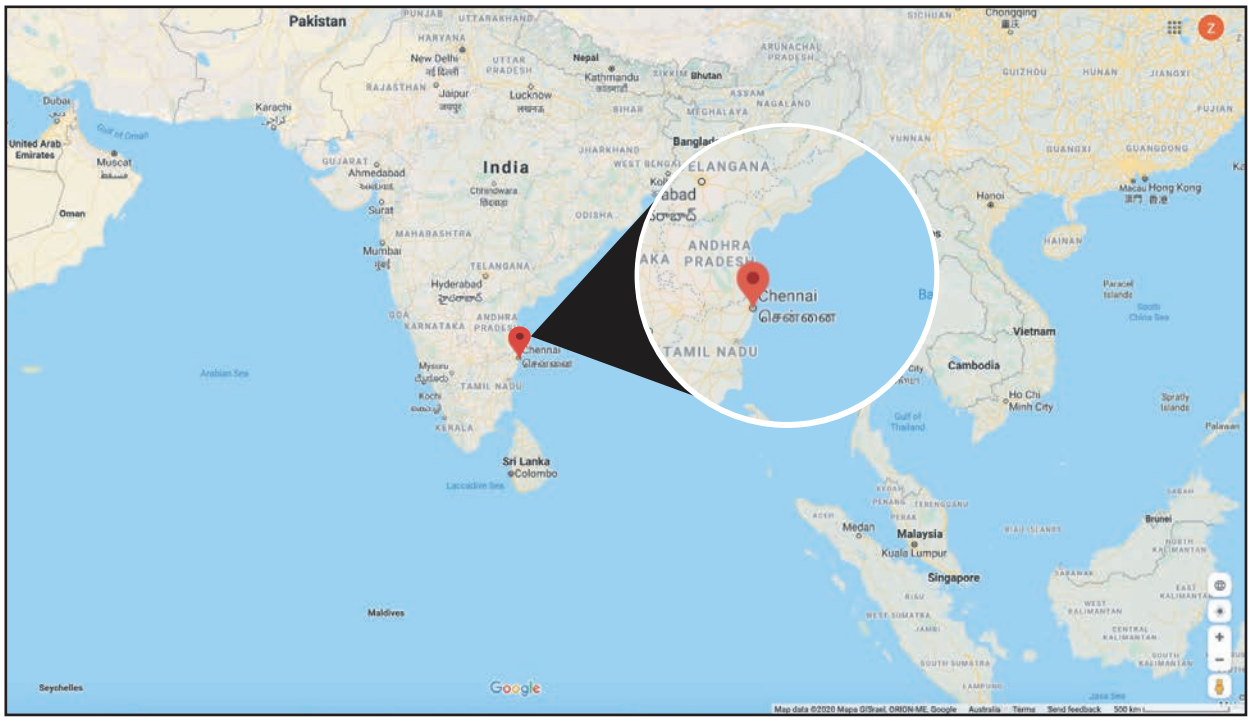
With a population of over nine million people, Chennai is the sixth-largest city in India. This bustling city is also one of India's most visited tourist destinations and a centre for many technological industries. However, in 2019, Chennai ran out of water, which led to a range of disastrous social and economic consequences.

KEY TERM

wetlands an environment featuring land that is either permanently or seasonally covered with water

Between 1980 and 2010, Chennai experienced rapid growth. Almost 400 square kilometres of buildings were constructed in areas that were once **wetlands**. This completely changed the flow of water throughout the location, because less water was able to infiltrate into the groundwater supplies. Meanwhile, the population had grown considerably, which increased demand for the groundwater resources.

▼ **Figure 8.1** Chennai is located on the south-east coast of India



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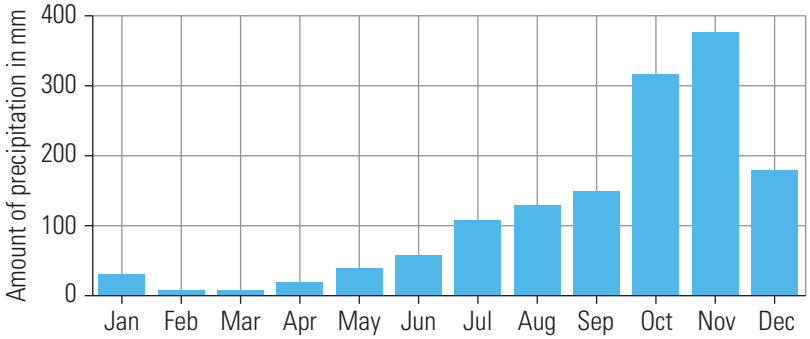


◄ **Figure 8.2** This graph shows the average monthly rainfall in Chennai

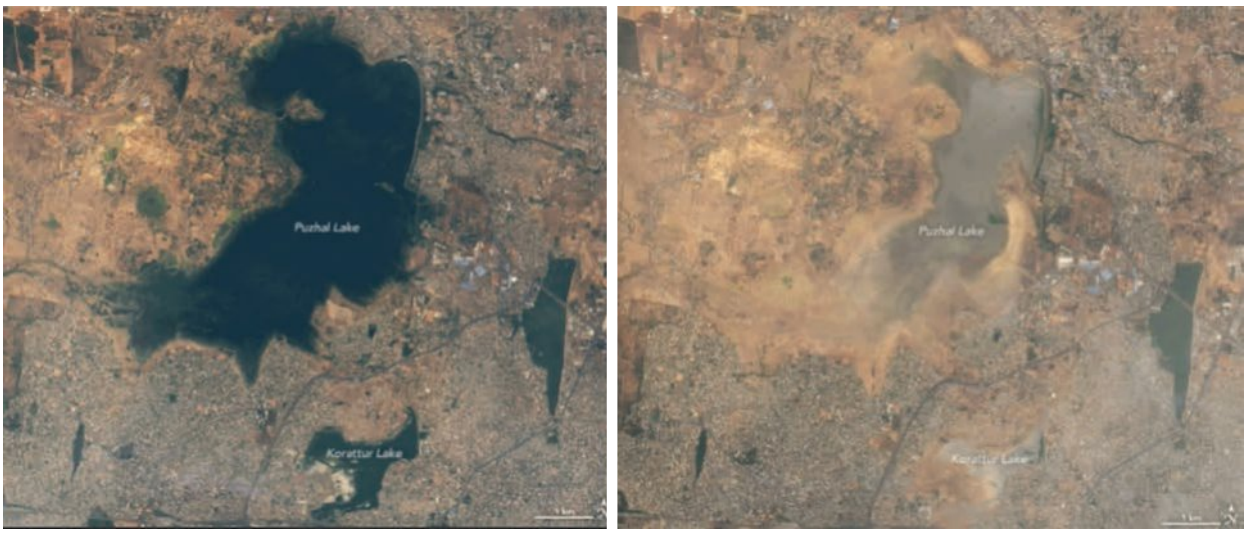
Unchecked growth in construction, and pollution from various industries and coal power stations, led to the **degradation** of many of the remaining wetlands and rivers. Some of these areas were even turned into rubbish tips. This meant that many surface-water supplies were no longer useable in Chennai. On top of this, Chennai relies on heavy rainfall during the **monsoon** season in October and November (see Figure 8.2). This rainfall is unpredictable and is so heavy in some years that the city experiences severe flooding. However, in other years, such as 2018 and 2019, rain does not come.

In June 2019, after extended periods of low rainfall, soaring temperatures and poor water management, there was a water crisis in Chennai. Chennai reached 'day zero' and ran out of water. The city's four main reservoirs were empty. Millions of residents were forced to wait in line at public pumps for hours to access enough water to get through each day. People in Chennai struggled to maintain basic levels

KEY TERMS

degradation the reduction in the quality and health of a natural environment due to natural processes or human activities

monsoon the seasonal changes in atmospheric wind circulation and precipitation



▲ **Figure 8.3** Puzhal Reservoir is one of the four major reservoirs in Chennai. This satellite imagery from NASA shows that it dried up completely between May 2018 (left) and June 2019 (right).

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▲ **Figure 8.4** In June 2019, workers withdrew the remaining water from the Puzhal Reservoir

of hygiene as they were unable to wash their clothes, dishes or themselves. Restaurants, businesses and schools were forced to close, and hospitals had to reduce their staff and turn patients away. Many people had no other choice but to leave their homes and seek refuge in nearby cities. Throughout the city there was a feeling of helplessness as people waited for rain to come.

As a temporary solution to Chennai's water crisis, the Indian government used trucks to bring thousands of water tankers into the city. In addition, the government organised a train to bring 2.5 million litres of water each day from the Kaveri River, which is 216 kilometres away from Chennai. However, these supplies were only enough for roughly half of the population. While the wealthy were able to pay extraordinary prices for water from private tankers, the poor living in slums were less fortunate.

▲ **Figure 8.5** People living in dense urban settlements lined up for hours to collect their daily water from tankers in Chennai

Heavy rainfall in late 2019 filled 30 per cent of the reservoirs and ended Chennai's water crisis. However, Chennai is still extremely vulnerable to future water shortages.

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To ensure this water-shortage disaster is not repeated, various experts have recommended that Chennai do the following:

- Increase the amount of rainwater that is harvested from the roofs of buildings
- Construct a pipeline that allows it to access water from nearby areas
- Restore and conserve its rivers, lakes and wetlands
- Build multiple desalination and wastewater treatment plants.

Overall, people in Chennai will need to ensure that their water use and its management is sustainable to prevent future disasters. Further, the current rate of urban growth needs to be slowed and water extraction from groundwater has to be reduced to ensure water supplies are maintained. On a national scale, India needs to ensure it manages its water resources sustainably throughout the entire country. Twenty-one cities, including Bangalore, Hyderabad and Delhi, are all facing similar risks of running out of groundwater over the next few years. This means that 600 million people throughout the country are likely to face water scarcity in the future. India is not alone in its struggles with water management, with similar issues in water shortage facing Morocco, Iraq, Spain and South Africa.

▲ **Figure 8.6** This young girl was one of many citizens of Chennai who recognised the need for sustainable water management rather than just a temporary solution

MAKING THINKING VISIBLE 8.1

Headlines

Write a newspaper headline summarising the water crisis in Chennai. Which aspect of this case study is the most important?

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Chapter overview

Introduction

As the global population continues to grow, there is an increasing demand for water resources. In many places, water scarcity is a serious issue that can potentially lead to disastrous consequences. Each situation is unique and requires a range of management strategies to ensure water use is sustainable. This chapter explores the issue of water scarcity and provides several examples on how water scarcity is managed. It also looks at the way different people in different cultures are linked to water and the significance of water within these societies.

Learning goals

After completing this chapter, you should be able to answer these questions:

- How are water resources distributed around the world?
- How do Australia's water resources compare to other countries?
- What is water scarcity and what factors lead to it?
- How is water scarcity managed?
- How is water managed in Australia's Murray–Darling Basin?
- How can desalination, water recycling and efficient irrigation help to manage water scarcity?
- What role does water play in the spiritual, economic and cultural life of people in Australia and around the world?

Geographical skills

After completing this chapter, you should have practised the following geographical skills:

- Explain processes that influence the characteristics of places
- Identify, analyse, and explain spatial distributions and patterns, as well as identify and explain their implications
- Identify, analyse and explain interconnections within places and between places, and identify and explain changes resulting from these interconnections
- Collect and record relevant geographical data and information from useful primary and secondary sources, using ethical protocols
- Select and represent data and information in different forms, including constructing appropriate maps at different scales that conform to cartographic conventions, using digital and spatial technologies as appropriate
- Analyse maps and other geographical data and information, using digital and spatial technologies as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology.

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8.1 Water resources around the world

FOCUS QUESTIONS

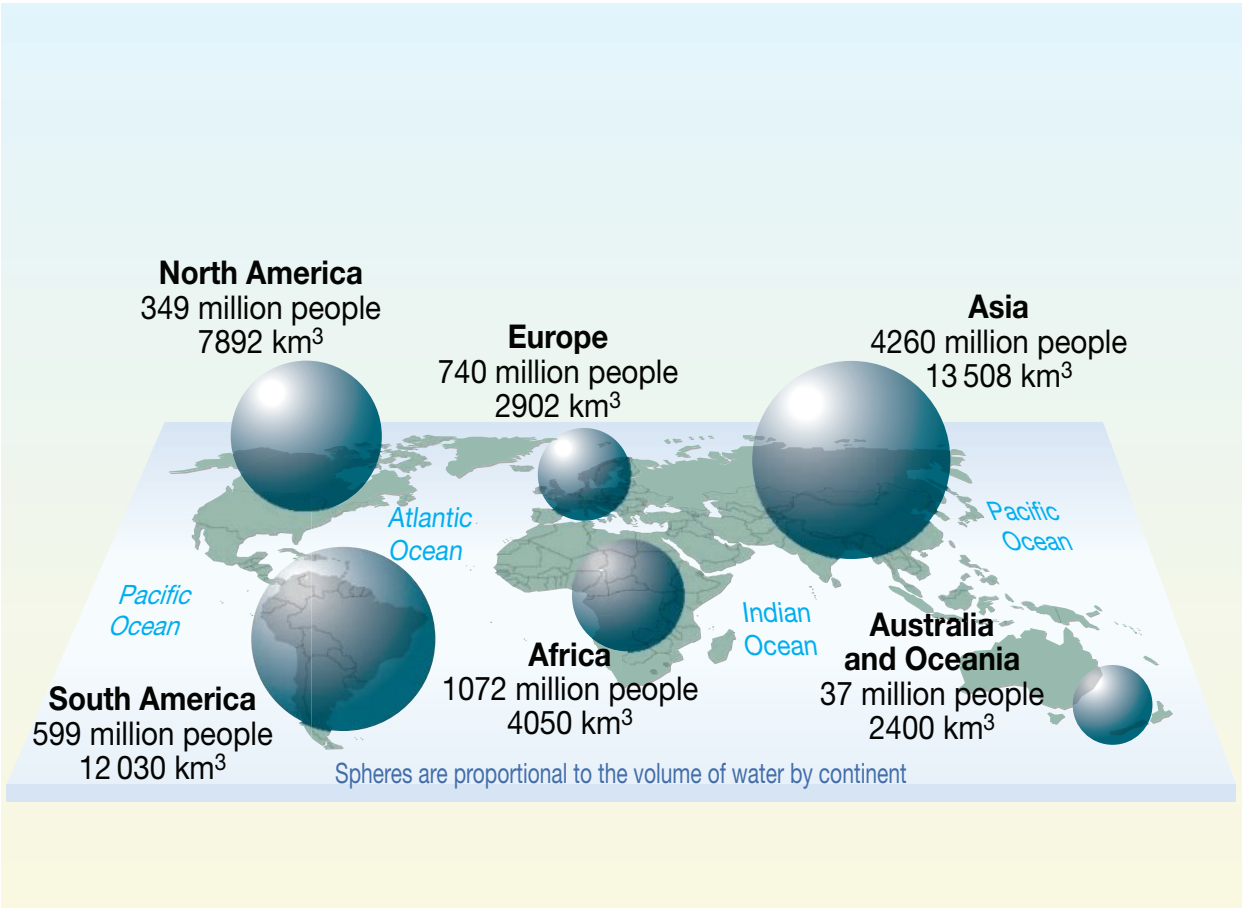
- How are water resources distributed around the world?
- How do Australia's water resources compare to other countries?

The driest place on earth is the McMurdo Dry Valleys in Antarctica. This region has not had any rainfall for nearly two million years. The Atacama Desert in Peru and Chile is also extremely dry. Some parts of this desert average less than one millimetre of rain each year. In contrast, the wettest place on Earth is Māwsynrām in north-eastern India. The village receives an average of 11 871 mm of rain each year. To put this in perspective, the average annual rainfall in Melbourne is 531 mm. These differences in rainfall, as well the physical features of a landscape and the ways in which water is managed, lead to a wide variation in the types and quantity of water resources around the world.

The global distribution of water resources

KEY TERM
abundance the amount of something that is found in a specific location

Water resources include all forms of water that can be used by people. This includes surface-water supplies (such as wetlands, rivers, lakes and reservoirs), groundwater supplies and water that melts from glaciers. Figure 8.7 shows the **abundance** of freshwater resources.



▲ **Figure 8.7** Freshwater resources available in each continent, showing the annual average volume

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KEY TERMS

ice sheet a thick layer of ice covering a large area of land for a long period of time

polar regions areas near the north and south poles

Approximately 10 per cent of the Earth's land is covered in glaciers and **ice sheets**. Around 96 per cent of this frozen water is located in the **polar regions**, especially in Antarctica. Besides ice, the second largest water resource is groundwater. All continents have a large supply, but there are variations within these regions. Although surface water resources are easy to access, they are in far shorter supply, especially in Australia.

Table 8.1 shows the total amount of renewable freshwater that is added to surface and groundwater supplies each year. It is called renewable because it renews (i.e. adds) to existing supplies.

The amount of renewable freshwater added each year is largely based on the amount of precipitation that falls in a region.

▼ **Table 8.1** The amount of freshwater added to different regions each year

Region	Renewable freshwater resources (km^3/year)
South America	12 724
North America	6 077
Eastern Europe	4 448
Sub-saharan Africa	3 884
East Asia	3 410
Western and Central Europe	2 129
South Asia	1 935
Oceania*	902
Central America and Caribbean	735
Middle East	484
Central Asia	242
Northern Africa	47
World	42 810

* Australasia, Melanesia, Micronesia and Polynesia

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 8.1

Representing data on a thematic map

Geographers use maps to represent information spatially. This can highlight trends and reveal connections between the physical and human environments. Thematic maps are used to represent a specific theme or subject area, such as the amount of water available in different regions.

1 Using the data in Table 8.1 and a blank map of the world, create a thematic map showing the amount of renewable freshwater supplies added to different world regions each year. Represent the data using different sized circles, like what is shown in Figure 8.7. This presentation will require you to add a legend to your map to show what values the different circles represent.

2 Ensure that your map contains all of the BOLTSS mapping conventions:
- Border
- Orientation
- Legend
- Title
- Source
- Scale.

3 Use your map to describe which parts of the world have a reliable renewable source of water.

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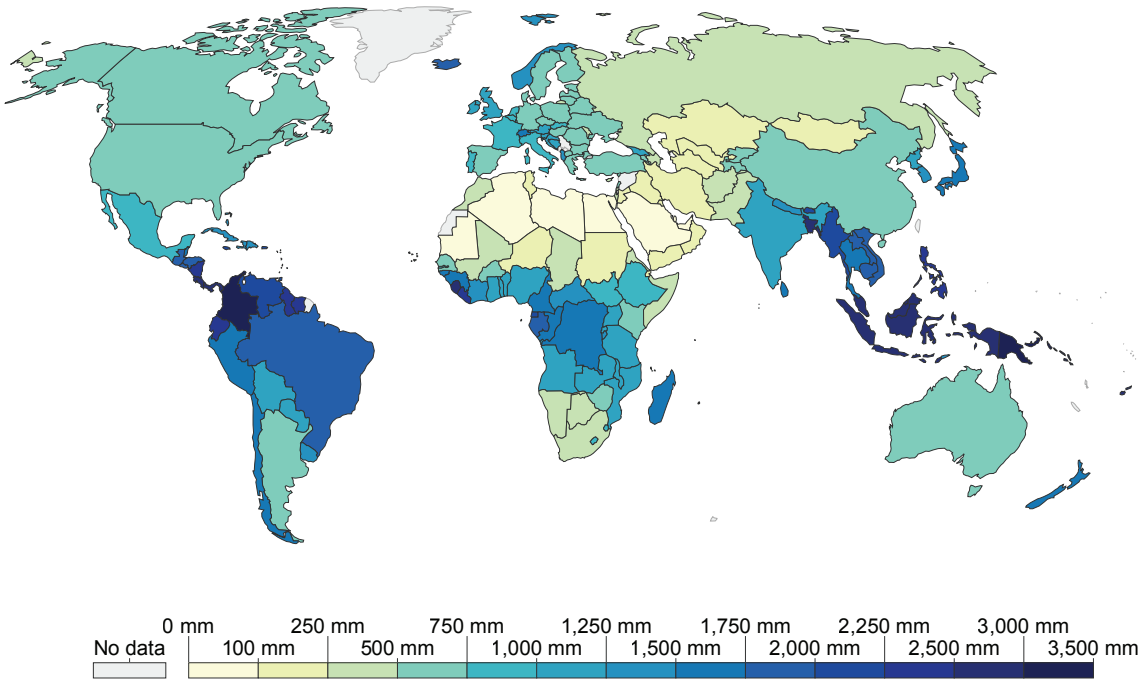
Precipitation recharges rivers, lakes, reservoirs and groundwater. As long as the amount of water used by the population of a region each year is less than the amount of precipitation, water resources will remain stable. This means that the water use is sustainable. If the amount of water withdrawn is greater than the amount of precipitation, then supplies of water will decrease.

Precipitation

KEY TERM
sleet rain that also contains some ice

One of the main factors determining the availability of water resources in a location is the amount of precipitation that it receives. As we learned in Chapter 7, precipitation refers to any form of water that falls from the clouds due to gravity and lands on the Earth's surface. This includes rain, snow, hail and **sleet**. As shown in Figure 8.8, precipitation varies significantly across the globe.



▲ **Figure 8.8** Precipitation in millimetres per year in 2014. You can also look this up online on the World in Data site or create another, updated map by using the National Geographic MapMaker tool.

Source: The World Bank

▲ **Figure 8.9** Storm clouds above Lake Eildon near Bonnie Doon

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DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 8.2

Using a Geographic Information System

A Geographic Information System (GIS) is a form of spatial technology used to gather, manage and analyse spatial information. This data is organised in layers using an interactive map. National Geographic MapMaker is an example of a GIS where different layers can be added to a global map. Data types include temperature, elevation, population density and precipitation.

Visit National Geographic's MapMaker website, then do the following tasks and answer the questions.

1. Click on the 'Layers' tab and select 'Add layer'.
2. Select the 'Climate and weather' category, and click on 'Precipitation and rainfall'.
3. Once the rainfall data has been added to your map, click on 'Legend' to see what the different colours represent.
   - **a** Name three locations that receive above 1500 mm of rainfall each year.
   - **b** Name three locations that receive less than 200 mm of rainfall each year.
   - **c** Most of South America receives more than 1000 mm of rainfall each year. Does South America add much freshwater to its water supplies each year?
   - **d** The Middle East does not add much freshwater to its supplies each year. Does this region receive a high level of precipitation?
   - **e** Based on your answers to Questions c and d, what can you conclude about the importance of precipitation in recharging water supplies?

River systems

Another factor relating to the water resources is the presence and size of rivers. Many major cities are built near rivers as they provide a reliable water source. In the past, rivers were heavily relied on for transport and as a food supply. The damming of rivers enables water to be stored in reservoirs so that it can be used for irrigation.

▼ **Figure 8.10** The Amazon River in Brazil is the largest river basin in the world

The size of rivers is linked to precipitation. When precipitation falls, it collects and drains into streams that flow downhill into larger streams, which eventually become a large river channel. The area of land that collects rainfall is known as a **drainage basin**. The largest river drainage basins are the Amazon, Congo, Nile, Rio de la Plata and Mississippi. The Amazon Basin alone covers over 7 million square kilometres! In contrast, many countries in desert or arid areas have no permanent rivers at all. These countries include Saudi Arabia, Bahrain and Kuwait.

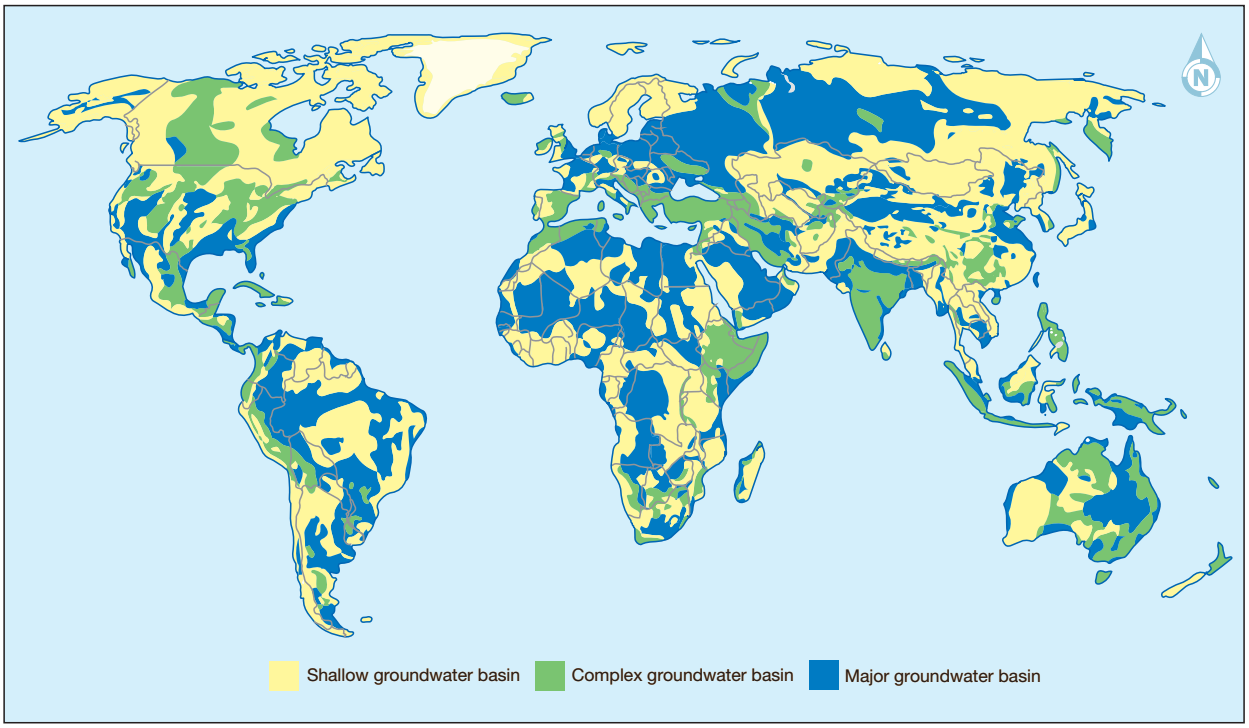
KEY TERM

drainage basin an area of land where precipitation collects and drains into a central point such as a river channel

Groundwater

Just like rivers and other forms of surface water, access to groundwater resources varies significantly around the world.

Figure 8.11 shows the distribution of these resources. The places in the map that are coloured in blue are those that have an abundant supply of groundwater. The water in these major basins is relatively easy and cheap to withdraw. Groundwater supplies in the map, shown in green, are considered complex. The groundwater in these areas is difficult to access as water supplies might be separated by layers of rock or might contain a mixture of both salt and freshwater. The areas in yellow in the map have shallow supplies and only a small quantity of water.



▲ **Figure 8.11** This map shows the global distribution of groundwater resources

ACTIVITY 8.1

Groundwater resources

Refer to Figure 8.11 and an atlas or Google Maps, and then answer the following questions.

1 Estimate the percentages of each type of groundwater resource in Australia.
2 Compare your answer in Question 1 to the United States.
3 Saudi Arabia is the largest country in the world that does not have any permanent rivers. Does it contain any major groundwater basins?

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Water resources in Australia

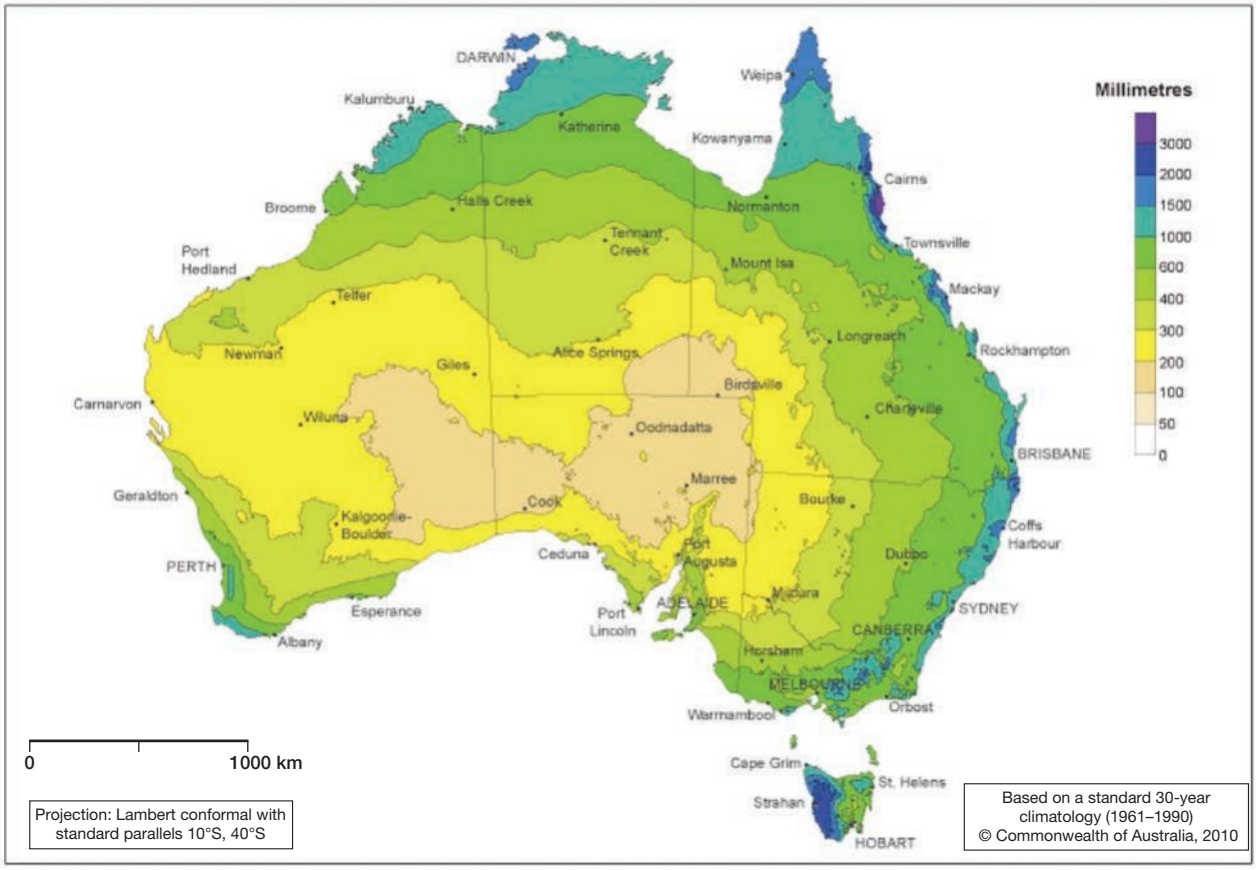
> I love a sunburnt country, a land of sweeping plains, of ragged mountain ranges, of droughts and flooding rains.
>
> **My Country – Dorothea Mackellar**

The excerpt from Dorothea Mackellar's poem *My Country* sums up Australia's water resources perfectly. It is a land of contrast; Australia's climate is prone to extended periods of low rainfall and to floods. While some areas have a very high average rainfall, others are classified as deserts. As such, the availability of water varies considerably.

Australia is the second-driest continent on Earth after Antarctica. Although the average annual rainfall in Australia is 417 mm, Figure 8.12 shows that this number varies significantly across Australia. Coastal areas generally receive the most rainfall whereas rainfall decreases towards the centre.

Australia has a large system of groundwater basins stretching under about 60 per cent of the continent (see Figure 8.13). Australia's Great Artesian Basin is the largest and deepest groundwater basin in the world. It covers 1.7 million square kilometres across Queensland and into the surrounding states and territories. The Great Artesian Basin is estimated to hold around 8700 million megalitres of water.

Australians are reliant on groundwater extracted from basins in arid areas where rainfall is erratic and drought conditions are more common. Hundreds of bores are used to pump water out of the ground for use in agriculture and industry, as well as for domestic purposes.



▲ **Figure 8.12** The spatial distribution of average annual rainfall in Australia

Source: Australian Government, the Bureau of Meterology

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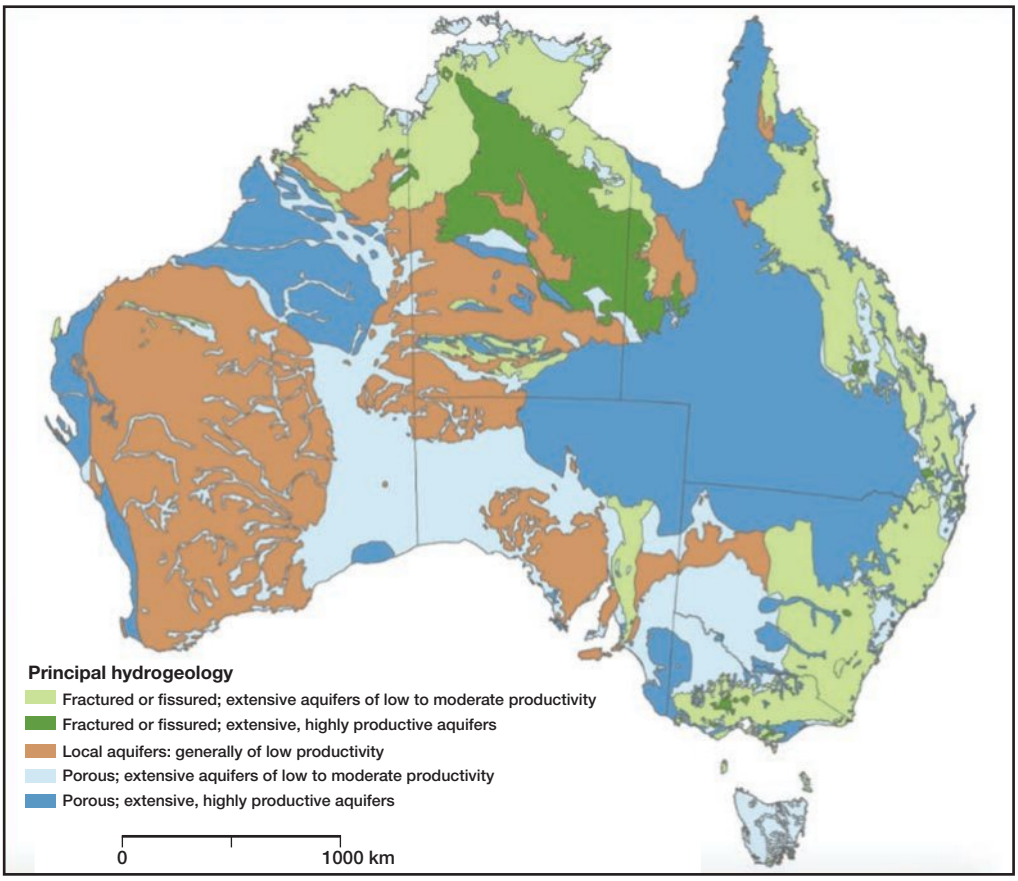
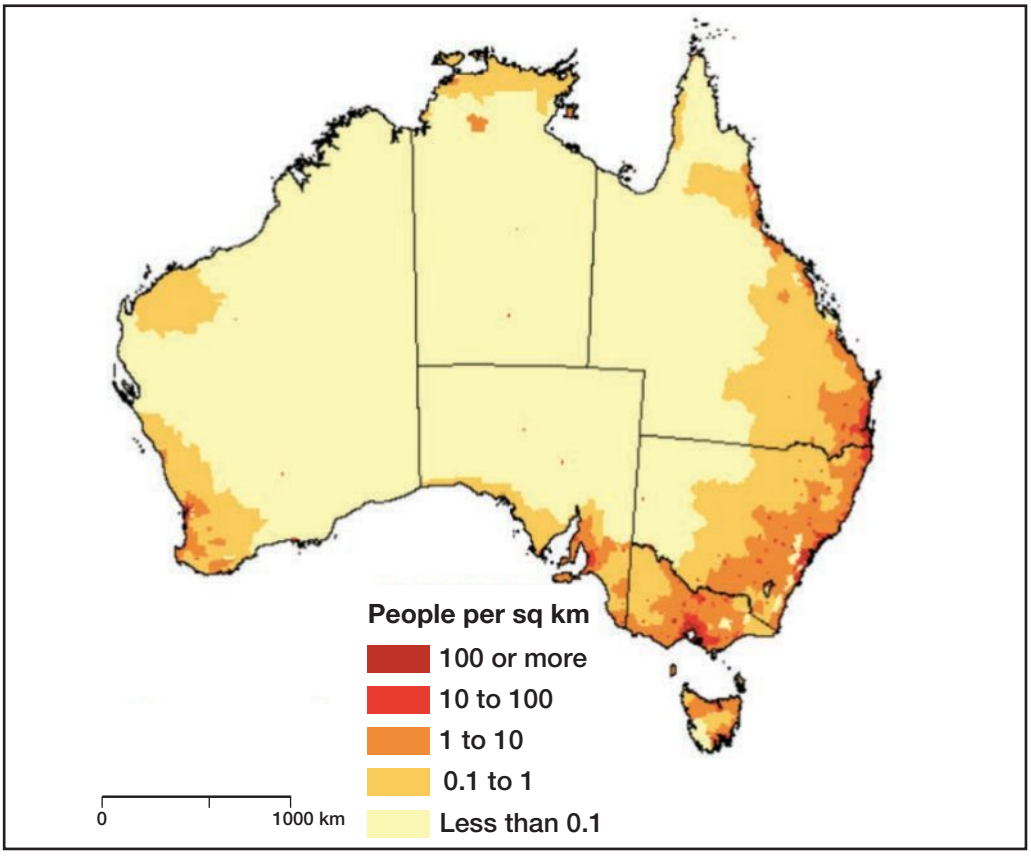


▲ **Figure 8.13** The spatial distribution of Australia's groundwater supplies. The aquifers, in dark blue and dark green, are the largest and highest quality supplies.

Source: Bureau of Meteorology Groundwater Insight



▲ **Figure 8.14** The spatial distribution of Australia's population

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DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 8.3

Describing the spatial association between different features

Describing the spatial association between features on different maps is an important part of understanding the relationship between them. It involves looking at different maps of the same scale and analysing how similar or different their spatial distributions are. In other words, are the features arranged in the same way? A spatial association can be described as strong if the two maps have a very similar distribution or arrangement. A spatial association is moderate if the distribution matches in some regions but not others. And a spatial association is weak if the two maps do not appear to have much of a relationship.

1 Refer to Figures 8.12 and 8.14, and answer the following.
   - a Is there a strong, moderate or weak association between average rainfall and population density?
   - b Provide examples of places from the maps to support your answer.
   - c Are there any exceptions to this relationship?
   - d Suggest a reason for the relationship you see between rainfall and population.

2 Refer to Figures 8.13 and 8.14, and answer the following.
   - a Is there a clear relationship between groundwater supplies and population density?
   - b Suggest a reason for your answer.

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 8.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Name the three main types of freshwater resources from the largest supply to the smallest.
2 Where is most of the Earth's freshwater located?
3 What is a GIS?

Interpret

4 Why is water use sustainable when the amount used is less than the amount added through precipitation?
5 Explain why groundwater is such a significant water resource for Australians.
6 Describe how rainfall varies spatially across Australia. In your answer, refer to specific regions and places.

Argue

7 Discuss whether there is a spatial relationship between rainfall, groundwater and population in Australia.

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8.2 Water scarcity

FOCUS QUESTIONS

- What is water scarcity and what factors lead to it?
- How is water scarcity managed?

The story of Chennai's water crisis presented at the start of this chapter is just one example of water scarcity facing people in many places around the world. Booming populations, lack of rainfall, unchecked urban development and unsustainable water use are all factors that contribute to these kinds of disasters. However, if we look closely at the factors that cause water scarcity, we can find ways to manage and reduce the impacts of water shortages.

What is water scarcity?

Water scarcity is when there is a lack of freshwater resources to meet the demands of water usage within a region. This occurs when the amount of water needed for agricultural, industrial and domestic uses is greater than the amount of water available. When the amount of water naturally replenishing supplies is insufficient to meet demands, this is known as 'physical water scarcity'. In some cases, although there is enough water available, the **infrastructure** needed to access it does not exist as it is too expensive to build. This is known as economic water scarcity.

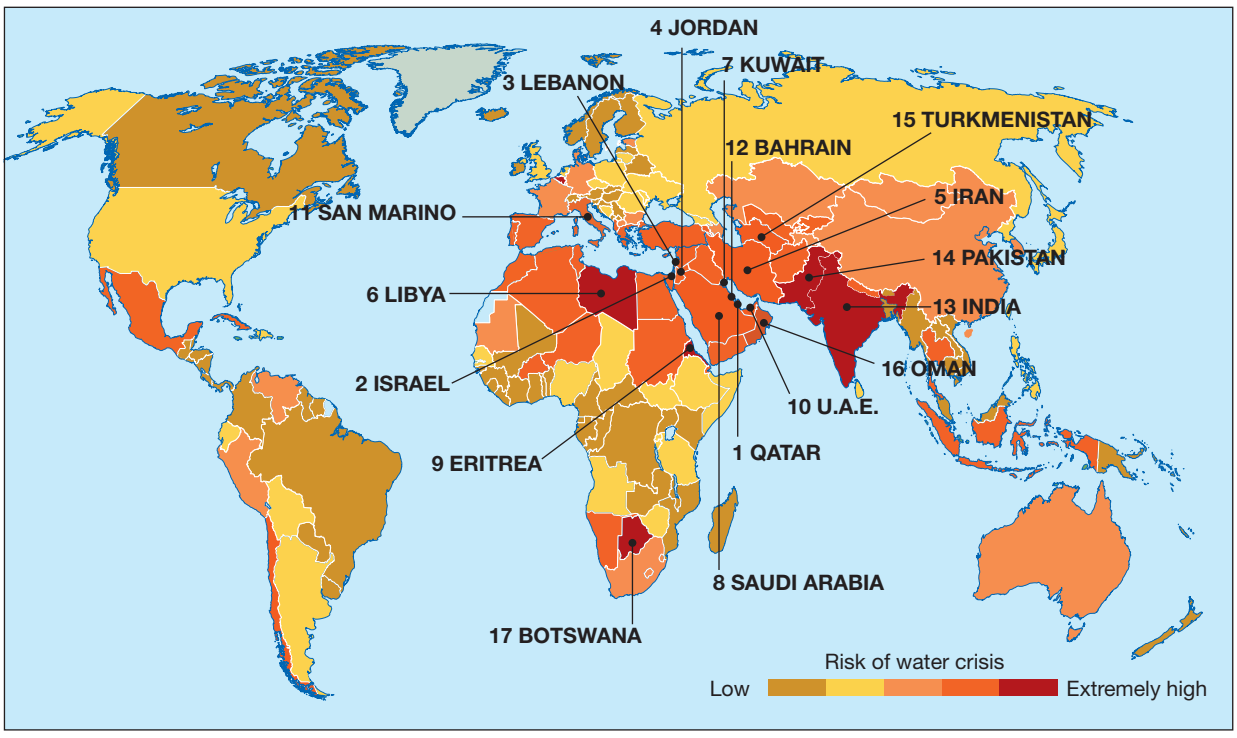
KEY TERMS

water scarcity a lack of freshwater resources to meet the demands of water usage within a region

infrastructure the physical structures and facilities needed within a community such as roads, buildings and pipelines

Water scarcity affects people on every continent. Over 1.2 billion people lack access to clean drinking water and 2.8 billion people experience water scarcity for at least one month each year. As shown in Figure 8.15, countries in the Middle East and North Africa are facing the highest levels of water scarcity.

▼ **Figure 8.15** The 17 countries shown in this map are facing water scarcity and are at risk of having ongoing water crises



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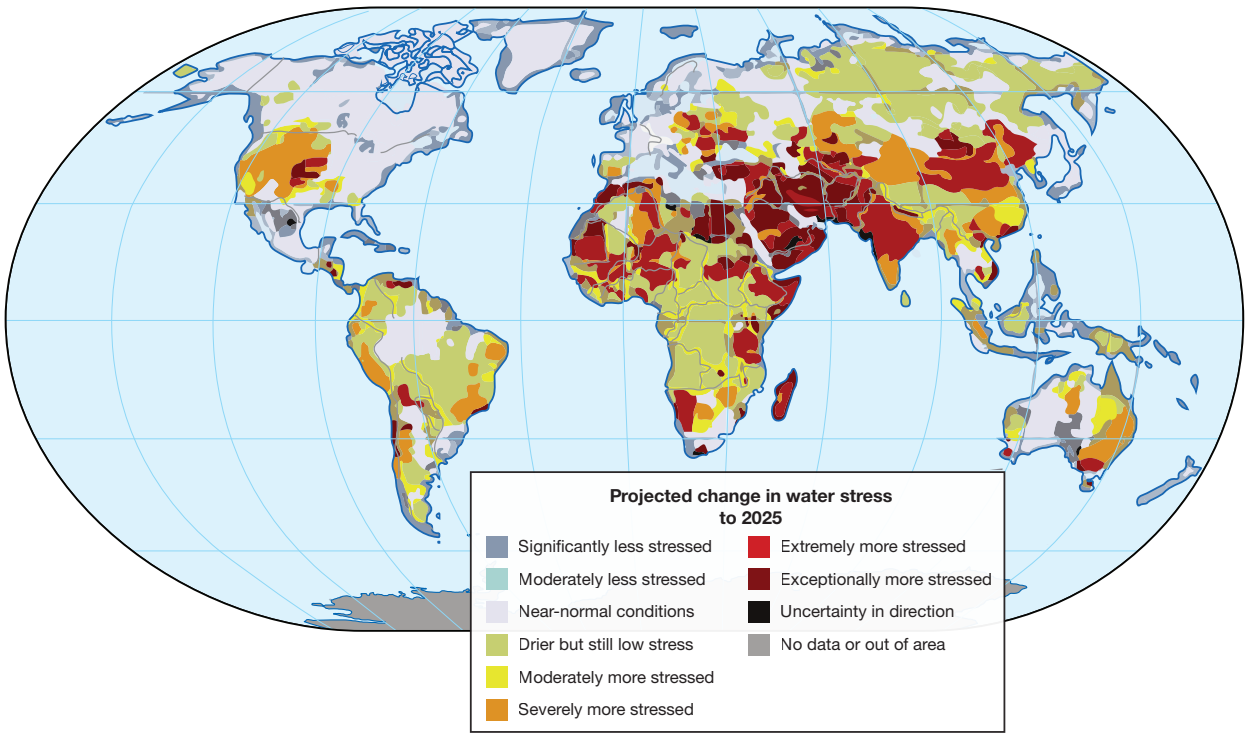

▲ **Figure 8.16** The levels of water stress in 2025, as predicted by the National Intelligence Council
Source: National Intelligence Council

If current trends continue, water scarcity is likely to become an increasing problem. According to the National Intelligence Council in the United States, two-thirds of the world's population may face water shortages by 2025. As shown in Figure 8.16, the problem is expected to get worse for many of the regions that are already at risk.

ACTIVITY 8.2

Future water scarcity

Refer to Figure 8.16, then answer the following questions.

1 Name three countries or regions that are likely to face higher levels of water scarcity by 2025.
2 What factors do you think will be responsible for these increases in water scarcity?

Causes of water scarcity

There are several factors that lead to water scarcity, including:

- Decreases in rainfall, which leads to a reduction in water-replenishing supplies
- Increases in population, which leads to an increase in demand for water
- Rapid urban development, which spreads out onto wetlands and pollutes waterways
- Increased poverty, which stops countries from being able to purchase or construct water-management infrastructure (such as desalination or water-recycling plants)
- Unsustainable allocation of water withdrawals for purposes like irrigation.

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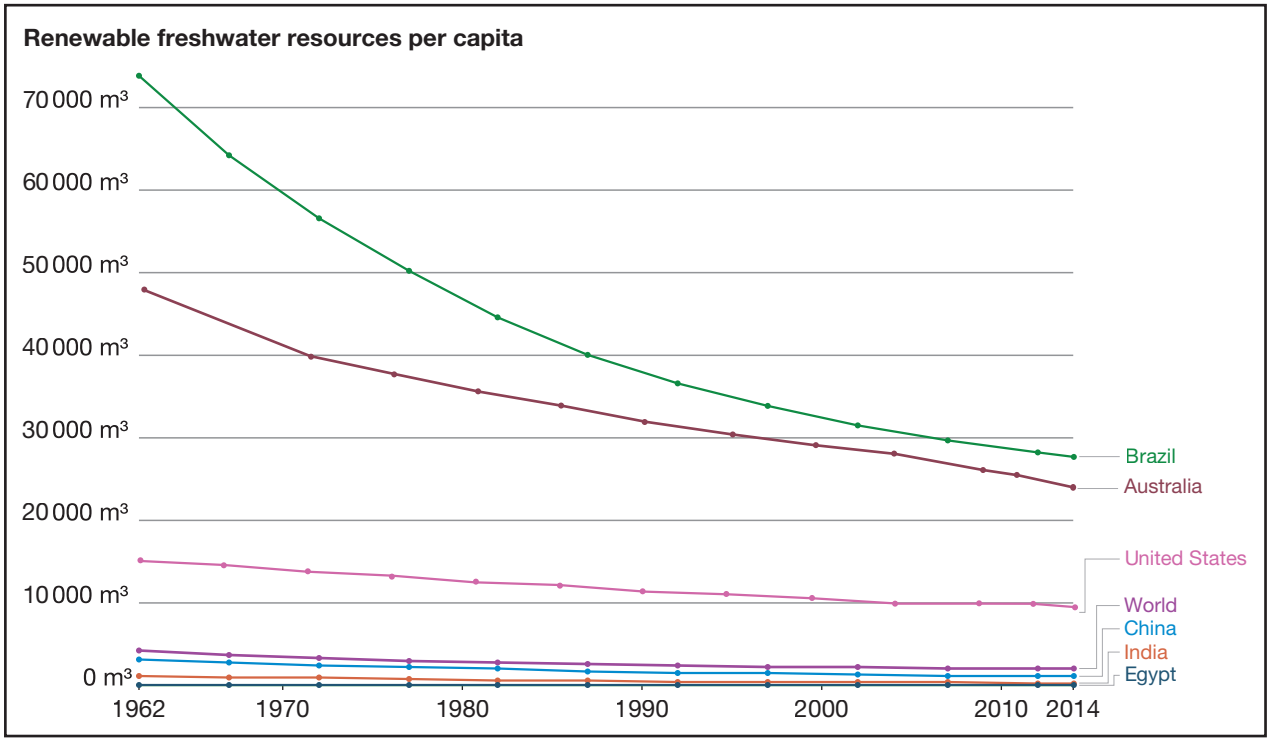
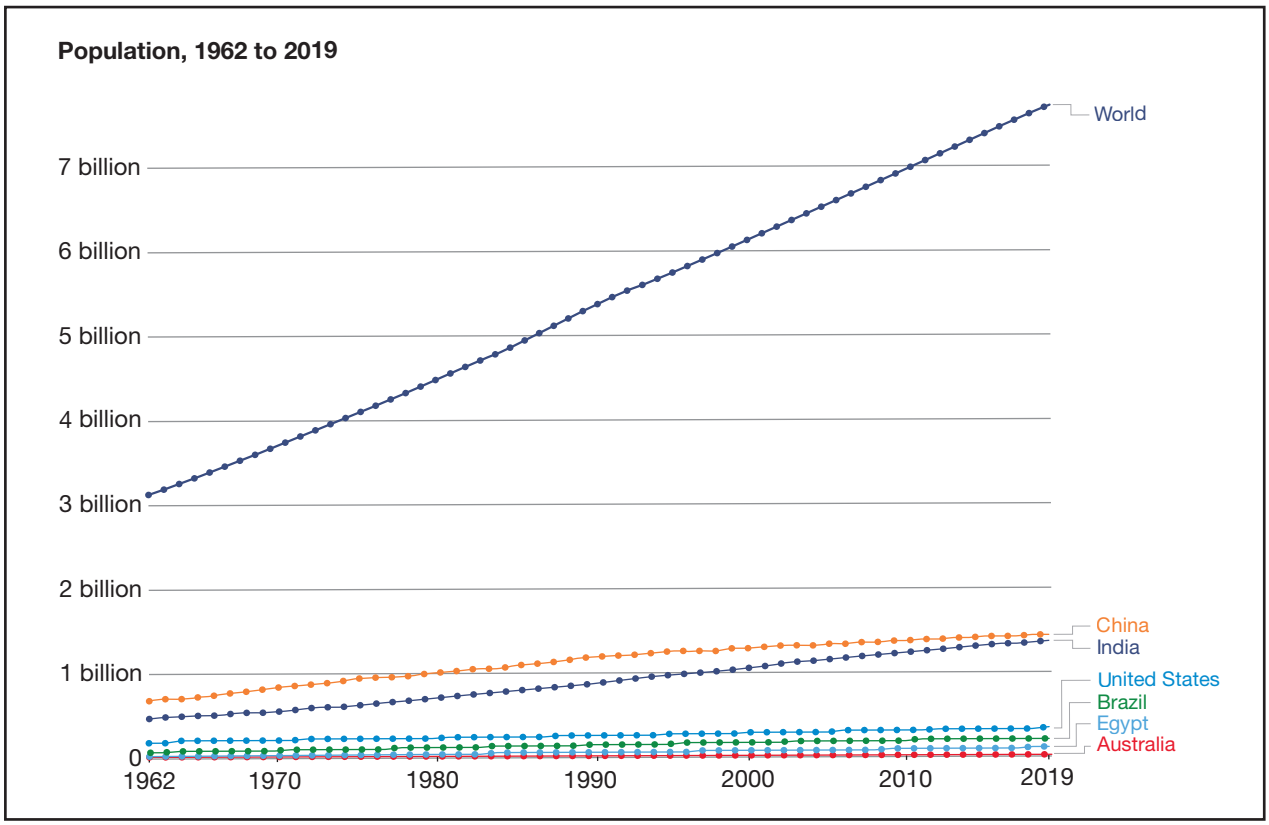
Figure 8.17 shows a change in the amount of renewable freshwater resources per capita in selected countries since the 1960s. Over this period, the populations of these countries has also increased (see Figure 8.18). This means that the amount of water available has to be shared between more people, which gives each person a smaller share.



▲ **Figure 8.17** The change in the amount of freshwater from 1962
Source: Our World in Data and World Bank



▲ **Figure 8.18** The change in the population from 1962
Source: Our World in Data and Gapminder: HYDE & UN Population Division (2019)

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ACTIVITY 8.3

Factors that lead to water scarcity

Read the information about factors that cause water scarcity, then answer the following questions.

1 Rank the factors leading to water scarcity from the most significant to the least significant. Write a paragraph justifying your ranking and compare your choices with a classmate.
2 Refer to Figures 8.17 and 8.18.
   a List the countries that have had a significant decrease in the amount of water available per capita since 1962.
   b List the countries that have had a significant increase in their population since 1962.
   c Compare your answers for parts a and b. Discuss whether population growth alone appears to have a large or small impact on water resources per capita.
   d Suggest why population growth does not always have a significant impact on water resources per capita.

Impacts of water scarcity

There are several serious problems associated with water scarcity, including **drought**, loss of jobs, water crises, economic issues and environmental damage.

KEY TERMS

drought a long period of water shortage, usually as a result of low rainfall

agricultural industry the business involved in cultivating plants and livestock

cull the selective slaughter of animals to reduce their population

Drought

When there is extended periods of low rainfall, there is often a shortage of water. This means that there is not enough water to meet the needs of people or the environment. This includes domestic supplies for people living in cities and agricultural supplies for farmers living in rural areas. The period is called a drought.

Australia has experienced several severe droughts throughout its modern history. These include the Federation Drought (1895–1903), the World War II drought (1937–1947) and the Millennium Drought (1997–2009). A recent drought began in 2017 and affected large parts of the country. It contributed to the dry conditions that fuelled disastrous bushfires during the 2019–2020 season and left many towns without water.

In January 2020, Stanthorpe in southern Queensland had to truck in water daily to supply its 5000 residents. Local residents had to shower in plastic tubs, then use that water to flush the toilet and wash clothes.

For people living in drought-affected regions, water scarcity is not just about having quicker showers or not being able to water the garden. Instead, water shortages in these regions can mean the destruction of the environment and the local **agricultural industry**. This leads to the loss of jobs and a severe drop in the local economy. Crops fail during a drought and farmers are usually forced to sell or **cull**

▲ **Figure 8.19** Fourteen trucks transport 1.3 million litres of water to Stanthorpe from Connolly Dam in Warwick during 2020

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livestock as they do not have enough feed to keep them alive. Farmers are often left feeling helpless, which can lead to depression and other mental-health issues.

▲ **Figure 8.20** This farmer is hand feeding his sheep on his drought-affected property in Coonabarabran in New South Wales

▲ **Figure 8.21** This farmer in Boggabri is driving across the dry landscape in his farm to feed his sheep. The feed is usually grown locally, but the farmer has needed to purchase feed from elsewhere at $1000 per day to keep his stock alive.

▲ **Figure 8.22** This farmer watches a sheep drink from what remains of a dried up freshwater dam at a farm in Wandandian in New South Wales

Water crises

KEY TERMS

water crisis occurs when the amount of freshwater that is easily available within a region is less than what the region needs

projections estimated forecasts based on current trends

A **water crisis** is defined as a situation where the amount of freshwater that is easily available within a region is less than what the region needs. This means that each year, the amount of stored water decreases. If this situation continues for an extended period of time, supplies can eventually run out.

Between 2017 and 2018, Cape Town in South Africa faced a severe water crisis. Water-storage levels had been declining steadily since 2015, and were sitting at between 15 and 30 per cent of the dams' total capacity. **Projections** showed that Cape Town was heading towards 'day zero', which is when all water for domestic use is shut down and residents instead have to queue for daily water rations.

To stop day zero from happening in Cape Town, strict water restrictions were put in place. This forced the residents to limit their use of water to just 50 litres per day. The national government also diverted water that was normally used for agriculture and instead allocated it to urban supplies. Education campaigns helped people to understand the potential impacts of the water crisis. Water maps were also used to show people how much water they used compared to their neighbours. The reductions in usage, combined with heavy rains in the middle of 2018, meant that day zero was avoided in Cape Town.

▲ **Figure 8.23** Cape Town's main dam was only at 10 per cent capacity in April 2018

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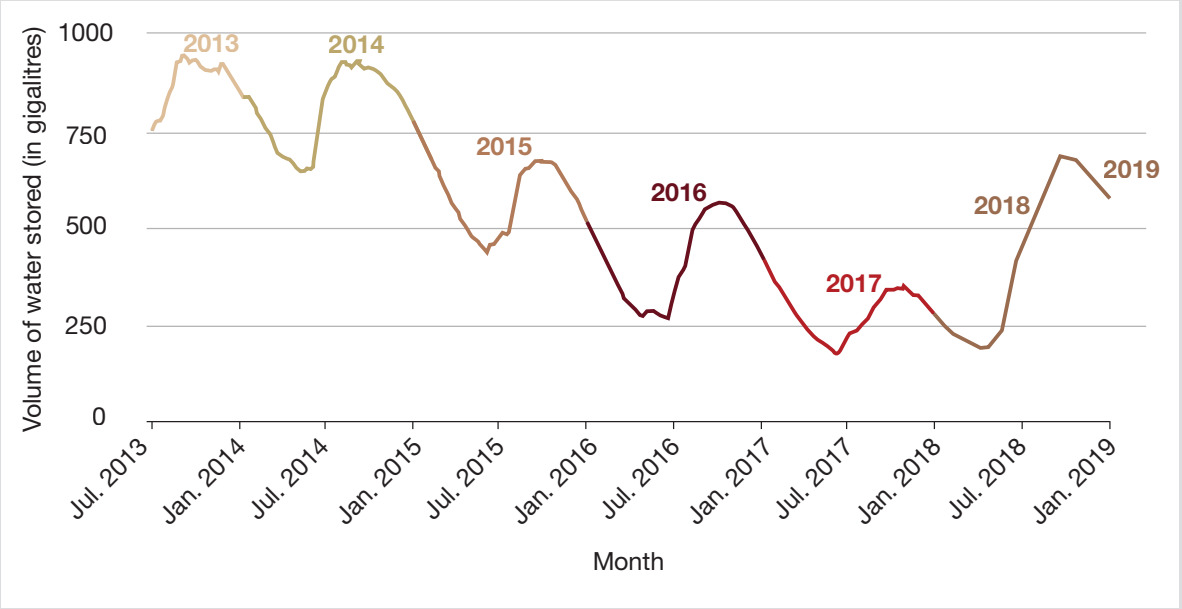
ACTIVITY 8.4

Cape Town's recent water crises

Refer to the graph in Figure 8.24, then answer the questions that follow.



▲ **Figure 8.24** Variation in Cape Town's water storage supply between July 2013 and January 2019 measured in gigalitres (one gigalitre is a million litres)

1 Describe the overall trend in water supply over the time period shown.
2 What do you think is the cause for peaks (maximums) and troughs (minimums) that regularly occur at a similar time each year?
3 Look up Cape Town's current water storage level. Is it at a safe level? How does it compare to the level in Melbourne or in your local city or town?

Environmental impacts

As well as affecting people, water scarcity can lead to a variety of negative environmental impacts. When water is scarce and needed to support a growing population, more is withdrawn from natural sources and less remains to support the natural environment. This can affect environments containing rivers, lakes and wetlands. The amount of water in these environments is reduced and many of the natural processes that are needed to maintain the health of local ecosystems, like floods, are not able to occur.

KEY TERM
invertebrates animals that do not have backbones

During 2019, the Macquarie Marshes in the western region of New South Wales suffered environmental damage due to long-term drought conditions. This wetland is one of the largest remaining wetland systems in Australia. The area is an essential habitat for mammals, birds, fish and **invertebrates**. However, the Macquarie River, which transports water to the wetland, ran dry for the first time in over 50 years. Combined with the region's lack of rainfall, this turned the wetland's lush, green environment into a dry and dusty wasteland. A reason for this change was that any water that was available had to be given to towns such as Warren, Cobar and Nyngan. Although this event led to the loss of many species, wetlands are adaptable to extreme weather events and so the Macquarie Marshes will flourish again once water returns to the region.

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Water scarcity management

Although water scarcity is often caused by factors that are beyond the control of people, such as extended dry periods, in many cases the impacts can be managed and reduced. Some management strategies that will be explored in the following sections include:

- Redistributing water supplies from a nearby area temporarily
- Reallocating water from different sectors, such as agriculture, to be used for domestic purposes
- Accessing water from alternative supplies using methods such as desalination and water recycling
- Reducing water consumption by educating the public, implementing water restrictions and using technology, such as water-efficient appliances and shower heads
- Providing financial aid to poor and vulnerable communities.

▲ **Figure 8.25** The Macquarie Marshes are a series of wetlands along the Macquarie River and a significant habitat for a range of species

▼ **Figure 8.26** Several years of drought conditions have turned the Macquarie Marshes into a dust bowl

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 8.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Define the following terms:
   - **a** Water scarcity
   - **b** Physical water scarcity
   - **c** Economic water scarcity
   - **d** Drought.
2 How many people across the world experience water scarcity for at least one month each year?
3 List three impacts of a drought.

Interpret

4 Outline and describe one factor that leads to water scarcity.
5 Explain how water scarcity can impact both the natural environment and people in rural and urban areas. You can use the information in Figure 8.27 to help you with your response.

Argue

6 Sustainable water use and management needs to be made a priority in order to avoid catastrophic water crises in the future. Do you agree with this statement? Use the information and case studies provided in this chapter to support your argument.

▲ **Figure 8.27** Hot and dry conditions during a drought can lead to dust storms and a lack of food available for livestock. When there isn't enough pasture for sheep, farmers must buy expensive feed to keep their flocks alive.

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8.3 Water scarcity in Australia: the Murray–Darling Basin

FOCUS QUESTION

How is water managed in Australia's Murray–Darling Basin?

The Murray–Darling Basin is Australia's largest river system. It stretches across four states and is where nearly 40 per cent of Australia's food is produced. A lot of the food and fibre produced here is also exported, which contributes $22 billion to the Australian economy. The picturesque rivers and lakes within the region make it a popular location for tourism. Tourists spend a total of $8 billion within the basin each year. The management of the water within the Murray–Darling Basin requires a balance between industrial, domestic and environmental uses. This is a complex task, especially during times of drought.

KEY TERMS

catchment area the area of a basin that collects and drains water

migratory birds birds that travel seasonally for breeding and feeding

Geographic characteristics

The Murray–Darling Basin has a total **catchment area** of 1 060 000 square kilometres. This makes it the twentieth largest river system in the world. The Murray–Darling Basin covers 14 per cent of Australia's total surface area. This covers the Australian Capital Territory, three-quarters of New South Wales, half of Victoria, and parts of Queensland and South Australia. The three main rivers within the system are: the Murray River, Darling River and the Murrumbidgee River.

More than 2.6 million Australians live within the Murray–Darling Basin and over 3 million people access its water resources. The number of people who use the Murray–Darling Basin's water resources continues to grow each year. There are also 120 species of waterbird and 46 native fish species that rely on the diverse habitats provided in the basin's rivers, wetlands and floodplains. In total, there are 30 000 wetlands within the Murray–Darling Basin and 16 of these are internationally significant. This is because they are rare and unique, and provide habitat for **migratory birds** from places like China and Japan.

▼ **Figure 8.28** The Murray–Darling Basin spans four states and one territory, and contains several large rivers

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▲ **Figure 8.29** The basin supports a range of diverse environments such as the red gum forests in the Murray Valley National Park

Impacts of water scarcity

The competing demand for a limited water supply within the Murray–Darling Basin means that water scarcity is a major issue. Shortages in water leads to a range of economic, environmental and social impacts in the region.

Economic impacts

Agriculture is the main form of industry within the Murray–Darling Basin. Although the basin covers 14 per cent of Australia's surface area, it contains 20 per cent of Australia's agricultural land. Within the Murray–Darling Basin, there are over 50 000 farms and 9000 agriculture businesses.

Agriculture using irrigation is more common in the Murray–Darling Basin than elsewhere in Australia. In fact, two-thirds of the total amount of irrigated land in Australia is in this area, even though less than two per cent of the total amount of agricultural land is irrigated. The basin relies on large water withdrawals and contributes to a total of 70 per cent of all of Australia's agricultural water use. Cotton and pasture use half of this water, while other common crops include rice and grapes. The region also provides 30 per cent of Australia's total dairy production. The money generated from irrigation contributes significantly to the region. For every $1000 that is earned from irrigation, an additional $3500 is generated in local towns and related industries.

Unfortunately, drought is a common occurrence within the Murray–Darling Basin. Farmers are allocated a certain amount of water that they are allowed to withdraw each year from rivers and groundwater supplies. However, water levels regularly run low. In extreme cases, rivers completely dry up. This means that, in some cases, the allocation given to farmers is reduced and, in extreme cases, some farmers are not allocated any water. This leads to the failure of crops. Many farmers have to sell or cull livestock as they do not have enough feed to keep their animals alive. Not only does this lead to a loss of revenue for farmers, it has a flow on effect to the economy of the local towns and communities.

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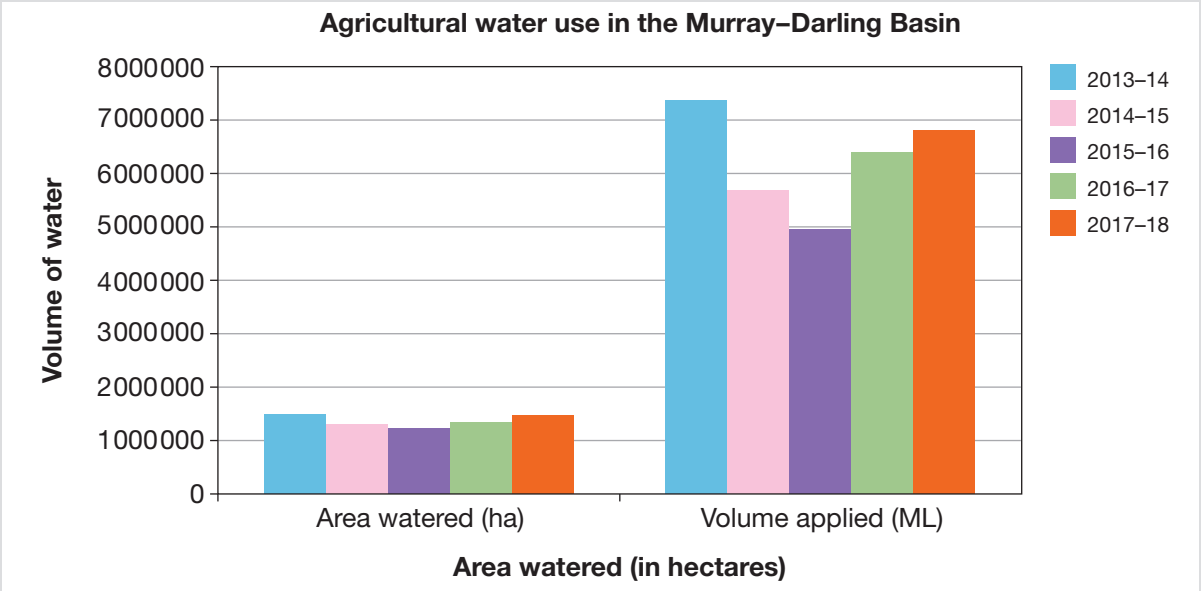
▲ **Figure 8.30** During times of drought, reservoirs such as the Hume Dam can reach low capacities and even dry out completely

ACTIVITY 8.5

Murray–Darling Basin agricultural water use

Refer to Figure 8.31, then answer the following questions.



▲ **Figure 8.31** The amount of area watered and the amount of water used in the Murray–Darling Basin between 2013 and 2018

1. Describe how the amount of land watered within the Murray–Darling Basin has changed between 2013 and 2018.
2. Has there been a significant change to the amount of water used for agriculture from 2013 to 2018?
3. Suggest a reason for the changes or lack of changes you identified in Questions 1 and 2.

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Environmental impacts

The Murray–Darling Basin has a range of diverse environments containing many unique habitats. The plants and animals within these environments have adapted to natural conditions. There is a balance between all the natural processes within these environments. Many of the rivers and lakes only contain water during floods, and the environments are adapted to seasonal wet and dry periods.

KEY TERMS

flow regime the seasonal changes to the flow of rivers

algae bloom the rapid increase or growth in the amount of algae within water

While the regulation of rivers using dams and weirs is essential in providing a water source for irrigation, they do not allow rivers to flow naturally. Dams and weirs significantly alter the **flow regime** of rivers. During drier times, rivers do not have adequate water. During wetter times, when flooding normally occurs to recharge wetlands and floodplains, water is held back and stored in dams. These changes significantly damage the environment that rely upon these natural conditions.

In early 2019, a heat wave combined with low river flows from an ongoing drought led to a **algae bloom** of blue-green algae in the Darling River near Menindee. Blue-green algae is toxic to humans and animals if it is consumed. As blue-green algae dies and decomposes, it sucks oxygen out of the water, affecting the water's quality. This particular bloom led to the death of up to a million Murray cod and perch, which was an ecological disaster.

▲ **Figure 8.32** A blue-green algae bloom led to the death of up to one million fish in the Darling River

▲ **Figure 8.33** The low water levels in the Darling River in January 2019

ACTIVITY 8.6

Impacts of water scarcity in the Murray–Darling Basin

Use a table to summarise the impacts of water scarcity in the Murray–Darling Basin. Include the name of each impact, its classification (environmental, social or economic) and a brief description.

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Managing water

Water scarcity, competing demands and the size of the Murray–Darling Basin makes managing the water from this resource incredibly difficult to manage. The Murray–Darling Basin Plan coordinates the management of water between the four states and one territory to ensure a sustainable and balanced outcome for all.

Murray–Darling Basin Plan

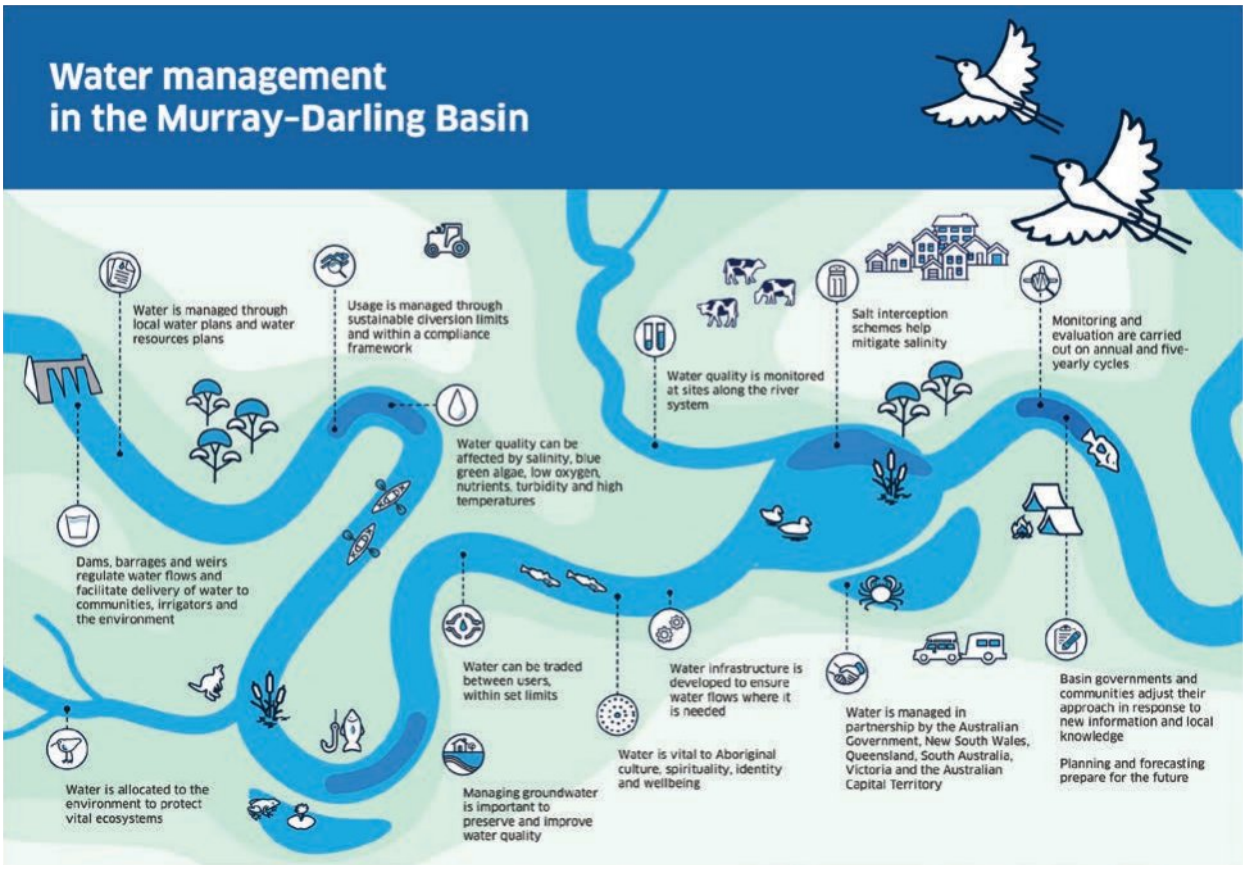
The Murray–Darling Basin Plan was established in 2012. It is a coordinated approach to manage the basin's water resources between all four states, the ACT and the Australian Government. Its three main aims are to ensure that the Murray–Darling Basin has:

- Vibrant communities that have a stable water supply to meet their domestic uses
- Productive industries such as agriculture that can provide jobs and help local communities to thrive
- Healthy and diverse environments that support a range of plants and animals.

To ensure all of these demands are met in all parts of the basin, the plan sets limits on the amount of surface water and groundwater that can be withdrawn. These limits are adjusted based on rainfall conditions. The limit allows more water to be allocated for **environmental flows**. Environmental flows refers to water that is allowed to flow through the system naturally to support the environment. Although less water is allocated for irrigation, updated infrastructure uses water more efficiently, which reduces the impact on the agricultural industry.

KEY TERM

environmental flows the amount of water required to sustain freshwater environments



▲ **Figure 8.34** The management strategies used within the Murray–Darling Basin Plan (you can also magnify this image in the digital versions of this book)

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 8.3

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 Define the following terms:
   - a Catchment area
   - b Flow regime
   - c Environmental flows.

2 Write a paragraph summarising the geographical characteristics of the Murray–Darling Basin.

3 Outline two ways in which water scarcity can impact the Murray–Darling Basin.

Interpret

4 Discuss why agriculture is such a significant part of the Murray–Darling Basin and why water scarcity can have such a large impact on this industry.

▲ **Figure 8.35** Farmers in the Murray-Darling Basin rely on water from the river system to irrigate their crops

5 Explain why allowing water to flow through the Murray–Darling Basin naturally is important for the environment.

6 Consider the strategies represented in Figure 8.34. Which of these strategies do you think will be the most and least effective in managing water and overcoming water scarcity?

Argue

7 Discuss why a coordinated approach to water management, such as the Murray–Darling Basin Plan, is needed to ensure economic and social stability, as well as the sustainability of the Murray–Darling Basin.

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8.4 Water resources in Israel: a nation of extreme water scarcity

FOCUS QUESTION

How can desalination, water recycling and efficient irrigation help to manage water scarcity?

> Today, nearly 90 per cent of our waste water is recycled … That's around four times higher than any other country in the world. It is a remarkable achievement and this benefits not only Israel. Israeli companies are helping save water around the world, from Africa to California to India.
>
> Gilad Erdan, Israeli Minister of Strategic Affairs and Public Diplomacy, 2017

Israel is a small country located in the Middle East at the eastern end of the Mediterranean Sea. Over 60 per cent of the country is classified as a desert. Much of the rest of the land is arid, but the climate in some northern regions is classified as **temperate**. Rainfall occurs predominantly in the winter months, with some regions receiving over 1000 mm per year. However, towards the south, some areas in Israel get as little as 25 mm.

KEY TERM

temperate a climate that has four distinct seasons: summer, autumn, winter and spring

▲ **Figure 8.36** Israel is located in the Middle East

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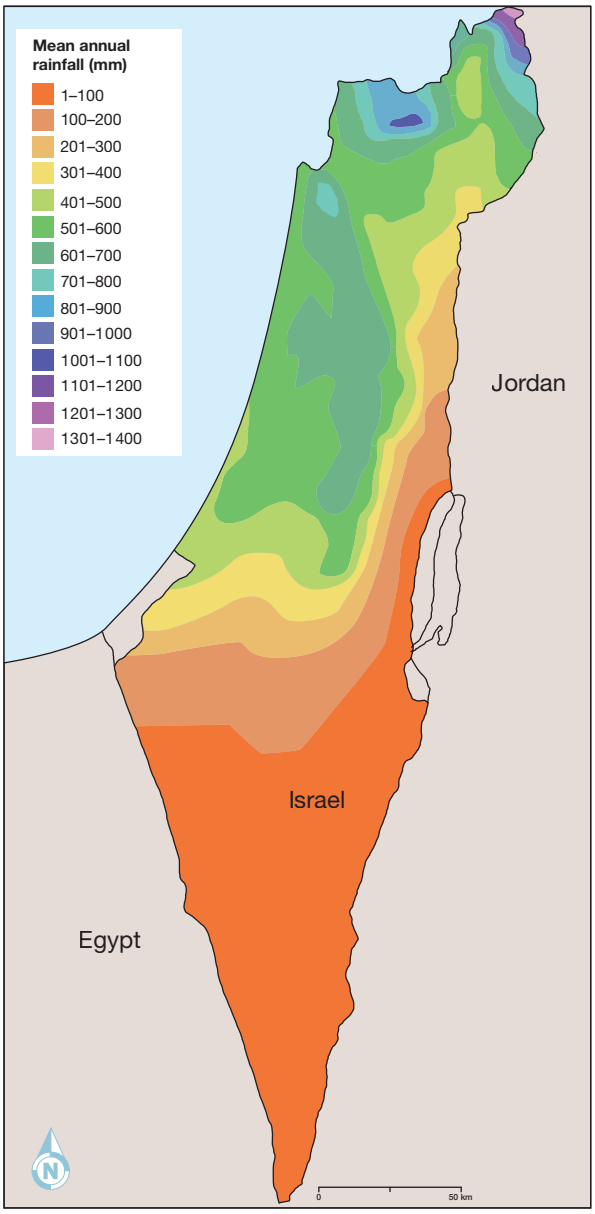
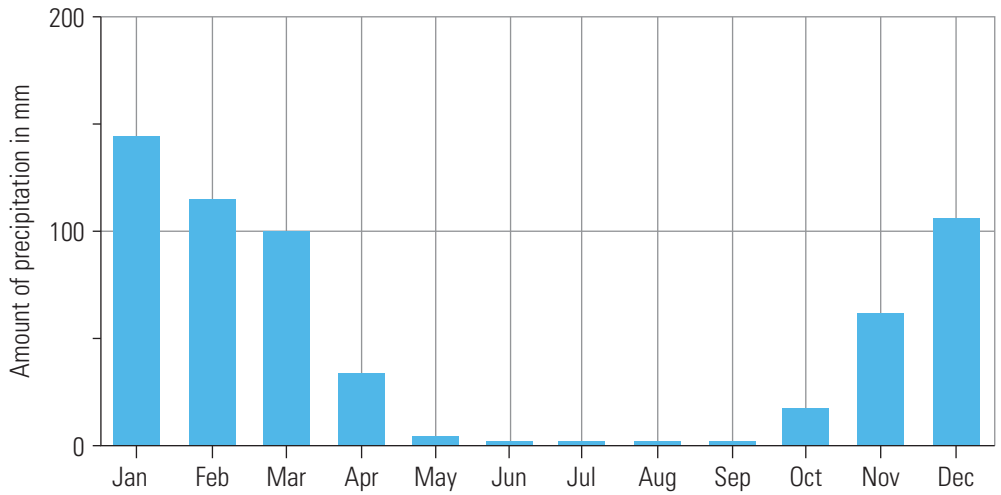
▲ **Figure 8.37** Israel has a diverse climate. Some regions in the north receive reasonable levels of rainfall (top photograph). Other regions in the south receive very little (bottom photograph). This can make it challenging for Israel to manage its water for agriculture and domestic uses.



▲ **Figure 8.38** The average annual rainfall of Israel varies considerably between the north and south of the country



▲ **Figure 8.39** This graph shows the average rainfall each month in Jerusalem, Israel/Palestine

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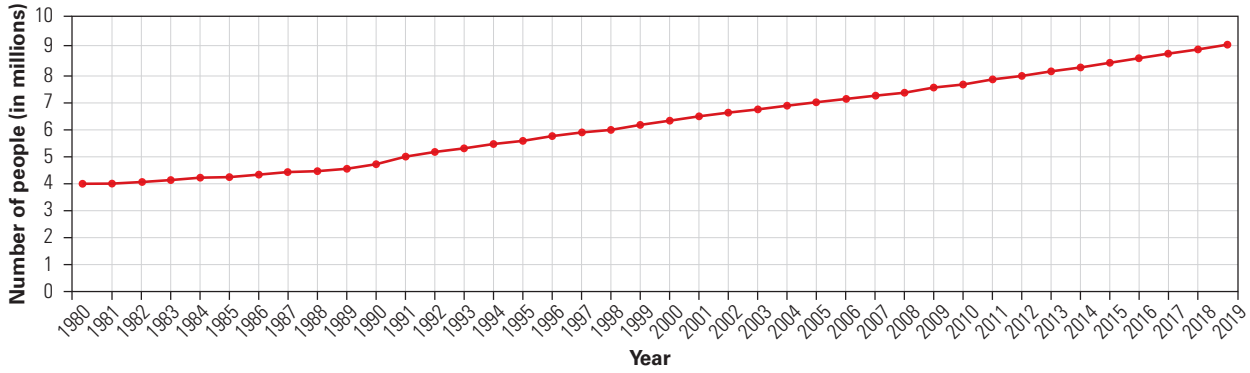
The water challenge

During the late twentieth century and early twenty-first century, Israel's population grew rapidly from 4 million in 1980 to nearly 9 million in 2019. Over this time, the average rainfall each year decreased and it is expected to drop by a further 15 to 25 per cent by the end of the century. A growing population together with a reduction in rainfall means that less water is available for each person in Israel. While this ordinarily would be a recipe for extreme water scarcity, careful management and technological innovation have meant that Israel has been able to maintain a sustainable water supply for the population.



▲ **Figure 8.40** The population growth of Israel between 1980 and 2019

ACTIVITY 8.7

Rainfall and population growth in Israel

Look at the data in Figures 8.38, 8.39 and 8.40, then answer the following questions.

1 Refer to Figure 8.38.
   - **a** Which colour covers the largest area and how much yearly rainfall does this region receive?
   - **b** Describe how the average annual rainfall varies across Israel. Refer to specific regions and the amounts of rainfall using the legend.

2 Refer to Figure 8.39.
   - **a** Describe how the monthly rainfall in Jerusalem varies across the year.
   - **b** Find a rainfall graph for your local area. Compare it to the rainfall in Israel.

3 Refer to Figure 8.40.
   - **a** Describe how Israel's population has grown between 1980 and 2019. Refer to specific years and population totals.
   - **b** Suggest how population growth might contribute to water scarcity and other management issues.

Managing water scarcity

Israel has implemented a number of strategies to manage its water resources. A critical step was an education campaign aimed at teaching Israel's population about water scarcity, and the ways in which water can be conserved in and around the home. 'Israel is drying' was a commercial featuring celebrities showing their skin drying out to resemble a parched landscape. The education campaign is estimated to have reduced domestic water use by 18 per cent.

Israel also improved its water infrastructure (such as leaking pipes) to reduce their domestic water loss by nine per cent. The country further reduced household water use by making dual flush toilets and efficient shower heads mandatory.

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▲ **Figure 8.41** Drip irrigation pipes in a flower bed at Ramat Hanadiv gardens in Israel. Drip irrigation is one way to conserve water. It has the potential to save water by allowing water to drip slowly to the roots of plants directly.

Water used for agriculture in Israel became far more efficient due to the development of drip irrigation. This technique uses less water than more intensive forms of irrigation such as sprinkler systems.

However, the greatest achievement in Israel's water management has been increasing its water supply through water recycling and desalination. This has meant that Israel has a stable water resource that is no longer reliant on rainfall.

Wastewater recycling

Israel has become a world leader in the recycling of wastewater. It went from recycling just 5 per cent of its wastewater in 1985 to 85 per cent in 2015. Sewage water is treated at several water-recycling plants and suppled in reservoirs to be used for agriculture. Because this water resource does not vary based on rainfall, farmers can rely on a similar supply each year.

Excess recycled water is used to increase river flows such as the water flow in the Jordan River. Experts hope that these flows will help to increase the health of the river environments and surrounding landscapes, restoring these areas to how they were before they were damaged by water withdrawals.

▼ **Figure 8.42** There are more than 240 reservoirs in Israel. They are used to supply water for agriculture and to farm fish

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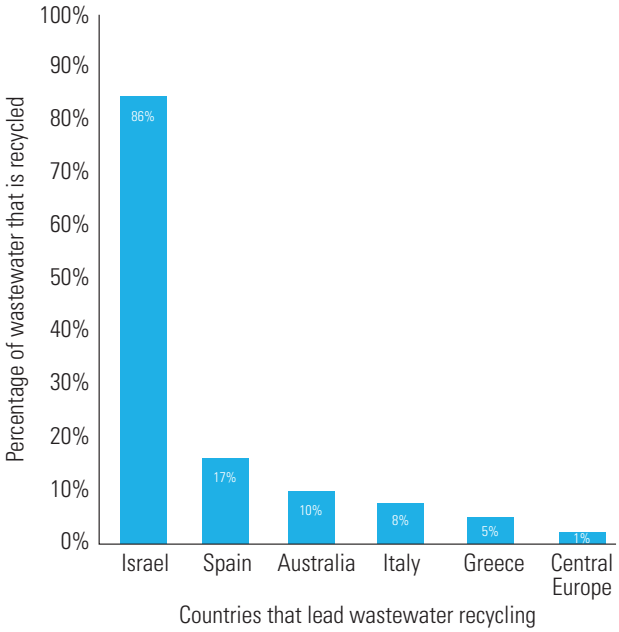
Desalination

Israel has five desalination plants, which treat water from the Mediterranean Sea. All of them are among the largest in the world. The Sorek desalination plant is the biggest and treats 600 000 cubic metres of water each day. This is enough to supply water for 1.5 million people, which is roughly one-fifth of Israel's total population. Thirty smaller desalination plants in Israel treat **brackish** groundwater. Altogether, the desalination plants provide 650 million cubic metres of potable water each year. This is roughly 35 per cent of Israel's water supply.

Despite Israel's success with desalination, there are drawbacks to using desalination plants. For example:

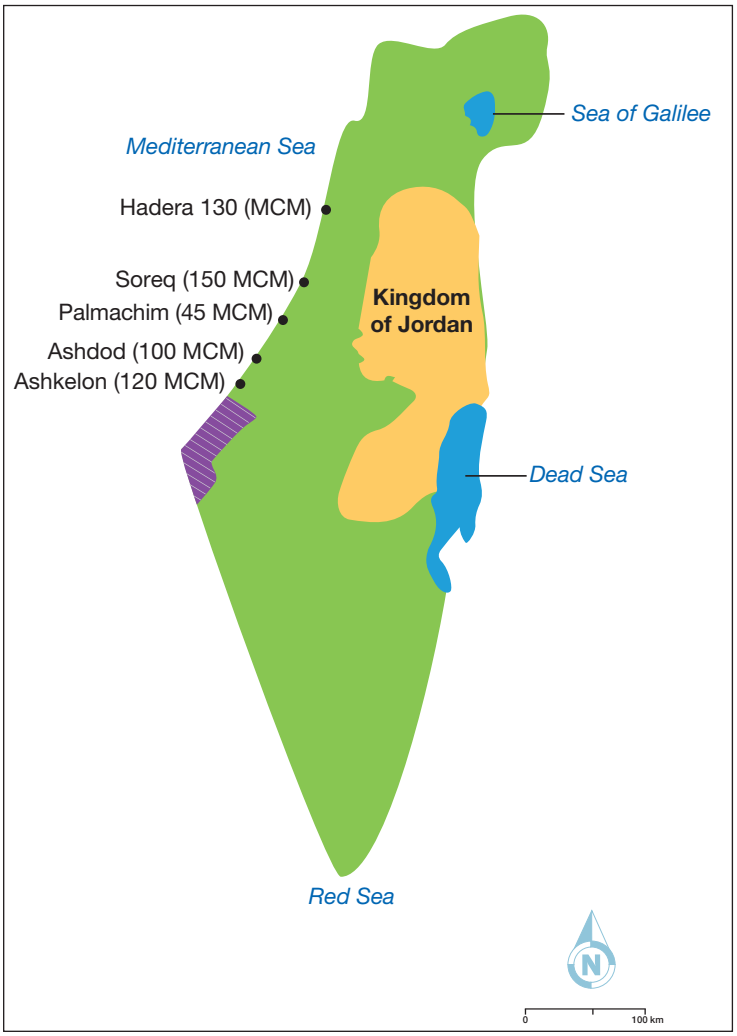
- Each desalination plant costs approximately $400 million to build
- Desalination plants require a lot of energy to run and consume a total of 3 per cent of Israel's total electricity supply
- Desalination plants are owned by private companies and there are concerns that they might raise prices, which will make water less affordable
- Once saltwater has been treated, very salty water is released back into the Mediterranean Sea, which environmentalists are concerned might cause damage to the local sea life.

▼ **Figure 8.43** Ambassador Daniel Shapiro tours the Hadera Desalination Plant in 2012, which was the most modern desalination facility in Israel and the leading desalination plant in the world. After the tour, the Ambassador drank a glass of water that had been salty sea water only 90 minutes previously.



▲ **Figure 8.44** Israel is a world leader in wastewater recycling

KEY TERM
brackish water that is slightly salty



▲ **Figure 8.45** The location of Israel's five main desalination plants and their production capacities, in million cubic meters (MCM) per year

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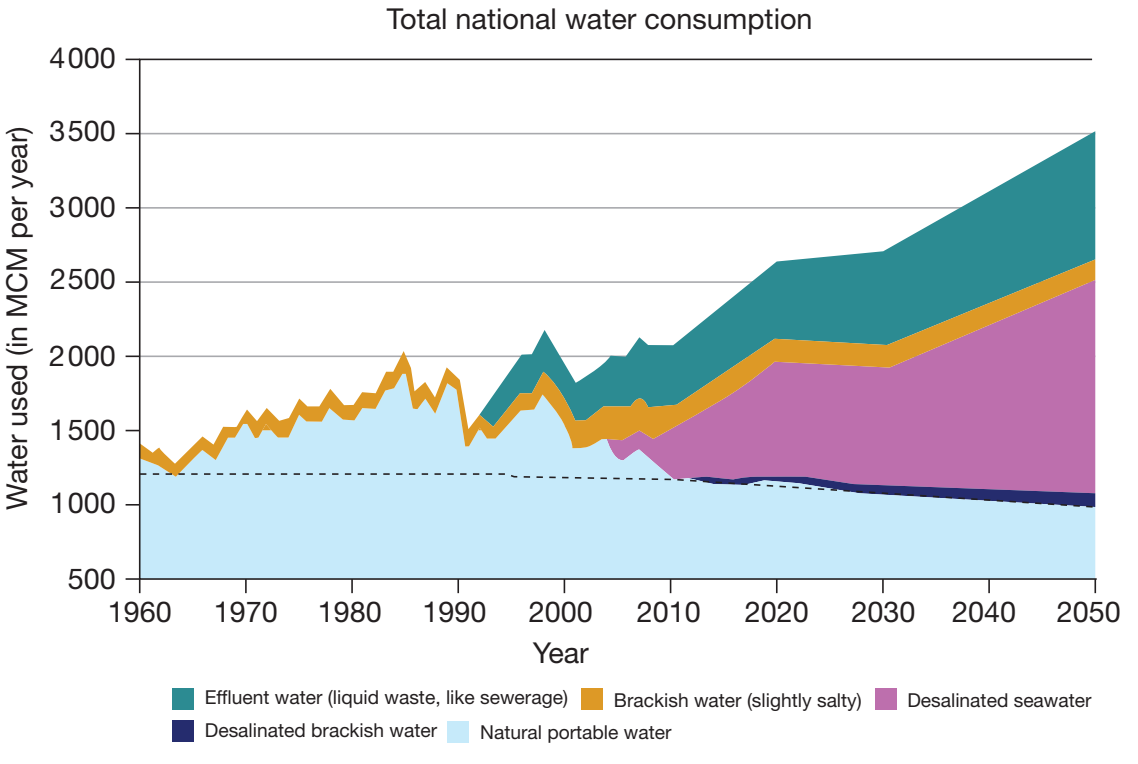
DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 8.4

Stacked line graphs

Stacked or compound-line graphs are made up of several line graphs stacked on top of each other. The top line of the graph shows the total or overall quantity, and the thickness of each colour in the graph shows the proportion that each segment makes of the total. As with a normal line graph, the change in the total and the change in these proportions can be analysed.

In Figure 8.46, the top line of the graph shows how the total water consumption in Israel is changing over time. Changes in the thickness of each colour show how much water comes from each of the different water resources. For example, in 2010, approximately 1200 MCM/yr came from natural potable water, 300 MCM/yr came from desalinated seawater, 200 MCM/yr came from brackish water and 400 MCM/yr came from recycled effluent water or wastewater.

Answer the questions below using the information from Figure 8.46.



▲ **Figure 8.46** This graph shows the change in the amount of water consumed in Israel and the proportion of where it comes from. It is measured in million cubic metres (MCM) per year.

1 Describe how the total water consumption in Israel changed between 1960 and 2020.
2 Describe how water consumption is expected to change from 2020 to 2050.
3 Suggest a reason for the changes you have described in Questions 1 and 2.
4 Based on the information in the graph, in roughly what year did Israel start recycling its wastewater and desalinating seawater?
5 How has the amounts used of each type of water resource changed over time and how is this expected to change in the future?
6 Suggest a benefit that will come from the predicted reduction in the use of natural potable water.

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▲ **Figure 8.47** A drip-irrigation system used to irrigate olive trees in Jerusalem

Drip irrigation

In traditional forms of irrigation, farmland is flooded with water or sprayed with large sprinkler systems. A large amount of water is wasted as it evaporates or runs off the land. This means that the water does not seep into the soil or it infiltrates too rapidly for plant roots to absorb it. Drip irrigation involves the slow dripping of water directly onto the plant's **root zone**. The result is a higher **crop yield** and a higher quality product. Israel's shift towards drip irrigation has decreased the amount of water needed for agriculture by 30 per cent.

The future

Even though Israel managed to use desalination and water recycling to secure a reliable water supply, their challenge is not over. Israel's population is still growing at a very rapid rate and is expected to double by 2050. Meanwhile, rainfall is still far lower than average. Sustainable management and continued technological innovations will be needed to ensure that Israel's water resources can support its population and industries. However, the lessons Israel has learned in managing its water supply have important consequences. Many of the innovations Israel has made, such as drip irrigation, are being implemented across the world in countries like India, Kenya and the United States.

KEY TERMS

root zone the area of soil surrounding the roots of a plant

crop yield the size of a crop grown within an area

Amazing but true …

Drip irrigation was invented in Israel in the twentieth century. The idea began in 1930 when a young water engineer, Simcha Blass, noticed a row of trees on a farm. One tree was twice as tall as the others. He noticed a water pipe had leaked and was regularly dripping water onto the tree's root zone. Blass patented his idea in 1959 and created the first drip-irrigation company in 1964.

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 8.4

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 State two reasons why Israel has to manage its water resources carefully.
2 List and describe three ways that Israel has managed to reduce its water scarcity.
3 How much of Israel's wastewater is recycled?

Interpret

4 Describe how recycling water can benefit both society and the natural environment.
5 Discuss why education was an essential part of Israel's water management.

Argue

6 Compare and contrast Australia's water management to Israel's.
   a Discuss how Australians could adopt innovations from Israel that might help us to deal with our own water scarcity more effectively. (You can use Figure 8.48 to help you with your answer.)
   b Consider the possible negative consequences of adopting these ideas.

▲ **Figure 8.48** Water purification plants are becoming more common around the world in an effort to maintain the sustainability of water resources. This is an aerial view of a plant similar to those used in Israel to purify brackish water and wastewater.

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8.5 The significance of water for different peoples

FOCUS QUESTION

What role does water play in the spiritual, economic and cultural life of peoples in Australia and around the world?

Water is and always has been essential to all aspects of life. In fact, recent evidence from NASA suggests that liquid is likely to exist on Mars, which could be a hint of current or previous signs of life! Not only does water sustain life, but it is also a significant part of diverse ancient and modern-day cultures around the world. Water is culturally and spiritually important to many societies, including ancient civilisations.

Ancient beliefs and cultures

Since ancient times, water has been a significant part of cultures around the world. Many cultures made water an important part of their religious rituals and beliefs.

The ancient Egyptians called the Nile River the 'father of life'. They believed that the god Khnum controlled the flow of the Nile and sent the floods each year. To keep this god happy and ensure the Nile River continued to flow, the ancient Egyptians built shrines and temples honouring Khnum. They also threw food and statues into the Nile River as offerings to the god.

◄ **Figure 8.49** This bas-relief is from the Temple of Khnum in Egypt and shows an offering of water to Khnum from a pharaoh

▲ **Figure 8.50** The ruins of the Temple of Poseidon, believed to date back to the fifth century BCE, at Cape Sounion in Greece. This is one of many temples dedicated to the ancient Greek god Poseidon, god of water and the sea

Ancient Greeks had a similar connection with water through their god, Poseidon, who was the god of the sea and water, as well as earthquakes, storms and horses. The ancient Greeks relied heavily on the sea for trading and transport between the mainland and the Greek islands. There are ancient temples dedicated to the worship of Poseidon in Greece.

To learn more about ancient Egypt, see Chapter 2, and to learn more about ancient Greece, see Chapter 3.

Archaeological evidence shows that Aboriginal and Torres Strait Islander peoples lived along the river banks in places all throughout Australia. They managed these waterways to ensure they could use the fish and plant life to feed themselves.

The connection between Aboriginal peoples and water was recognised in 2019 when the Budj Bim cultural landscape was added to the World Heritage Site list. This site

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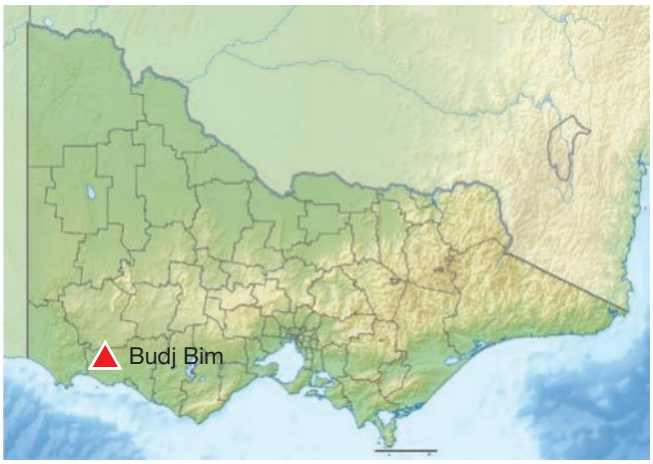

▲ **Figure 8.51** Budj Bim is a located in southwestern Victoria, within Budj Bim National Park. Stone traps were used by the Gunditjmara people to trap eels for food.

KEY TERMS

aquaculture the breeding and harvesting of fish and other freshwater organisms

weir a small dam or barrier stopping the flow of a river

in western Victoria is an **aquaculture** system containing **weirs**, channels and holding ponds to trap fish. The system supplied the ancient Gunditjmara people with a reliable food source to consume and trade.

To learn more about Aboriginal and Torres Strait Islander peoples as the First Australians, please see Chapter 1, and to learn more about ancient India, see Chapter 6.

Beliefs and cultures today

Hindus believe that large rivers are sacred and provide a connection with the gods. The Ganges River is one of the most significant rivers in Asia. It is over 2500 kilometres long and flows through some of the most populated places in India and Bangladesh. Four hundred million people rely on it for drinking, bathing and irrigation.

The Ganges River is sacred for Hindus as it is considered to be a form of the goddess Ganga. Many Hindus believe that if you bathe in the Ganges River you will be cleansed of your impurities and negative actions. Millions of people make pilgrimages to the Ganges River to bathe in its waters. Many people also scatter the ashes of their deceased loved ones on holy rivers like the Ganges River. Hundreds of Hindu festivals and celebrations are held on the banks of the river each year.

Amazing but true …

Although the Ganges River is believed to be sacred and spiritually pure, it is one of the most polluted rivers on Earth.

▲ **Figure 8.52** Rapid population growth and urban development in India has led to the widespread pollution of the Ganges River and surrounding regions

Water has been and still is a significant part of the culture of Aboriginal and Torres Strait Islander peoples. Water is a symbol of life and has been a central part of Indigenous lifestyles for tens of thousands of years.

> Water is the life for us all … If that water go away, everything will die. That's the power of water. He connect with the land.
>
> **John 'Dudu' Nangkiriyn, Bidyadanga, Western Australia**

In modern Australia, Aboriginal and Torres Strait Islander peoples living in remote communities in the Northern Territory see water management as a high priority. Due to a lack of permanent rivers in desert areas, many of these communities rely heavily on accessing bore water from groundwater supplies. The people in these remote communities are forced to compete with mining, livestock and urban areas to access their share of a limited water supply.

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ACTIVITY 8.8

First Australian history

Research the history of a large river or coastal region in your local area. Write a paragraph summarising:

- Who the traditional owners of the land are
- The history of what the area was used for
- Current links with First Australians.

Aesthetic and recreational value

Many people might not have a deep spiritual connection to water, but it is still a significant part of their culture. For example, water activities are enormously popular in Australia and around the world. These activities include water-based sports such as swimming and waterskiing, and hobbies such as fishing.

The beauty of coastal and river environments, alongside the recreational opportunities that water provides, means that places near water are popular choices for holidays. Water also plays a big part in increasing the prices in real estate. Waterfront properties in capital cities or in places that have easy access to the beach, such as the Gold Coast, usually have higher prices than properties that are inland.

Amazing but true …

A study in 2015 found that 13 per cent of Australians, which is a total of 2.7 million people, live in a house that has a swimming pool. Those of us who have a swimming pool, or regularly go swimming in one, know how fantastic they are for relaxing, exercising and spending time with friends or family. Australia is well known for its swimming athletes, many of who have won Olympic medals. Ian Thorpe and Leisel Jones have won nine Olympic gold medals each.

FIELDWORK 8.1

Exploring the significance of a local water resource

Fieldwork is an essential part of studying geography. It enables you to investigate many of the concepts studied in the classroom by collecting data out in the real world. In this investigation, your aim is to explore a water resource close to your school or home, and determine the ways it is used and its significance for the surrounding region.

First, choose a local resource and develop a plan for a fieldwork investigation. Ideas include:

- The Yarra River
- A smaller urban or rural river such as the Dandenong Creek, the Maribyrnong River or the Yea River
- A lake such as Lysterfield Lake, Lake Wendouree, Pink Lake or Lake Eildon
- An example of water management such as the raingardens at Docklands or Federation Square
- A water reservoir such as Upper Yarra Reservoir or Cardinia Reservoir.

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Use the following structure to plan your investigation and present your results.

Title and introduction

Introduce your study by providing some context. This should include the location of your chosen water resource and what aspects you will be investigating.

Aim

Write an aim for your fieldwork that is achievable based on the data that you intend to collect.

Research question

Write a research question that you intend to answer using the data that you collect. Examples include:

- What are the different ways this resource is used by people?
- What role does this resource play in the local water supply and the surrounding environment?
- How is this resource managed?

Hypothesis

Write a clear and concise hypothesis. This is a testable statement that provides a testable prediction prior to collecting the primary data. It should relate to the research question.

Primary data collection

Consider the types of primary data that you will need to test your hypothesis and answer your research question. Examples include:

- Observations, annotated photos and field sketches showing the interconnection with the surrounding landscape
- Water-quality samples
- Analysis of the quality and species of vegetation surrounding water bodies
- Interviews and surveys of local residents about how they use the resource
- An interview with a group that manages the water supply such as Melbourne Water, a catchment management authority or a local community group.

Secondary data collection

Use a range of secondary sources to supplement your primary data. Examples include:

- Satellite images and elevation data gathered using Google Earth
- Previous studies and management information from the websites of management groups and government authorities.

Presenting and analysing your data

Summarise your data using tables, graphs and maps where appropriate. Analyse your data to draw conclusions, answer your research questions and state whether your hypothesis has been supported or disproven.

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Conclusion and evaluation

Summarise your findings and evaluate the success of the field trip. What were the positives and negatives of your data collection? What could be done differently next time? What additional data could be collected to extend this investigation?

References

Always ensure you keep a record of any sources used and present these in a bibliography.

END-OF-SECTION REVIEW 8.5

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 Describe an example of an ancient civilisation having a spiritual or cultural link with water.
2 What do Hindus believe will happen to people who bathe in the Ganges River?

◄ **Figure 8.53**
Devotees immerse themselves in the Ganges River at Varanasi as part of a religious festival. Each year cities like Varanasi are inundated by pilgrims who want access to the Ganges River.

Interpret

3 What evidence shows us that groups of First Australians managed water resources to suit their needs?

Argue

4 The history of water management by Aboriginal and Torres Strait Islander peoples is valuable and should be a primary concern when managing water resources. Discuss whether you agree with this statement. Refer to specific examples to justify your opinion.

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Making thinking visible

Circle of viewpoints

Managing water within the Murray–Darling Basin is one of the greatest resource-management challenges in Australia. Choose one of the following perspectives:

- A farmer who withdraws water to irrigate crops
- A local resident in a farming town such as Goulburn or Renmark
- An environmentalist concerned with the health of wetlands and river environments.

Complete the following statements regarding the way you think water within the Murray–Darling Basin should be managed, from your chosen viewpoint.

I am thinking of water within the Murray–Darling Basin from the point of view of …

I think water within the Murray–Darling Basin …

A question I have from this viewpoint is …

3 Research tasks

Choose one of the examples provided throughout this chapter and prepare a case study. This will require in-depth research about a topic and specific location. Two ideas are given here.

- An evaluation of the success of the Murray–Darling Basin Plan by comparing different regions such as Finley and Mildura.
- The recent water scarcity situation for Chennai or another location in India.

Develop a research question based on your topic and present your results in a written report or an oral or audio-visual presentation.

4 Extended-response question

Claim: *Water scarcity is caused by a range of factors and leads to a variety of consequences for different places. Ensuring economic, social and environmental sustainability in these water-scarce regions requires unique management responses.*

Discuss this statement in the context of one or more case studies presented within this chapter.

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5 Problem-solving task

Consider the water crises in Chennai and Cape Town. Discuss whether the water-management strategies used in the Murray–Darling Basin or in Israel could have been applied in these situations. What factors might determine the success of these responses in these places?

▲ **Figure 8.54** Residents in Cape Town queuing to refill water bottles in January 2018. During this time, residents were limited to the maximum daily water usage of around 50 litres a day per person, which is about the equivalent of a two-minute shower.

6 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about water management

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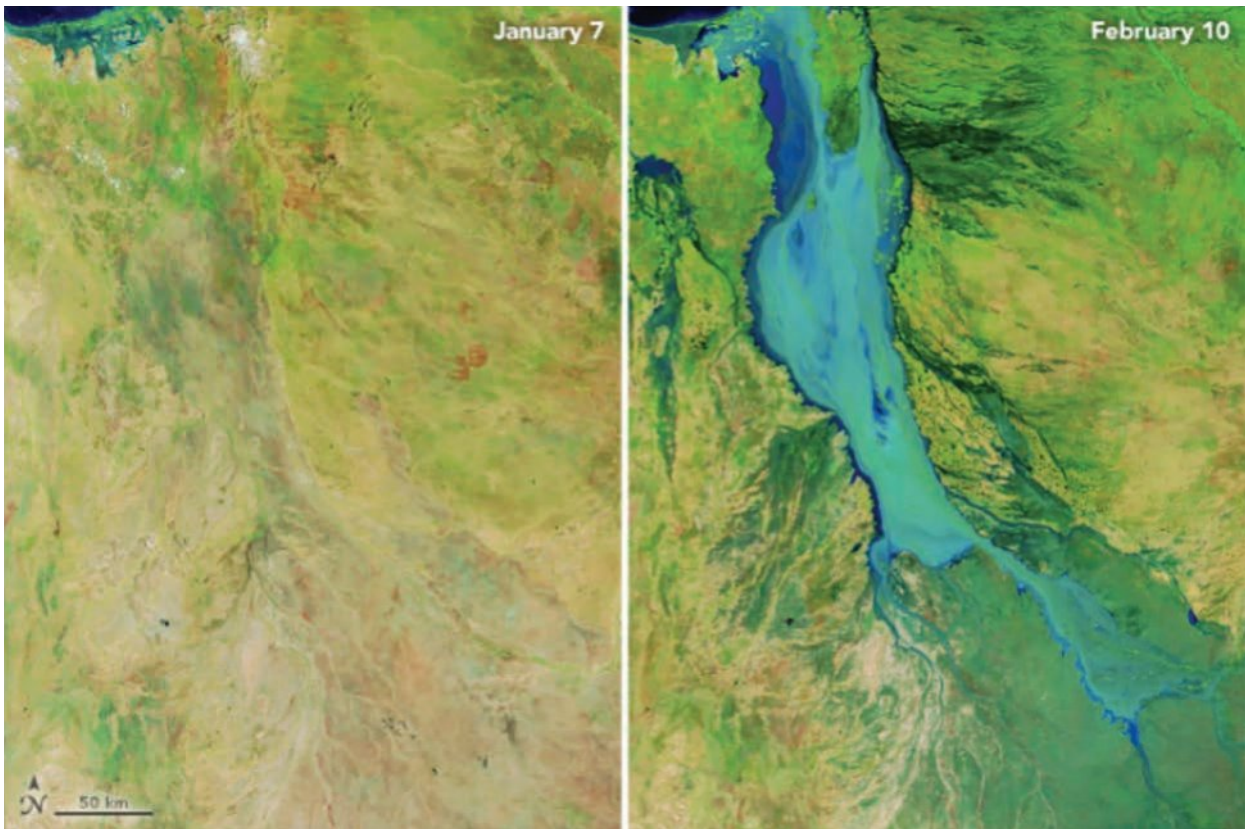
CHAPTER 9

Hydrological hazards: floods

Setting the scene: the Queensland floods of 2019

During 2019, Queensland experienced some of the worst flooding in Australia's history. The floods wrecked homes and infrastructure, threatened the safety of locals and cost hundreds of millions of dollars in damages. Flood warnings were issued for six of Queensland's major rivers. The flooding of Queensland's longest river, the Flinders River, was estimated to have been the worst in over 50 years, with the river spreading as wide as 60 kilometres across its floodplain.



▲ **Figure 9.1** These are satellite images of the Flinders River in 2019. The image on the left was taken before the flooding in January 2019. The image on the right shows the flooding in February 2019.

KEY TERMS

floodplain an area of flat land near a river that is often flooded when the river becomes too full

megalitres a metric unit of capacity equal to a million litres

After more than 1.4 metres of rain fell on Townsville over eight days, the Ross River Dam was at 247 per cent of its capacity. To prevent the dam from collapsing under the weight of the water, the Queensland government had to release water downstream. Nearly 2 megalitres of water was released from the dam every second. This led to the flooding of more than 3000 homes across 20 suburbs. More than a thousand people were evacuated.

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The flooding overwhelmed emergency services, with people having to wait to be rescued from the flood waters. According to an ABC News report, the Populin family, who lived in a suburb of Townsville, ended up with 16 families sheltering in their house overnight. The family were lucky enough to have a generator so that they could keep their electricity running during the flooding. One of their neighbours had a small boat that he used to ferry people to safety in the Populin's house. Another of their neighbours used a kayak to get his family safely to the house. Overall, almost 60 people waited at the Populins for several hours until the army were able to take them safely to an evacuation centre. Animals were not so lucky; an estimated 500 000 cattle died in the floodwaters.

▲ **Figure 9.2** Civilians being assisted in evacuating by members of the Australian Army. In some places the water was reported to be at the chest height of an average adult.

Floods such as these are a regular occurrence in Australia and they cause millions of dollars in damage almost every year. This flood caused $885 million dollars' damage. Although the state and federal governments prepare for floods, limiting the impact of floods on people and the environment is challenging because of their unpredictable nature.

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 9.1

Analysing satellite imagery

Satellite images, such as the ones shown in Figure 9.1, are photographs taken from space using satellites. If you have ever looked at your house or school on Google Earth, then you have used satellite imagery. Satellite images are very useful to geographers because they show large-scale changes to the landscape. This means that these images can be used to analyse events such as floods.

Satellite images often show a north arrow so that we know which way they are oriented. They also include a linear scale. A linear scale enables us to compare distances on the image with distances in the real world. In Figure 9.1, the length of the line in the bottom-left of the first image represents a distance of 50 kilometres.

Refer to Figure 9.1 and then answer the following questions.

1. What do you think the colours in the images represent? (You may wish to create a legend to support your answer.)
2. What is the approximate length of the Flinders River in the image?
3. How wide did the floodwaters spread?
4. What impact did floodwater seem to have on nearby **vegetation**?
5. Why do you think some people choose to live near rivers despite the risk of flooding?

KEY TERM

vegetation the plants found in an area such as trees, shrubs and grasses

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▼ **Figure 9.3** The first satellite image shows the normal footprint of the Ross River as it flows through Townsville. The second image shows the extent of the 2019 flooding at its peak.

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MAKING THINKING VISIBLE 9.1

Explanation game

1. Examine at the two satellite images in Figure 9.3.
2. Identify something interesting about these images and write a sentence using the sentence starter: 'I notice that ...'.
3. Once you have written your sentence, ask yourself 'Why is it that way?' or 'Why did it happen that way?' Write a few sentences in response.

▲ **Figure 9.4** Townsville during the floods, which some refer to as a 'once in a century' weather event. Thousands of residents were evacuated.

◄ **Figure 9.5** Flood waters overwhelm Townsville. As the rain worsened, water from the Ross River dam was released to prevent the failure of the dam's wall.

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Chapter overview

Introduction

Hydrological hazards are dangerous weather events involving water. They include having too much water, such as in the case of heavy storms leading to floods and landslides, and not having enough water, such as a lack of rain leading to a **drought**. Hydrological hazards are driven by atmospheric conditions such as wind, humidity, temperature and rainfall.

KEY TERMS

drought long period of water shortage, usually as a result of low rainfall

climate the long-term trends in the weather conditions of a place such as its average rainfall and temperature

Hydrological hazards have an enormous impact on people, places and the environment. Some places are extremely vulnerable because of their **climate** and location. In many parts of Australia, people regularly deal with the danger and consequences of this type of hazard.

This chapter focuses on floods as an example of a hydrological hazard. It covers the causes of floods, different types of floods, the various ways that floods impact people and places, and the strategies that are put in place to reduce flooding and its impacts.

Learning goals

After completing this chapter, you should be able to answer these questions:

- What are floods?
- Why do floods occur?
- Where do floods occur?
- What are the social, economic and environmental impacts of floods?
- How do people respond to floods to minimise their impacts?

Geographical skills

After completing this chapter, you should be able to:

- Explain processes that influence the characteristics of places
- Identify, analyse and explain spatial distributions and patterns, as well as identify and explain their implications
- Identify, analyse and explain interconnections within places and between places, and identify and explain changes resulting from these interconnections
- Select and represent data and information in different forms, including constructing appropriate maps at different scales that conform to cartographic conventions, using digital and spatial technologies as appropriate
- Analyse maps and other geographical data and information, using digital and spatial technologies as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology.

▲ **Figure 9.6** Venice suffered the worst flood of the Adriatic Sea for 50 years in November 2019. As a city built in the middle of a lagoon, separated from the sea by thin strips of land, Venice has to plan against flooding.

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9.1 Floods: a natural process or a natural disaster?

FOCUS QUESTIONS

- What are floods?
- Why do floods occur?
- Where do floods occur?

What are floods?

A flood is when water **submerges** land that is normally dry. Floods can last anywhere from a few hours to several months and can affect small individual places, entire towns or many kilometres of land. They occur in a variety of places such as near rivers and dams, in the valleys between mountains and in coastal regions. Floods are a naturally occurring part of the water cycle and are essential in maintaining the health of many environments. However, when floods meet civilisation, they can wreak havoc and be very costly.

Why do floods occur?

When rain falls, some of the water **infiltrates** or seeps into the soil, some of it **evaporates**, and some of it flows into rivers and creeks (referred to as **runoff**). During large rainfall events, such as large storms, soil can become **saturated**, meaning that it can no longer absorb any more water. This causes more water to run into river systems. Eventually, the rivers become so full that the water flows out over the floodplain.

Coastal flooding

Coastal areas are particularly vulnerable to flooding. Floods occur when large amounts of water are pushed ashore, sometimes several kilometres inland from the coast. Flooding in coastal areas happens because of a **storm surge**, **high tide** or **tsunami**. Storm surges occur as a result of large storms, for example those caused by a **tropical cyclone**. High winds push water up against the coast as a cyclone approaches, causing a temporary rise in the sea level. This can be particularly disastrous if it occurs during a high tide.

KEY TERMS

submerge to cause something to be under water

infiltrate to seep into the ground so that water is absorbed by the soil

evaporation the process of a liquid changing to a gas, especially by heating

runoff water that is not absorbed by the land and flows from high areas to low areas

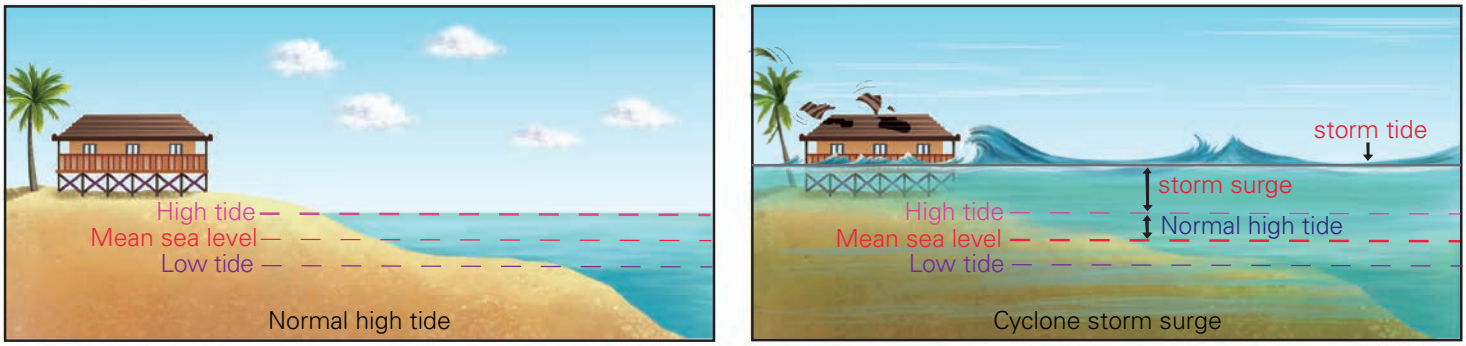
saturate to reach a point where soil cannot absorb any more water

storm surge a rise in sea levels due to wind and other atmospheric elements of a storm

high tide the time when the sea or a river reaches its highest level and comes furthest up the beach or the bank

tsunami a high wave that forms out at sea due to a disturbance underground such as an earthquake

tropical cyclone a rapidly rotating storm system with strong winds and thunderstorms



▲ **Figure 9.7** A storm surge leads to a temporary increase in the height of the sea level. This illustration shows the sea level in a coastal area before a storm surge (left) and during the surge (right).

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ACTIVITY 9.1

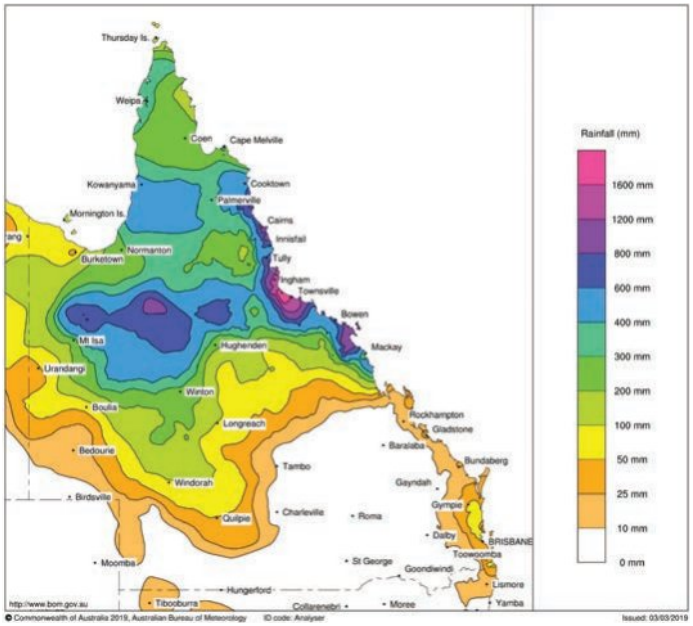
Creating a flowchart

Draw a flowchart that summarises the process that forms a flood. Use some of the key words from the text and include linking words to show the connection between these concepts.

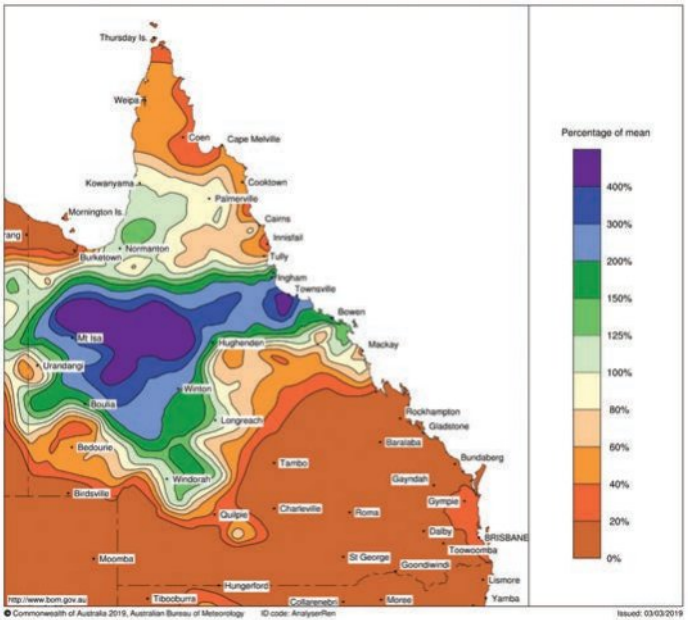
High rainfall leading to flooding

The beginning of this chapter outlined the devastation of the 2019 Queensland floods. Figure 9.8 shows the amount of rainfall that fell in Queensland during this period.

Figure 9.9 shows the amount of rainfall that fell during this period compared to the normal February average. In some places, the rainfall was 400 per cent more than the average, which is five times the usual amount.



▲ **Figure 9.8** The amount of rainfall that fell in Queensland from 26 January to 9 February 2019 (please see the digital versions to zoom in on this figure)



▲ **Figure 9.9** The amount of rainfall from 1 to 19 February 2019, compared to Queensland's February average (please see the digital versions to zoom in on this figure)

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 9.2

Describing space

Geographers use maps to analyse the distribution of phenomena in space. This is not referring to outer space, but 'spatial distribution', which is how things are arranged. Geographers analyse spatial distributions and look for patterns so that they can understand how or why things occur.

Refer to Figure 9.8 and answer the following questions.

1. Which part of Queensland received the most amount of rainfall from 26 January to 9 February 2019? How much rain fell during this period?
2. Name three places that received more than 800 millimetres of rainfall.
3. Which parts of Queensland received the least amount of rainfall?
4. Write a statement summarising the pattern of rainfall shown. Include a description of the regions that received the most and least amount of rain, as well as the location of these regions. You can use compass directions, and words such as 'coastal' and 'inland' to help you with this.

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Amazing but true …

Tropical cyclones are known as 'hurricanes' in the United States and 'typhoons' in Asia.

► **Figure 9.10** This satellite image shows Tropical Cyclone Ingrid in the Coral Sea just off the coast of northern Australia in 2005

Different types of floods

There are three main types of floods: flash floods, slow-onset floods and quick-onset floods. Floods vary because of the **meteorological event** that caused them and where the flood is located, such as near the coast, inland or close to mountain ranges. As Figure 9.11 shows, floods can occur because of modifications to the land, such as building cities on floodplains. While building dams can slow the flow of rivers and reduce the risk of flooding, if a dam fails it can be a major cause of downstream flooding.

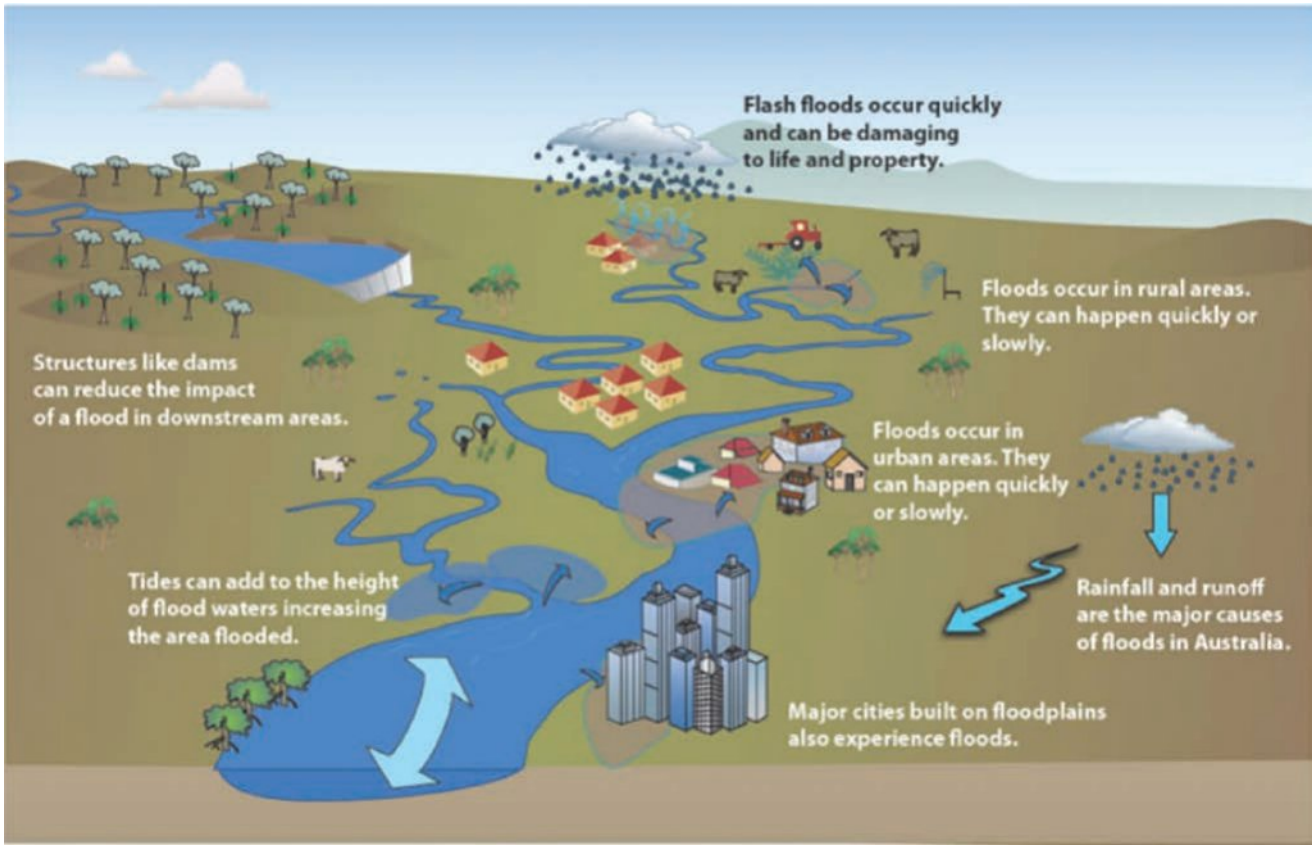
KEY TERMS

meteorological event an event relating to changes in the weather such as fog, rain, storms and cyclones

thunderstorm a storm that produces thunder and lightning and usually heavy rainfall or hail

Flash floods

Flash flooding is caused by a large amount of rain falling over a short period of time. This is usually due to large **thunderstorms** that lead to heavy rainfall. Flash floods are the most rapid type of flood, typically occurring within six hours of an intense rainfall event.



▲ **Figure 9.11** The characteristics of floods

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▲ **Figure 9.12** A taxi driving through Queensbridge Street in Melbourne during a flash flood

KEY TERM
urban areas built-up environments such as cities or large towns

This means that flash floods pose the greatest threat to life as there is little time to warn people or for them to evacuate.

Many places are vulnerable to flash flooding because they are built on floodplains. This includes a large number of Australian towns and cities such as Melbourne, as shown in Figure 9.12. **Urban areas** are vulnerable because they are covered with hard surfaces such as roads, footpaths and roofs. This means that during high rainfall events, water cannot infiltrate or seep into the soil and the water is instead washed into drains. When these drainage systems fill, flash flooding occurs.

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 9.3

Reading a climate graph

Climate graphs are used to represent the mean (average) temperature and rainfall of a location throughout the year. The graphs can be used to compare the climates of different places, and extreme weather events to long-term averages.

The information on the climate graph in Figure 9.13 is organised monthly. The red and blue lines represent the average maximum and minimum temperatures (°C) each month. These values can be read from the vertical axis on the left. Rainfall is shown in millimetres (mm), which is represented as blue bars. These values can be read using the vertical axis on the right.

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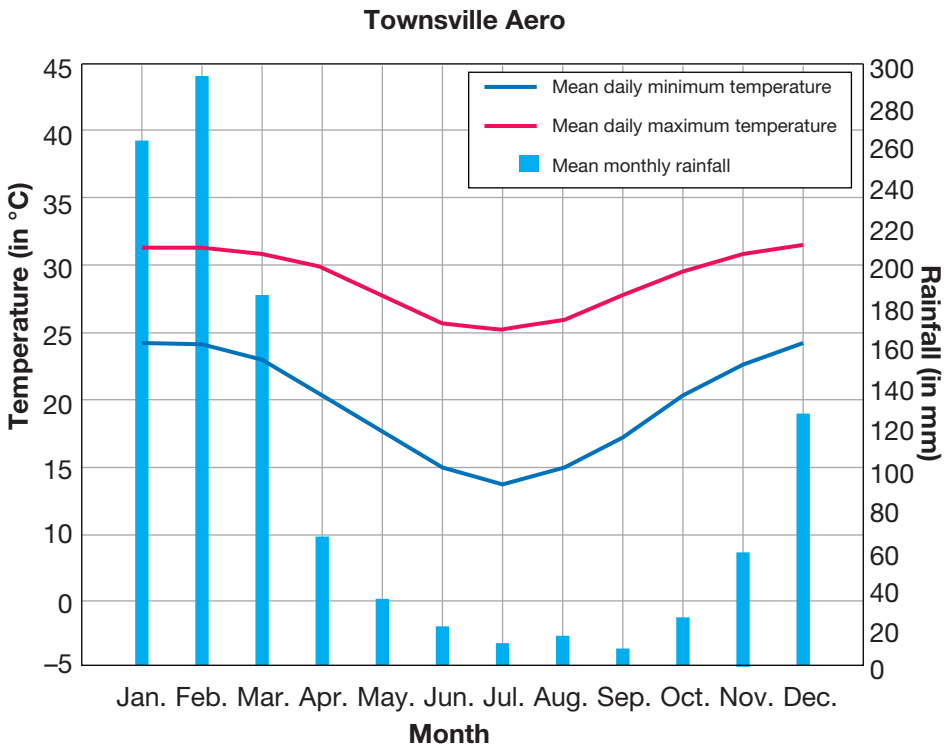

▲ **Figure 9.13** Climate graph of Townsville

1 Use the graph in Figure 9.13 to answer the following questions about Townsville.
   - **a** Which is the hottest month and what is the highest mean temperature?
   - **b** Which is the coldest month and what is the lowest mean temperature?
   - **c** Which month has the highest average rainfall and how many millimetres does it usually receive?

2 The table here outlines the amount of rainfall that fell during the first eight days in February in 2019. Use this table to answer the questions.

Date	Rainfall (mm)
February 1	216
February 2	121
February 3	153
February 4	173
February 5	43
February 6	108
February 7	17
February 8	122

   - **a** What was the total amount of rainfall for the first eight days of February 2019?
   - **b** How much greater was this than the February average?

3 Search online to find a climate graph for another place in Australia. Write a paragraph comparing the climate in Townsville to the climate in this place. In your discussion, refer to specific climate data such as monthly rainfall, total rainfall and average temperatures throughout the year.

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▲ **Figure 9.14** In December 2017, Euroa received a record-breaking 146 millimetres of rainfall in 24 hours, which led to widespread flooding of the town. There were 1500 requests for help from the State Emergency Service.

Slow-onset floods

Slow-onset floods occur when water slowly builds up over several days or weeks. When there is a large amount of rainfall spreading over several hours, days or even weeks, the ground becomes saturated. This means that infiltration can no longer occur. Therefore, a large amount of runoff flows into rivers and creeks. When river channels can no longer contain this extra water, the water overflows the banks and floodwaters spread across the floodplain, inundating the land.

Slow-onset floods typically occur in rural areas and can last several weeks or even months. Residents are given plenty of warning, allowing them to prepare and evacuate. This means slow-onset floods are less dangerous to human lives than other types of floods. However, they have a huge economic cost because of the destruction to infrastructure. Slow-onset floods can cause damage to towns, roads, railway lines, bridges and agricultural land, and livestock can die.

Quick-onset floods

Quick-onset floods tend to occur more frequently in steep mountainous areas of high rainfall, where rivers flow quickly. They can be caused by high rainfall events or snowmelt. Quick-onset floods also occur in coastal areas where rivers have the largest volume of water flowing in them, or where there is the risk of tropical cyclones. These types of floods only last for a short period of time and the land is typically submerged for a few days. However, quick-onset floods are very dangerous as they occur with little warning and the floodwaters often move rapidly. People can be caught unprepared.

ACTIVITY 9.2

Summarising the main features of floods

Summarise the features of the three main types of floods in a table. You may wish to use the following template as a guide.

	Flash flood	Quick-onset flood	Slow-onset flood
Description			
Cause			
Impacts			
Example			

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Where do floods occur?

The locations where floods occur can be explained by the causes of a flood. High rainfall is the most common cause of flooding and so areas that experience high rainfall or events such as tropical cyclones are likely to experience flooding. The shape of the landscape can also determine flooding as the physical features of the land control where water flows. **Low-lying areas** are particularly vulnerable because water flows downhill to reach these places.

A less obvious reason why some areas are vulnerable to floods is because of poverty. While many wealthy areas can build structures and infrastructure to prevent flooding, many poorer regions, particularly those with a high population density, do not have this luxury.

Flooding in Bangladesh

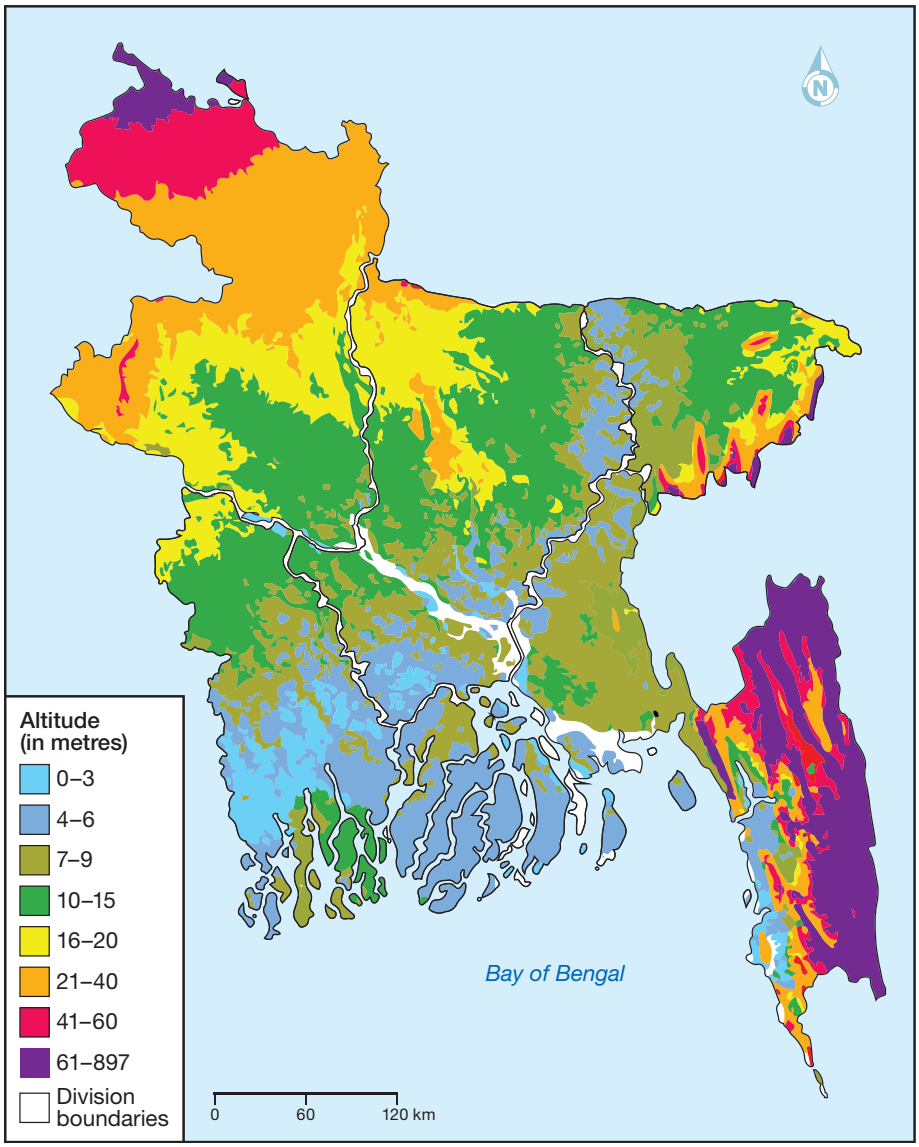
Bangladesh is an example of a country that is very vulnerable to flooding. It experiences major floods most years because Bangladesh:

- Is located where the three largest rivers in Asia, the Ganges River, Brahmaputra River and Meghna River, meet in the Ganges Delta
- Has a very low elevation, with most of its land mass located less than ten metres above sea level (see Figure 9.15)
- Has a subtropical climate, which means it experiences a **monsoon** season with very high rainfall from June to October each year
- Has a very high population density and is a relatively poor country, which means that floods have a major impact.

KEY TERMS

low-lying area an area that has a very low elevation and is close to sea level, usually located near the coast

monsoon the seasonal changes in atmospheric wind circulation and precipitation



◄ **Figure 9.15**
An elevation map of Bangladesh

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ACTIVITY 9.3

Interpreting data

Look at the elevation map in Figure 9.15 and answer the following questions.

1. Estimate how much of Bangladesh is located at an altitude of less than 10 metres.
2. Describe where the lowest and highest parts of Bangladesh are located.
3. Use an atlas or Google Maps to explore the region north of Bangladesh. What major landform is located here?

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 9.4

Describing the characteristics of a place

When geographers refer to a place, they are referring to:

- Location
- Geographic characteristics
- The sense of place and the connections that people have with it.

Location can be described in two ways. *Absolute location* refers to a place's exact location. This might be its latitude and longitude or a street address. *Relative location* is the distance and direction that a place is from somewhere else. For example, Ballarat is located approximately 100 kilometres north-west of Melbourne.

Geographic characteristics are the features of a place. These can be divided into *natural* and *human* characteristics. The geographic characteristics of Bangladesh listed earlier are its major landforms, elevation, climate (natural characteristics) and population density (human characteristics).

The sense of place is harder to define. It refers to what the place is like, why it is significant and the connections that people have with it. Different people have different connections to a place based on their age, gender and interests.

Now that you know these characteristics of a place, complete the following research task.

1. Use Google Earth or an atlas to find a major city in Bangladesh.
2. Describe the absolute location of your chosen city by stating where it is located within Bangladesh or its latitude and longitude.
3. Describe the relative location of your chosen city by describing how far and in what direction it is from Dhaka, Bangladesh's capital.
4. Research your chosen city online and list some of its geographic characteristics. This might include population, elevation and any major rivers or other landforms located in or around the city.
5. Repeat this activity using a location that is significant to you. You might choose a place where you ride your bike or somewhere you have been on a holiday. Use the three characteristics of place to describe this area to a classmate.

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END-OF-SECTION REVIEW 9.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 Define the following terms:
- Flood
- Floodplain
- Infiltration
- Evaporation
- Runoff
- Saturated
- Tropical cyclone
- Low-lying area
- Elevation.

2 List three of the impacts of the 2019 Queensland floods.

3 Explain the difference between a flash flood, a slow-onset flood and a quick-onset flood.

4 Explain what a storm surge is and why it can cause flooding.

Interpret

5 State whether each of the following is an example of a flash flood, slow-onset flood or a quick-onset flood.
- **a** A tropical cyclone brings very heavy rainfall to a coastal town over a 24-hour period. Local rivers immediately begin to overflow onto the floodplain.
- **b** A thunderstorm causes heavy rainfall from 4.00 pm until 7.00 pm, which leads to rapid flooding of a suburb of Melbourne.
- **c** Consistent rainfall over a three-day period in one of Victoria's rural areas causes rivers to slowly rise and flood over several kilometres.

6 Describe the characteristics of a place that might make it vulnerable to flooding.

Argue

7 High rainfall is the only reason why floods occur. Discuss whether you agree with this statement. Provide an explanation and examples to justify your opinion.

8 Discuss whether you think people should be allowed to live in places that are vulnerable to flooding. Consider the attractions in living in those areas and the drawbacks.

◄ **Figure 9.16** Bangladesh during a flood

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9.2 Reducing the impacts of floods

FOCUS QUESTIONS

- What are the social, economic and environmental impacts of floods?
- How do people respond to floods to minimise their impacts?

What are the impacts of floods?

In geography, an impact refers to a change or an effect of an event. This includes the consequences of the change or effect. Geographers often classify impacts into three categories:

- *Environmental impacts* which are to do with both the natural and human environments
- *Social impacts* which are to do with people including their wellbeing or safety
- *Economic impacts* which are to do with money including income or costs.

When we think of the impacts of an event, most people tend to consider negative effects. However, it is important to remember that impacts within these categories can also be positive.

Environmental impacts

Floods are a natural and essential process in maintaining the health of many environments. They have a very important role as an interconnection or link between river channels and floodplains. By flowing over land, floodwaters recharge groundwater systems. They also replenish wetlands and forests with water, sediment and nutrients. Floods lead some species of fish to breed or migrate. Many of these benefits to the environment also benefit farmers as floods can make land more fertile for growing crops or pasture.

The Barmah–Millewa Forest (shown in Figure 9.17) is the largest river red gum forest in Australia. The place is a vital habitat for thousands of waterbirds. Flooding in

▼ **Figure 9.17** Floods are essential in maintaining the health of wetlands such as the Barmah–Millewa Forest

▲ **Figure 9.18** Debris left behind after flooding can clog waterways and provide a place for bacteria to breed

2010–11 ended a drought in the area that lasted almost a decade. The floods revitalised the wetland and forest areas, and ensured the survival of local species.

Although floods play an important part in maintaining the environment, they can also damage an area, particularly environments that have been modified by people. During a flood, **sediment** from floodplains is collected by floodwater. This can contain pollutants, such as harmful chemicals from houses, farms and factories, and **heavy metals**. The pollutants are washed into rivers and become part of the water system. This can contaminate food supplies, especially fish. Debris can be washed downstream and cause blockages or wash away important plant life in and around the river or stream. Rotting carcasses of livestock killed in the floods can degrade the water's quality.

Social impacts

The destruction that often comes with floods can have a large impact on people. This impact increases significantly if floods occur in areas that are highly populated. Floodwaters can threaten the physical safety of people, especially during flash or quick-onset floods. There is also an increased risk of people contracting waterborne diseases and other infections during a flood as well as immediately after. More than 1850 people have died since 1900 as a result of floods in Australia.

KEY TERMS

sediment solid material that is moved by rivers and deposited in a new location

heavy metals dense metals such as iron and lead

displacement moving something or someone from its original place to somewhere else

During floods people may be forced to evacuate their homes, farms and businesses, and schools can be closed for long periods of time. Building structures are often damaged or destroyed, which leads to the **displacement** of people for extended periods. Floods also damage the physical infrastructure that people rely on for utilities such as sewage, electricity and water. As a result, there can be disruptions to power and clean water supplies.

An impact of any natural disaster, sometimes forgotten, is the psychological effect the event has on local people. Figure 9.19 presents some first-hand accounts from those affected by the 2019 Queensland floods.

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I was just aghast at the pace of the water ...When it started to hit about two metres high, the debris was hitting posts under the house. The noise was deafening at some points and it got scary. I saw the rescue helicopter and I thought I could be in that soon.

Roger Goodwin – Townsville resident whose home was damaged in the floods.

It's like inland seas; there're waves in the middle of it in some parts … Flying down there you can see a lot of dead cattle; there's a few survivors. There are a lot of places that are reporting 100 per cent [losses] … and big numbers too, not just a couple of hundred [cattle].

Robert Chaplain – farmer near Cloncurry

North Queensland's unprecedented, catastrophic and ongoing flooding event has seen people evacuated, homes and businesses damaged, roads, schools and childcare centres closed. Sadly ... people have also lost their lives. While the flood waters recede, people are returning to their homes and the true extent of the damage is realised.

Anastacia Palaszczuk – Premier of Queensland

▲ **Figure 9.19** These first-hand accounts describe some of the impact of the Queensland floods in 2019.

Amazing but true …

The impacts of floods in Queensland are often felt around Australia. Extensive damage to banana crops often causes banana prices to soar. In extreme cases, supermarkets can run out of supplies.

▲ **Figure 9.20** This farmer in Innisfail is assessing the damage to his banana crop following a flood caused by a tropical cyclone

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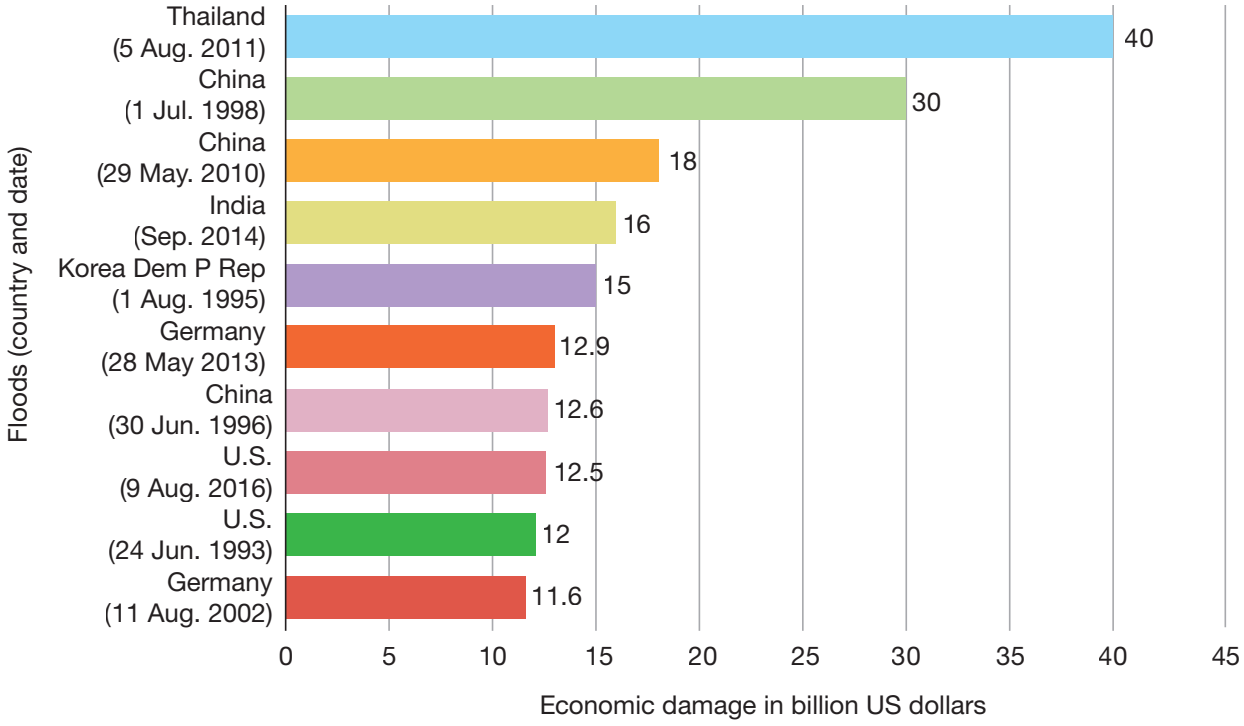
Economic impacts

Floods are the most expensive disasters we experience in Australia. On average, they cost Australia $377 million each year. Between 1967 and 2017, experts estimated that flooding in Australia cost around $42.6 billion dollars; the disastrous floods that occurred in 2010–11 in Queensland are estimated to have cost $14.1 billion. Figure 9.22 shows that, although this cost is significant, even more costly floods than this occur around the world.

Most of the economic impact of floods happens in the aftermath when local and state governments clean up the destruction and repair or rebuild infrastructure. Flooding can damage or wash away roads, bridges, buildings and railway lines. Floods also have a huge impact on agricultural output as they wash away crops and kill large numbers of livestock.

▲ **Figure 9.21** Volunteers helping flood victims clear out their houses, dump damaged and contaminated possessions, and clean what can be salvaged



▲ **Figure 9.22** This graph shows the economic impact of the ten most significant floods from 1900 to 2016. The costs are shown by the billion in US dollars.

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DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 9.5

Observational scale

As well as being categorised as environmental, social or economic, impacts can be categorised based on scale.

Scale refers to the level at which something is examined. In geography, observational scale refers to the relative size of an area being investigated.

Common scales that are used are outlined here:

- *Local scale*: affecting a single place
- *Regional scale*: affecting an entire area such as a suburb, town or state
- *National scale*: affecting an entire country
- *International scale*: affecting multiple countries
- *Global scale*: affecting a significant proportion of the world.

For example, a severe flood might occur in a region (regional scale) which affects an entire country (national scale) or might even require financial assistance from other countries (international scale).

Another common way of categorising impacts is by considering the temporal or time scale. This refers to impacts that are short term or long term. For example, floods might cause a short-term impact on the safety of people, but a long-term impact on a local economy.

Now that you know more about scale, please complete the following questions that explore the impacts that floods have socially and economically, as well as on the environment.

1 Compare the economic and social impacts of floods.
   - **a** Research online to make a list of the deadliest floods in human history.
   - **b** Use the list you have made to create a new list of floods that have occurred since 1900.
   - **c** Using a blank map of the world, pinpoint the location of these floods. Use different sized symbols or colours to represent the amount of deaths from each flood.
   - **d** Compare the location of these floods with the information in Figure 9.22.
   - **e** Discuss whether the locations of the deadliest floods match those that had the largest economic cost.
   - **f** Suggest a reason for your answer to question 1e.

2 Using the information provided and researching online if necessary, summarise the different impacts of floods in a table. List the observational scale and the temporal scale (temporal = time) of the impact. Also, provide an example where possible. You may wish to use the template here as a guide for your work.

Category	Description	Observational scale	Temporal scale	Example
Environmental impact				
Social impact				
Economic impact				

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How do people minimise the impact of floods?

People who live in flood-prone areas use several responses to reduce the impacts of floods. Some of these strategies are *preventative*, which means that they aim to reduce the likelihood of a flood. Others are *adaptive*, which means that they try to reduce the impact of floods when they occur. Four common types of responses are presented in Figure 9.23.

▼ **Figure 9.23** There are different ways that people can respond to the risk of flood and to flood events

Management response	Description	Example
Alterations to building designs	In areas that flood regularly, houses are often built on stilts so that they are not damaged by floodwaters. An example of this is in Phnom Krom in Cambodia. Another construction method used to prevent flood damage involves making buildings watertight by sealing any gaps so that floodwaters cannot get inside them.	 Stilt houses at Phnom Krom
Dams, dykes and levees	Dams are built in the upper sections of rivers to contain water and control the amount of liquid flowing downstream. Dykes and levees are long structures built alongside rivers to help contain floodwaters and prevent water from flowing behind them. Spillways control the release of water from dams and levees. The Bonnet Carré Spillway in Louisiana, United States, diverts floodwater from the Mississippi River so that it flows out to the Gulf of Mexico rather than towards New Orleans.	 Floodwater from the Mississippi River at Bonnet Carré Spillway
Computer modelling and forecasting	Meteorologists can track the possible development of rain cells and storms to predict how much rain will fall over an area several days in advance. They also use satellite images and radar to track storms to help predict the likelihood of a flood. Data for these services is managed in geographic information systems. FloodCheck Queensland is an example that provides information about flood heights and risk assessments.	 Computer modelling and forecasting helps people to better manage the impacts of floods
Evacuation	As with most hazards, the safest way to avoid danger is to evacuate. This is often done with the help of emergency services. Unfortunately, if the scale of the flood is too large or the flood rises too rapidly then this might not always be possible. On 23 January 2019, residents in Makassar in Indonesia had to be evacuated to avoid dangers from floods and landslides.	 The people in Makassar, Indonesia, being evacuated during a flooding disaster

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KEY TERM
meteorologist a person who studies the atmosphere, especially the weather, and makes predictions for weather forecasts

Many of the responses outlined in Figure 9.23 are linked. For example, places that build houses on stilts might also construct dykes and levees for added protection. **Meteorologists** use modelling and forecasting data to determine whether a dam or levee will be able to contain floodwaters. Meteorologists also inform emergency services of the need to evacuate. Unfortunately, despite these responses, extreme and unexpected events such as flash floods are still largely unpredictable. Also, while evacuation can keep people safe, it does not protect valuable infrastructure from being destroyed.

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 9.6

Using a geographic information system

As you learned in Chaper 8, a geographic information system (GIS) is a form of spatial technology used to gather, manage and analyse spatial information such as hydrology data. This can include river and flood water heights, elevation data and the location of previous flood events. Geographers use this data to better understand how floods work, to model future flood events and to analyse which areas are most vulnerable.

Brisbane's flood-awareness map is a GIS that can be used to explore the likelihood of a flood occurring in the suburbs of Brisbane. Visit Queensland's FloodCheck at http://floodinformation.brisbane.qld.gov.au/fio/ to take a look. You will need to agree to the terms and conditions before you can get started. You can zoom into the CBD of Brisbane.

1 What is the name of the river running through Brisbane?
2 Click on the Flood Awareness Map and then select the 'High likelihood' flood layer.
   a What is the chance of a highly likely flood occurring each year?
   b Describe where floodwater is likely to travel in a flood. Will it affect houses?
3 Select one of the more severe types of floods. State how likely this kind of flood is, and describe how and where the floodwaters are likely to spread.
4 Click on the link to find out recommendations to help residents prepare for floods. List the three preparations that you think are the most important. Justify why you think these preparations are more important than others.

▼ **Figure 9.24** Brisbane during floods

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CASE STUDY 9.1

The 2018 floods in Japan

In July 2018, areas of western Japan were hit by their worst flooding in more than 35 years. In some places, up to 583 millimetres of rain fell in a 24-hour period. This led to significant flash flooding, with floodwaters reaching as high as five metres.

Floodwaters caused landslides, inundated homes and other buildings, and destroyed or damaged key infrastructure, such as railway lines, roads and power lines.

The economic cost of this flood was estimated to be up to AUD $21 billion, while the social impact included the death of 200 people.

▲ **Figure 9.25** This landslide in Hiroshima prefecture that was triggered by the 2018 flooding in western Japan. The landslide covered the railway lines and brought down powerlines.

When Japan's meteorological agency released a warning of historic rainfalls, the government responded by ordering more than 8 million people to evacuate their homes. Seventy thousand firefighters, rescue workers and members of the Japan Self-Defence Forces (JSDF) were deployed to rescue people left stranded by floodwaters. Many worked from helicopters or used boats to ferry trapped people to evacuation centres that were set up by local governments, often in school gyms.

The Japanese government set up a special group, known as a task force, that was dedicated to helping people recover from the flood. The government also allocated US$24 million to get immediate necessities, such as food and fresh water, to towns that were cut off by floodwaters and mud. It took up to ten days in some areas for the government to return water and electricity to areas that were hardest hit. During this time, people had limited access to drinking water. In the city of Hiroshima, the water allocation per person was rationed to only 12 litres a day, which is not enough for showering and meeting other sanitary needs.

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▲ **Figure 9.26** Members of the JSDF rescuing residents who were stranded by the 2018 floodwaters

Rescue workers and volunteers cleared mud from towns and roads for several days. The temperatures during this period reached 30 degrees Celsius and people were without power, often in crowded emergency accommodation and with limited access to amenities. The Japanese government promised hundreds of millions of US dollars in aid to areas hit hardest by the flooding, including five-year, interest-free loans to help businesses to reopen. International aid was also provided by several countries. They offered money to assist with clean-up costs, and sent food, medicines and teams of specially trained doctors and nurses to the regions hit by the floods.

▲ **Figure 9.27** Kurashiki in Okayama prefecture, where many of the houses were almost entirely underwater

QUESTIONS

1. Use Case study 9.1 to list the social and economic impacts of the hydrological disaster in western Japan in 2018.
2. Summarise the main ways that people responded to this flood emergency. Include both short-term and long-term responses.
3. Based on the information provided, do you think the overall response was effective? Provide reasons for your answer.

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Amazing but true …

The eastern side of Japan is also vulnerable to floods. Tokyo is a city built on a floodplain; more than 1.5 million people live below the sea level there. To protect against floods, the Tokyo government built the Metropolitan Area Outer Underground Discharge Channel, which is 50 metres beneath the city. This channel is the largest stormwater drain in the world and is designed to fill up with floodwater to stop it from flowing into the city. It cost US$3 billion to construct and took thirteen years to complete.

▲ **Figure 9.28** Tokyo's Metropolitan Area Outer Underground Discharge Channel

END-OF-SECTION REVIEW 9.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 In what way can floods have a positive impact?
2 Provide an example of a flood's impact on an area, either local, regional, national or international.
3 What are spillways and how do they prevent flooding?

Interpret

4 Discuss why you think floods are the costliest disasters in Australia.
5 Why do you think school gyms were chosen as evacuation points in the 2018 floods in Japan?
6 During the 2018 floods in Japan, up to 583 millimetres of rain fell in a 24-hour period. Research the average monthly or annual rainfall in your local area and compare it to Japan's 2018 rainfall event.

Argue

7 Refer to the four responses outlined in Figure 9.23. Rank these four responses from most effective to the least effective in terms of reducing the negative impacts of floods. Justify your reasoning.
8 Wealth is a major factor in the ability of a country to respond to flooding. Do you agree with this statement? Justify your answer by referring to examples presented within this chapter.

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Making thinking visible

I used to think that flooding …

Now I think that flooding …

This exercise in visible thinking asks you to track the difference between what you knew about flooding before starting this chapter, and what new understandings you have acquired since reading the chapter.

Using the stem sentences here, write a paragraph explaining what you previously knew about the topic. Then write another paragraph explaining what you now understand about the topic.

1A I used to think that flooding was caused by …

1B Now I understand that flooding can be caused by …

2A I used to think that flooding only had negative impacts because …

2B Now I understand that flooding can have positive impacts because …

3A I used to think that flooding was dangerous because …

3B Now I understand that flooding is also dangerous because …

3 Research task

Choose a major flood that has occurred somewhere outside of Australia. Undertake research to prepare a case-study report that includes the following:

- The location and geographic characteristics of your chosen place
- The cause of flooding
- The economic, social and environmental impacts over short and long-term periods
- A summary of responses that either aimed to prevent the flooding or reduce the flood's destruction
- An evaluation of effectiveness of these responses.

Conduct research to find out which places in the world are most prone to severe flooding. Create a map that shows where this flooding occurs and where it is most severe.

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4 Extended-response questions

Claim 1: *Preventative responses are far more effective than adaptive responses in reducing the impacts of flooding*.

Discuss whether you agree or disagree with this statement using information presented in this chapter.

Claim 2: *A country's wealth is a major factor in determining whether or not it is able to reduce the risk and impacts of floods.*

Discuss whether you agree or disagree with this statement by using information presented in this chapter.

5 Problem-solving task

Design a type of construction that will help to prevent flooding or a style of building that would reduce the impact of flooding. Draw a labelled diagram demonstrating and explaining your design.

6 Visible-thinking routine

You will be creating a concept map to track your understanding of floods. First, write the topic 'Floods' in the centre of your page. Then follow the steps: generate, sort, connect and elaborate.

- **Generate** a list of key ideas based on what has been covered in this unit.
- **Sort** your ideas according to how central they are to the topic of flooding. Place central ideas near the centre where your title 'Floods' is and write less important ideas towards the outside of the page.
- **Connect** your ideas by drawing connecting lines between ideas that have something in common. Write a short sentence under each line explaining how the ideas are connected.
- **Elaborate** on each idea by adding a few dot points to describe the concept or give more information about it.

7 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about floods

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Unit 2

Place and liveability

Overview

The *places* we call home look and feel different to each of us. Factors such as our location, income, and our connections to the community and the natural environment all play a role in how we experience our neighbourhoods, towns, cities and suburbs. To live well in a place, we need access to basic necessities. We also need to be able to enjoy the culture, entertainment and activities that make a place feel safe and fun. So, liveability not only means surviving in a place but thriving there, too.

Places are always changing. Figures A, B and C show the changes that have occurred in Melbourne from 1865 to today, while Figure D shows green changes that are happening now and may increase within the future. Soon, streets could be dominated by driverless cars, while farms may be perched on city rooftops.

Video
Unit overview

How you feel about a place can also change as your needs alter over time. For instance, growing up in a rural region might be great when you are young as you can enjoy the open space and freedom. However, later you may decide to move to a city to go to university.

In this geography unit, you will investigate what places mean to Australians and people around the world, as well as what services and facilities make a place liveable. This will help you to recognise key characteristics of our built environments, and understand the human activities and beliefs that have helped to shape them. You will also learn to see places from the perspectives of different groups of people. Understanding the characteristics of built environments and others' perspectives can help you be more connected to your own environment and community. You may even want a career as a town planner or an architect!

▼ **Figure A** This is one of the first photographs ever taken of Melbourne. It shows Swanston Street looking north from Collins Street, and was taken in 1858.

▼ **Figure B** This photograph, taken in the 1950s, shows the way Melbourne's central business district and railway lines developed. What changes can you detect between these first two images?

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▲ **Figure C** Melbourne's central business district, 2019

▲ **Figure D** The City of Melbourne has set a target to plant 300 trees each year to double the canopy cover in Melbourne by 2040. This image is from a building in Sydney; vertical vegetation like this and rooftop gardens could change Melbourne's skyline in the near future.

Learning goals

After completing this unit, you should be able to answer these questions.

- What is place and liveability?
- Which factors influence where people live and what they think of their place?
- How do we measure the liveability of a place?
- How does the distribution of facilities and services affect the liveability of places?
- How does community and social connectedness affect the liveability of places?
- How have people improved the liveability of places in Europe and Australia?

Introducing geographical concepts

In this unit, you will have many opportunities to practise geographical concepts.

The concept of **place** involves the physical location of an area, and the meaning that the location has for individuals, communities and cultures.

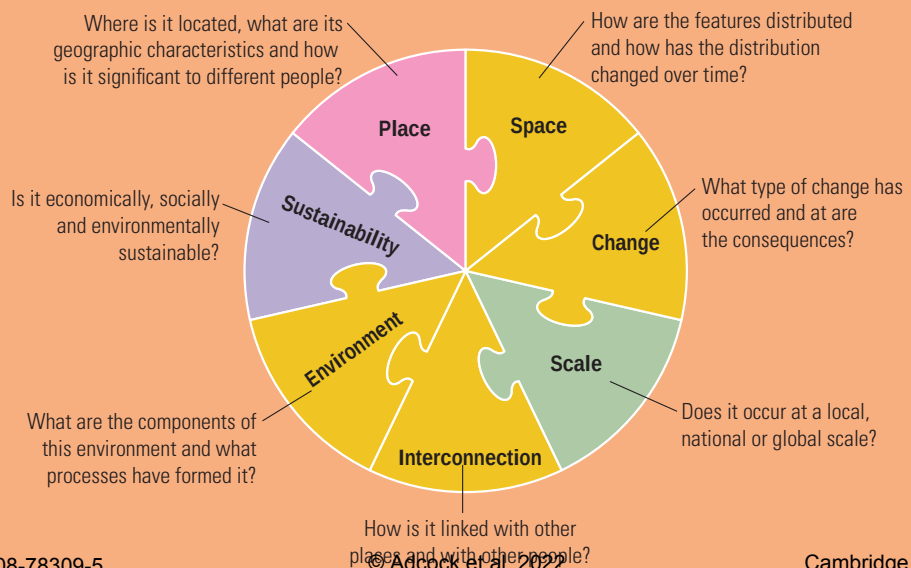
Space refers to the spatial distribution of places and their characteristics. We use maps and spatial technology to examine, monitor and compare spatial distributions so that we can assess and manage changes.

When geographers look at **change**, they investigate the type of changes that have occurred. They also look at when, where and why change has happened.

The **environment** in geography refers to the characteristics of an environment, how an environment supports life, and the connections between an environment and people.

Interconnection involves the links between places and the ways that people influence or are influenced by the characteristics of places.

Geographical concepts



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CHAPTER 10

Place and liveability

Setting the scene: urban planning and the distribution of streets in Melbourne

Melbourne often ranks as one of the world's most liveable cities. But what is it about our city that makes it so popular for residents and visitors alike? Have you ever wondered how Melbourne was first designed? Or how the city keeps evolving to meet our changing needs?

KEY TERMS

infrastructure the physical structures and facilities needed within a community such as roads, buildings and pipelines

central business district (CBD) the centre of business in a town or city

pedestrian people who are walking rather than travelling in a vehicle

urban planning the process of planning the layout and infrastructure of a place

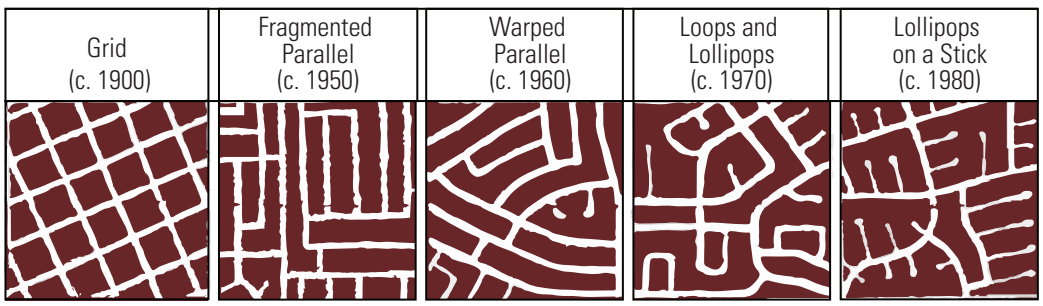
sustainability the wise use of resources so that that they are available into the future

accessibility resources or services are available and affordable for all people to use

Melbourne's rating as a highly liveable city is due to its stability, education, health care, **infrastructure** and employment. Melbourne's **central business district (CBD)** is an important part of its infrastructure. The CBD's grid system makes the city easy to navigate and the wide streets are perfect for Melbourne's iconic tram system. **Pedestrian** access is ensured in Melbourne because of the city's laneways and little streets. All these features are not accidental; they exist because of **urban planning**.

Urban planners shape the world we live in because they design our cities and plan our infrastructure. However, over time, urban planning designs have changed. A grid system was a common design feature a couple of centuries ago. The use of a grid for urban design was popular from the seventeenth to nineteenth centuries when new cities were forming. Since the 1900s, urban planners have created designs for cities to accommodate cars. Now, modern designs focus on **sustainability** and **accessibility**. Figure 10.1 shows the evolution of street design in the twentieth century.

Melbourne's CBD is referred to as the 'Hoddle grid system'. Its designer, Robert Hoddle, created the first town plan for Melbourne in 1837. The area Hoddle created is bordered by Spencer Street, La Trobe Street, Spring Street and Flinders Street. At that time, Melbourne had a small population of only a few hundred people.



▲ **Figure 10.1** Types of street patterns in urban planning during the twentieth century

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Today, Melbourne's CBD is a major economic and cultural hub for nearly five million people.

The grid system was a standard feature of urban planning practice in the 1800s. But the design of the Hoddle grid is slightly different to a traditional grid system because it has traditional square blocks with wide streets. It also includes narrow or little streets to provide rear accessways for long narrow buildings. Figure 10.3 shows the original design for Melbourne.

▲ **Figure 10.2** Illustration of Melbourne as it looked in 1838

Over time, the names of various streets have changed to reflect the values of the area. For example, Stephen Street was once known for its criminal activity but was renamed Exhibition Street because of the 1880 International Exhibition that was held in Melbourne. Another name change was Yarra Bank Road, which became Batman Avenue in 1913 to honour John Batman's founding role of Melbourne.

KEY TERMS

sense of place the meaning that a person or group attaches to a specific area or space

heritage status a status given to a building or area to protect it from future development and preserve its past

While the layout of Melbourne's CBD has not changed, the use of the space and the sense of **sense of place** has evolved. Transport has continued to improve and serve the growing population, and streets have become more accessible for pedestrians. The value and meaning of various places in the CBD have also changed over time.

Federation Square, which was established in 2002 and is located next to the Hoddle grid, was recently granted a **heritage status** by the Heritage Council of Victoria. Its design and construction initially divided many Melbournians.

▲ **Figure 10.3** The original design for Melbourne, which shows the Hoddle grid

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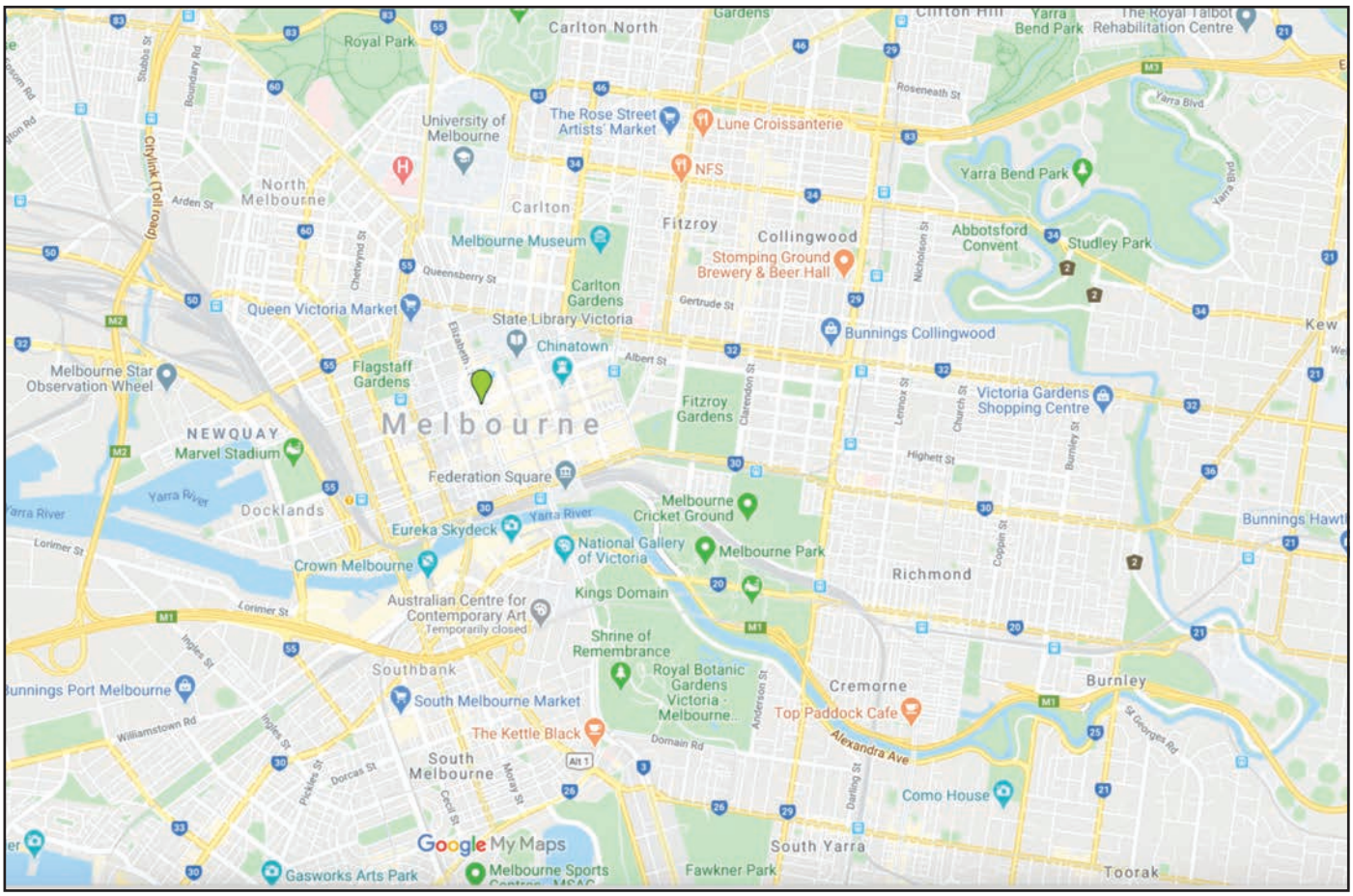
KEY TERM

amenity a feature that is desirable, useful or aesthetically pleasing

The cost of Federation Square's construction was above original estimates, and some thought its design was an eyesore and inconsistent with nearby buildings. However, Federation Square has since become a major public gathering space and has developed social significance for the people of Melbourne.

The Bourke Street Mall is also an important pedestrian space in Melbourne's CBD. Vehicle traffic was banned in 1978 between Elizabeth Street and Swanston Street so that the space could be only used by pedestrians and trams. Many of Melbourne's arcades connect to this section of Bourke Street.

There has been a recent move to reclaim more of Melbourne's CBD for pedestrians and public transport. This urban plan is meant to improve safety and **amenity** in the city. It also reflects the current trends in other liveable cities around the world.



▲ **Figure 10.4** Melbourne's CBD

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MAKING THINKING VISIBLE 10.1

See, think, wonder

Copy the following table.

	See *What are the things you see, observe or notice in this image?*	**Think** *What do you think about the liveability and sense of place in this image? Why?*	**Wonder** *What does it make you wonder about the space?*
Image 10.5			
Image 10.6			
Image 10.7			

With a partner, use Figures 10.5, 10.6 and 10.7, which show different places in Melbourne, to complete the table.

▲ **Figure 10.5** A gathering at Federation Square

▲ **Figure 10.6** A photograph of Bourke Street Mall

▲ **Figure 10.7** A photograph of Royal Arcade

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Chapter overview

Introduction

In this chapter, you will explore the concepts of liveability and sustainability in different parts of the world. You will complete various fieldwork activities and conduct research to find out about a range of developments throughout the world, including Melbourne. You will work through a range of activities and case studies to build your skills and to encourage you to think like a geographer.

Learning goals

After completing this chapter, you should be able to answer these questions:

- What is liveability?
- What factors affect liveability?
- What does liveability mean to you?
- How do we measure liveability?
- What makes one place more liveable than another?
- How does access to services and facilities affect the liveability of a place?
- How does environmental quality affect the liveability of a place?
- How does a feeling of social connectedness affect the liveability of a place?
- How does a feeling of community identity affect the liveability of a place?
- How can liveability be increased?

Geographic skills

After completing this chapter, you should be able to:

- Conduct a survey and review your findings
- Complete a field sketch with annotations
- Read a topographic map
- Create a mind map to brainstorm ideas
- Create a line graph to illustrate data over time.

► **Figure 10.8** Melbourne is considered to be one of the most liveable cities in the world according to the Global Liveability Survey

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10.1 Why do people live where they do?

FOCUS QUESTIONS

- What is liveability?
- What factors affect liveability?
- What does liveability mean to you?

This concept of liveability focuses on why people live where they do. The reasons a person lives in an area or moves to a different area is often based on their perceptions about the liveability of a place.

Where would you rather live?

People live in different areas for a variety of reasons. Some people move for employment and education opportunities, some people move seeking safety and security, and some people stay in an area because of their connection to it.

ACTIVITY 10.1

Features of liveability

Examine the places shown in Figures 10.8 to 10.18 and use Google Street View to explore the areas further. Then, answer the questions that follow.

▲ **Figure 10.9** Shaftesbury, Dorset, United Kingdom

▲ **Figure 10.10** Istanbul, Turkey

▲ **Figure 10.11** Jaen Street (Calle Jaén), La Paz, Bolivia

▲ **Figure 10.12** Uros Islands, Puno, Peru

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▲ **Figure 10.13** Black Creek Pioneer Village, Toronto, Canada

▲ **Figure 10.14** Chefchaouen, Morocco

▲ **Figure 10.15** Brooklyn, New York City, United States

▲ **Figure 10.16** Siem Reap, Cambodia

▲ **Figure 10.17** An unnamed islet, Queensland, Australia

▲ **Figure 10.18** Mumbai, India

1 Identify the features that affect the liveability of each area shown. Consider both the positive and negative features of living in each place.

2 Which place, or places, could you see yourself living in?

KEY TERMS

liveability the qualities of a place that enable a person to live there with a good standard of living. To work out whether a place has a high or low level of liveability, we consider the quality of economic, environmental and social living conditions in that place

What is liveability?

Liveability is a measure of the living conditions of a certain place. To measure whether a place has a high or low level of livability, we look at the quality of economic, environmental and social living conditions in that place. The features of a place are often perceived differently because they depend on a person's background, age

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and culture. This **perception** of a space means that different people value diverse features and experience those features in unique ways. Their perception is what creates a sense of place. In other words, your experiences in a space and the meaning you attach to it make up your 'sense of place'.

The concept of space

In geography, the term **space** refers to a physical area. This includes all the area's objects or physical features. Spaces often relate to a point of latitude, and vary in their **scale**. They can be small, like a room, or large like a city, country or region. How each physical feature is distributed in a space is an important consideration because it contributes to how that space is used. For example, a city or town that is spread out with limited public transport will usually have high use of private vehicles.

KEY TERMS

perception the way something is viewed or understood

space how different places, and the features within places, are distributed

scale the size of an area and how it is viewed in relation to another area

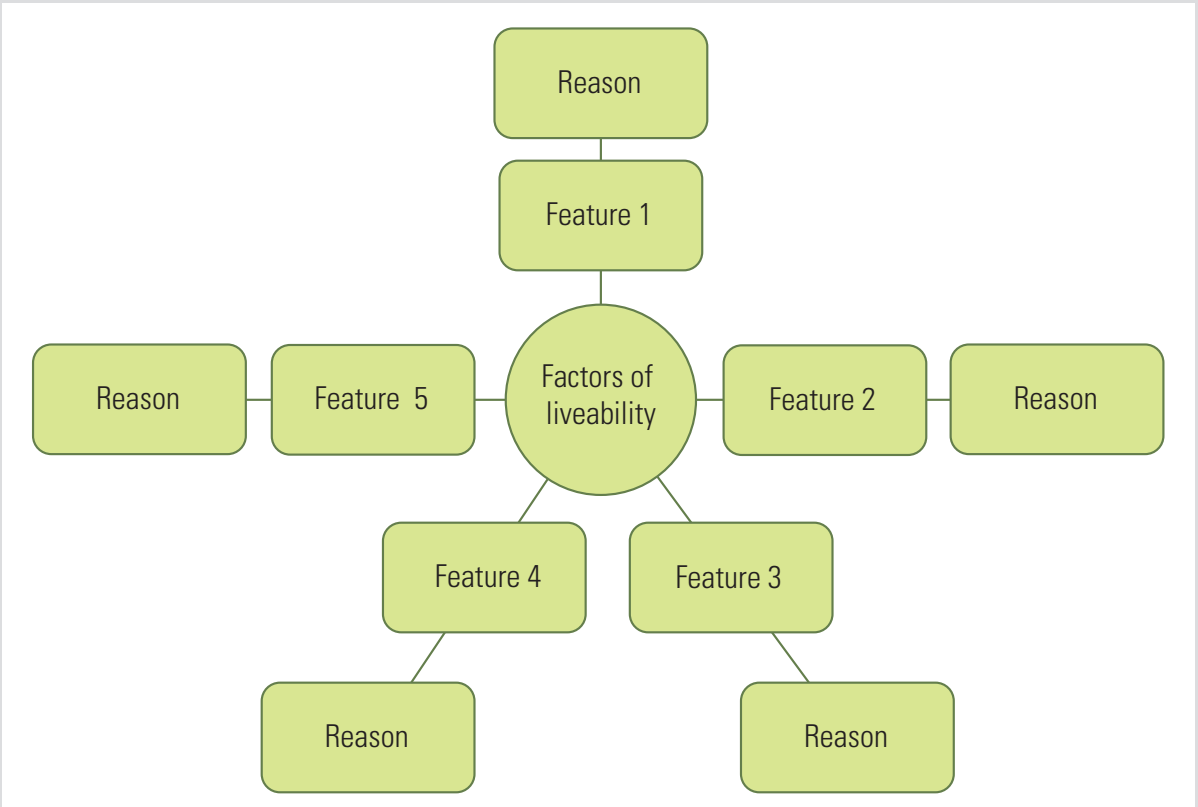
ACTIVITY 10.2

Ranking task

Use the content you have read so far to answer the following questions.

1 With a partner, brainstorm features that make a place liveable.

2 Choose five factors that you consider to be the most important and create a concept map like the one shown here. For each factor, you should also provide a reason for why you think it is significant.



3 Share your mind-map work with the class and explain why you think each factor you chose is important.

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Why do people live where they do?

The choices people make about where they live are often based on push factors and pull factors. A **push factor** is a reason that causes a person to leave an area, such as unemployment, poverty, lack of access to services and limited opportunities for education. A **pull factor** is a reason a person moves to or is drawn to an area. These are positive motivations that will benefit the person who is moving to a place, such as better job opportunities, accessible services, education and living conditions.

KEY TERMS

push factor the reasons people move away from an area

pull factor the reasons people move in to an area

Forced migration is a push factor. In times of conflict, many people are forced to leave their homes for fear of their safety and security. These people do not have a choice about where they live and they simply have to go somewhere so they can be safe. According to the United Nations High Commissioner for Refugees, approximately 70.7 million people around the world were forced to leave their homes due to violent conflict in 2019.

CASE STUDY 10.1

Understanding different perceptions of place

Simon is a refugee who came to Australia from Syria to escape the war. Read what Simon says about Australia, then answer the questions that follow.

I have a lot of precious memories from Syria, especially from my first year at university, which was wonderful and eye opening. I was following my passion in environmental science in Damascus and my life was going well. But that year, the war broke out. At first, my family was anxious, but we were still hopeful that nothing would change for us. However, in the second year, the situation started to escalate quite rapidly and brutally. Soon, there were car explosions and mortar shelling on a daily basis, as well as electricity blackouts, water scarcity and food shortages.

▲ **Figure 10.19** Simon
Source: New Humans of Australia website

I was desperate to flee, but my parents were reluctant for me to travel alone or illegally. So, I started applying to universities around the world and I was actually accepted to many of them. Unfortunately, I was constantly rejected in my applications for a student visa. In this time, my family started moving backward and forward from Syria to Lebanon. For years we had to flee from Syria when things got too dangerous and leave Lebanon when our money ran out. It was a stressful time, as we lived very close to the terrorist line in Syria.

Finally, we were approved to come to Australia as refugees. We were very fortunate to have an aunt here, and if it wasn't for that we might never have been given the visas that would change our lives forever. When we landed in this new place and they said, 'Welcome to Australia', that was just an incredible moment that no words can describe. But the closest word I can use was that of relief.

Source: Simon, 'I have a lot of precious memories of Syria', New Humans of Australia website, 14 July 2018

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QUESTIONS

1 Make a list of the push factors that forced Simon to leave his home.
2 Make a list of the pull factors that brought Simon to Australia.
3 Compare the liveability of Simon's homeland Syria to his new home of Australia. What are the benefits of this new home for Simon and his family? (It might help to think about the access to services and new opportunities.)

ACTIVITY 10.3

Analysing spatial patterns

In this activity, you will explore the concepts of space and **change**.

KEY TERM
change the ways in which something is different to the past

Go to the BBC's website and search for 'Syria from space: Three cities in darkness and light'. You will see three sets of satellite images that show the impact of the Syrian war over time in the country's major cities. Spend some time looking at these images and then answer the following questions.

1 Describe the changes you see for Damascus over time.
2 Why do you think different regions lost their lights? When do you think this happened?
3 Identify the impacts of what you see for the people who live in these cities in terms of their safety, health, connectedness and access to services.
4 Compare the two daytime, aerial images of Raqqa in 2012 and 2017. What do you notice?

CASE STUDY 10.2

A comparison between Brisbane and Vienna

Read the information provided to you about Brisbane and Vienna, and then answer the questions that follow.

Brisbane

Brisbane is the capital city of the Australian state of Queensland. It is located on the eastern coast of Australia and is in the lands of the Turrbal (Jagera) people. The metropolitan area of Brisbane has 2.5 million residents.

The city is built on the floodplains of the Brisbane River, 14 kilometres from Moreton Bay. This has meant that Brisbane

▲ **Figure 10.20** Brisbane is located on Australia's east coast

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has experienced many flooding events, including major weather events in 1974 and 2011. The city has a humid, subtropical climate and has regular storms over the summer months. It is a hub for business and education in Queensland.

▲ **Figure 10.21** Brisbane River flows through Brisbane

Transport

Public transport in Brisbane consists of trains, buses and ferries. As the city is expected to grow, the public transport system is planned to grow with it. This growth will include a rail network that crosses the Brisbane River and a high-frequency bus-transit system. These rail and bus networks will link together to provide the city with stronger options in public transport.

▲ **Figure 10.22** A typical Brisbane bus

▲ **Figure 10.23** Ferries are part of Brisbane's network of public transport

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Housing

Homes in Brisbane are more affordable than those in Sydney and Melbourne. This is an economic factor that helps to make Brisbane liveable. Many people have moved from Sydney and Melbourne to Brisbane because of this economic pull factor. High-rise apartment buildings are increasingly common in the suburbs close to the CBD. Suburbs further away from the CBD tend to have low-density houses and townhouses. Queenslander-style homes in Brisbane are common. These homes are timber with a corrugated iron roof. They are high set, meaning they have elevated foundations, to allow for ventilation and typically have a surrounding veranda. The Queenslanders were designed and built specifically for Brisbane's subtropical climate.

▲ **Figure 10.24** Traditional Queenslander houses are built raised from the ground to counteract flooding and encourage a cooling airflow

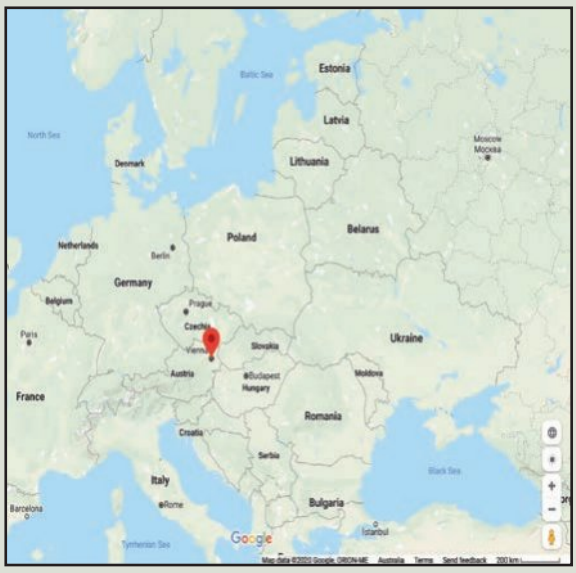
Lifestyle

The people of Brisbane embrace an outdoor and active lifestyle. The city is located within an hour's drive of both the Gold Coast and the Sunshine Coast. These are frequent weekend destinations for people who live in Brisbane. Brisbane's suburbs have high levels of access to services such as schools and health care. Crime rates are relatively low and the city is generally considered to be safe.

▲ **Figure 10.25** This surfer is catching waves in front of the high-rise buildings on the Gold Coast

Vienna

Vienna is often listed as one of the world's most liveable cities. It is the capital of Austria and has a population of 1.9 million people (2.6 million within the metropolitan area). The city is located on the banks of the Danube River. The city has an oceanic climate with warm summers and cold, dry winters. Humans have occupied the land as far back as the Stone Age. The bubonic plague (Black Death) struck in 1679, killing one-third of the city's population. The city was also deeply affected by the world wars. Vienna was bombed 52 times and 20 per cent of the buildings were destroyed during the World War II. This long history has shaped a unique city.



▲ **Figure 10.26** Vienna is in Austria

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Design

The centre of Vienna is on the World Heritage List. For this reason, there are no high-rise buildings within the area. The buildings in the historic city centre have a wide variety of historic design features. The centre includes castles, gardens and monuments.

▲ **Figure 10.27** Schönbrunn Palace is Vienna's best-known tourist attraction

Economy and education

Vienna is one the wealthiest regions within the European Union. The city is Austria's main centre for tertiary education; it has many universities and professional colleges. The Viennese value education and their city has been home to some of the great thinkers of history, such as the founder of psychoanalysis – Sigmund Freud.

▲ **Figure 10.28** Vienna University is one of the oldest universities in Europe

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Transport

Vienna has four main forms of public transport. There is a subway (U-Bahn), a local train system (S-Bahn), a tram system and a bus network. The public transport system in Vienna is extensive and frequent. It is also less expensive than other major cities in Europe. A yearly public transport ticket costs only one Euro per day. These low costs and the high levels of service that accompany them enhance the city's liveability.

▲ **Figure 10.29** Trams are seen here on Vienna's majestic boulevard, the Ringstrasse

Lifestyle and culture

Vienna has a long and proud history of art and culture. Some of the most celebrated composers and musicians come from Vienna, including Mozart and Beethoven. The city is home to many theatres and opera houses. Vienna is also home to many sporting teams who compete nationally and internationally. The long history, cultural pride and relaxed atmosphere of Vienna make it one of the most liveable cities in the world.

▲ **Figure 10.30** Vienna's State Opera House is on Vienna's Ringstrasse

QUESTIONS

1. Create a Venn diagram so that you can see the similarities and differences between Brisbane and Vienna. You can use the information in this case study and your own online research.
2. Which features of liveability are there in Vienna that could be used to improve the liveability in Brisbane?

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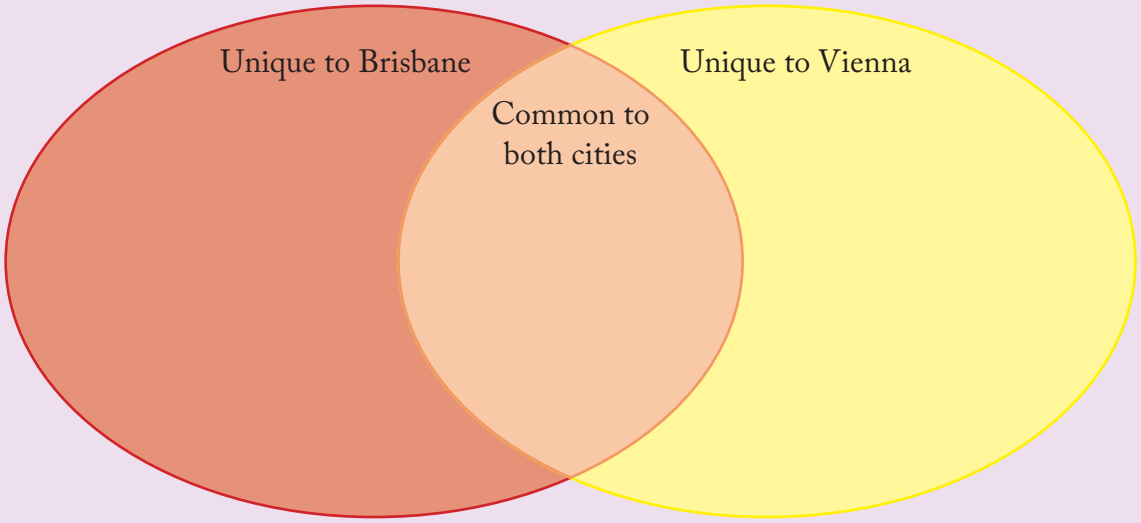
What is a Venn diagram?

A Venn diagram is a great way to show similarities and differences between concepts. It usually has two or three circles that overlap each other. In the overlapping area, the similarities appear. In the separate areas, the differences are shown.



ACTIVITY 10.4

Mapping my local area

1 Using Google Earth, create an annotated map of your local area. Mark points of interest and features of liveability in the area.

2 Describe the distribution of your area's features. (Where are these features located? What does the space look like?)

FIELDWORK 10.1

Conducting a survey of the local neighbourhood

Fieldwork in geography consists of practical activities that are done away from your classroom at school. It can involve a range of activities including: observing, questioning, planning, collecting, recording, evaluating, representing, analysing, concluding, communicating, reflecting and responding.

In this fieldwork task, you will visit your neighbourhood and answer some questions. These questions will form a class survey about the local neighbourhood. Here are the steps to take.

1 As a class, discuss the criteria to make sure that you understand what each criterion is asking you to look for.

2 Complete the survey form, based on the suburb you live in. »

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3 Compare your completed survey with people in your class who live in the same area as you.

4 Compile your survey results for your suburb and identify the top five features of liveability in your area.

5 In a small group, make a poster that advertises these features of liveability for your local area.

Criteria	**Score:** **1 Very poor** **2 Poor** **3 Satisfactory** **4 Good** **5 Very good**				
Environment					
• Average temperature	1	2	3	4	5
• Quality of town planning and design	1	2	3	4	5
• Availability of parks, gardens and green space	1	2	3	4	5
• Access to sports and entertainment facilities	1	2	3	4	5
• Landscaping and appearance of streets	1	2	3	4	5
Culture					
• Quality of recreational facilities	1	2	3	4	5
• Access to places of worship	1	2	3	4	5
• Diversity of restaurants and shopping	1	2	3	4	5
• Access to libraries and historical sites	1	2	3	4	5
Economy					
• Employment opportunities	1	2	3	4	5
• Affordable housing	1	2	3	4	5
• Access to goods and services	1	2	3	4	5
Infrastructure					
• Quality of roads	1	2	3	4	5
• Quality and availability of public transport	1	2	3	4	5
• Telephone and internet coverage	1	2	3	4	5
• Quality of housing	1	2	3	4	5
• Water, sewage and electricity availability	1	2	3	4	5
Education					
• Quality and availability of public schools	1	2	3	4	5
• Quality and availability of private schools	1	2	3	4	5
• Access to vocational and higher education facilities	1	2	3	4	5
Health care					
• Quality and availability of public health care	1	2	3	4	5
• Quality and availability of private health care	1	2	3	4	5
• Quality and availability of aged care facilities	1	2	3	4	5
Law and order					
• Lack of petty crime (theft)	1	2	3	4	5
• Lack of violent crime	1	2	3	4	5
• Level of vandalism	1	2	3	4	5
• Sense of personal security	1	2	3	4	5

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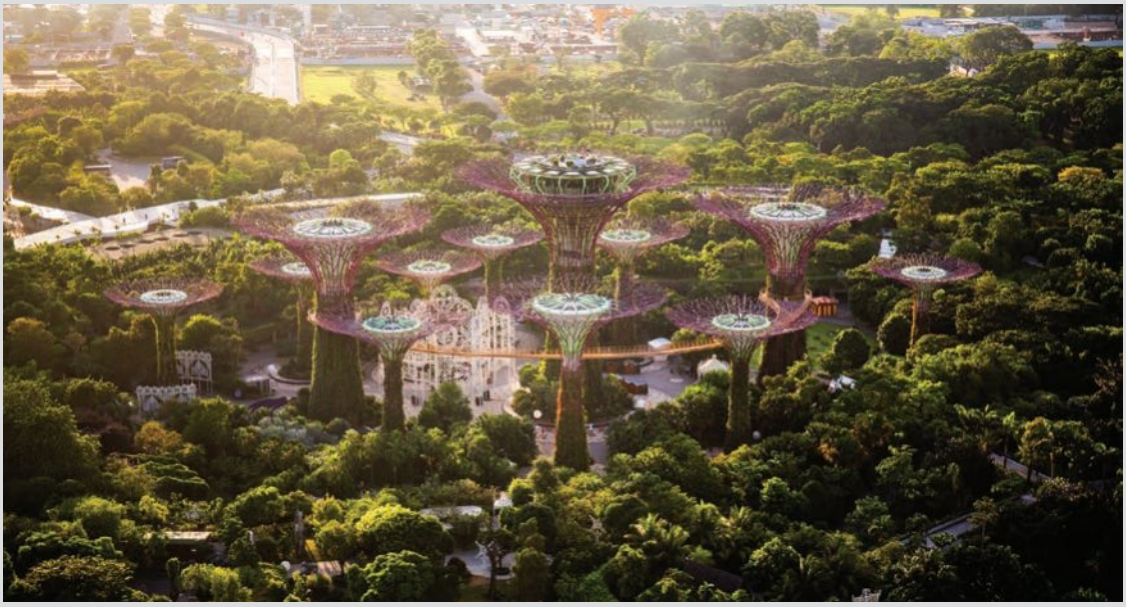
ACTIVITY 10.5

Research and mapping task

Identify a place anywhere in the world you could picture yourself living. Research this location, and identify some social, environmental and economic features of the area's liveability.

1. Using Google Earth, create a tour of this place. You should include at least eight stops. For each stop, ensure that you have an image and include an 50-word description.
2. Share your tour with a small group.



▲ **Figure 10.31** Singapore has beautiful gardens and parks. Gardens by the Bay has large metal structures covered with greenery that connect a 'sky' path. Visitors can walk this path to gain a bird's-eye view of the surrounding trees.

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 10.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1. What is a push factor? Provide three examples.
2. What is a pull factor? Provide three examples.
3. Define the concept of place.
4. What key historical events have had an impact on Vienna?

Interpret

5. How does someone's perception or experience influence their sense of place?
6. Why are safety and security important features of liveability?

Argue

7. Identify the factors that affect the liveability of your local area. Explain why these factors make or do not make your local area liveable.

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10.2 Measures to evaluate a place's liveability

FOCUS QUESTION

How do we measure liveability?

Several organisations conduct research on the liveability of cities throughout the world. Each year, these organisations rank cities based on set criteria. Some of the measures relate to physical infrastructure and features like transport, while other measures are more subjective and relate to people's perceptions such as whether an area is safe. Geographers and urban planners use the data to evaluate the features of a place that enhance or degrade its liveability. This evaluation is then used in their planning decisions so that they can make changes to other towns and cities to improve the liveability of them.

How is liveability judged?

Judgements about a place's liveability are based on perceptions. A person's perception comes from their personal experiences, background and values.

Different people value different features of a space and are drawn to those features based on their preferences and values. This attraction to a feature is a pull factor. For example, young adults may be drawn to the bright lights and buzz of the city, and therefore choose to live and work there. They can then easily access the features of the city they like. Other age groups or families may value more space. They might choose to live further away from the city so that they can access more open areas, such as parks, bush walks and other natural features. While these people's daily travel to their jobs may be longer, they have the space and the lifestyle that they value. People judge the liveability of a place based on **tangible** factors like infrastructure and services, as well as **intangible** factors like safety and culture.

KEY TERMS

tangible things that you can physically see and touch

intangible something that exists but you cannot see or touch

▼ **Figure 10.32** Vancouver, in British Columbia, Canada, has frequently been ranked North America's most liveable city

▲ **Figure 10.33** Santiago, Chile, with the Andes mountains visible in the background

How is liveability measured?

Environmental, social and economic factors influence the liveability of a place. Liveability, or quality of life, is often measured by factors like access to fresh water, food, housing, transport, health care, education, and a safe and stable environment.

Mercer, one of several organisations that measures liveability, uses the following criteria to measure liveability in the Mercer Quality of Living Survey:

- Stable and reliable government, legal and law-enforcement services
- Economic and business environment
- Availability and quality of medical services, health and hygiene (including sewage, waste disposal and levels of air pollution)
- Education
- Public services and transportation (including electricity, water, public transportation and traffic congestion)
- Recreation, such as restaurants, theatres, cinemas, sports and leisure
- Consumer goods, such as the availability of food and a range of other items
- Housing, including rental housing, household appliances, furniture and maintenance services
- Natural environment, including climate and records of natural disasters.

Mercer's twenty-first annual Quality of Living Survey in 2019 used this criteria to rank 231 cities. The cities in Europe, Oceania and North America generally ranked high.

Cities were separately ranked according to personal safety, which included crime levels, law enforcement, personal freedom and media freedom. Australian cities all ranked within the top fifty for personal safety. Cities that ranked at the lowest in this area are in parts of the world that have ongoing violent conflict, such as Syria and Iraq.

Another organisation that studies liveability around the world is the Economic Intelligence Unit (EIU).

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Every year, the EIU ranks 140 cities around the world. They measure over 30 different factors about each city, such as how good the education and health care are, how clean the water is, and if there is a lot of crime. Each city is then given a score out of 100, with a score of 1 being completely horrible to live in and 100 considered as being as good as it gets.

According to the EIU, the most liveable city in 2019 was Vienna, in Austria. Vienna received a score of 99.1, while Damascus in Syria was the lowest scoring city, with a score of just 30.7. Australia has three cities inside the top 10, including Melbourne (2nd, with 98.4), Sydney (3rd) and Adelaide (10th).

ACTIVITY 10.6

Research task

Do some online research to find the most recent reports from Mercer and the EIU on liveability. Then, follow these steps.

1. Select a liveability report.
2. Choose two environmental, economic and social measures used in the index.
3. Conduct research to compare a city in the top five with a city from the bottom five of your chosen index. Use the criteria that you selected in step two to make your comparison.
4. Create a presentation of your findings.

Amazing but true …

Melbourne consistently ranks well on liveability surveys. Why is that? Melbourne has high scores on health care, education and infrastructure (which is the buildings, energy and transport systems in the city). Melbourne also scores highly in other areas, because the city has lots of sporting and cultural activities available. It is also one of the safest cities in the country. Melbourne might score lowest on climate though, with the city's weather being particularly unpredictable at times.

▼ **Figure 10.34** Damascus is Syria's capital and largest city. The civil war threatens the safety of those who live there, as well as their access to essential services.

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 10.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What were the highest and lowest ranking cities in the world in 2019 according to EIU?
2 Write the definition of a tangible liveability factor and an intangible liveability factor. Give one example of each.
3 How many of Australia's cities ranked in the world's top ten? Which cities were they?
4 Why do geographers and urban planners use data to evaluate the features of a place?

Interpret

5 What features make Melbourne one of the most liveable cities?
6 Why is Damascus one of the world's least liveable cities?

Argue

7 What do you think we can learn from looking at the liveability of cities from around the world?

▲ **Figure 10.35** Do you think low traffic is a tangible or intangible liveability factor? What about well-maintained and safe roads?

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10.3 Facilities and services, and environmental quality

FOCUS QUESTIONS

- How does access to services and facilities affect the liveability of a place?
- How does environmental quality affect the liveability of a place?

Access to facilities and services affects the liveability of a place. Adequate access needs to be available and affordable, and facilities and services need to be environmentally, socially and economically sustainable. This is so future generations can continue to live in the area. The quality of the environment also affects the liveability of a place.

Accessible facilities and services

Sustainable access to facilities and services enhances the liveability of an area for its residents. The availability and **affordability** of services and facilities acts as a pull factor by attracting more people to a place. This attraction leads to population growth.

Over time, Victoria's population has grown, partially due to its pull factors. However, a lack of accessibility to services in rural and remote areas has often led to **rural-urban migration**. This means that people move from rural areas to live in cities.

KEY TERMS

affordability the ability to afford a service or attendance of a facility; for example, going to the doctors

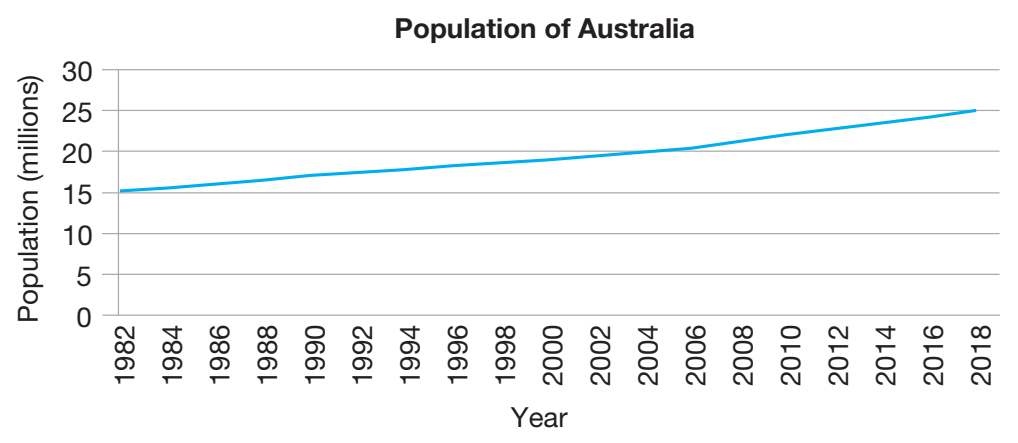
rural-urban migration when people move from rural areas to urban areas, usually for better opportunities such as employment and education

To sustain regional centres, state governments are giving more power to local governments to run local services. This makes it easier for people in rural areas to access the services that they need, so that they don't feel the need to move to cities.

ACTIVITY 10.7

Representing data in a line graph

Simple line graphs provide an effective way to show change over time. The graph here is an example of a line graph showing the population change over time for Australia.



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Create a line graph that shows Victoria's population growth from 1982 to 2018, using the data in Table 10.1.

▼ **Table 10.1** Estimated resident population in Victoria from 1982 to 2018

Year	Estimated resident population (millions)
1982	3.9
1984	4.1
1986	4.2
1988	4.3
1990	4.4
1992	4.5
1994	4.5
1996	4.5
1998	4.6
2000	4.7
2002	4.8
2004	4.9
2006	5.06
2008	5.26
2010	5.46
2012	5.65
2014	5.89
2016	6.17
2018	6.46

Instructions:

To construct a line graph, follow these steps:

1. Draw a horizontal line. On the far left of the line, draw a vertical line upwards. The horizontal axis is called the 'x-axis'. The vertical axis is called the 'y-axis'. The point where the x-axis and y-axis intersect is called 'the origin'.
2. Mark in 19 points along the horizontal axis and 13 points along the vertical axis. These points should be equal in scale. Leave the first point (the origin) blank.
3. Below the horizontal x-axis, write in the progression of years from the beginning of your data set to the finish. Refer to Table 10.1 for the information you need.
4. To the left of the vertical y-axis, write zero at the origin and then work your way up each of the 13 points by 0.5 until you reach 6.5. This is enough to cover your smallest and largest y-values. This is enough to cover your smallest and largest values.
5. Neatly label each axis and give the graph a title.
6. Plot each value on the graph by creating a dot where the population data meets the year. For example, where the data on the left meets 3.9, measure across to where this lines up with 1982 and mark the spot with a small dot.
7. When all the data has been marked on the graph, join the points with a continuous hand-drawn curve.
8. Now stand back and examine your line graph. What does it tell you about population growth in Victoria?

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Classifying settlements

Settlements are usually classified as either *rural* or *urban*. Rural settlements are found in the countryside and have fewer than 10 000 residents. They are often spread out. This geographic distance and low population often makes it difficult for governments and businesses to provide services and facilities. Urban settlements have more than 10 000 residents and are often more compact. There is usually better access to services and infrastructure in urban areas.

What settlements need

For a settlement to function effectively, residents need access to services like clean, fresh water. Water is vital to a settlement, which is why so many cities are located close to major rivers. As modern cities grow, the people that live in them need access to a variety of services and infrastructure. This includes **sanitation**, housing, adequate and affordable food, employment, and health care. Residents also need to feel connected. Transport plays a vital role in connecting people and places. Public transport gives people the ability to go to different places and access services, which is especially important for those who do not have access to private vehicles.

Urban sprawl

As more and more people move to cities, **urban sprawl** often occurs. This is where a city starts to spread outwards. The outskirts of cities usually have low-density housing. These areas of lower density buildings often have design features that encourage car dependency and limits access for those without vehicles.

KEY TERMS

sanitation the system for taking dirty water and other waste products away from buildings to keep places clean and protect people's health

urban sprawl the gradual spread of cities into previously rural areas due to population growth

ACTIVITY 10.8

Spatial data interpretation activity

This activity explores the concept of urban sprawl and the growth of cities.

1. Review the maps and the changes that have occurred in some of the world's megacities by searching for 'The age of megacities ArcGIS' and clicking on the link.
2. Choose one location and explain how the distribution of the city has changed over time.

Population density

Population density refers to the number of people per square kilometre. This can be calculated for a small space, a city, a country or a region. Population density is one of the most important aspects of urban planning. Urban planners use information about a population to make decisions on future services and infrastructure. Population density determines the types of dwellings that can be constructed in an area and the services that are provided. If density is low, then services are sparse and less efficient. If density is too high, an area can become overcrowded and uncomfortable. A well-planned urban area usually has a mixture of housing, commercial and industrial uses.

KEY TERMS

population density a standard measurement of people per square kilometre, which can be calculated at different scales (suburbs, cities, countries, regions)

megacity a city with 10 million or more residents

High-population densities are a major feature of a megacity. A **megacity** is a city with a population of 10 million people or more. Megacities often have major social and economic pull factors, such as

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housing, education and employment. These factors have led to rural-urban migration, which is also a phenomenon known as urbanisation. Currently, more than half of the world's population lives in an urban area. This urbanisation can sometimes lead to improvised settlements, known as slums. Services can become difficult to deliver in these areas and so living standards are often poor.

ACTIVITY 10.9

Comparing images

Look at Figures 10.36 to 10.39 and choose which images are good examples of:

a High-density living
b Low-density living
c A slum
d A mega-city.

Some pictures may fit into more than one category.

▲ **Figure 10.36** Shanghai, China

▲ **Figure 10.37** New York City, the United States

▲ **Figure 10.38** Rio de Janeiro's Rocinha is the largest shanty town in South America

▲ **Figure 10.39** Húsavík, Norway

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ACTIVITY 10.10

Calculating population density and interpreting data

The population density of an area is calculated by dividing the total population by the total land area. Use the equation here to calculate the population densities for the countries provided in Table 10.2. Copy and complete the table with your calculations. Then, answer the questions that follow.

$$\textit{Population density} = \frac{\textit{Total population}}{\textit{Area in square kilometres}}$$

▼ **Table 10.2** Population and land area of selected countries

Country	Population	Land area	Population density
Spain	46 723 749	499 564	
Brazil	209 469 333	8 358 140	
India	1 352 617 328	2 973 190	
Bangladesh	161 356 039	130 170	
Australia	24 992 369	7 692 020	
United Arab Emirates	9 630 959	71 020	
Mexico	126 190 788	1 943 950	
Iran	81 800 269	1 628 760	
United Kingdom	66 488 991	241 930	

1 Which country has the highest population density?

2 Compare Australia's population density to other countries listed here. Why is Australia's population density so low?

3 Calculate the population density of your classroom by using the following steps.

- **a** Measure the dimensions of your classroom using a tape measure and determine the number of square metres of the room. (For example, if a room is 6 metres wide and 6 metres long, it is 36 square metres.)
- **b** Count the number of people in the class.
- **c** Divide the number of people by the size of the classroom to get the classroom population density.

CASE STUDY 10.3

Mumbai's population density

Read the information about Mumbai provided to you and then answer the questions that follow.

Mumbai is a city of extremes. It is ranked as the twelfth richest city in the world and there is a large billionaire population. At the other extreme, however, more than half of the city's population lives in improvised settlements (slums) that lack clean air and water, as well as basic electricity and transport.

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Mumbai has the largest slum population in the world. This has created a unique economy. The wealthy own prosperous businesses and live in high-rise apartments, but the poor are often craftspeople and artisans, who live in one-story buildings that are poorly maintained and built closely together. This means that adequate services are difficult to provide to those living in these slum areas and they have a lower standard of living.

◄ **Figure 10.40** An aerial view of Mumbai and the Dharavi slums seen from a plane

◄ **Figure 10.41** A street view of the Dharavi slums

QUESTIONS

1 Examine the image of the slums shown in Figure 10.40.

- **a** What do you notice about the population density?
- **b** How do you think the slums and the CBD are **interconnected**?

2 Examine the poverty shown in the street view of the Dharavai slums (Figure 10.41).

- **a** What do you *notice* about the sustainability and liveability of living in a Mumbai slum?
- **b** What do you *think* about the sustainability and liveability of living in a Mumbai slum?
- **c** What do you *wonder* about the sustainability and liveability of living in a Mumbai slum?

KEY TERM

interconnection the relationship between places and people, and the ways in which they influence each other

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Urban modes of transport

To enhance the liveability of an area, accessibility to other locations, services and facilities is vital. Accessibility is often best provided through roads and public transport. Sometimes the cost of a car can be unaffordable and, at other times, people make the choice not to have a car. Some social groups, such as migrants, international students, the elderly and younger people, rely heavily on public transport to feel connected and to move around. To ensure sustainability and **equity**, large settlements need to provide public transport options, such as buses, trains, ferries and trams.

▲ **Figure 10.42** This photograph from 1901 shows a steam tram in Sydney

▲ **Figure 10.44** A tram moves along George Street towards Randwick in Sydney on 14 December 2019 in Sydney. Restoring trams to Sydney has been a controversial project with the projected costs in late 2019 estimated to be A$2.9 billion.

▲ **Figure 10.43** Sydney used trams until the late 1960s, but trams were reintroduced to the city in 2019

KEY TERM

equity all people have equal access to resources that meet their basic needs

Trams are an iconic feature of Melbourne. Some cities in Australia have recently begun introducing or reintroducing the use of trams or similar transportation. For example, Brisbane stopped its tram service in 1969 to much public outcry, but a new rapid transit system is planned to open in 2023. The Gold Coast introduced a new light-rail system to service the city in 2014. And Sydney halted its use of trams in 1961, but as of 2019, the city has reintroduced them by using the old tram network. These enhancements of the public transport infrastructure demonstrate change over time.

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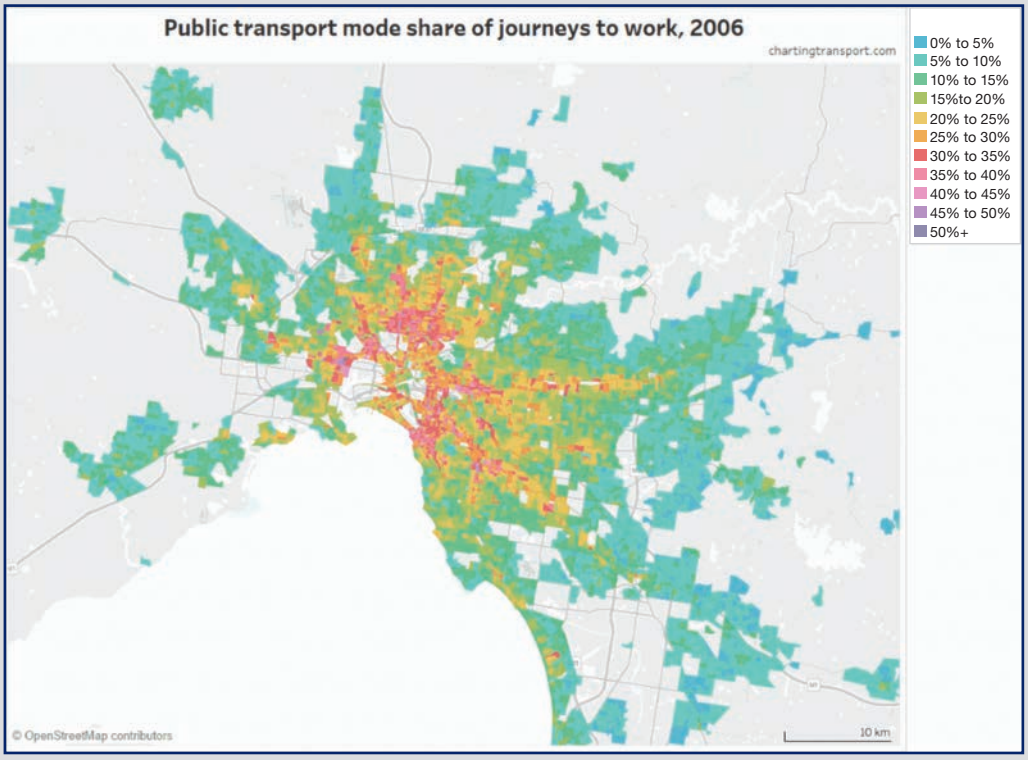
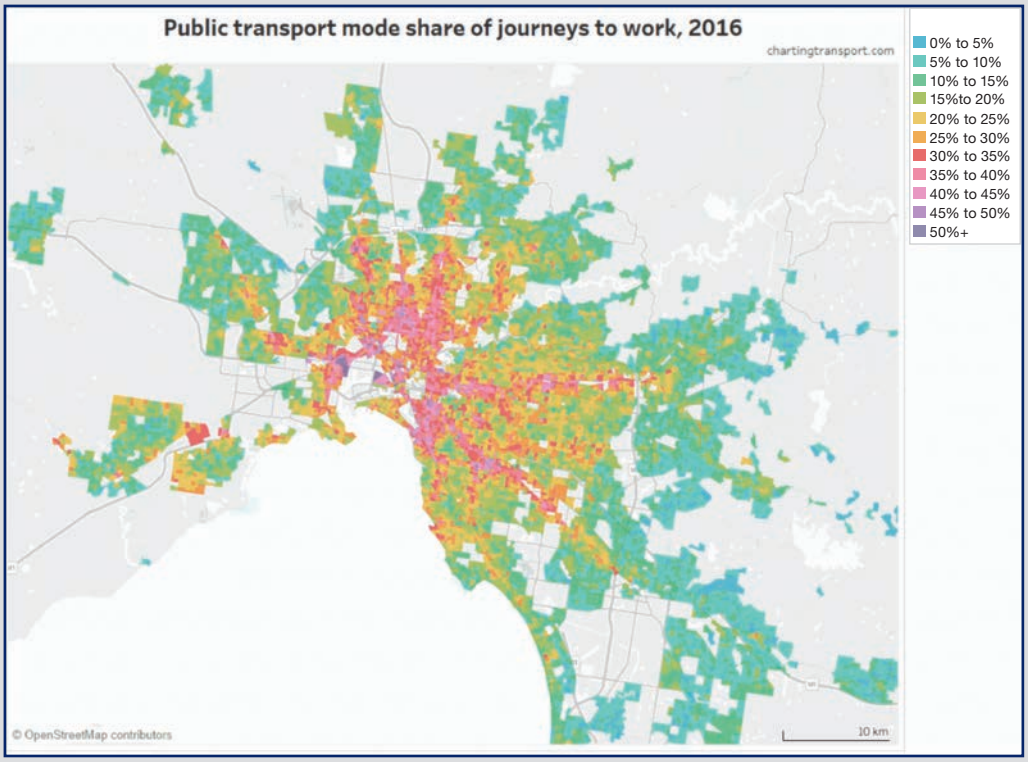
ACTIVITY 10.11

Recognising spatial patterns

The following two images show us what percentage of workers use public transport to get to work in Melbourne's CBD, as well as where they travel from. The first image is from 2006 and the second is from 2016. Study the images and answer the questions that follow.





1 What are two changes that you can see in the pattern of public transport use?

2 What do these changes show us about public transport use over time?

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Rural health care and education

Large-scale services are sometimes difficult to provide to rural communities because these areas are often geographically spread out and the populations are small. However, advancements in technology have improved the effectiveness of providing services to rural areas. For example, health-care providers are improving health care in these locations through technology. Increasingly, doctors are consulting with patients in rural and regional areas through electronic communications. Some rural and regional hospitals are also using nurses and other health-care professionals to consult with patients rather than doctors. For more critical cases, transport and accommodation is provided at a very low cost to rural and regional residents so that they can access the treatment services in larger urban areas.

Rural areas have also seen improvements in accessing educational services. Because of digital technology, students who live in rural and regional areas now can access distance education. Previously, students accessed lessons via radio communication. But, as technology improved, students are increasingly able to access their lessons online and interact with their teachers using live streaming. Students are also better able to share their work with their teacher and collaborate online with other students.

CASE STUDY 10.4

Vanuatu

Read the information about sanitation in Vanuatu and then answer the questions that follow.

Sometimes, international groups help developing countries increase their liveability. For example, the United Nations, World Health Organization and international aid agencies are working to improve the sanitation in rural and regional areas in less economically developed countries.

In the Ambae Island communities of Vanuatu, a project has been set up to help community-based businesses produce and sell sanitation products. The businesses create products like toilets and hand basins to sell to people in the community. Not only is this improving the sanitation and health of local communities on Ambae Island, it is also creating jobs and economic growth. In turn, this is leading to the improved liveability of the people who live on Ambae Island because they have increased access to sanitation.

QUESTIONS

1. Name some of the organisations that are helping people on Ambae Island increase their standard of living.
2. How are these organisations assisting Vanuatu? Explain the effects of this help by using information from the case study.

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Quality of the environment

Water and air quality are essential factors in determining the liveability of a place. Access to clean water and air improves the health of a population as well as the natural environment. Water and air pollution can severely impact the health of residents.

Chapter 8 describes the importance of a community having access to clean, fresh water.

Many cities are built close to river systems to take advantage of the resources of the natural environment. This proximity to a river system means that there is consistent access to fresh flowing water for the population. The river is also useful for transportation to ship people and goods.

Sustainable environments

Designing a place to maximise the use of renewable resources is important. If this is done, the sustainability and liveability of a place increases.

The energy and structures used in cities tend to attract and produce heat. This generation in heat is known as a heat island. To reduce the effects of heat islands, major cities in Germany have introduced green roofs. A green roof involves partially or completely covering a roof with vegetation. A green roof creates insulation, provides habitats for local species, absorbs carbon dioxide and helps to cool air temperatures. In 2014, Germany had 86 million square metres of rooftop vegetation. The use of green roofs in Germany has been so successful that they are now being used in designs in other parts of the world.

▲ **Figure 10.45** An example of urban agriculture in Paris, France, where the rooftop is being used to grow vegetables

In Santander, Spain, smart technology is already making the city more efficient: rubbish bins send alerts when they are ready to be emptied and streetlights automatically dim when no one is on the street.

Air pollution has become a larger problem as cities become more busy. This has severe impacts on people's health, causing more premature deaths than smoking cigarettes. In Oslo, the capital of Norway, many initiatives are reducing air pollution. 'CityTrees', which are park benches covered in a living wall of moss, absorb pollution. One CityTree cleans the air more effectively than 275 real trees. Oslo has also added 1000 charging stations to encourage electric vehicle use, and their buses are powered by biogas, which is produced from city sewerage.

In this topic, we have examined some of the ways that environmental quality, as well as access to services and facilities, affect the liveability of a place.

In the next activity, we will use a topographic map to examine the distribution of human features (such as services and facilities) and natural features (such as vegetation) in a town.

We can then use this information to think about how the distribution of characteristics in a space can influence the liveability of a place and consider how liveable this town would be for the local residents.

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DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 10.1

Reading and interpreting topographic maps

In this activity, you will practise the geographic skill of reading a topographic map, as well as look closely at the interconnection of man-made and natural environments. Look at the topographic map for the Victorian town of Anglesea on the Great Ocean Road (on pp. 328–329) and answer the queries that follow. You can also go to the digital versions of the book to zoom in more to the image.

You can also refer to the 'Guide to using topographic maps' in the Interactive Textbook

Topographic maps use **contour lines** to show the shape of the Earth's surface. Contour lines allow us to know the heights of mountains, the ocean's depths and how steep an area is, just by reading a map. Contour lines are often represented on a map by thin brown lines that join points of equal elevation. Some of the lines have a number written on them. These numbers represent the metres (or feet) above or below a certain point (usually sea level). The closer the contour lines on a map, the steeper the terrain. This is because the elevation is changing a lot in a short distance. The **contour interval** is what we call the difference in elevation from one contour line to the next. Because not all contour lines have the elevation written on them, we can use the contour interval to work out the elevation of the unnumbered lines.

Topographic maps also have grid lines. These grid lines can help us locate and explain where different features of the map are found.

We can find larger features, such as the township of Anglesea, by finding its area reference (AR). An AR is made up of four numbers. The first two numbers are called eastings. These numbers run along the top and bottom of the map. The numbers increase in an easterly direction along the map. The following two numbers are called northings. We find these numbers along the side of the map. These numbers increase in a northerly direction along the map. To find the AR of Anglesea, we first look to the easting number to the left of the township. In this case the number is 54. We then find the northing number directly below the township. This makes up our second two-digit number, 45. The AR for Anglesea is therefore 5445.

To find smaller features, we need to be more specific and use grid references (GR). A GR has six numbers. The first three numbers of a GR identify the easting, and the following three identify the northing. The first two numbers of the easting and northing are easy to determine as they are the same as the AR. For instance, the AR of Anglesea's ambulance is 5444.

To determine the numbers of a GR, imagine that each AR square has 10 equally-spaced horizontal lines and 10 vertical lines running through it. Each imaginary line is numbered one to ten. If you want to pinpoint something in an AR, you use the imaginary numbers of the horizontal and vertical lines to indicate where the feature is. For example, the ambulance at AR 5444 is about 2 imaginary lines across and 9 upwards, which means its GR is 54**2**44**9**. Notice that the GR is the third and last number.

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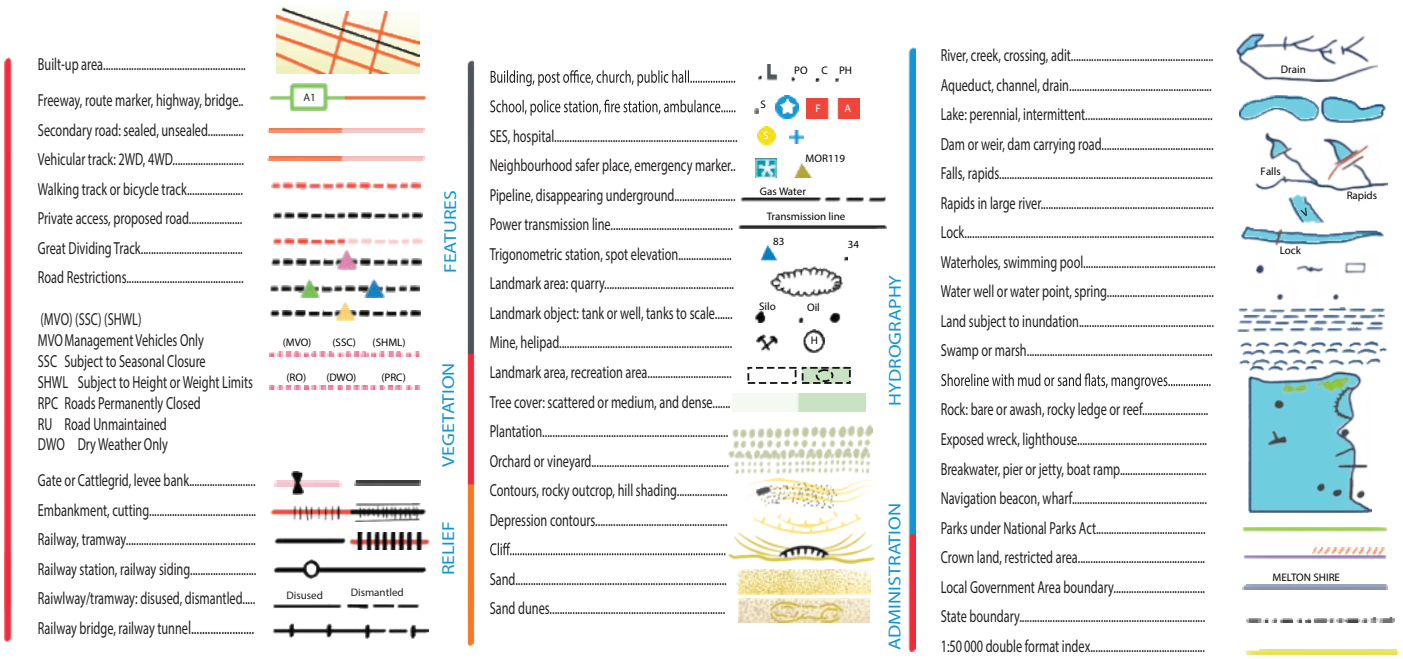
Symbols are often used on maps to represent the features of a map. These symbols are found in the *legend*. They often try to look similar to the feature that they are trying to represent. For example, can you find the symbol for a lake in the legend? Can you find a lake on the topographic map? What is the AR or GR of this lake?

1 Identify one natural characteristic located at AR 4842
2 Identify the type of community facility located at AR 5344.
3 Identify the natural characteristics located at:
   a GR 470434 b GR 543428 c GR 518448
4 Identify the human characteristics located at:
   a GR 474383 b GR 455492 c GR 556463
5 Choose one of the natural and one of the human characteristics that you identified above and explain how each of these might improve or reduce the liveability of Anglesea.
6 a Using the scale on the map, determine roughly how large the town of Anglesea is.
   b The population of Anglesea is approximately 2500 people. Do you think this is likely to be a high- or low-density place?
7 What assumptions could you make about the liveability of this town, based on the services and infrastructure this region has to offer? What may be some of the benefits and drawbacks of living here?
8 Use the contour lines in and surrounding Anglesea to read the topography. Is the topography of the region relatively flat or hilly?
9 What is the elevation of the highest point that you can find in this region?
10 Identify one benefit and one drawback of living in a place with this type of topography.
11 The closer the contour lines on a map, the steeper the terrain. Explain why this is the case.



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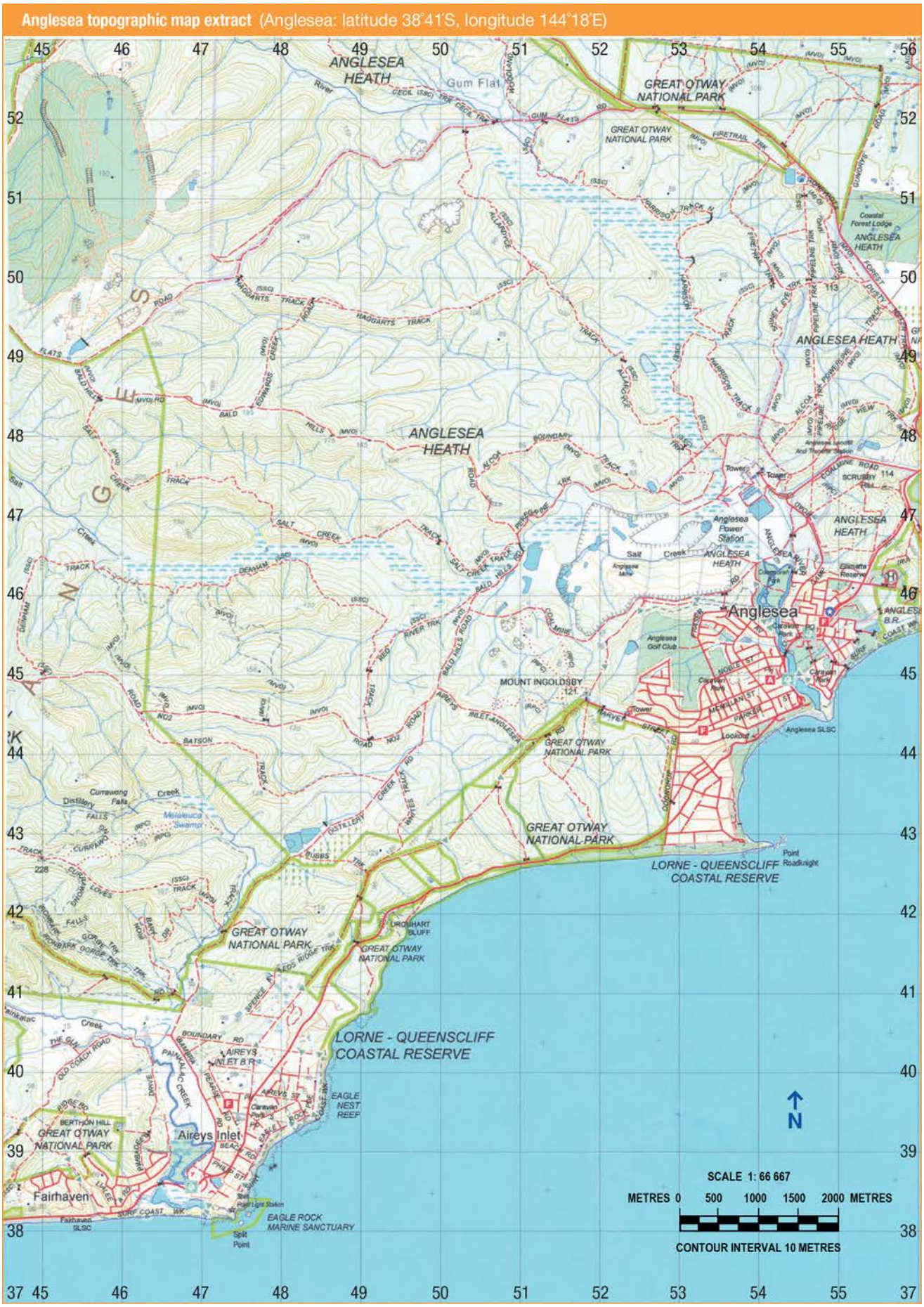

▲ **Figure 10.46** A topographic map of Anglesea (legend on previous page)

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Digital activity
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 10.3

Review questions

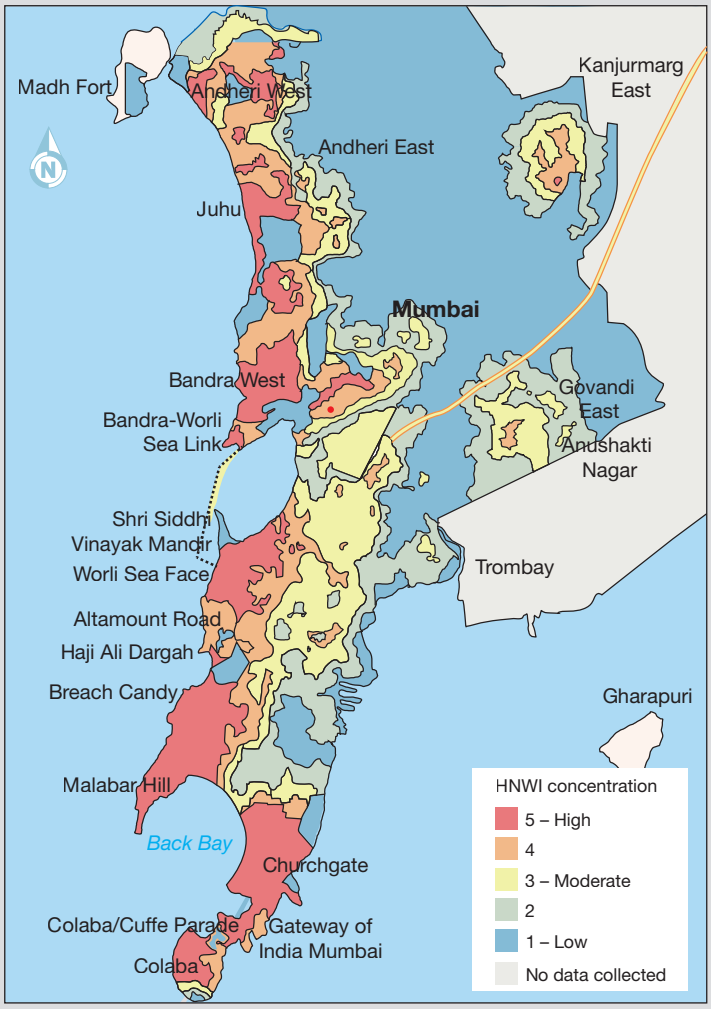
Answer these questions on paper or in the Interactive Textbook.

Recall

1 What is urban sprawl? How have urban planners tried to reduce this?
2 Define population density. Why is it important?
3 How is health care and education becoming more accessible to people living in rural areas?
4 What is sustainability?

Interpret

5 How do green roofs reduce the effect of heat islands?
6 Mumbai is the Indian city with the most 'high net worth individuals' (HNWIs). A HNWI is a person who has assets over $US1 million. Refer to Figure 10.47, which shows the neighbourhoods in Mumbai with a high concentration of HNWI, then answer the following.
   a Describe the distribution of HNWI concentration in Mumbai. To answer this, make sure that you identify which neighbourhoods have high and low concentrations of HNWI and describe where these are located.
   b Based on the map, why do you think many millionaires choose to live where they do in Mumbai?
   c Choose one of the wealthy neighbourhoods and research what makes this neighbourhood appealing to millionaires.



▲ **Figure 10.47** Concentration of HNWI in Mumbai

Argue

7 Environmental sustainability needs to be considered by urban planners. Do you agree with this statement? Give reasons for your point of view.

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10.4 Social connection and community identity

Connection enhances our sense of belonging to a community and can influence our sense of place. Social connection and community identity are important concepts because they contribute to the liveability of a place.

Social connection and community identity

Social connection is the experience or feeling of closeness to others. People feel connected when they are loved, valued and cared for within their community. Connected people have interpersonal relationships and work to maintain them.

Social connection is extremely important to our health and wellbeing. For this reason, it is important for communities to have opportunities to connect with each other. Social connections then form a community identity. A person's community identity is based on their experiences of their local community and their sense of belonging. Community identity is often created because of a physical location, but communities are increasingly formed online through social media.

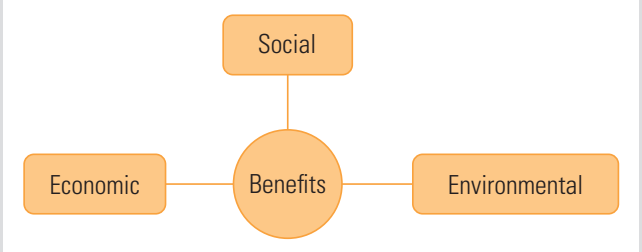
ACTIVITY 10.12

Research task

This activity explores the benefits of social connection and having a community identity.

1 Here is a list of benefits that result from social connection and having a community identity. Categorise each benefit as either economic, social or environmental.
- Businesses giving back to the community (for example, a business giving free coffees to homeless people or a business supporting the local football team)
- Loneliness is combatted
- Community gardens are created
- Mental health is improved
- Safety in the community is increased because people keep an eye out for each other
- An economy is shared through online marketplaces and physical markets
- Resources, such as a local toy library, are shared
- People work together to improve the local environment
- Businesses are supported by the people in the community.

2 Create a mind map and brainstorm some other benefits that result from social connection and community identity. Use the template shown to help you with your ideas.



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Safety and security

Safety affects our sense of place and our connection to the local community. Some places lack safety, which forces people to leave the area. For example, Syria has this push factor because the country has experienced significant conflict since 2011. The conflict has led to the loss of lives, homes, infrastructure, services and facilities. Half the population in Syria has been **displaced** since the conflict began and significant cultural places have been destroyed. These losses and lack of safety have shattered the community spirit.

KEY TERM
displace force someone to move from their home, usually because of war, natural disaster or persecution

In other areas, the violence against women makes it difficult for women to fully participate in their communities. The violence has forced them to take additional precautions for their safety.

Racial and cultural intolerance also affects the sense of safety and community. To improve the feeling of connection and safety it is important to promote cultural understanding. In Australia, there are many people from diverse backgrounds. Celebrating the cultural richness that Australia has increases our sense of social connection, community and safety.

Amazing but true …

Concrete bollards have been installed in Melbourne's CBD to ensure the safety of people and to provide secure locations. The bollards act as a barrier because they stop cars from being driven into pedestrian-only places. The bollards also create areas where people can take refuge in the event of a security incident.

In 2017, someone drove a car through the Bourke Street Mall, killing six people. Similar incidents have also occurred in London and Barcelona. After the incident in Melbourne, temporary bollards were put in place, but now permanent bollards are installed. In other places in Melbourne, obstructions to cars take the form of street furniture and planter boxes. The installations improve the safety and increase the pleasantness of the CBD.

▲ **Figure 10.48** Southern Cross Station has concrete bollards so that cars cannot drive into the station from the road

▲ **Figure 10.49** Metal bollards on Bourke Street Mall give pedestrians a safe, secure area to walk

▲ **Figure 10.50** Some of the concrete bollards in Melbourne are used as meeting points

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Safety is vital for the development of a community's liveability. Urban planners can improve the safety and security of public spaces through their designs. The measures urban planners use are known as passive measures. Passive measures deter and disrupt threats to security and make it easier to monitor the safety of a public space. They include monitoring locations through CCTV, using street lighting and safety mirrors, and ensuring the presence of others (such as using outdoor seating at restaurants). Having people fill the streets at night in a safe way allows people to keep an eye on activity (this is called passive surveillance) and stops others from engaging in illegal behaviour.

More direct or active security measures prevent antisocial behaviour and physical threats. An example of this is safety bollards.

Disconnection from communities

Some members of our communities feel disconnected because they cannot physically access their local area. This leads to social isolation. Areas that have good physical connections improve the social connections of members of the community. Physical access can be improved through public transport for those without access to cars, and ramps enable physical access for those with a disability in the community. Social connections can also be created through the work of organisations that work with marginalised people. Connections enhance the liveability and wellbeing of all.

Improving connections

Community groups and activities give people opportunities to find like-minded people and improve their connections to others.

▼ **Figure 10.51** This girl with a disability and her friend are using a bus with an access ramp for wheelchairs

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There are groups and activities available for people from all walks of life. Traditionally, these types of connections have occurred through organised clubs, such as sporting teams. However, today there is a wider variety of ways available for people to create connections in their communities and find people who have similar interests to them.

Events like pub choirs enable adults to socialise and enjoy singing in a large choir. 'No lights, no lycra' are dance classes that allow people to dance in a darkened room like no one is watching. 'Men's sheds' enable men to bond with other men over a shared interest in physical work and crafts. Groups like these help people to increase their confidence, as well as to create, connect and share with others in their local communities.

ACTIVITY 10.13

Research and creative tasks

This activity invites you to think about ways to create connections to others in your community. Think about what you have read about community identity and social connection, then follow these steps.

1. Research online the community events and groups that exist in your local area. Make sure you look out for activities that build community identity.
2. Use the information you find to create an event for young people that aims to expand on their social connections.
3. Create a poster or social-media campaign to advertise your event.

Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 10.4

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1. What is social connection?
2. How is community identity formed? Provide an example of what this might look like.
3. Give an example of a passive measure for increasing public security.
4. Give an example of an active security measure for safety in a public place.

Interpret

5. Why is it important for people to feel a social connection to their community?
6. How do people connect with their community?

Argue

7. How important do you think online communities are in providing a social connection and identity? Justify your answer.

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10.5 Strategies used to enhance liveability

FOCUS QUESTION

How can the liveability of a place be increased?

Sustainability and interconnections are increasingly important features of liveability. Urban planners are developing innovative ways to improve the liveability of local areas.

This section contains case studies of innovations that show what types of factors enhance the liveability of a place.

CASE STUDY 10.5

Enhancing liveability for young people in Victorian rural areas

Read the information here and then answer the questions that follow.

According to the Youth Affairs Council of Victoria, 22 per cent of Victoria's young people aged from 12 to 25 live in rural and regional areas. Their experiences of liveability are very different to young people who live in urban areas. Access to services can be limited for youths in rural locations. There can be privacy issues because the young people may know their doctor or nurse personally. They do not have access to the variety of education options and career opportunities that the youths in urban areas have. This can mean that young people from rural locations feel forced to leave their town to pursue the careers and opportunities they want.

QUESTIONS

Visit the Youth Affairs Council of Victoria's website and look for the rural and regional section. Then, answer the following questions.

1. Identify an issue related to liveability for young people in rural and regional Victoria. (For example, an issue on education, mental health or political participation). Read through the information provided on the website and find further information from other sources about the issue.
2. Design an advertising or awareness-raising campaign for young people in rural and regional areas about the issue you have identified. Make sure you answer the following questions:
   - **a** What is the issue?
   - **b** Why is it an issue?
   - **c** What can be done about it?
   - **d** What message would you like to send in your campaign?
   - **e** How would you communicate your message (print advertising, radio, social media)?
3. Create a presentation that explains your campaign.

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CASE STUDY 10.6

Pontevedra

Read the information about Pontevedra and then complete the questions that follows.

▲ **Figure 10.52** The city of Pontevedra

Pontevedra is a city in the north-west of Spain in a province known as Galicia. The city has a long history, stretching back to the Roman Empire. During the medieval period, Pontevedra became an important trading hub in the region. The city boasted a large and secure seaport. During the sixteenth century, sediment from the river began to build up along the harbour, making it unusable for large ships. When this industry declined, so did the population. In 1833, Pontevedra became the capital of its province. This revived the city which currently has a population of approximately 83 000 people.

▲ **Figure 10.53** Pontevedra is in Spain

The city banned all non-essential motor vehicles in its medieval centre in 1999. Pontevedra is known as one of the most pedestrianised cities in Spain and has won international awards. The city has a plan called the Metrominuto. The Metrominuto is a map that marks the distances between key locations in the city and the pedestrian travel-time between them. This pedestrian-friendly environment follows the examples of Bruges, Copenhagen and Amsterdam. The Metrominuto, combined with the vehicle ban in the centre of the city has drastically improved the **walkability** of the city.

KEY TERM
walkability a measure of how easy it is for a pedestrian to walk around

◄ **Figure 10.54** The old town of Pontevedra has many narrow streets

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Before the ban in 1999, the city centre was in decline because there was crime and antisocial behaviour, pollution and traffic. However, since the vehicle ban, the city centre has been revived. Crime has declined, and air and noise pollution are no longer a problem. Businesses within the area have benefitted from more pedestrians and it is a more friendly environment. Therefore, the vehicle ban has improved liveability in the city.

QUESTIONS

Use Google Earth or Google Maps to conduct a virtual field trip around Pontevedra. Then, answer the following questions.

1 Open Google Earth or Google Maps and search for the following location: Ponte do Burgo. Use Street View to explore the area around this intersection and create a field sketch of the bridge from Avenue de Buenos Aires.

2 Search for Praza Ourense, Pontevedra, and use Street View to explore the area. Describe the types of built features that are in the location. Are there mostly **commercial buildings** or **residential buildings**, or a mix of the two? Are the buildings high, medium or low density? What social, economic and environmental features are there?

KEY TERMS

commercial building a building that is used for business activities

residential building a building that is used for private activities

DEVELOPING GEOGRAPHICAL CONCEPTS AND SKILLS 10.2

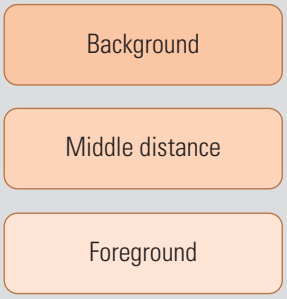
Creating a field sketch

To construct a field sketch, follow these steps.

1 Study the scene or photograph you want to draw and select the features to be sketched. It may be helpful to use a viewing frame.

2 Using a soft pencil (it makes it easier to erase mistakes), draw a frame the same shape as the scene you wish to sketch on a blank piece of paper.

3 Divide the scene you wish to sketch into three parts: The foreground, middle distance and background as shown in the figure.



4 Sketch in the main features or lines of the scene. This may include the horizon and other prominent landform features.

5 Mark in other prominent features or lines, such as roads, railway lines, rivers or powerlines. These will provide reference points for the addition of detailed features.

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6 Add detail if appropriate. Details may include buildings, trees and fences.
7 Use shading and colour to highlight the key features of your field sketch. Avoid making your sketch too cluttered.
8 Label the main features shown in your sketch.
9 Give your field sketch a heading and note the date of the observation.
10 Highlight your frame with a black felt-tipped pen.

Urban consolidation and renewal

To improve sustainability and reduce urban sprawl, many cities are turning to **urban consolidation**. Urban consolidation is the idea that residential development and population growth is restricted to the urban areas that already exist. This means that urban areas are not expanded into rural locations and other areas. The currently existing urban areas are often known as brownfield sites. They are located within existing urban areas and have usually had another land use. Urban consolidation involves a process of redeveloping this land and improving its liveability through connectedness and better services. One major example of this in Victoria is the development at Fishermans Bend in Melbourne.

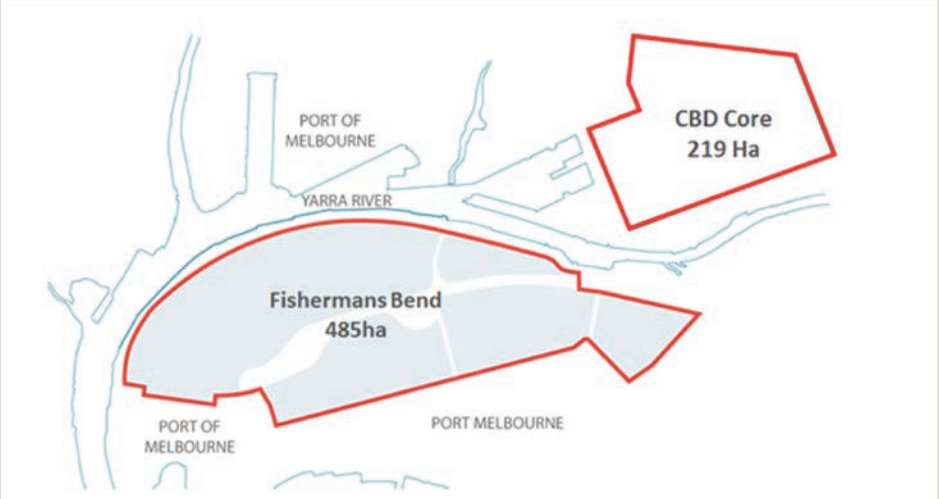
KEY TERM
urban consolidation keeping residential development and population growth restricted to the urban areas that already exist

CASE STUDY 10.7

Fishermans Bend, Melbourne

Read the information about Fishermans Bend and then answer the questions that follow.

Fishermans Bend is a major project for urban renewal in Melbourne. The development will be completed in 2050 and will cover 480 hectares. At completion, Fishermans Bend will be home to 80 000 people. It will also provide employment for 80 000 workers. Fishermans Bend is located in the heart of Melbourne and will connect the Melbourne CBD to the bay.



◄ **Figure 10.55** The location of Fishermans Bend in relation to Melbourne's CBD

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▲ **Figure 10.56** The education and community precinct at Ferrars Street

A plan for liveability and sustainability

The development at Fishermans Bend aims to be liveable and sustainable. The developers have planned for a wide variety of services. These include housing, amenities, schools, roads and transport. Fishermans Bend has identified eight sustainability goals. These are detailed in Table 10.3.

KEY TERMS

walkable an area that can be accessed by walking

biodiversity variety of plant and animal life

▼ **Table 10.3** Fishermans Bend's eight sustainability goals

Goal	Description
An inclusive and healthy community	A variety of housing types and densities. Community infrastructure will be a key feature of the development. This includes schools, health services, public spaces and sporting facilities.
A prosperous community	Primary, secondary and tertiary education opportunities will be available. Fishermans Bend will also support diverse industry and employment.
A low-carbon community	Energy-efficient design will ensure the development is a low-carbon community. This will include renewable energy, and the reduction of private vehicle use.
A water-sensitive community	To drought-proof the development, the use of drinkable water will be minimised. Public spaces and buildings will use recycled and rainwater for non-drinking purposes. Storm water will be retained for this.
A climate-adept community	The development will be resilient to the effects of climate change. This includes extreme weather events, such as flooding, droughts, storm surges and heatwaves.
A connected and liveable community	Fishermans Bend aims to be a **walkable** and connected development. It will include links such as walkways, cycling paths and public transport. Shopping centres and community services will be near public transport. This will provide accessibility and discourage the use of private transport.
A low-waste community	Landfill waste will be minimised. Waste-management systems that divert organic waste away from landfills will be used. Household and commercial recycling will be maximised.
A biodiverse community	Public spaces will encourage **biodiversity** by providing habitats for native plants and animals. Native vegetation will be planted in public spaces and parks. Wildlife corridors will ensure animals are able to move around safely.

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Acknowledging the past

The area has a long history. The traditional owners of the land are deeply attached to the Melbourne area. Aboriginal peoples from the Bunurong and Woiwurung language groups shared territory at the head of Port Phillip Bay. In the case of Fishermans Bend, their attachment is specific to the sand flats and delta of the Yarra River. The land was a rich hunting ground with a range of animal and plant-based food sources. Ideas about how to honour the traditional owners of Fishermans Bend include displaying Aboriginal art, stories and audio guides, as well as landscaping the open spaces with indigenous plants.

Fishermans Bend also has a strong maritime connection. The land eventually became farming land from the 1850s to 1940s. By the World War II, the area had once again transformed, this time into factory and industrial land. Women took on traditionally male-dominated roles during the war, and worked in the motor-car and aircraft factories in the area. The developers of Fishermans Bend intend to honour and reflect the rich and diverse history of the area through its design.

An interesting use of space

A new secondary school will be established to cater for 1100 students. The school is a high-rise development to be constructed in the shape of a ship. This unique design honours the history of the area, which includes the proximity to the ocean, the ferry terminal for the *Spirit of Tasmania*, a maritime history and past industry. The School will support modern educational needs alongside a strong focus on STEAM (science, technology, engineering, arts and maths). Once completed, the School will include a high-tech robotics workshop, digital technology and fabrication lab, all of which will expose students to career pathways that align with Fishermans Bend's proposed design, engineering and manufacturing precinct.

▲ **Figure 10.57** The ship-shaped design for the secondary college at for Fishermans Bend

▲ **Figure 10.58** A cross section view of the high-rise interior that has been designed for the secondary college at Fishermans Bend

Comparisons to European designs

The connectedness that is planned for Fishermans Bend is like that seen in many European town plans. Traditional European designs are for high-density and mixed-use buildings. Often retail and offices share a building with residences. Schools are multi-storey and are built on one-street blocks. This design style uses space efficiently, and improves connectedness and walkability.

Fishermans Bend is similar to the older sections of European towns built in a pre-car era. For example, the Gothic quarter of Barcelona has many small narrow streets, which do not encourage vehicle traffic.

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Most traffic is pedestrian. The narrow streets often lead to open public spaces called plazas. Plazas are gathering points for people and are a key social feature of Spanish architecture.

◄ **Figure 10.59** The Plaça Reial in the Gothic quarter in Barcelona, Spain

QUESTIONS

1. Explain where Fishermans Bend is in relation to the Melbourne CBD.
2. What are the aims of the Fishermans Bend development?
3. How will Fishermans Bend be water sensitive?
4. How will animals be supported by the design?
5. Why will the new secondary school be built in the shape of a ship?
6. Why will the school, like European schools, be in a multi-storey building?
7. Explain the advantages of a traditional European town design.
8. What might be the disadvantages of a traditional European town design in a new development in Melbourne?
9. Explain the positive and negative impacts the design of Fishermans Bend will have on its liveability.

END-OF-SECTION REVIEW 10.5

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1. What does it mean for an area to be pedestrian friendly?
2. What percentage of Victorian youths live in rural and regional areas?
3. What is urban consolidation?
4. How is Fishermans Bend acknowledging its diverse history?

Interpret

5. Why do you think crime decreased when vehicles were banned in Pontevedra?
6. Why does Fishermans Bend have sustainability goals?

Argue

7. Identify and evaluate the features of liveability in Fishermans Bend. Justify your argument.

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online, or via a downloadable checklist.

2 Making thinking visible

I used to think that place and liveability meant …

Now I think that place and liveability means ….

This exercise in visible thinking asks you to connect, extend and challenge the knowledge you had prior to reading this chapter with what you have learned.

How does what you know about place and liveability *connect* to what you have learned in this chapter?

Which new ideas in the chapter *extend* or push your thinking in new directions?

What concepts in the chapter *challenge* or confuse what you used to think about place and liveability? Do you have any questions about what you have learned?

3 Research task

A tale of two cities: Masdar and Melbourne

Visit the interactive edition of this textbook to access a detailed research task that compares two different places and their approaches to enhancing liveability.

4 Problem-solving task

Create a liveable community

A new community is being developed. It is your task to plan this new community using the knowledge you have gained from this chapter.

Search for 'If the World Was Only 100 People' on YouTube and watch the video to understand the characteristics of the community you are creating.

With a partner or a group, design a community that will accommodate these people. What you create should consider the following key concepts:

- Liveability
- Accessibility
- Walkability
- Sustainability
- Community
- Place
- Social connection
- Safety.

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You should ensure that you include infrastructure that supports health care, schools, roads, recreation, open spaces and anything else you think is essential for liveability.

After you have designed your liveable area, create an aerial view of the place on an A3 paper and label the key features.

5 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about liveability

▲ **Figure 10.60** Extreme poverty and extreme wealth live side by side in Mumbai

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3

Economics and Business

What is 'Economics and Business'?

If you have shopped in a supermarket, you will know that there are many different goods available to shoppers. Do you ever wonder where the goods come from? Are the products locally produced or do they come from overseas? Do you know how demand influences the price of a product? Or how demand ensures that the supply of a good is always met?

The study of Economics and Business is important because it helps us to develop an understanding of market forces. This understanding influences our decisions as consumers. Understanding the market enables us to see how producers meet our needs and wants. It also means that we can understand how consumers decide what they will purchase.

The relationship between consumers and producers depends on the laws of demand and supply. Since the Earth's resources are finite, producers need to use resources efficiently. This is so waste is minimised and the future is safeguarded.

Planning is an essential activity for a successful business. Similarly, setting long-term and short-term goals is necessary. Do you know how to set goals? Do you know what a

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priority is? Goals and priorities can take time to identify and establish, but with careful planning, you can set priorities to successfully achieve your objectives.

As a person who purchases goods and services, it is important for you to know your consumer rights. What happens if you purchase a product and it does not do what the retailer says? Consumer rights are vital for you to know so that businesses do not take advantage of you.

◄ **Figure A** Supermarkets contain hundreds of products that thousands of businesses worked together to produce and provide. How many businesses and people do you think would be involved in a supermarket supplying vegetables to a consumer?

► **Figure B** Knowledge about economics and business helps us to plan for the future

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Unit 1

Financial decision-making

Overview

How do consumers and businesses make economic decisions each day? The decisions that consumers and business make affect the pricing of goods and services. Prices are also influenced by demand and supply.

In this unit you will learn about the laws of demand and supply, and the effect they have on the price of a product. You will become aware of the impact that a shortage of a good, or the surplus of a good, has on a product's price. You will also learn how the marketplace is influenced by government strategies, which can shape prices and the Australian economy.

This unit focuses on how consumers make economic decisions based on their wages, needs and wants. These decisions, as well as societal norms, affect the way people save money. Goal setting is an important part of budgeting because it helps you to achieve your savings goal. You will see how using the SMART goal-setting strategy helps keep you accountable in achieving your objectives.

Video
Unit overview

Finally, you will learn about your consumer rights. Many of the products and services you purchase automatically come with guarantees. Most of these rights are enforced by laws to protect consumers from faulty products.

Learning goals

After completing this unit, you should be able to answer these questions:

- How do consumers make economic decisions?
- How does demand and supply shape the pricing of goods and services?
- What is opportunity cost?
- In what ways does the Australian government shape the economy?
- How does a consumer set priorities to establish a budget? What influences a consumer to set priorities?
- What are the different types of goals? How can you create SMART goals to assist you with saving money?
- Why is financial literacy important?
- What are the consumer rights and guarantees protected by legislation? What do exceptions mean?

► **Figure C** Making sound financial decisions is essential to achieving personal and business goals. Everyday tasks like shopping are part of this.

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CHAPTER 11

Resource allocation and making choices

Setting the scene: dairy farming and the price of milk in Australia

Murray Goulburn and Fonterra are two of Australia's largest milk processors. In April 2016, they reduced the prices they paid to farmers for their milk products, which caused dramatic problems across Australia's milk industry.

Coles and Woolworths had been selling their own brands of milk at $1 per litre since 2011. They initially absorbed the losses incurred in processing milk to sell their milk brands at this price. However, from 2014, the supermarkets used their bargaining power to negotiate lower prices with the milk processors. This meant that Coles and Woolworths were no longer absorbing the costs of processing the milk to sell it at $1 per litre. The supermarkets still lost money on the milk they sold for $1 in Tasmania and Queensland because of transportation costs, but they made up for it in the other states because of the lower prices they negotiated for milk processing.

Since the supermarkets were paying milk processors less for processing milk, Murray Goulburn and Fonterra dropped the prices they paid farmers for their raw milk. This price drop severely affected the incomes of farmers.

▲ **Figure 11.1** Dairy farmer Ben Govett walks Sary the dairy cow along Swanston Street on 25 May 2016 in Melbourne, Australia. On this day. hundreds of protestors walked from Federation Square to Parliament House to protest against the price cuts by two of Australia's largest milk processors.

Photo by Darrian Traynor/Getty Images (90797512)

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The farmers were mostly small family businesses; their work entailed long hours, had high costs and was at the mercy of the weather. Many farming families were hit hard by the milk-price drop and decided their businesses were no longer sustainable. Farmers exited the industry to the extent that there was a substantial drop in the volume of milk in the following season.

▲ **Figure 11.2** A dairy farmer checks on his Holstein cattle at Neerim South in Gippsland, Victoria

Public support grew for the farmers because many thought that the farmers were being held to ransom by the supermarkets' pricing of their milk. In 2016, the Australian Competition and Consumer Commission (ACCC) launched an inquiry into the issue. Many consumers felt that they could wear slightly higher prices if it meant the farmers were getting a fairer deal.

By 2018, the ACCC had made a number of recommendations, including making the contracts between farmers and milk processors simpler and more transparent. However, there was only an increase in price for supermarket-branded milk in early 2019 – the price rose to $1.10.

▲ **Figure 11.3** A shopper browses the many milk products available at a Coles supermarket in Sydney

MAKING THINKING VISIBLE 11.1

Think, pair, share

After reading the information on pricing in the milk industry, consider the questions here.

1. What are the issues raised by the farmers?
2. Should supermarkets take these issues on board when making economic decisions?
3. What would you be prepared to pay for a litre of milk? Why?

Journal your answers and share your work with a partner or the class.

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Chapter overview

Introduction

Resource allocation is a necessary part of an economy. This chapter discusses how essential resources are allocated through the forces of supply and demand. You will learn how the optimal use of resources is necessary so that waste through an oversupply is minimised. You will also learn how the price of a product can be determined by a surplus or a lack of supply and demand. Lastly, you will be shown how government laws and regulations, as well as global influences such as recessions, also affect prices.

Learning goals

After completing this unit, you should be able to answer these questions:

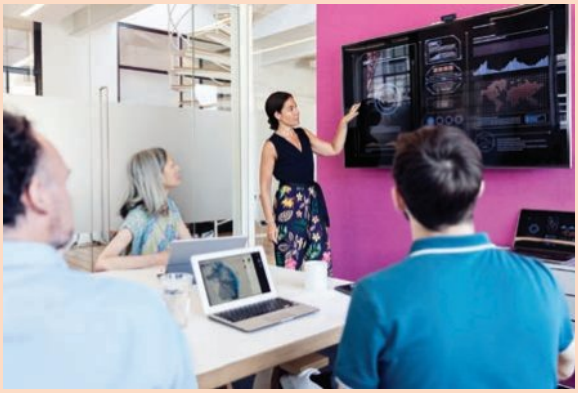
- How do consumers make economic decisions?
- How does demand and supply influence the prices of products and services?
- What are the strategies used by the Australian government to influence markets?

▼ **Figure 11.4** Land, labour, capital and management are the four types of 'economic inputs' or factors of production

Land is considered to be a natural resource. It includes blocks of land where commercial buildings are built, and farmland and pastures for the growing of crops and herding of cattle. Land also includes the ocean, forests, natural gas, water resources (such as lakes and rivers), as well as oil and mineral deposits. Land refers to all economic resources we find in nature.

Labour is also known as human resources. It is the work put in by people who participate in the production processes of goods and services. Labour is the work done by everyday workers such as factory workers, teachers, builders, office administrators and cleaners, as well as unskilled workers in the workforce.

Capital in economics is not the money used or spent on a business. Rather, it refers to the assets used to create the goods. Machinery, buildings and equipment, and transport vehicles (such as trucks) are known as capital.



Management, also known as 'enterprise', refers to knowledge and skills. Enterprise is used by owners of businesses and managers to coordinate the production process of goods and services. These skills are sometimes referred to as 'entrepreneurship'.

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11.1 How do consumers and producers influence the market?

FOCUS QUESTIONS

- How do consumers make economic decisions?
- How does demand and supply influence the prices of products and services?

Consumers make choices every day about the types of goods and services they spend their money on. Their choices are affected by cost, the availability of the goods and how much money they have to spend on their item. The consideration of these and other factors is part of **economics**.

Economic resources are also known as factors of production. They are divided into four categories: *land*, *labour*, *capital* and *management*. Figure 11.4 shows these four categories for economic resources.

Making economic decisions

We make economic decisions every day based on our **wants** and **needs**. A want refers to something that you desire to have. It is something that would be good to have, but it is not *necessary*. A want is something that you may or may not be able to obtain. For example, you may want to have an overseas holiday, buy a luxury car or have the latest designer jacket.

A need, on the other hand, refers to something that you *cannot do without*. For example, a human being needs food, water and shelter to survive. You could possibly go without water for a day, but you do need to drink water to stay alive.

KEY TERMS

economics the study of the way in which economies work

wants products and services that people want but are not necessary for survival

needs products and services that people cannot do without

scarcity refers to the finite resources we have on earth and the decisions we make to allocate these resources to satisfy consumer needs

The value of needs and wants are different. By differentiating our needs and wants, we are able to allocate resources to create goods to meet the needs of consumers. When we balance the **scarcity** of resources, we are able meet as many additional wants as possible, after the needs are satisfied.

◄ **Figure 11.5** Consumers and producers have a closely connected relationship, which influences the supply and demand in markets, and the allocation of resources

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There are many concepts associated with the market system. Understanding these concepts helps us to understand how consumers and producers influence the **market**.

KEY TERM
market the business or trade in a particular product, including financial products

Markets

In economics, the price that is paid for a good or service is dependent on its demand and supply. Consumers and producers are the key players in any market.

Consumers are those who purchase goods and services from producers and suppliers. Producers are also known as manufacturers. They can be entrepreneurs who make goods and services for people to consume. Producers are often employers because they hire people to work in different parts of their businesses.

In any market, the price for a good or service is dependent on consumer demand and the quantity supplied by a manufacturer.

The law of demand

The law of demand is that when demand rises for a product, the price also rises. This means that the higher the demand for a product, the higher the price a consumer is prepared to pay for it (see Figure 11.7). The factors that influence the demand of a product include:

- The price of a competitor's substitutes
- A consumer's income level
- A consumer's personal taste and expectations
- The number of consumers in the market
- The price of complementary products.

The law of supply

The law of supply is that as the price of a good or service increases, the quantity supplied by the manufacturer will also increase. This means that the higher the price of a product, the larger the quantity of the product will be supplied. Similarly, the lower the price of a product, the lower the quantity of the product will be supplied (see Figure 11.7). The factors that influence the quantity of a product supplied include:

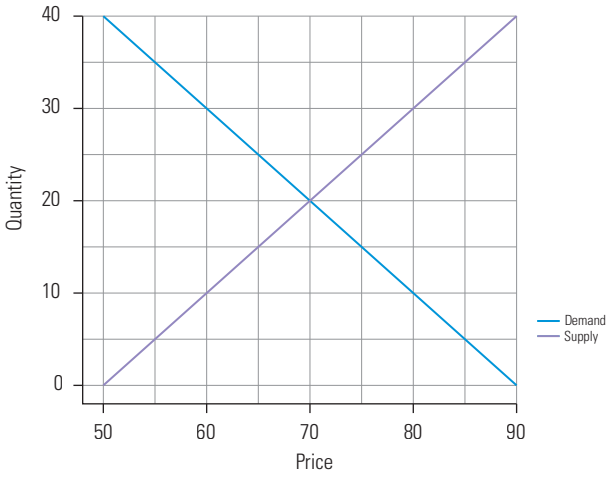
- The price of the inputs (the raw materials) used to make the product
- The price of the product itself

▲ **Figure 11.6** A shopper pays a vendor for fruit at a Melbourne market. In this case, the woman is the consumer, the person who grew the fruit is the producer, and the fruit-store vendor is the supplier

- The amount of time the product has been in the market
- New technology
- Government policies.

Scarcity

Some of our Earth's resources are limited in nature. Gas, coal and other precious minerals are scarce because they have a limited supply. As our human population grows, scarcity becomes more of an issue. This is because we are trying to satisfy unlimited human wants in a world that has limited resources to manufacture products.



▲ **Figure 11.7** Demand and supply lines

MAKING THINKING VISIBLE 11.2

Explanation game

Look at Figure 11.7 and answer the following questions.

1. Identify something interesting about this graph. You can use the sentence prompt 'I notice that …'.
2. Now that you have your observation, ask yourself 'Why is it that way?' or 'Why did it happen that way?'
3. Discuss what you think with a partner.

Amazing but true …

The number of first-home buyers increased by 21.33 per cent in December 2019. The decade-high figure shows that first-home buyers are making a comeback in the property market.

In addition, the federal government recently introduced a First Home Loan Deposit Scheme to help low- and middle-income earners buy their first house. Under the scheme, the government gives a guarantee to 10 000 first-home buyers that they can purchase a home with a deposit of only 5 per cent of the property's purchase price. Usually, the deposit needed is at least 20 per cent. The introduction of the federal government's First Home Loan Deposit Scheme encourages first-home buyers to enter the market.

The rise and fall of the demand and supply of a product directly affects the price of a product. This relationship is known as the **price mechanism**. The price mechanism informs producers how much they should or should not produce in order to maximise their profits.

KEY TERM

price mechanism the relationship between the supply and demand of a product or service, which affects its price

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▲ **Figure 11.8** The shelves are almost empty of baby formula at this large supermarket in Sydney. Many Australian supermarkets placed signs on their shelves to advise customers that they could only buy a certain number of tins.

In January 2019, there was a scarcity of infant baby formula in Australia. This forced supermarkets like Coles and Woolworths to limit the purchases of these products (see Figure 11.8). The supermarkets did this to discourage consumers from bulk-buying infant baby formula due to shortages of this product.

The shortage in infant baby formula was caused by *daigou*, which is when personal shoppers buy products in one country to sell to customers overseas in their market. In this case, the personal shoppers were purchasing infant baby formula from supermarket shelves for resale in China. The Chinese demand for infant formula was fuelled by inflated prices for these products in China. This made the *daigou*-sourced baby formula more affordable for this overseas market.

KEY TERMS

equilibrium price occurs when demand and supply are equal

shortage a situation in which there is not enough of something

The equilibrium price

Manufacturers have to find ways to use precious resources efficiently because of scarcity. In this way, resources are not wasted and profits are maximised. The best outcome is when the quantity supplied equals the demand for a product. When this occurs, the product is sold at the **equilibrium price**. The equilibrium price occurs when the demand line intersects the supply line. It is the optimum price because it is where supply equals demand. For example, in Figure 11.7, the equilibrium price is $70 because consumers will demand 20 units and producers will supply 20 units at this price point.

The impact of shortages and surpluses

When demand exceeds quantity, a **shortage** arises. A producer usually responds by increasing the price of the product, which earns them a greater profit. Consumers are willing to pay more for a product that is in short supply, but if the price continues to rise due to ongoing shortages, different scenarios may occur. For example:

- Consumers might be put off by the high prices and the product could drop out of the market
- Entrepreneurs could spot the opportunity and produce similar-type products, which drives prices down again.

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Conversely, when supply exceeds demand, a **surplus** arises. A producer responds by decreasing the price of the product so they can sell all their available stock and recoup their costs. Some scenarios that might occur then are:

- New consumers are attracted to the reduced price and enter the market
- The lowered price decreases profits so much that the producer leaves the market (and so manufacturing of the product stops).

Opportunity cost

Opportunity cost relates to the economic decisions we make every day. It refers to the value of something being given up in order to acquire something else instead. Opportunity cost is also known as the 'best forgone alternative'.

Every economic decision made by a consumer has an associated opportunity cost. For example, the opportunity cost of you buying a new pair of sneakers for $50 could be the interest you would have earned from having that same $50 in a bank account. Another example is the opportunity cost of doing homework on Sunday night because you went out all weekend.

KEY TERMS

surplus an amount that is more than is needed

opportunity cost the loss of an alternative course of action when an economic decision is made

END-OF-SECTION REVIEW 11.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 How do the laws of demand and supply work?
2 Describe the four types of economic inputs.

Interpret

3 Why it is important for a producer or manufacturer to strive for an equilibrium price?
4 Explain the impact on price and recommend profit-making strategies for a manufacturer in the following scenarios:
   a There is a surplus of a product
   b There is a shortage of a product.

Argue

5 Create a poster showing the opportunity cost of buying a brand new pair of sneakers that cost $250. Use different examples and images in your answer.
6 Use a spreadsheet to create a graph that shows the demand and supply curves for the sale of the sneakers in Question 5. Use the data in the table here to create your graph. (Hint: use a scatter chart).

PRICE	QUANTITY DEMANDED	QUANTITY SUPPLIED
$80	45 000	25 000
$90	40 000	30 000
$100	35 000	35 000
$110	30 000	40 000
$120	25 000	45 000
$130	20 000	50 000

Digital quiz
Please see the Interactive Textbook to access digital activities

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11.2 How are markets influenced by governments?

FOCUS QUESTION

What are the strategies used by the Australian Government to influence markets?

Australia has a **mixed economy**, which means that the economy is guided by market forces as well as by the government. The role of the Australian Government is important because it uses different types of strategies to help shape Australia's economic landscape. These strategies are known as **economic policies**.

KEY TERMS

mixed economy a market economy in which there is also government intervention

economic policies strategies developed by the government to address economic growth and tax revenue

inflation a continuing rise in prices caused by an increase in the money supply and demand for goods

unemployment rate the number or percentage of people in a country or area who do not have jobs

gross domestic product a measure of the total value of production of goods and services in an economy over a period of time (usually one year)

economic cycle a period during which a country's economy goes from growth to recession

microeconomic the part of economics that studies individual markets and businesses, or how individual people spend or earn money

macroeconomic the part of economics connected with financial systems at a national level

tax money paid to the government that is based on your income or the cost of goods or services you have bought

Economic policies are aimed at decreasing **inflation** (rising prices) and reducing the **unemployment rate** (the level of job shortage). Economic growth is measured by **gross domestic product** (GDP). Typically, Australia's annual GDP fluctuates through **economic cycles**.

Laws and regulations

The federal government introduces laws, and develops **microeconomic** and **macroeconomic** policies to influence the Australian market. For example, in 2000, the Australian Government introduced a goods and services tax (GST). This was a **tax** that removed the need for individual sales taxes, which had rates that varied from product to product and service to service. Instead, the GST was a flat 10 per cent tax on *all* goods and services (although there are some exemptions).

In 2017, the GST was updated because of the large increase in online shopping. The tax now applies to digital products and services, such as Netflix. The GST also now applies to online purchases from overseas markets for

Amazing but true ...

The Victorian government introduced a state-wide ban of all lightweight plastic shopping bags at the end of 2019. The ban includes degradable, biodegradable and compostable bags that have a thickness of 35 microns or less. Victorian retailers can no longer legally supply or sell these types of bags to consumers.

The legislation was put in place after the Victorian government asked Victorians for their opinion on the issue. The government received over 8000 submissions, with 96 per cent of Victorians supporting a ban on single-use plastic bags. Victorians overwhelmingly supported a ban because lightweight plastic shopping bags are an environmental hazard. Around 1 billion plastic bags were being used in Victoria each year and over 10 million of these were ending up in landfill.

So far, single-use plastic bags in Australia have been phased out of all states and territories in Australia, except for New South Wales, which is yet to introduce legislation on the issue.

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low-value goods (i.e. those up to the value of $1000). This means that buyers of products from online product platforms like eBay now pay GST for anything that is purchased for less than $1000.

Federal budget

The federal government passes a federal **budget** annually. This document sets out Australia's financial forecast and fiscal policy for the following years. It also contains estimates of the Australian Government's revenue and expenses. The government funds services like education and health because they are essential to a functional economy.

When a budget is passed, the government might provide tax cuts to help create an equitable distribution of income across Australia. The government might increase its spending on health, education and infrastructure (like railways and highways). Or it could give incentives to businesses so that they hire apprentices. These kinds of policies help to allocate resources efficiently.

Subsidies and rebates

The government gives **subsidies**, which are cash grants, to businesses and industries that the government wants to promote or support. For example, the Australian Government might give wage subsidies of up to $10 000 to Australian businesses so that the businesses can hire job seekers in ongoing positions.

▲ **Figure 11.9** Treasurer Josh Frydenberg and Finance Minister Mathias Cormann with the federal budget for 2019–20 at Parliament House in Canberra

This kind of subsidy helps to ease costs for a business so it can employ and keep staff. The businesses could also use the money to upskill their staff so that their earning capacity increases.

Rebates are amounts of money that are returned to the spender. They are a way for a government to delegate work to private industry. For example, the Australian Government is currently offering rebates to Victorians who buy solar panels. This 10-year program is designed to encourage Victorians to use green energy. Eligible households can be reimbursed a portion of the cost of the solar panels.

KEY TERMS

budget a record of the income coming in and the money going out (expenditure)

subsidies money given as part of the cost of something to help or encourage it to grow

rebates an amount of money that is returned to you, especially by the government, such as when you have paid too much tax

The global financial crisis in 2009

The fall in the US housing market is often cited as the start of the 2009 global financial crisis (GFC). Banks had large losses and millions of people worldwide lost their jobs. This happened in the wake of the Lehman Brothers' collapse. Lehman Brothers was a global financial services firm.

▲ **Figure 11.10** An investor watches the Australian Stock Exchange in Melbourne as it shows heavy losses in the lead-up to the 2009 GFC

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Australia weathered the GFC better than other parts of the world. The Rudd Labor Government at the time established a stimulus package worth $42 billion to invigorate the economy. This was primarily done to prevent Australia from sliding into recession. The strategies of the stimulus package were varied, but some of the policies are shown in Figure 11.11.

Cash handout	• Cash up to $950 was given to 8.7 million Australian workers who earned $100 000 or less and lodged a tax return in the 2007–2008 financial year.
Education payments	• A payment of $950 was provided for each child in families earning a low to middle income.
Hardship bonus	• A payment of $950 was provided to 21 000 farmers or farm-dependent small business owners.
Training and learning bonus	• A payment of $950 was given to eligible students, apprentices and unemployed people for training and learning purposes.
First home owner grant	• The first home owner grant tripled from $7 000 to $21 000 for a newly constructed home. The grant for first-home buyers for existing properties was doubled to $14 000.
Building the education revolution	• Funding increased for new facilities such as libraries and multipurpose halls in primary schools. • Refurbishment works commenced in eligible schools. • Construction or refurbishment of science labs or language learning centres in secondary schools was initiated.

▲ **Figure 11.11** Stimulus strategies implemented to invigorate the Australian economy during the 2009 GFC

MAKING THINKING VISIBLE 11.3

Compass points

Use the compass points shown here to reflect on the strategies used by the Rudd Labor Government to stimulate the Australian economy during the 2009 GFC.

1. **E = Excited**
   - What excites you about these strategies? What's the upside?
2. **W = Worrisome**
   - What do you find worrisome about these strategies? What's the downside?
3. **N = Need to know**
   - What else do you need to know to help you evaluate the strategies?
4. **S = Stance or Suggestion for moving forward**
   - What is your stance or opinion on the strategies that the government of the time used? How might you further evaluate the strategies used during the 2009 GFC?

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The strategies shown in Figure 11.11 helped to stimulate Australia's economy at a time when many countries around the world were deep in recession. Dr Steven Kennedy, who was working as a general manager of Australia's Treasury, said in a speech in 2009:

> The Australian Treasury estimates that without the stimulus packages the unemployment rate would have been forecast to peak at 10 per cent rather than $8\frac{1}{2}$ per cent. With the stimulus, there are estimated to be up to 210 000 more people with jobs.

▼ **Figure 11.12** Governments sometimes need to provide financial support to individuals, households and businesses during times of crisis. For example, in 2020, the Australian Government acted decisively in providing large sums of money to support job seekers and businesses during the COVID-19 pandemic.

END-OF-SECTION REVIEW 11.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1. List the different types of strategies used by the Australian government to stimulate the economy.
2. Explain the importance of a Federal budget.
3. What is a global financial crisis?

Interpret

4. Evaluate the strategies used by the Australian government during the 2009 GFC.
5. Discuss why the GST was amended to include online overseas purchases of up to $1000 in value.

Argue

6. Conduct online research to find out what other strategies could be used to stimulate an economy when it is in recession. Discuss the merits of each of the strategies you discover.

Digital quiz
Please see the Interactive Textbook to access digital activities

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End-of-chapter activities

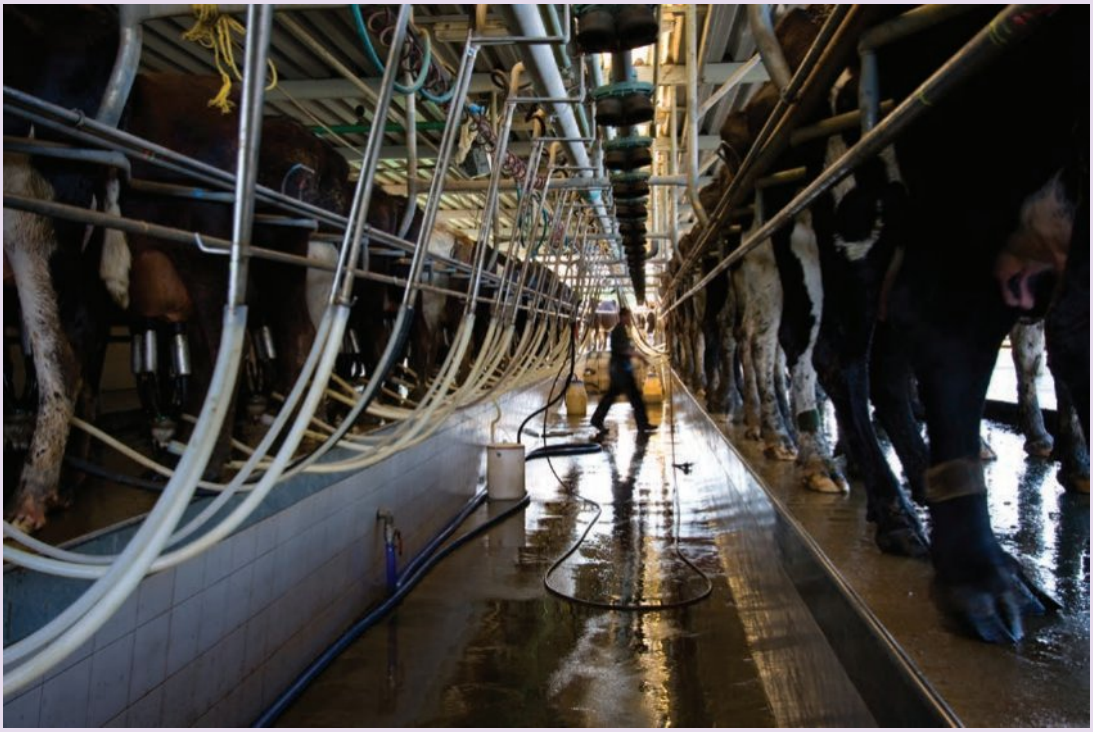
1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Research task: Investigating the Australian milk industry

Research the Australian milk industry. You will need to examine:

- The background issues relating to the price of milk
- The location of Australia's milk industry
- The gross income of farmers per litre of milk
- The price of milk across supermarkets
- The regulations and industry practices surrounding the price of milk
- The opinions of consumers on the price of milk.



▲ **Figure 11.13** A dairy worker prepares cows for milking in a milking pen at a dairy farm in New Zealand. The farm supplies milk to Fonterra, which is the world's top dairy exporter.

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Cambridge University Press

3 Using your research, create an information resource. You may choose to:

- Create a website on the various issues
- Create a petition to raise the price of milk in support of famers
- Write a letter to the local newspaper, or your local member of parliament, putting forward the issues you have gathered.

▲ **Figure 11.14** In 2009, French farmers protested against the fall in milk prices by going on strike. This image shows the farmers using their tractors to form the letters of the European Milk Board ('EMB') and the shape of a star in a field. Do you think actions like this are useful in educating the public about pricing issues?

4 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about resource allocation

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CHAPTER 12

Consumer and financial literacy

Setting the scene: Australians and financial literacy

In 2015, the Programme for International Student Assessment (PISA) tested how well 15-year-old students from fifteen countries understood finance. The results showed that nearly 20 per cent of Australian students could not recognise an invoice, let alone know its purpose. This was a better result than some other countries – for example, in the United States, Poland and Brazil, over 50 per cent of students did not recognise an invoice. However, the result for Australia revealed that the financial understanding of Australian students was far behind that of students in China, Russia and some Canadian provinces.

The research from PISA also showed that only 15 per cent of Australian students had **financial literacy**. On top of this, Australian students attending schools in rural areas were falling behind their peers in the city. These results are concerning because many of the students tested probably had part-time jobs and were only three years from leaving school. In other words, some young Australians about to leave their schooling did not have the financial literacy to be self-sufficient in their full-time work or tertiary studies.

KEY TERM
financial literacy the ability to understand basic principles of business and finance

▲ **Figure 12.1** Research has shown that Australian students do not understand finance as well as students in some other countries

Another important reason why young Australians need to be financially literate is because of the recent findings of the royal commission into the banking industry. The Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry was a formal public inquiry that concluded in early 2019. The royal commission found that many banking institutions in the financial sector had deliberately defrauded their customers. Having greater financial literacy will help young Australians protect themselves better against being cheated financially.

In addition, we are in a time where terms and conditions for bank accounts, loans and insurance policies are the norm. Much of this information is difficult to understand because of the complex legal language that is used to cover various scenarios. However, if young Australians are financially literate, they will be able to handle financial shock, as well as meet short-term and long-term financial goals.

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▲ **Figure 12.2** Keeping on top of bills and accounts can be overwhelming, which is why financial literacy is so important. Financial literacy enables you to keep financial records and make basic plans to keep yourself comfortably within a budget.

MAKING THINKING VISIBLE 12.1

See, think, wonder

Re-read the following information about the results from the PISA test on financial literacy and answer the questions.

> …only 15 per cent of Australian students were at the highest level of financial literacy. On top of this, Australian students attending schools in rural areas were falling behind their peers in the city.

1. What do you notice about the level of Australian students' financial literacy? (*I see…*)
2. What do you think about the difference in financial literacy between city and regional students? (*I think…*)
3. What do you wonder about the results of financial literacy for Australian students? (*I wonder…*)

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Chapter overview

Introduction

Education in financial literacy helps you to establish savings goals by distinguishing your needs from your wants. In this chapter you will learn about prioritising, which is a skill individuals and businesses use to plan for the future. You will also learn about setting long-term and short-term goals to achieve financial and organisational goals. Since you are a consumer, the chapter discusses your consumer rights and how you are protected by law. You will also learn about the guarantees given by businesses for the goods and services they sell.

Learning goals

After completing this unit, you should be able to answer these questions:

- How do consumers make decisions in relation to their spending?
- How does legislation protect consumer rights?
- What are the differences between financial and organisational goals?

◄ **Figure 12.3** Do you know how your rights as a consumer are protected?

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12.1 Financial decision-making, and consumer rights and responsibilities

FOCUS QUESTIONS

- How do consumers make decisions in relation to their spending?
- How does legislation protect consumer rights?

We make financial and economic decisions every day. Will you make your lunch or buy it today? Do you want to go out for a movie on the weekend with your friends? Will you buy the latest iPhone or settle for a generic model? Do you want to save money for a rainy day and not buy a phone? These are all examples of financial and economic questions. What you decide will be based on your needs and wants. Your financial and economic decision-making will also be influenced by many other factors, such as wages, societal norms and values. A **consumer** makes economic decisions based on these factors, needs and wants on a daily basis.

Wages

The **wage** or the salary that a person earns from their job plays a huge role in determining how the person spends their money. Your wage is dependent on the type of job you have, whether you work full-time or part-time, and the skills associated with your role. A person's wage pays for a mortgage, groceries, essential items and utility bills (such as electricity, gas, phone and water). People have to set budgets to fulfil their financial commitments. This is why a good understanding of financial literacy, which includes how to save and budget, is essential in life.

Societal values and norms

The Australian Bureau of Statistics has reported that nearly 68 per cent of households in Australia are owner-occupied.

▲ **Figure 12.4** These Melbourne protestors, who marched for higher wages and better working conditions in 2019, brought the city to a standstill

This shows the great value that Australians place on owning their own home.

Owning your own home is known as 'the great Australian dream', and many Australians spend a portion of their income on home repayments.

KEY TERMS

consumer a person who buys goods or services for their own use

wage a specific amount of money that is regularly paid, usually every week, to an employee

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The Australian Government supports this ideal by offering a first-home-owner's grant to Australians. This eases the cost of purchasing a residence for the first time.

Consumer rights

Imagine that you have just bought a brand-new bicycle, but you find after a week that the gears are not working properly and the bell cannot be heard. You would be pretty upset if the store you bought the bicycle from did not repair the problems for you. But you do have a right to have your bicycle fixed by the retailer. This entitlement is known as a **consumer right**.

A consumer right is a guarantee that a good or service purchased by a consumer will work or be what the retailer says. It is also known as a consumer guarantee. The Australian Competition and Consumer Commission (ACCC) outlines that consumer rights include:

- The right to a repair, replacement or refund for a faulty product or service
- The right to compensation for damages and loss caused by a faulty product or service
- The right to cancel a faulty service.

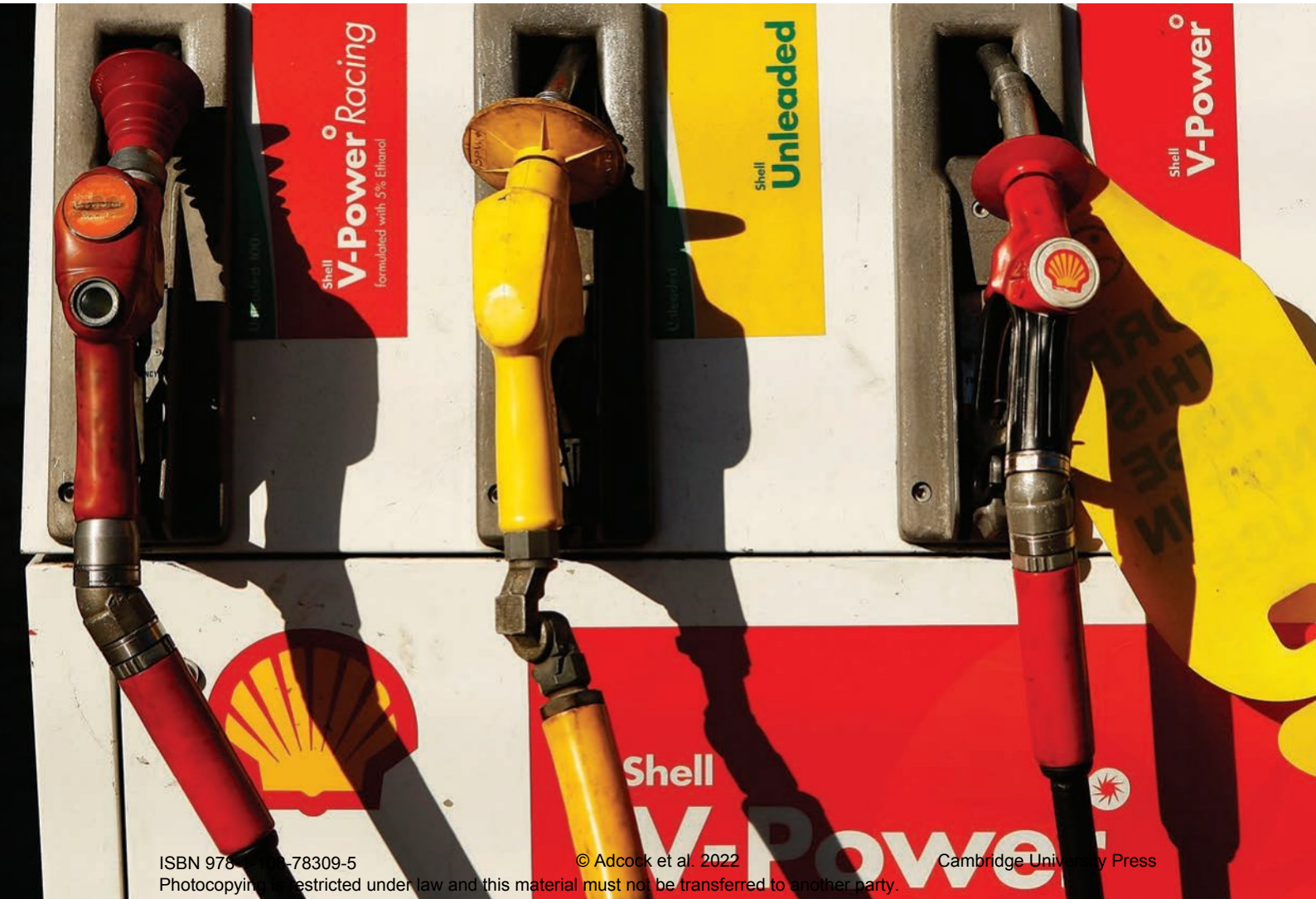
KEY TERM

consumer right a guarantee that a purchased good or service will work or be what the retailer says

Australian Consumer Law

The *Competition and Consumer Act 2010* is Commonwealth legislation that is enforced by the ACCC on a federal level. The Act contains a schedule known as Australian Consumer Law, which applies to all states and territories. State and territory consumer protection agencies, such as Consumer Affairs Victoria, help to enforce businesses to comply with the law. These state agencies also educate consumers on their rights and help to settle disputes.

▼ **Figure 12.5** The ACCC monitors issues like petrol prices across Australia. This government body helps to ensure businesses are providing fair pricing to consumers



The rights and protections in the *Competition and Consumer Act 2010* can be complex, but it is important for you to understand the guarantees and exceptions in Australian Consumer Law. This is so you are informed as a consumer and know your rights.

Consumer guarantees

The different types of consumer guarantees are found in sections 51–59 of Australian Consumer Law. Some of these include:

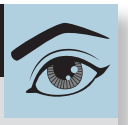
- The good sold is of an acceptable standard of quality
- The advertising of a good accurately describes the good
- Any extra promises made by a manufacturer about the quality of a good is accurate (these promises are known as 'express warranties')
- The good is fit for the purpose as described by the manufacturer (it does what the manufacturer says it will do)
- The purchased good matches the model used to sell the good
- The supplier will not try to repossess the sold good
- The manufacturer is able to provide repair services and spare parts for a good that is sold.

Exceptions

Australian Consumer Law also lists exceptions to consumer guarantees. These exceptions occur in the following situations:

- You got what you asked for but changed your mind about buying the good, found it cheaper somewhere else, decided you did not like the purchase or had no use for the good
- You misused the product, which caused the fault or a problem
- You knew of or were made aware of the faults before you bought the product
- You asked for a service to be done in a certain way against the advice of the business or were unclear about what you wanted.

MAKING THINKING VISIBLE 12.2



Explanation game

Re-read the sections on 'Consumer guarantees' and 'Exceptions'.

1. Choose one guarantee and one exception to focus on.
2. Use the sentence prompt 'I notice that…'.
3. Then follow this observation with the question 'Why is it that way?' or 'Why did it happen that way?'

Amazing but true …

In recent years, more than 100 million vehicles worldwide were installed with faulty airbags from Takata, a Japanese automotive parts company. Approximately 3 million of these vehicles were in Australia, and included cars from BMW, Holden, Honda, Mitsubishi and Toyota.

The defective airbags were linked to 23 deaths around the world, including one in Sydney in 2017. The airbags, which could spray shrapnel when deployed, resulted in an urgent recall. Worryingly, even a minor collision could activate the faulty airbags.

Australian motorists were encouraged to check whether their car was installed with the defective product by visiting the Is My Airbag Safe website or their car manufacturer's website. Those people who had the faulty airbags installed in their cars were entitled to have their vehicles towed to a dealership for repair and the airbags replaced for free.

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 12.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 List the different factors that influence your spending habits. Give an example for each.

▲ **Figure 12.6** What kinds of financial and economic decisions do you make?

Interpret

2 Choose three consumer guarantees found in sections 51–59 of Australian Consumer Law. Why is each an important right for a consumer?

3 Why do exceptions exist? Choose two of the exceptions listed to help explain your answer.

Argue

4 To what extent does Australian Consumer Law protect a customer? Use at least three examples in your answer.

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12.2 Financial and organisational goals for individuals and businesses

FOCUS QUESTION

What is the difference between a financial and an organisational goal?

Setting goals and creating a plan to achieve them is important. This process enables you to achieve what you set out to do. A **goal** is a measurable objective that is achieved within a fixed timeframe.

A *financial goal* is a target that is set by a specific and future financial need. This type of goal helps individuals and businesses decide how they spend, save and invest their money. A financial goal is achieved through budgeting and saving.

An *organisational goal* is a statement of what a business wants to achieve through its activities. This kind of goal is often connected to objectives that are measurable targets of how a business completes its aims. An organisational goal is achieved through a series of strategies or actions that a company undertakes. For example, increasing a product line, using advertising or hiring staff.

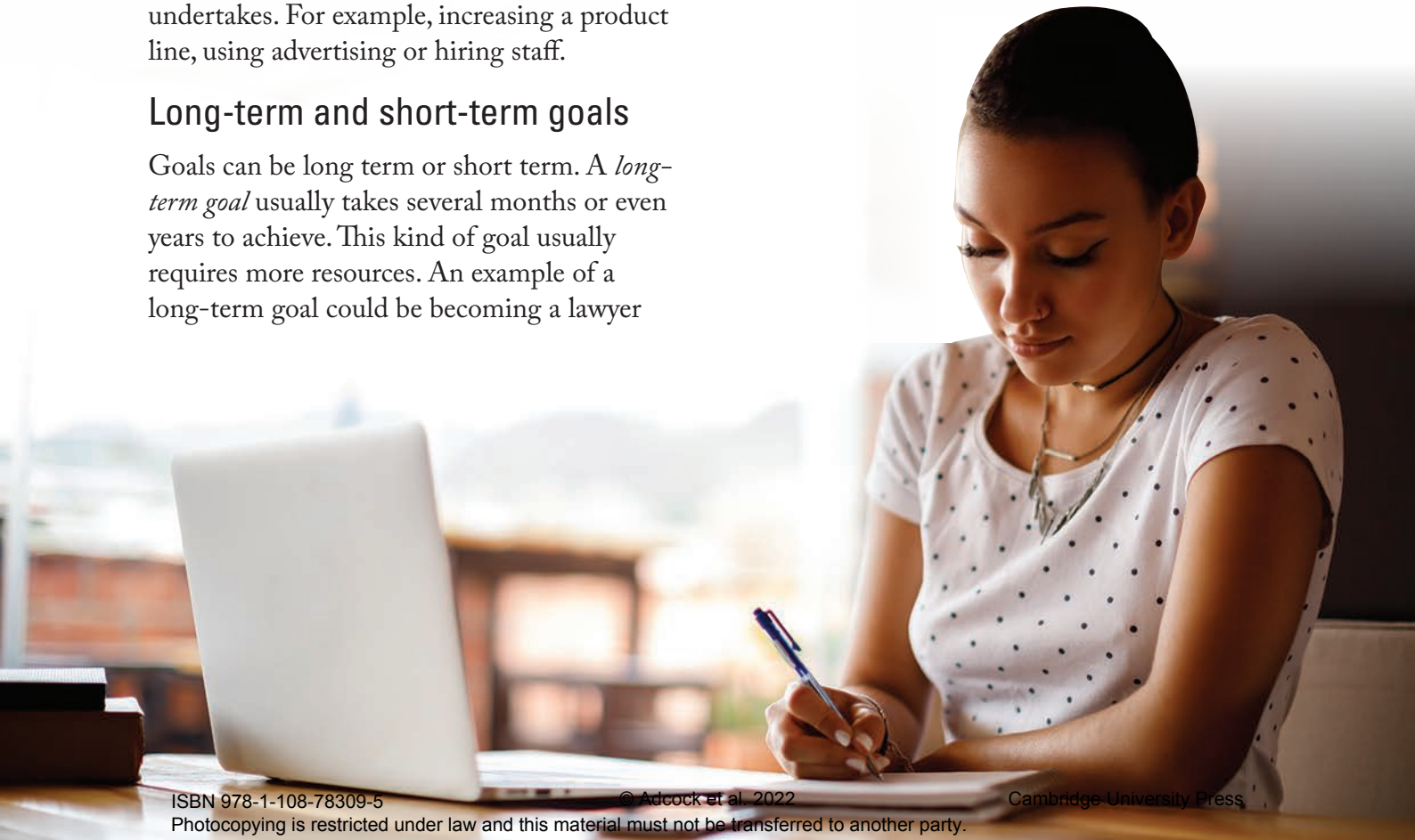
Long-term and short-term goals

Goals can be long term or short term. A *long-term goal* usually takes several months or even years to achieve. This kind of goal usually requires more resources. An example of a long-term goal could be becoming a lawyer (it takes four to five years to complete this tertiary qualification). Another long-term goal could be saving for your first home.

KEY TERM
goal an aim or purpose to achieve a specific result

A *short-term goal* is a goal you would like to achieve in the near future: for example, next week, next month or at the end of the term. Sometimes short-term goals are related to long-term goals because they can be stepping stones to achieving a long-term goal. For instance, you may dream of becoming an entrepreneur (a long-term goal) but you first need to develop your business ideas and concepts (a short-term goal).

▼ **Figure 12.7** Identifying what your short-term and long-term goals are helps you to plan your budget and the income range you need



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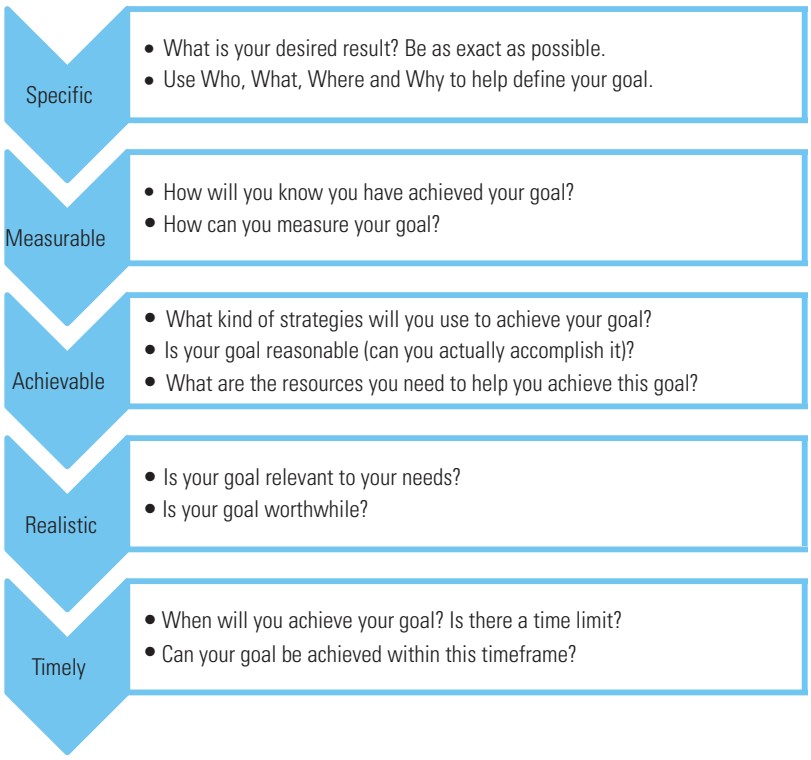
SMART goals

Writing a goal is often not easy for people. However, by using the SMART-goal technique, it becomes more manageable. This strategy breaks down the goal into smaller parts. A SMART goal is designed to be a statement that outlines the direction a person takes to achieve a goal. It is an acronym that stands for:

- Specific
- Measurable
- Achievable
- Realistic
- Timely.



▲ **Figure 12.8** The process of creating a SMART goal

SMART goals can be used by individuals and businesses to set financial and organisational goals. Figure 12.8 outlines what is involved in a SMART goal and the types of questions you need to think about.

Writing a SMART financial goal

You can use the SMART-goal strategy to help you develop a SMART financial goal. Being able to write a financial goal is important as it helps you think of ways you can achieve your financial objectives. Your financial goals will depend on your budget, what you spend and your wage.

Let's consider the SMART goals here for a student, Sally, and for an entrepreneur, Tim.

Individual: *Sally is looking at buying her first car when she finishes school. Saving for a car is often a rite of passage for many young teenagers. For Sally to achieve the goal of buying her own car, she will need to put a plan in place that helps her to meet her savings goal.*

▲ **Figure 12.9** Sally needs to investigate her options, including which model of car she should buy

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▲ **Figure 12.10** Tim is an entrepreneur who owns a frozen yoghurt company. He wants to develop a new line of low-fat dessert based on his current product line.

Entrepreneur: Tim is looking at developing a low-fat version of a popular yoghurt dessert that his business is selling at a profit. Sales are good and there is great customer feedback requesting a low-fat version of the dessert.

Specific

For the goal to be *specific*, you have to clearly express exactly what you intend to do and why it is important to you.

Sally the student	I'd like to buy a second-hand car as this will help me to get to university or to my new job.
Tim the entrepreneur	I'd like to develop a low-fat version of the yoghurt dessert I currently sell.

Measurable

For the goal to be *measurable*, you could use money or a budget to assess your progress. Time is another way you might measure your goal.

Sally the student	I'd like to save $10 000 by the end of 2023.
Tim the entrepreneur	I'd like to invest $30 000 into developing a low-fat version of the yoghurt dessert and have it ready for sale by 2023.

Achievable

For the goal to be *achievable*, you may need to look at your current savings and part-time job wage. You may also need to work out if the investment and timeline is appropriate to your goal. This will help you to determine if your goal is attainable.

Sally the student	I have saved $2000 already from birthday gifts since I was 12. I also have a job working part-time three days a week.
Tim the entrepreneur	My current profits indicate that I will not need the money spent on investment for operations. The time needed to experiment on the flavour is appropriate.

Realistic

For the goal to be *realistic*, you will need to work out whether your goal is affordable. For instance, you may realise that your goal is not realistic because your work shifts are not guaranteed and you may need to readjust your budget. Similarly, you may need to adjust your timeline.

Sally the student	My shift may be reduced from three to two days a week during the holidays so I may need to work at another job in order to reach my savings goal.
Tim the entrepreneur	After a number of taste testings, negative feedback has indicated that the low-fat version flavour is too sweet. The company's dietician needs more time to develop flavours.

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KEY TERM
savings habit a pattern of putting money aside towards a savings goal

Timely

For the goal to be *timely*, you will need to set a date for the goal's deadline. You can track the progress of your goal by checking your savings account and keeping track of the money you spend. You may need to adjust your activities accordingly.

Sally the student	*I will contribute $100 each payday to my savings account to reach my savings goal.*
Tim the entrepreneur	*I will need to invest a further $10 000 to flavour development in order to get the taste of the low-fat version right. Sales of the original flavour continue to do well.*

Savings

Many Australians find it difficult to save. A recent report from UBank (a division of National Australian Bank) revealed that Australia is a nation of spenders. Specifically, the report said:

- Around two million Australians have less than $1000 set aside in savings.
- Approximately 35 per cent of Australians do not have a dedicated savings account.
- About 60 per cent of Australians do not have a savings plan.
- Nearly half of Australians (46 per cent) do not use a weekly budget.
- As many as one in three Australians are living pay cheque to pay cheque.

The fact that one in three people do not have any money by payday means that developing a savings habit is more important than ever.

There are four strategies that you can use to develop a good **savings habit**:

1. Visualise your goal
2. Make savings a habit
3. Use your card less
4. Write down what you spend.

▼ **Figure 12.11** You would be wise to start saving money for your goals from as young an age as possible

Visualise your goal

A study from the University of Melbourne's Faculty of Business and Economics found that people are more inclined to save money if they are in touch with their future self. If you visualise how you want to retire, you will make more of a mental effort to create a positive financial future for yourself. Whether you are saving for a holiday or for a rainy day, visualising yourself in your travels or knowing that you can afford to get your car fixed if it breaks down is empowering.

Make savings a habit

Experts estimate that it takes 66 days to create a new habit. Saving a small amount each week, such as $2 per day, and then doubling it for the following week and for each week thereafter makes savings more manageable. Using smart

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phone apps, such as Australian Securities and Investments Commission's TrackMyGOALS, can help you to nominate a weekly spending limit and encourage you to save.

Use your card less

If you paid for all your goods and services with cash rather than by using a payment card, you would be less likely to spend your money.

Write down what you spend

Taking note of what you spend weekly is a good habit to develop. It helps you keep track of your expenses. Some people find it useful to create a monthly budget to establish the cash position of an individual. Creating a budget also helps you to identify priorities and manage upcoming bills.

Amazing but true...

Business Victoria is a comprehensive online resource designed to help businesses in Victoria start, run and grow. On the Business Victoria website, business owners can:

1. Access information about key business issues and get their questions answered
2. Access information about specific industry sectors
3. Identify the government licences and regulations that apply to their business
4. Step through interactive guides customised to their business situation
5. Find relevant financial support, advice and training.

END-OF-SECTION REVIEW 12.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Digital quiz
Please see the Interactive Textbook to access digital activities

Recall

1 Define the terms listed.
   - a Short-term goals
   - b Long-term goals
   - c Savings

2 What does the acronym SMART stand for?

3 What is the difference between a financial goal and an organisational goal?

Interpret

4 Create SMART goals for the following scenarios.
   - a Victoria is a Year 11 student. She intends to travel after her Year 12 exams. Victoria currently works two shifts a week and has saved up $3000 so far.
   - b Eric has been working as an architect since graduating from university three years ago. He is keen on starting a new design firm.

Argue

5 Research three different types of savings accounts available. Create a table that lists their interest savings rates. Evaluate each type of savings account.

6 Discuss the merits of two savings strategies identified.

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Research task: Saving for a phone

Your old mobile phone is not reliable as it keeps running out of charge. However, you do not have enough money to buy a new one just yet. You are required to set some goals to achieve a savings total of at least $1000.

- Create a SMART goal to achieve this saving goal.

After a year, you have your saving goal! It's time to buy a phone.

- Do some online research to decide on the make of a phone that you would like to purchase. Write down the purchase price.
- Subtract your savings of $1000 from the purchase price to determine how much money you may still need to borrow to purchase the phone. Write down the loan amount. This is known as the loan principal.
- Research three different types of personal loans online. Write down the interest rate and term of your loan. The term of your loan could be for 12 or 24 months.
- Now visit the 'Personal loan calculator' on the moneysmart.gov.au website. Enter in the details for each of the personal loans you researched. The calculator will tell you the monthly payment and the total amount you will pay over the loan term. Write the results of your research in a table like the one below.

Which loan did you go for and why?

Lender name	Loan type	Loan principal	Interest rate	Loan term	Monthly payment	Total amount paid
ABC Bank	Personal	$500	5.95%	12 months		

◄ **Figure 12.12** Take your time researching the best fit for your phone and loan

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▲ **Figure 12.13** Saving for a big purchase is a very rewarding experience

3 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about financial literacy

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4

Civics and Citizenship

What is 'Civics and Citizenship'?

Australia is a democratic country, which has many laws that affect our daily lives. The rules and regulations that govern these laws help us to know what we must and must not do. For example, road safety rules determine the speed you are allowed to travel on a freeway and when you can legally drive. Laws, rules and regulations help keep Australian society in order. There are consequences when someone breaches a law.

Civics and Citizenship examines the features of the Australian Constitution and the protections it provides to Australians. The *Commonwealth of Australia Constitution Act* outlines Australian's democratic government, and the responsibilities and freedoms of Australian citizens. This includes the participation of Australian citizens in elections.

The Australian justice system protects the rights of individuals through the courts and legal system. Laws are made by the courts (common law) and by parliament (statutory law).

The shared values of Australians and the country's secular system gives us a unique identity, which is enriched by our diverse and multicultural communities.

Video
Unit overview

► **Figure A** Parliament House in Melbourne, where the Victorian Parliament meet and make decisions as a state government

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CHAPTER 13

Aboriginal and Torres Strait Islander peoples should be aware that this chapter contains images and names of people who have, or may have, passed away.

Government and democracy

Setting the scene: the Australian Marriage Law Postal Survey of 2017

In 2017, the Australian public was surveyed on whether the law should be changed to allow same-sex couples to marry.

To change an aspect of the Australian Constitution, a **referendum** is required. Voting is compulsory in a referendum and the Australian Government must abide by the result. A **plebiscite** is also a compulsory national vote, but its result is not binding for the government. Plebiscites are used to gauge the public's opinion on a subject so that the government can be guided on the best way to proceed on an issue.

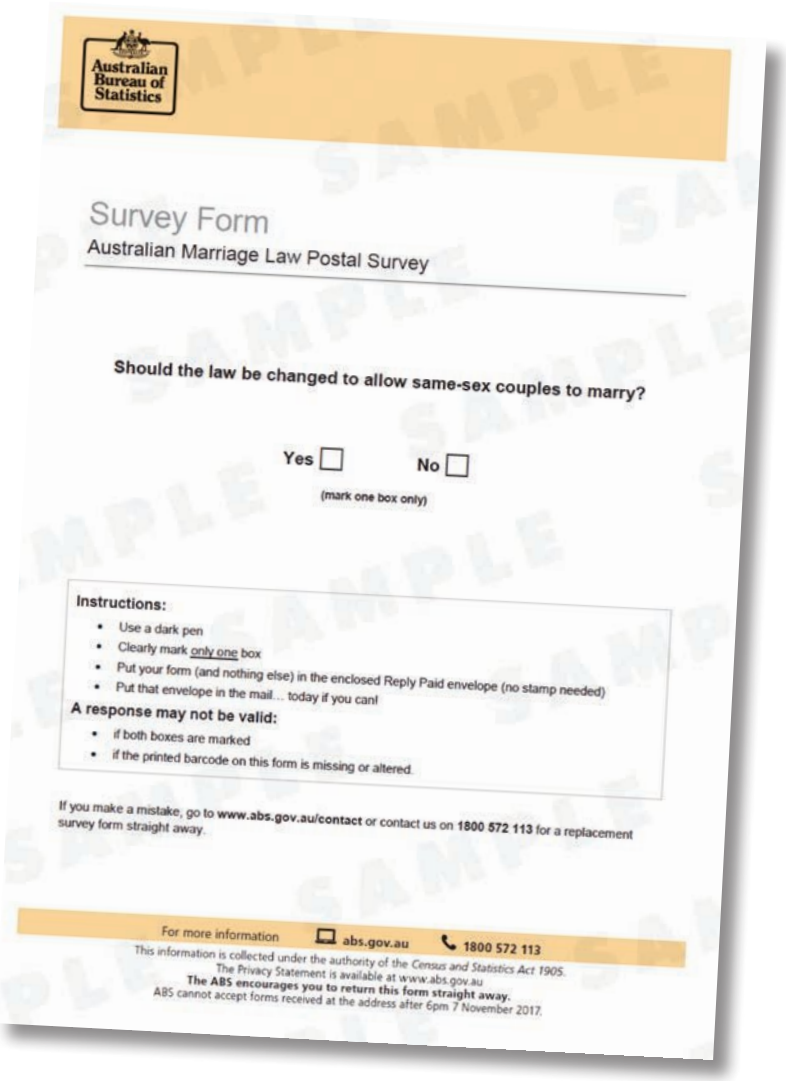
KEY TERMS

referendum a general vote on an issue affecting the Australian Constitution that all enrolled voters must vote on

plebiscite a vote on an issue that all enrolled voters must vote on to show the government whether the issue has public support or opposition

The Australian Marriage Law Postal Survey was not a referendum or a plebiscite, but a new way of assessing the public's opinion on an important topic. It was a survey that was mailed out to eligible voters asking them a single question: Should the law be changed to allow same-sex couples to marry?

The survey was not compulsory or binding – voters could choose whether to participate and the result of the survey would not change the Australian Constitution. The reason a survey was suggested was because the Australian Government tried and failed to pass a bill in parliament for a formal plebiscite on same-sex marriage.


Australian Bureau of Statistics

Survey Form

Australian Marriage Law Postal Survey

Should the law be changed to allow same-sex couples to marry?

Yes ☐ No ☐

(mark one box only)

Instructions:

- Use a dark pen
- Clearly mark only one box
- Put your form (and nothing else) in the enclosed Reply Paid envelope (no stamp needed)
- Put that envelope in the mail... today if you can!

A response may not be valid:

- if both boxes are marked
- if the printed barcode on this form is missing or altered.

If you make a mistake, go to www.abs.gov.au/contact or contact us on 1800 572 113 for a replacement survey form straight away.

For more information abs.gov.au 1800 572 113

This information is collected under the authority of the *Census and Statistics Act 1905*. The Privacy Statement is available at www.abs.gov.au

The ABS encourages you to return this form straight away.

ABS cannot accept forms received at the address after 6pm 7 November 2017.

▲ **Figure 13.1** Sample of the survey form used in the 2017 Australian Marriage Law Postal Survey

The result of the survey showed strong support for changing the *Marriage Act 1961*. Nearly two-thirds of responses to the survey

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said that the law should be changed to allow same-sex couples to marry.

Consequently, parliament passed a bill that created the *Marriage Amendment (Definition and Religious Freedoms) Act 2017*. This Act legalised same-sex marriage in Australia and the *Marriage Act 1961* was officially updated, effective from 9 December 2017.

The change to the *Marriage Act 1961* brought Australian law in line with the majority of public opinion. Marriage is now defined as 'the union of two people to the exclusion of all others, voluntarily entered into for life'. This change allows for same-sex marriages to occur in Australia. This is similar to laws in countries like the United Kingkom, the United States and New Zealand.

The Australian Marriage Law Postal Survey is an example of how public opinion can influence law-making in Australia. To change the law, parliament must follow a law-making process. This process, which can sometimes be difficult, is the focus of this chapter.

▲ **Figure 13.2** Labor Senator Penny Wong (left), Same Sex Marriage Ambassador Magda Szubanski (centre) and Labor opposition leader Bill Shorten (right) celebrate after the same-sex marriage bill passed in the Federal Parliament in Canberra on 7 December 2017.

MAKING THINKING VISIBLE 13.1

Compass points

Reflect on the information in this section so far about the national survey using the compass points as prompts. Record your responses to the questions and share them with the class.

1. **E = Excited**
   - What excites you about the issue? What's the upside?
2. **W = Worrisome**
   - What do you find worrisome about it? What's the downside?
3. **N = Need to know**
   - What else do you need to help you evaluate the change?
4. **S = Stance or Suggestion for moving forward**
   - What is your current stance or opinion on the issue? How might further evaluate the change in law?

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Chapter overview

Introduction

The *Commonwealth of Australia Constitution Act* contains rules on how Australia is governed. These rules cannot be changed unless the Australian people approve the change through a referendum. Changing the words of the Australian Constitution is hard to do because it requires a 'double majority'. This chapter describes what a double majority is as well as the principles behind a representative government. You will also learn how Australians participate in Australia's democracy through elections at the federal, state and local level. The chapter also discusses voting-eligibility requirements.

Learning goals

After completing this chapter, you should be able to answer these questions:

- What is the structure of government in Australia?
- How does Australia's democracy operate?
- How do Australian citizens elect members of parliament?
- Who is eligible to vote?
- How do we change the Australian Constitution?

▲ **Figure 13.3** Parliament House in Canberra where the federal government sits

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13.1 The key features of government in Australia

FOCUS QUESTION

What is the structure of government in Australia?

Australia's system of government

Australia's system of government is modelled on the British Westminster system. The Australian Government is a **federation** that consists of six **states** and two **territories**. There is also a federal body known as the Commonwealth Parliament, which means that there are nine parliaments in total in Australia. The Commonwealth Parliament is located in Parliament House in Canberra, the capital of Australia.

Most state parliaments are **bicameral** in nature. This means that each parliament has an upper house and a lower house. The upper house is known as the 'legislative council' and the lower house is known as 'the legislative assembly'. In Victoria, the legislative council has 40 members and the legislative assembly has 88 members. In the Commonwealth Parliament, the Upper House is called the Senate, and the Lower House the House of Representatives.

Queensland, the Australian Capital Territory and the Northern Territory each have a **unicameral** parliament. This means they only have single house, which is called 'the legislative assembly'.

KEY TERMS

federation a system of government where powers are divided between a federal government and state governments

state a defined area within Australia controlled by its own political unit, which has the power to pass its own laws

territory a defined area within Australia controlled by its own political unit, but its laws can be revoked by the federal government

bicameral refers to a parliament having an upper and lower house, such as in New South Wales, Victoria, Western Australia, South Australia and Tasmania

unicameral refers to a parliament having one house, such as in Queensland, the Northern Territory and Australian Capital Territory

▼ **Figure 13.4** Parliament building in Melbourne

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Lower House	Upper House	Governor/Governor-General
• Forms government • Decides on matters of national interest • Represents the interests of the people in their electorates • Proposes, debates and votes on bills and amendments • Examines issues in committees • Scrutinises executive government	• Decides on matters of national interest • Represents the interests of people in their states or territories • Proposes, debates and votes on bills and amendments • Examines issues in committees • Scrutinises executive government	• Gives royal assent (approval) to a bill passed by the house of representatives and the senate • Makes recommendations to change a bill • Starts the process for a federal election • Appoints times for sessions of parliament to be held

▲ **Figure 13.5** The roles of Governor and Governor-General, and the upper and lower houses of parliament are distinct

The upper and lower houses of parliament have different roles, as Figure 13.5 shows.

KEY TERMS

constitutional monarchy a form of government where the monarch is the head of state

Governor-General the monarch's representative at a federal level

Governor the monarch's representative at a state level

State parliaments delegate their law-making authority to local councils. Local councils are comprised of elected members from a council electorate. The number of members who make up local councils vary and this depends on the size of an electorate.

Australia is a **constitutional monarchy**. This means that the monarch of the United Kingdom is also the monarch of Australia. The monarch, currently Queen Elizabeth II, is represented by the **Governor-General** at the federal level and by the **Governor** at a state level. Governors-generals and governors are appointed by the monarch based on advice from the respective federal and state parliaments.

◄ **Figure 13.6** Queen Elizabeth II meets with the Australian Governor-General the Honourable David Hurley and his wife at Buckingham Palace on 12 June 2019

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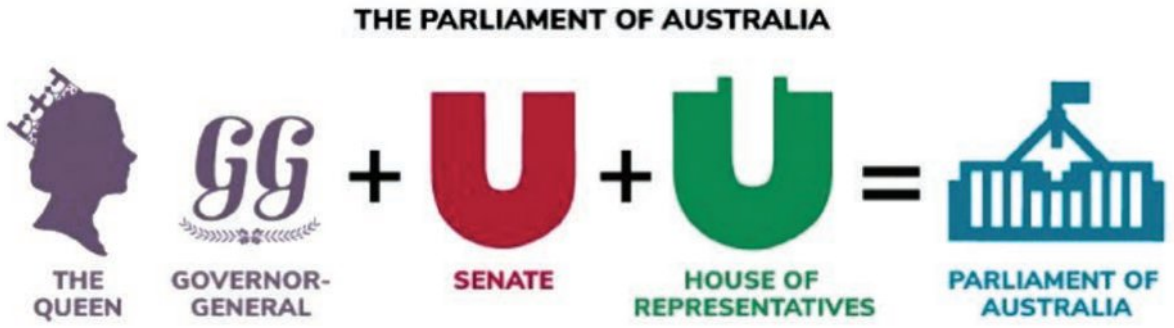

▲ **Figure 13.7** The Parliament of Australia is made up of the Governor-General, who represents the Queen, the Upper House (Senate) and the Lower House (House of Representatives)

MAKING THINKING VISIBLE 13.2

Think, pair, share

Look at Figure 13.7.

1 What are the different types of responsibilities held by each part of this equation?
2 Journal one point each for each part.
3 Share your ideas with your partner or class.

Amazing but true …

Every person around the world who travels overseas cannot leave their country without a passport. A passport is a legal requirement that identifies you and your nationality, and allows you to travel abroad. But Queen Elizabeth II is an exception to this rule. The Queen does not need a passport to travel internationally because all British passports are issued in her name!

END-OF-SECTION REVIEW 13.1

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 How many states and territories make up Australia's federation?
2 The Victorian parliament is bicameral in nature. What does this term mean?

Interpret

3 Why are the strengths and weaknesses of having a bicameral parliament?
4 Who makes laws in Australia?

Argue

5 Australia is a constitutional monarchy, which makes the monarch of England our head of state. Do you think Australia should retain this model? Should Australia become a republic, with the head of state being an elected president instead of a monarch, instead?

Digital quiz
Please see the Interactive Textbook to access digital activities

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13.2 Australia's democratic system

FOCUS QUESTION

How does Australia's democracy operate?

Australia's government processes and structures of parliament support a representative **democracy**. Representative democracy refers to a system of government where citizens elect representatives from among themselves to form a government. This process of selection is known as an **election**.

KEY TERMS

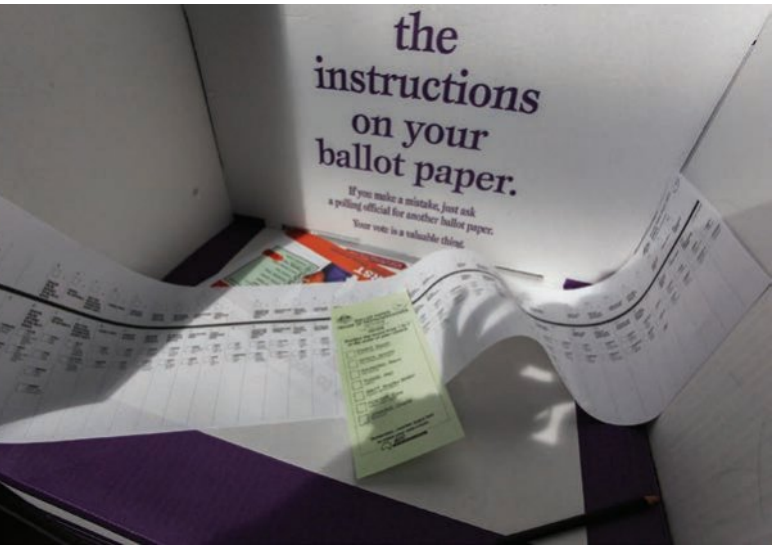
democracy a political system where a government's power is vested in its citizens, who vote through elections to shape decisions

election a local, state or national ballot cast by citizens who vote for the person or political party who best aligns with their values

Australian Constitution a set of rules that outlines the rights of Australians and how power is shared between federal and state parliaments

electorate a defined area within a state or territory that is represented by a member of a political party

Australia's representative democracy is outlined in the **Australian Constitution**. Members of the upper and lower houses of parliament must be elected. This is because Sections 7 and 24 of the Australian Constitution says that both houses need to be 'directly chosen by the people'.



▲ **Figure 13.8** This ballot booth in a Victorian state election shows ballot papers for the house of representatives and the senate

The process of elections is the keystone to representative government. Australian voters elect members of the Australian political parties for office. Once elected, members of parliament act on behalf of their voters by representing their views in parliament. This helps ensure that issues within an **electorate** are raised and addressed.

Elections are held frequently so that members of parliament keep pace with the changing views of electorates. The most recent Victorian state election, held in November 2018, saw Labor Leader Daniel Andrews being re-elected as the Premier of Victoria.

Electorates

There are approximately 151 federal electorates in total in Australia. In Victoria, there are 88 electorates, which vary in geographic size and the number of enrolled voters. For example, the electorate of Lowan District in Western Victoria is over 39 000 square kilometres but only has a total enrolment of 43 436 people. In contrast, Richmond District has an area of only 14 square kilometres but has a total of 54 680 people on the electoral roll.

From time to time, the Australian Electoral Commission changes the boundaries of electorates. This is so that the population numbers stay relatively similar. In other words, the number of enrolled voters in each electorate does not vary by more than 10 per cent. This process is known as redistribution.

State electorates are generally named after towns and suburbs, but federal electorates are often named after historical figures. These include early settlers and explorers, as well

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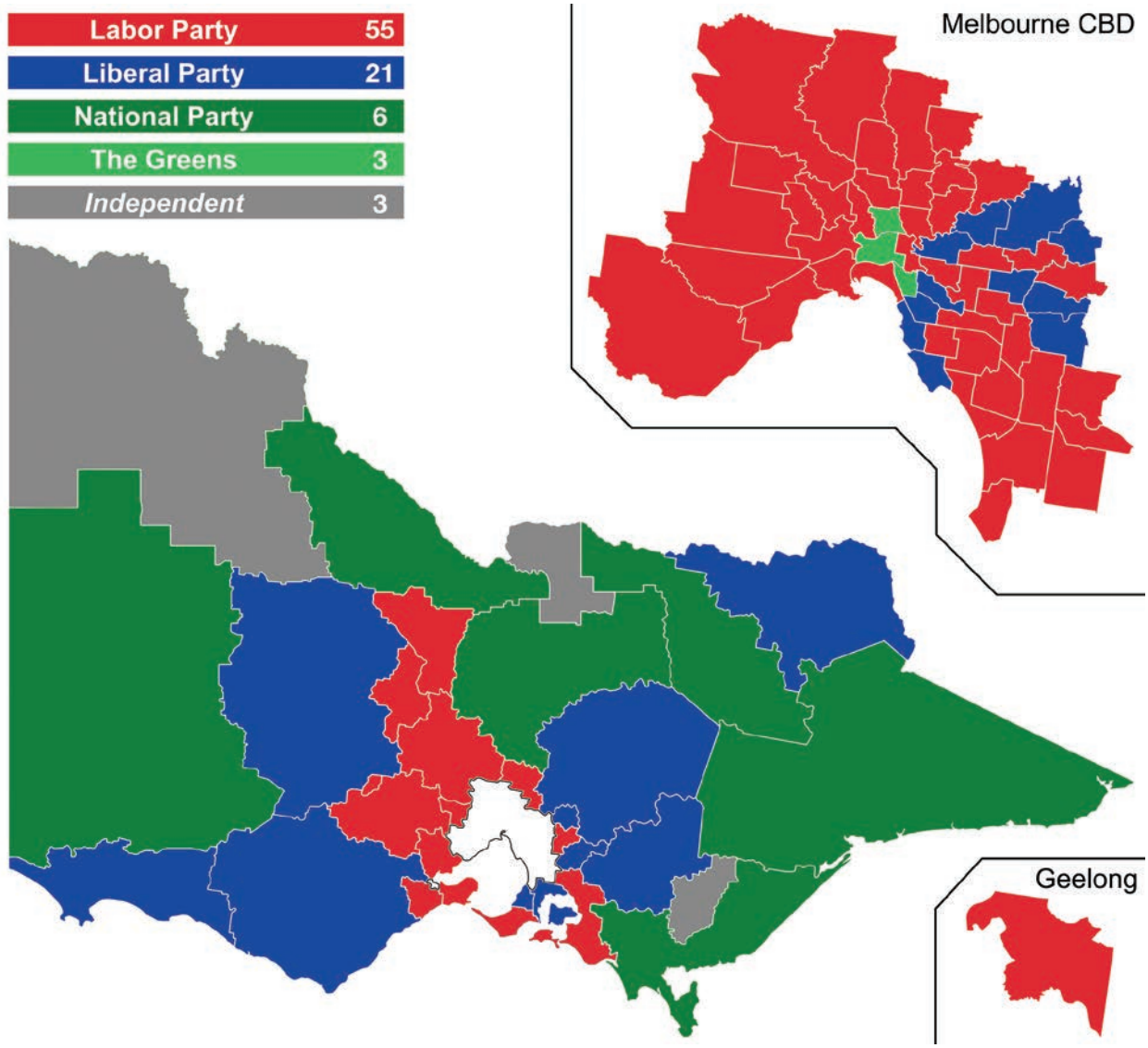
as First Australians. The Kingsford Smith electorate, located on Botany Bay in New South Wales, is named after the Australian pioneer aviator, Charles Kingsford Smith. The Jagajaga electorate in north-east Melbourne is named after three Wurundjeri elders.

Amazing but true ...

The longest-serving Australian prime minister was Sir Robert Menzies. He was in office from 1939 until 1941, and then served again from 1949 to 1966. In total, Sir Robert Menzies spent 18 years and 163 days as Australian Prime Minister.



▲ **Figure 13.9** Results in the different electorates for the 2018 Victorian state election

MAKING THINKING VISIBLE 13.3

See, think, wonder

Look at the map in Figure 13.9 and write responses to these questions.

1. What do you notice about the map and distribution of votes? (*I see...*)
2. What do you think about the difference between city and regional election results? (*I think...*)
3. What do you wonder about the issues that guide voters in different regions? (*I wonder...*)

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 13.2

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What does the term 'election' mean?
2 What is representative democracy?

▲ **Figure 13.10** Queensland residents voting in a state election

Interpret

3 Why do you think Sections 7 and 24 of the Australian Constitution are important?
4 Why is redistribution necessary in determining electorates?

Argue

The following is a whole-class activity called 'class election'.

5 Split into groups of 4–5 students.
6 Each group of students is to establish their own political party. This will entail:
- Deciding what your party stands for and the values it views as important
- Creating a short, two-minute presentation to present to the class
- Making a simple ballot sheet for the class to use in its election
- Each student voting on their preferred party (other than their own)
- Tallying up the votes to establish who the winning political party is.

7 Discuss with the other students why the winning party was chosen.

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13.3 How citizens participate in Australia's democracy

FOCUS QUESTIONS

- How do Australian citizens elect members of parliament?
- Who is eligible to vote?

Australian citizens elect members of parliament through a process called elections. Elections are central to our democracy as they allow citizens to decide who runs the country, states and territories. Eligible citizens who participate in elections are called voters. Since Australia is a representative democracy, citizens are involved in elections at three levels of government: federal, state and local.

Types of elections

Federal elections are held once every three years. They are conducted by the Australian Electoral Commission. The Australian Constitution sets three years as the maximum amount of time a member of the House of Representatives can be in office. Elections for half of the seats in the senate are held at this same time or separately. But the prime minister can call for an election at any time.

The 2019 federal election saw a Liberal–National win, which made Scott Morrison Australia's 31st prime minister.

Victorian state elections are held once every four years. They are conducted by the Victorian Electoral Commission. The Victorian parliament has a four-year fixed term. General elections are held for seats in the legislative assembly and the legislative council in November of an election year.

Victorian local council elections are held every four years on the fourth Saturday of October. The *Local Government Act 1989* and *Local Government (Electoral) Regulations 2016* stipulate that Victorian council elections are held two years after the state elections. Therefore, if a state election is held in Victoria in 2022, a local council election will be held in 2024.

◄ **Figure 13.11** In 2019, federal Liberal–National leader Scott Morrison was sworn in as Prime Minister by Australia's Governor-General Sir Peter Cosgrove in Canberra

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Eligibility to vote

Section 101 of the federal *Commonwealth Electoral Act 1918* states that it is compulsory for Australian citizens who are 18 years of age and older to enrol to vote. Further, the Australian Electoral Commission and the Victorian Electoral Commission outline that to vote in a federal, state or local council election:

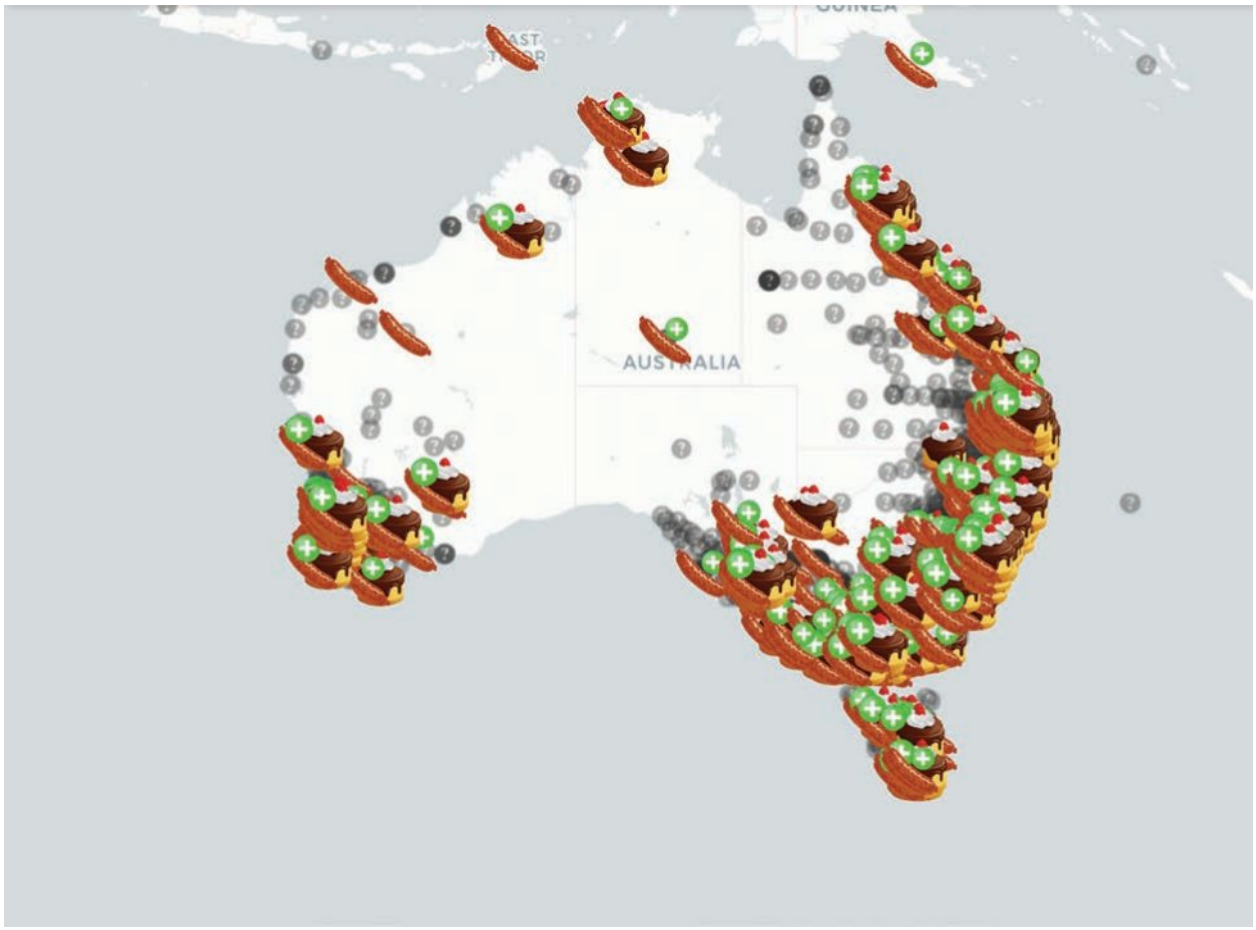
- You must be an Australian citizen or a qualified British subject (qualified British subjects are those on the Australian electoral roll between 26 October 1983 and 26 January 1984)
- You must have lived in a current address in Victoria for at least one month (local elections require at least 57 days).

Australian law requires you to vote if you satisfy these prerequisites. Failure to enrol to vote without an adequate reason can result in a fine of $83 (as of July 2019).

Election day: Democracy sausages

Australians will use any excuse for a barbeque – Australia Day, Anzac Day, the AFL Grand Final, a trip to Bunnings – take your pick! However, they do not embrace politics or politicians with the same fervour as seen in the United States. In the United States, there are huge political rallies, where those running for office are elevated to rock-star status with cheers and applause following every sentence they say. In fact, many Australians view politicians with open disdain or at least an eye-roll. And yet, Australians celebrate an election with a sausage sizzle!

You could argue that Australia has a high voter turnout because voting is compulsory. You could also argue that those selling



▲ **Figure 13.12** During the 2019 federal election, voters could locate the nearest sausage sizzle on an online map. Judging by this map, which state do you think embraced this concept the most?

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sausages have a captive audience and wisely set up the barbeque so the smell wafts straight to where people are queueing. But it would not be difficult to reject either of these claims.

The fine for not voting is small so if someone wanted to reject the Australian system of government, or those who run it, they might be willing to pay this price so that they do not have to enrol. Equally, it does not take a great effort to get your name checked off the electoral roll to avoid the fine and then submit a vote that cannot be counted.

However, voting seems to be an activity that Australians want to do. The voter turnout in Australia has never dropped below 91 per cent and informal votes, votes that are invalid, consistently only average between 4–5 per cent. Of course, not all informal votes are deliberately made so they cannot be counted. Nevertheless, there's a good chance the 'democracy sausages' will be sold out by the time the polls close because voting in Australia is popular.

Perhaps Australians want to participate in the democratic process and support their favoured party to win. Perhaps they do not support any party, but know which party they do not want elected. Or maybe they simply want a snag, burnt to a point nearing cremation, with tomato sauce on a piece of bread.

MAKING THINKING VISIBLE 13.4

I used to think …, but now I think …

Elections are an important part our representative democracy. Now that you have read a bit more about the electoral process in Australia, write down a response using each of these sentence stems:

1 I used to think …
2 But now, I think …

END-OF-SECTION REVIEW 13.3

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 List the different types of elections. How often is each election held?
2 Which governing bodies manage elections in Australia?

Interpret

3 What does Section 101 of the *Commonwealth Electoral Act 1918* state?
4 Why are local council elections important?

Argue

5 Failure to vote without an adequate reason results in a fine. Discuss the importance of compulsory voting. Should we make voting elective in Australia?

Digital quiz
Please see the Interactive Textbook to access digital activities

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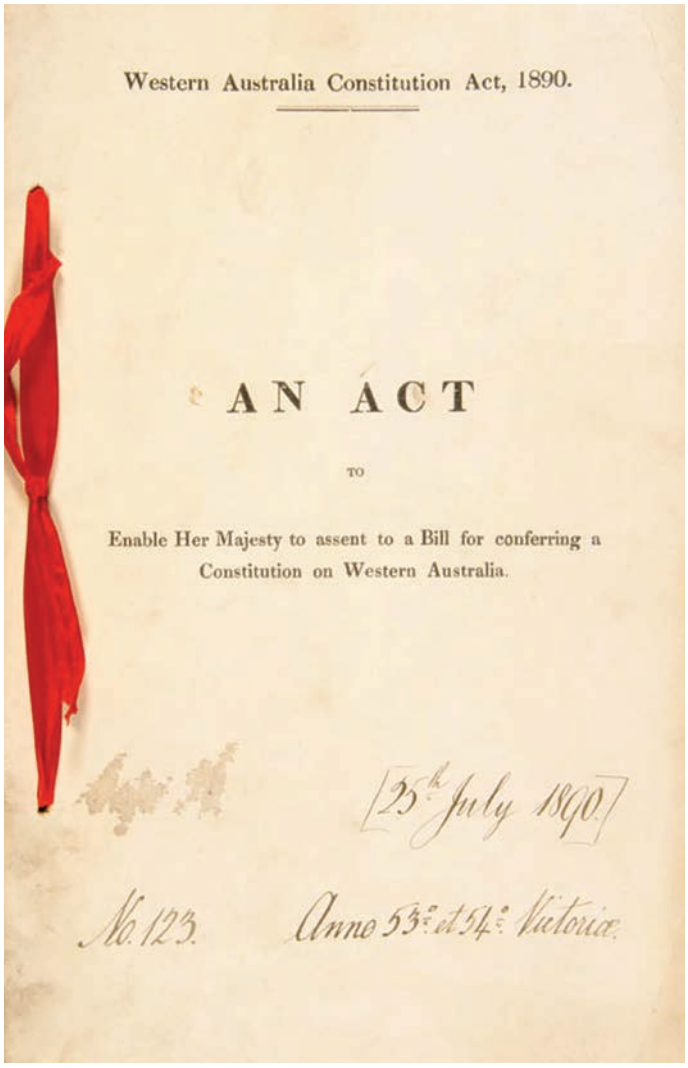
13.4 The process of constitutional change in Australia

FOCUS QUESTION

How do we change the Australian Constitution?

The *Commonwealth of Australia Constitution Act* is often referred to as the 'birth certificate of the nation'. The Act contains 8 chapters and 128 sections, and provides the rules on how Australia is to be governed. The Act outlines the different areas the states, territories and the commonwealth can make laws. For example, Chapter 1 describes the composition and powers of the federal parliament, and its bicameral nature. Chapter 5 outlines the law-making relationship between federal and state parliaments. Overall, the rules in the Act are there to guide state and federal parliaments.

KEY TERM
writ a form of written command that is legally binding


Western Australia Constitution Act, 1890.

AN ACT

TO

Enable Her Majesty to assent to a Bill for conferring a Constitution on Western Australia.

25th July 1890

No. 123. Anno 53° et 54° Victoriæ

▲ **Figure 13.13** The original *Commonwealth of Australia Constitution Act*

Changing the Australian Constitution

Chapter 8 of the *Commonwealth of Australia Constitution Act* outlines the process and rules in relation to changing the Australian Constitution. Section 128 states that the words of the Australian Constitution can only be changed by referendum. A referendum is a national ballot on a question to change the Australian Constitution. In order for a national vote to take place, the proposed change must first be approved through a bill by the federal parliament. The bill is then sent to the governor-general who issues a **writ** so that a referendum can occur.

For a referendum to be successful, a national majority (more than half) of voters from all states and territories *and* a majority (more than half) of voters in at least four out of six states must vote 'yes'. This is commonly referred to as the 'double-majority' test. Considering these dual standards, referendums require a high level of public support for them to be successful. If the double-majority test is passed, the federal government is bound by the outcome of the referendum.

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MAKING THINKING VISIBLE 13.5

Tug of war

Consider this statement: The double-majority test is too difficult to pass. We should get rid of this test. Instead, we should pass referendums only with a national majority.

1. Identify factors that *pull* at each side of this dilemma.
2. Write down reasons why you agree or disagree with this statement.
3. Write down two 'What if' questions to help support your contention.

Since 1901, Australia has held 19 referendums. Only eight of these have been successful due to the difficulty of achieving the double-majority requirement. The last referendum, held in 1999, asked Australians to vote yes if they thought Australia should become a republic. An overwhelming number of Australians voted no to this question, which made this referendum unsuccessful.

What is a plebiscite?

'Plebiscite' is not defined in the Australian Constitution. However, it is a national vote used to help members of parliament decide on how to act on an issue. The result of a plebiscite does not affect the Australian Constitution. Rather it is used to gauge whether an action has the support of general public. Voting on a plebiscite is compulsory, but the government is not bound by the result and can ignore it.

▲ **Figure 13.14** A how-to-vote card that encourages voters to vote yes in the 1999 referendum

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Digital quiz
Please see the Interactive Textbook to access digital activities

END-OF-SECTION REVIEW 13.4

Review questions

Answer these questions on paper or in the Interactive Textbook.

Recall

1 What is the aim of the *Commonwealth of Australia Constitution Act*?
2 What is the process of altering the Australian Constitution?

Interpret

3 Explain why it is difficult to pass the double-majority test.

Argue

4 Search for information about the 1999 referendum. Then, answer the following questions.
   a What were the two questions put to Australian voters in the 1999 referendum?
   b What percentage of the population was in favour in changing the Australian Constitution?
   c Why do you think Australians voted against this change?

▲ **Figure 13.15** Parliament House, Canberra

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End-of-chapter activities

1 Self-assessment

That just about wraps up this topic. How did you feel you went working through the chapter? Before you attempt the following activities, visit the Interactive Textbook to rate your confidence with this topic either online or via a downloadable checklist.

2 Research task: 1967 Referendum

Using online information and from the library, research Australia's 1967 referendum.

- What was this referendum about?
- What changes did the referendum propose?
- Why do you think that referendum called for these changes?
- What was the outcome of the referendum vote? (Find out how each state and territory voted, and explain how and if the double majority was achieved.)
- What did the referendum achieve for Australia's First Peoples?
- Going further, what new referendum topics have been proposed for Aboriginal and Torres Straits Islander peoples?

Present your research in the form of a poster, presentation, booklet or website.

▲ **Figure 13.16** This artwork about the 1967 referendum has extracts from the referendum documents and the Australian Constitution. It is on display in the parliamentary grounds in Canberra

3 Digital resources

Visit the Interactive Textbook to access:

- Victorian Curriculum Capability Project
- Interactive Scorcher Quiz
- Google Earth tour of key locations in this chapter
- Videos, image galleries and other extra materials.

Video
Five interesting facts about Australia's government

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Glossary

Please note that this glossary is for the print chapters only. For the digital glossary please see the digital versions of the textbook.

History

abnormal something that is not normal

Acropolis the complex of temples and other buildings built on the hill in the centre of Athens

agora an open public space used for markets or assemblies

allegory an artistic work in which the characters and events represent particular qualities or ideas related to morals, spirituality or politics

ancestors people you are descended from like a parent, grandparent, great-grandparent, great-great-grandparent and so on

ankh a symbol like a cross with a loop (an oval shape or circle) at the top, used in ancient Egypt to mean 'life'

aquaculture the cultivation of fish, shellfish, algae and other organisms in a water environment

archonship high offices in command of important jobs in the city-state of Athens

Arnhem Land a region of northern Australia, west of the Gulf of Carpentaria, which contains the largest Aboriginal reservation

artefact an object that is made by a person, such as a tool or a decoration; it is usually of historical interest

autonomy the right to rule or live independently

barracks a place where soldiers live and train

bas-relief a sculpture where the figures project slightly from the background

bolt a large roll of cloth

bodhisattvas a follower of Mahayana Buddhism who is able to reach nirvana (a state without suffering) but delays doing so out of compassion for the suffering of others

brutalise cause damage to something

bureaucracy a system for controlling or managing a country, company or organisation that is operated by many officials employed to follow rules carefully

canals channels dug to carry water

canopic jars jars for preserving the internal organs of the deceased, as part of the process of mummification; different jars were made for different organs

chariot a two-wheeled vehicle that was used in ancient times for racing and fighting; it was pulled by a horse or horses

city-state a city that rules itself and the area immediately surrounding it

civilisation a society that has developed an organised system of government, social customs and religious beliefs, as well as forms of technology that include writing and the arts

climate the general weather conditions usually found in a specific place

conserve to protect something so that it is not damaged or destroyed

consort a wife or companion of a ruler

co-regent a joint ruler

corroborate to support or confirm an idea or claim with extra evidence

Country the sum total of the culture, values, stories, locations and resources of Aboriginal peoples' area

cultural significance something that has visual, historic, social or spiritual value for a culture

currency any type of item used in trade; often coins or notes, but it also can be items of high value like gold, gems or silk

divination the practice of foretelling the future through supernatural means

dramatist an individual who writes dramas

dye a solution that can stain or colour material by chemically binding to it

dynastic succession a process of passing power and authority from one person to a family member, traditionally often father to son

dynasty a succession of rulers from the same family; in ancient Egypt and China some of the dynasties included rulers who were not related to the ruling family

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elixir of immortality a potion or medicine to keep you alive forever

embankments ridges of earth or stone walls used to hold back water

encroaching to take control or possession of something in a gradual way and often without being noticed

endow to give something to someone

ethical understanding to consider different perspectives on what is morally right

excavate to carefully dig up or reveal something in the ground

exertion physical or mental effort

exile the condition of someone being sent or kept away from their home, especially for political reasons

famine when there is not enough food for everyone in society

feudal a societal structure based on rank where higher ranks owe protection to lower ranks; lower ranks give a tribute in return, usually agricultural goods

fledgling something that is new or young and without much experience

forager a person or animal that goes from place to place in search of things that they can eat or use

free a term used to describe people in ancient times who were not slaves

frescoes pictures painted directly onto fresh plaster

garrison a group of troops stationed in a town or city

grain crops plants used to grow grain to use in making food like bread

grave goods items buried alongside a body; usually personal possessions or items to help their journey to the afterlife

Greco–Persian Wars a series of conflicts between the ancient Greek city-states and the Persian Empire

Hapi (or Hapy) the god of the annual flooding of the Nile in ancient Egyptian religion

hieratic a simplified version of the hieroglyphic script intended for everyday use

hieroglyphs a picture or symbol that represents a word or concept

hoplite ancient Greek citizens who were also soldiers in city-states; they fought with spears and wore bronze armour

hunter-gatherer members of a society that lives by hunting and collecting wild food, rather than by farming

inscription writing that has been carved into a hard surface, such as solid stone, to help people remember a certain person or event

inundation the yearly flooding of the Nile River

irrigation the practice of supplying land with water so that crops and plants will grow

kilns ovens for drying or baking mud and clay

kinship the relationship between members of the same family

land bridge a connection between two land masses that allowed humans and animals to cross to new areas

levees earth embankments built along riverbanks to prevent flooding

linguistic related to language or the study of language

luminescence dating a method of determining how long ago mineral grains were last exposed to sunlight or heating

magnanimity the quality of being highly moral in forgiveness and overlooking insults from others

matriarchal society a society ruled by women

mausoleum a very large and expensive grand tomb

megafauna large animals over 40 kilograms such as the elephant, rhinoceros and extinct diprotodon

military campaign a series of conflicts or battles that are aimed at reaching the same goal

military state a society that is organised around the military

monetised to have an established common currency, usually in the form of coins

mummification a method of preserving a dead body by removing the internal organs and drying out the body

mythological something that is imaginary; from myths or legends

nation-state an area of land ruled by a central government with clear and fixed boundaries

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necropolis an ancient cemetery

Neolithic period an era of change when people who used stone tools moved away from hunting and gathering to settle in an area to farm animals and crops

Nile River the main river running through Egypt

nomadic people without a fixed home who move from place to place

oracle a person who is guided by the gods to answer a question about the future

oral history information about historical events or periods that is passed from one generation to the next through spoken word, song or dance

osteoarchaeologist an archaeologist who specialises in the study of bones

pantheon all the gods in a religion or mythology

Peloponnesian War a series of conflicts between Athens and Sparta, and their allies

phalanx an ancient Greek military tactic that involved densely packed soldiers fighting with long spears and interlocking shields

pharaoh divine ruler of ancient Egypt; the term meant 'the one from the palace'

pigments dry substances that can be mixed with liquid to become coloured paints

plague a serious and highly infectious disease that kills many people

playwright a person who writes plays

polytheistic belief in many gods

preservation to prevent decay or damage to historical artefacts and sites

primary sources documents or artefacts that were created at the time of the historical event or era

pyramid a massive monument of ancient Egypt that has a rectangular base and four triangular faces that finish in a single point; they are built over or around a crypt or tomb

querns stone tools used for grinding grain

radar a device using very high frequency radio waves to identify objects, materials and their location

radiocarbon dating a method of calculating the age of extremely old objects by measuring the amount of a particular type of carbon in them

reconciliation bringing together Aboriginal and Torres Strait Islander peoples with other Australians to create good relationships

representation the way that someone or something is shown or described

rump jumps an exercise that involved jumping up and hitting your behind with your feet

sage-king is a ruler in ancient China known for being very wise and having good judgement

Sahul a continent during the Ice Age that contained the islands of Australia, New Guinea and Tasmania

sarcophagus a stone coffin decorated with sculpture or inscriptions

secondary source a document that provides or discusses information that uses information collected from primary sources

shaduf hand-operated device for lifting water from rivers, used in ancient Egypt from 2000 BCE to irrigate the land

shell midden a large pile of seashells thrown away by human beings in the past after they have eaten shellfish

shrine a place used for religious rituals

siege surrounding a place with an armed force in order to defeat those defending it

silt rich, fine soil carried in the waters of a river

smelting a process of heating rocks and sediment to extract metals

sophist a teacher in ancient Greece who specialised in philosophy

sovereign a king or ruler who has total and permanent authority

subsistence the state of existing by having just enough resources like food and water to stay alive

survey a type of physical investigation where an archaeologist carefully collects information about past human activities in a location

synthetic a substance made through a chemical process by humans rather than by nature

terrain the landforms of a particular area

The Dreaming the collection of religious beliefs and cultural practices of Aboriginal peoples

throttle to choke something

tradition a belief, principle, or way of acting that people in a particular society or group have continued to follow for a long time

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tribute a payment or gift provided to a king

underworld a place where the ancient Greeks believed the soul went when a person died; it was ruled by the god Hades

unification the process of combining things or people

uninhabitable areas not suitable for humans to live in

vassal a person or state that must pay tribute to a king in return for protection

virtues qualities of goodness or moral excellence

vizier the most important adviser and helper of a pharaoh

was-sceptre a stylised animal head at the top of a long, straight staff with a forked end; it was an ancient Egyptian religious symbol

weir a wall built under the water across a river so that the water level is raised and flows in a controlled way

World Heritage List UNESCO list of places that have cultural significance and so should be protected

yams starchy, potato-like root vegetables

Geography

abundance the amount of something that is found in a specific location

accessibility resources or services are available and affordable for all people to use

affordability the ability to afford a service or attendance at a facility; for example, going to the doctors

agricultural industry the business involved in cultivating plants and livestock

algae bloom the rapid increase or growth in the amount of algae within water

amenity a feature that is desirable, useful or aesthetically pleasing

aquaculture the breeding and harvesting of fish and other freshwater organisms

arid very dry, often without rainfall to support plants

artificial made by people, often as a copy of something natural

availability how easily people can access a service or facility

biodiversity variety of plant and animal life

bores holes drilled into the ground to access underground water resources

brackish water that is slightly salty

catchment area the area of a basin that collects and drains water

central business district (CBD) the centre of business in a town or city

change the ways in which something is different to the past

climate the long-term trends in the weather conditions of a place such as its average rainfall and temperature

commercial building a building that is used for business activities

condensation the process by which water vapor in the atmosphere cools and changes into liquid water

crop yield the size of a crop grown within an area

cubic kilometres a cubic kilometre is equal to a volume of 1000 × 1000 × 1000 metres; a cubic kilometre is also equal to a teralitre, which is exactly one trillion litres

cull the selective slaughter of animals to reduce their population

degradation the reduction in the quality and health of a natural environment due to natural processes or human activities

displacement moving something or someone from its original place to somewhere else

displace force someone to move from their home, usually because of war, natural disaster or persecution

drainage basin an area of land where precipitation collects and drains into a central point such as a river channel

drought a long period of water shortage, usually as a result of low rainfall

environment the air, water and land, which contains people, animals and plants

environmental flows the amount of water required to sustain freshwater environments

environmental resources resources that are from the natural environment such as water and wood

ephemeral something that happens only for a short time

equity all people have equal access to resources that meet their basic needs

erosion a process that gradually wears away and removes rock, soil and sediment by wind or water

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evaporation the process of a liquid changing to a gas, especially by heating

exploitation the use of something in order to get an advantage from it

fauna the animals of a particular region

fieldwork gathering information and data about a natural or human environment outside the classroom

filtered the process of removing solids and impurities from water

finite resources resources that have a limit or end

floodplain an area of flat land near a river that is often flooded when the river becomes too full

flora the plants of a particular region

flow regime the seasonal changes to the flow of rivers

fossil fuels fuels that were formed underground from plant and animal remains millions of years ago; examples include gas, coal and oil

freshwater water with less than 0.5 per cent of dissolved salts

geographical processes a series of events or actions that change environments, spaces and places

gigalitres a gigalitre is exactly one billion litres

glaciers large masses of ice that move slowly; they are frozen rivers of ice that form when snow accumulates and is compacted

habitat the natural environment where an animal or plant usually lives

hard surfaces human-made surfaces, such as concrete, which cover the natural ground and limit the amount of water that can infiltrate the soil to become groundwater

harvest to pick and collect crops, or to collect plants, animals or fish to eat

heavy metals dense metals such as iron and lead

heritage status a status given to a building or area to protect it from future development and preserve its past

high tide the time when the sea or a river reaches its highest level and comes furthest up the beach or the bank

hydroelectricity electricity produced by the force of fast-moving water such as rivers or waterfalls

ice caps a thick layer of ice that permanently covers an area of land

ice sheet a thick layer of ice covering a large area of land for a long period of time

infertile land or soil that is not good enough for plants or crops to grow well there

infertile land or soil that is not good enough for plants or crops to grow well there

infiltrate to seep into the ground so that water is absorbed by the soil

infiltration the process by which water is absorbed into the ground

infinite resources resources that are without limits

infrastructure the physical structures and facilities needed within a community such as roads, buildings and pipelines

intangible something that exists but you cannot see or touch it

interconnection the relationship between places and people, and the ways in which they influence each other

invertebrates animals that do not have backbones

irrigation the practice of supplying land with water so that crops and plants will grow

liveability the qualities of a place that enable a person to live there with a good standard of living. To work out whether a place has a high or low level of liveability, we consider the quality of economic, environmental and social living conditions in that place

low-lying area an area that has a very low elevation and is close to sea level, usually located near the coast

megacity a city with 10 million or more residents

megalitre a metric unit of capacity equal to a million litres

meteorological event an event relating to changes in the weather such as fog, rain, storms and cyclones

meteorologists a person who studies the atmosphere, especially the weather, and makes predictions for weather forecasts

migratory birds birds that travel seasonally for breeding and feeding

monsoon the seasonal changes in atmospheric wind circulation and precipitation

non-renewable resources resources existing in limited quantities that cannot be replaced after they have all been used

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nutrients any substance that plants or animals need in order to live and grow

ore a type of rock or soil that can be mined to obtain metal

pasture grass or similar plants suitable for animals, such as cows and sheep, to eat

pedestrian people who are walking rather than travelling in a vehicle

perception the way something is viewed or understood

percolation the process of a liquid moving slowly through a substance that has very small holes in it

perennial something that happens repeatedly or all the time

phenomenon an occurrence or observable fact

polar regions areas near the north and south poles

population density a standard measurement of people per square kilometre, which can be calculated at different scales (suburbs, cities, countries, regions)

populous a place that has a lot of people living in it

porous something that has many small holes so liquid or air can pass through, especially slowly

potable water that is clean and safe to drink

precipitation water that falls from the clouds towards the ground, especially as rain or snow

projections estimated forecasts based on current trends

pull factor the reasons people move in to an area

purified the process of removing dirty or harmful substances from water

push factor the reasons people move away from an area

regenerate to grow again

renewable resources resources that can be produced as quickly as they are used

residential building a building that is used for private activities

root zone the area of soil surrounding the roots of a plant

runoff water that is not absorbed by the land and flows from high areas to low areas

rural an area in the countryside that is not part of a large town or city

rural-urban migration when people move from rural areas to urban areas, usually for better opportunities such as employment and education

salinity the amount of salt contained in something

sanitation the system for taking dirty water and other waste products away from buildings to keep places clean and protect people's health

saturate to reach a point where soil cannot absorb any more water

scale the size of an area and how it is viewed in relation to another area

sediment a small, soft material that is moved by rivers and deposited in a new location

sense of place the meaning a person or group attaches to a specific area or space

sewage waste matter such as human urine or solid waste

sleet rain that also contains some ice

space how different places, and the features within places, are distributed

species a group of plants or animals that are classified as having the same characteristics

storm surge a rise in sea levels due to wind and other atmospheric elements of a storm

stormwater excessive water runoff from rain and snow after a storm

submerge to cause something to be under water

sustainability the wise use of resources so that they are available into the future

tangible things that you can physically see and touch

temperate a climate that has four distinct seasons: summer, autumn, winter and spring

thunderstorm a storm that produces thunder and lightning and usually heavy rainfall or hail

topsoil the soil that forms the top layer of ground where plants grow

transpiration the process of losing water through the surface or skin of a body or a plant

tributaries rivers or streams that flow into a larger river or a lake

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tropical cyclone a rapidly rotating storm system with strong winds and thunderstorms

tsunami a high wave that forms out at sea due to a disturbance underground such as an earthquake

urban relating to towns and cities

urban areas built-up environments such as cities or large towns

urban consolidation keeping residential development and population growth restricted to the urban areas that already exist

urban planning the process of planning the layout and infrastructure of a place

urban sprawl the gradual spread of cities into previously rural areas due to population growth

vegetation the plants found in an area such as trees, shrubs and grasses

walkability a measure of how easy it is for a pedestrian to walk around

walkable an area that can be accessed by walking

water crisis occurs when the amount of freshwater that is easily available within a region is less than what the region needs

water scarcity a lack of freshwater resources to meet the demands of water usage within a region

water withdrawals the total amount of water withdrawn from a surface water or groundwater source

weir a small dam or barrier stopping the flow of a river

wetlands an environment featuring land that is either permanently or seasonally covered with water

Economics and Business

budget a record of the income coming in and the money going out (expenditure)

consumer a person who buys goods or services for their own use.

consumer right a guarantee that a purchased good or service will work or be what the retailer says

economic cycle a period during which a country's economy goes from growth to recession

economic policies strategies developed by the government to address economic growth and tax revenue

economics the study of the way in which economies work

equilibrium price occurs when demand and supply are equal

financial literacy the ability to understand basic principles of business and finance.

goal an aim or purpose to achieve a specific result

gross domestic product a measure of the total value of production of goods and services in an economy over a period of time (usually one year)

inflation a continuing rise in prices caused by an increase in the money supply and demand for goods

macroeconomic the part of economics connected with financial systems at a national level

market the business or trade in a particular product, including financial products

microeconomic the part of economics that studies individual markets and businesses, or how individual people spend or earn money

mixed economy a market economy in which there is also government intervention

opportunity cost the loss of an alternative course of action when an economic decision is made

needs products and services that people cannot do without

price mechanism the relationship between the supply and demand of a product or service, which affects its price

rebates an amount of money that is returned to you, especially by the government, such as when you have paid too much tax

savings habit a pattern of putting aside money towards a savings goal.

scarcity refers to the finite resources we have on Earth and the decisions we make to allocate these resources to satisfy consumer needs

shortage a situation in which there is not enough of something

subsidies money given as part of the cost of something, to help or encourage it to grow

surplus an amount that is more than is needed

tax money paid to the government that is based on your income or the cost of goods or services you have bought

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unemployment rate the number or percentage of people in a country or area who do not have jobs

wage a specific amount of money that is regularly paid, usually every week, to an employee

wants products and services that people want but are not necessary for survival

Civics and Citizenship

Australian Constitution a set of rules that outlines the rights of Australians and how power is shared between federal and state parliaments

bicameral refers to a parliament having an upper and lower house, such as in New South Wales, Victoria, Western Australia, South Australia and Tasmania

constitutional monarchy a form of government where the monarch is the head of state

democracy a political system where a government's power is vested in its citizens, who vote through elections to shape decisions

election a local, state or national ballot cast by citizens who vote for the person or political party who best aligns with their values

electorate a defined area within a state or territory that is represented by a member of a political party

federation a system of government where powers are divided between a federal government and state governments

governor the monarch's representative at a state level

Governor-General the monarch's representative at a federal level

plebiscite a vote on an issue that all enrolled voters must vote on to show the government whether the issue has public support or opposition

referendum a general vote on an issue affecting the Australian Constitution that all enrolled voters must vote on

state a defined area within Australia controlled by its own political unit, which has the power to pass its own laws

territory a defined area within Australia controlled by its own political unit, but its laws can be revoked by the federal government

unicameral refers to a parliament having one house, such as in Queensland, the Northern Territory and Australian Capital Territory

writ a form of written command that is legally binding

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