

CHAPTER OVERVIEW

What's coming up

This chapter introduces students to the world of a geographer. It presents clear and simple explanations about several of the tools used by geographers to understand the surface of the earth. Particularly important is the introduction to learning about how landforms are represented on a map and how humans locate places and phenomena on maps. It is important when working through this chapter to encourage the use of appropriate geographic language regularly. For example, students should describe the location of a place using the compass points rather than using the words 'next to' or 'above' and 'below'.

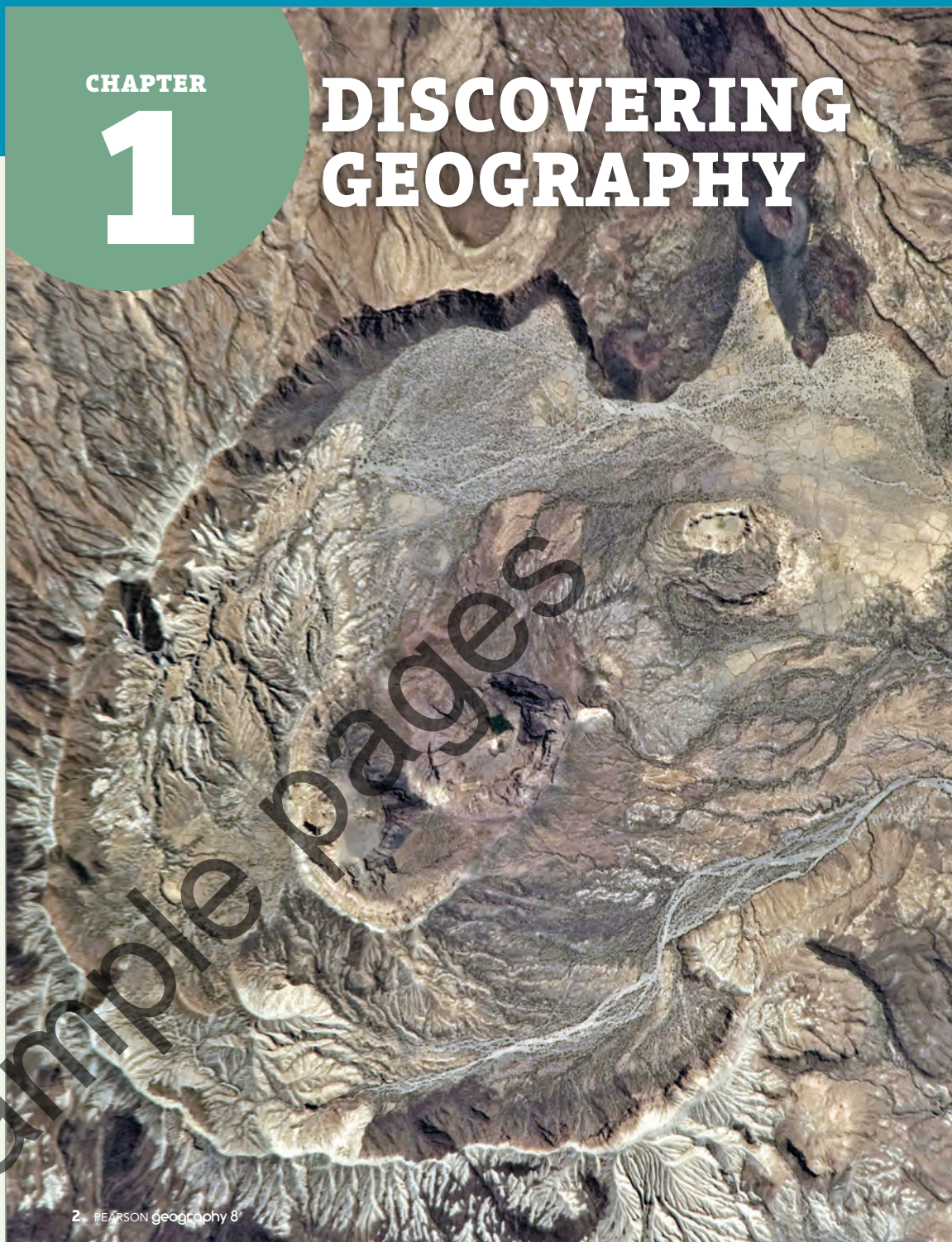
Pre-quiz

- 1 Students decide whether the following are true or false.
 - The Tropic of Capricorn is located in Victoria.
False
 - Height on a map is shown using contour lines.
True
 - Change can happen on the earth's surface over short and long time periods.
True
 - Patterns on maps are shown in many different ways.
True
- 2 Students complete the following sentences by choosing the correct word.
 - Imaginary lines drawn horizontally on a world or country map are called lines of (**longitude**/latitude).
 - World time zones are shown on a map by parallel lines of (longitude/**latitude**).
 - The colour green on a map usually means (**vegetation**/water).
 - The colour blue on a map usually means (**water**/the sky).
 - Contour lines on map are (real/**imaginary**).

CHAPTER

1

DISCOVERING GEOGRAPHY



Using the image

Students examine the image of the Nabro volcano in Eritrea. It had never erupted in recorded history then it began to erupt in June 2011. An ash cloud drifted over East Africa and caused disruptions to flights over Ethiopia and elsewhere. By 2013, the volcanic activity had changed to a slowly oozing lava flow. In the centre of the image, students should be able to pinpoint the volcanic vent or opening.

Conduct a brief oral discussion addressing questions such as the following.

- 1 Where in the world is Eritrea?
- 2 Where is the opening to the volcano?
- 3 What does this image tell you about the landscape in this part of Eritrea?
- 4 Explain why you think all of Eritrea might or might not look like it does in this photograph.

Geography is concerned with the changes taking place in all living and non-living elements of the earth's surface and atmosphere. The elements interact to produce the diverse landscapes that make up the world around us.

Physical geographers study the earth's climates, the formation of landforms, and the functioning and distribution of ecosystems.

Human geographers are concerned with the world's people, communities and cultures. Of particular interest are the ways in which the activities of people impact on places.

There's always something new to study in geography, for example the movements of people, including the shift to the cities (urbanisation), and the changes taking place in the distribution of economic activities. These changes are reshaping the geography of nations. Geographers are also interested in the impact of natural disasters, climate change and the ways in which new technologies are transforming the ways in which people interact.

Geography is much more than just knowing the names of countries and oceans. The study of geography allows us to better understand the changes taking place in the world in which we live.

KEY IDEAS

- To investigate change in geography
- To understand how people's worldviews affect the ways in which they interact with the natural, managed and constructed environments
- To develop the skill to identify spatial association between maps

GLOSSARY

biophysical environment	environments dominated by natural features such as landforms and vegetation. The biophysical environment includes the earth's soil, water, air, sunlight and all living things
change	a transformation brought about by environmental, economic, political, social and/or cultural factors
constructed environment	the earth's human-altered landscapes. It includes all those features that are normally associated with settlements, industries and agriculture
environmental ethics	what a person believes is right and wrong in terms of their behaviour towards the environment
environmental worldview	how people think the world works and what they believe their role in the world should be
geography	the study of all living and non-living elements of the earth's surface and atmosphere
managed environment	human-altered landscapes, dominated by elements of the natural environment; examples include crop and grazing lands, plantations and planted forests
perspective	a way of viewing the world
place	the human and physical characteristics of a specific location on the earth's surface
scale	the relationship between the distance on a map and the actual distance on the earth's surface
sustainable development	the managed use of the earth's resources and natural systems in a way that meets the needs of the present generation without affecting the ability of future generations to meet their own needs

1.0 Nabro volcano, Eritrea

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EAL/D support

Starter activity

To introduce EAL/D students to the concept of Geography, and to promote global awareness, provide each student with a blank world map. Students colour in the country in which they were born, and then draw an arrow showing the route they took to get to Australia. Encourage students to move around the room and converse with other students, choosing five other students' countries and routes to include on their map as well. Students born in Australia might like to complete this task based on their parents' or grandparents' countries of origin. This activity will stimulate conversation and help students feel that they are better able to connect with the themes and ideas in this chapter.

Getting started

As a stimulus activity, collect a wide range of maps for students to view. Provide a Venn diagram on A3 paper for each pair of students. Circulate the maps around the room, asking students to note similarities and differences between maps. Maps should be in colour. Some examples of appropriate maps include the following.

- Choropleth maps: shades of one colour show varying amounts or densities of a particular phenomena

- Topographic maps: show landform features with the use of contour lines and spot heights
- Dot distribution maps: show quantities of phenomena such as population
- Road maps, maps with grid references, weather maps, sketch maps

The key message to leave with students at this point is that all good maps have BOLTSS (border, orientation, legend, title, scale and source), that all maps have conventional symbols and colour systems and that maps give a geographer a great deal of spatial information.

PEARSON geography 8 RESOURCES

Pearson Reader and eBook

Documents

Test: Discovering geography
Teaching program: Chapter 1

Interactive activities

Understanding geographical concepts
Quadrants on a map
Latitude and longitude

Templates

Graphic organisers
Blank outline maps

Geographical knowledge and understanding

Vocabulary builder

Defining the definitions

MI: verbal-linguistic

Students write examples of each of these glossary terms. Sample answers are listed below.

Biophysical environments	Managed environments	Constructed environments
Examples:	Examples:	Examples:
Rivers	Grazing land	Residential land
Native forests	Cropped land	Commercial zones
Wilderness areas	Vineyards	Retail areas
Deserts	Patrolled coastal areas	Zoos and wildlife parks
Mountains	Docklands	
Coasts	National parks	

AC cross-curriculum priorities: sustainability

AC general capabilities: literacy

Geographical inquiry and skills

Geoskills

Mapping the change in my neighbourhood

MI: visual-spatial

Building on Figures 1.1 and 1.2, students translate their ideas onto a map. To do this they will need a map showing the streets and some local features. Students choose a colour scheme or symbols to represent natural and constructed features. Students create a map that shows the current features and an overlay to show how local land was used twenty or more years ago. For example, in a rural-urban fringe locality, land used for orchards might now be taken up by housing. In an inner urban area, older housing might have been replaced by a multistorey block of apartments or a shopping centre.

Students should also provide a description of the changes over time and space, noting the most significant change (for example, loss of farming zones for housing estates, loss of

1.1

Geography's focus on change

Geography is the subject in which we find answers to questions about the world around us. It is concerned with the processes that shape the earth's surface and the ways in which people interact with the environment. The study of geography helps us to better understand the world in which we live.

Change over space and time

Geographers often refer to the theme of **change** over space and time. It is the study of change that occurs in **places**. The outcomes of these changes are places that are different from other places and, in many cases, unique. The study of **geography** helps us to understand these changes and to predict what might occur.

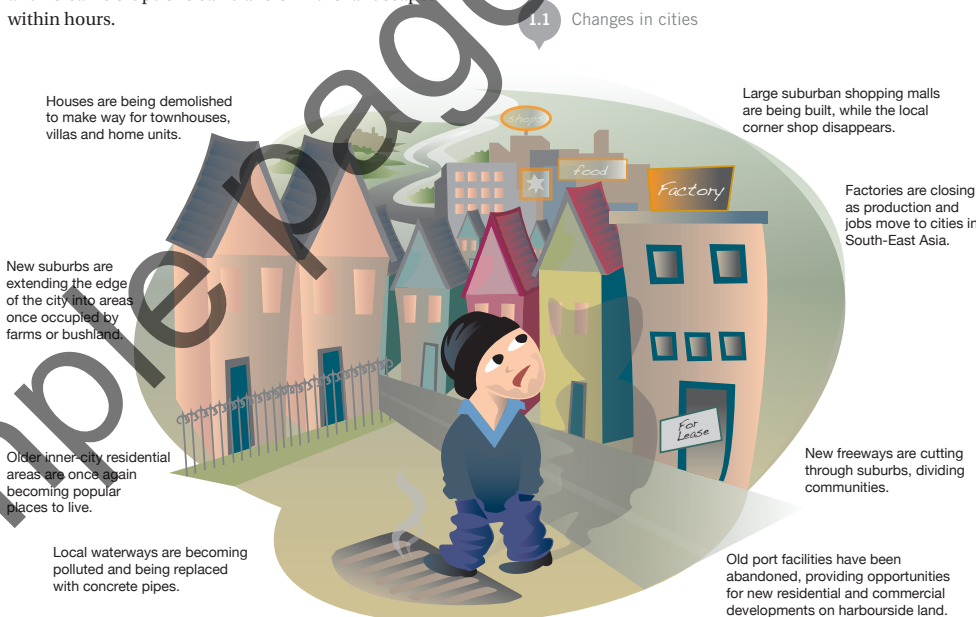
Natural environment

Changes in the **biophysical environment** can occur very slowly or quite suddenly. The shaping of landforms by the processes of weathering and erosion can take millions of years. In contrast, earthquakes, tsunamis and volcanic eruptions can transform the landscapes within hours.

Constructed and managed environments

Change also occurs in the constructed and **managed environments**. Those of us who live in cities (an example of a **constructed environment**) are surrounded by change. Figure 1.1 provides examples of these changes.

Those of us living in rural communities are also surrounded by change. Figure 1.2 provides examples of these changes.



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parkland for retail outlets or the change from a strip shopping centre to a large supermarket).

AC cross-curriculum priorities: sustainability

AC general capabilities: critical and creative thinking, personal and social capability

EAL/D support

Geographical concepts

Draw on students' own feelings in relation to the concept of change. Students review Figures 1.1 and 1.2 and consider the following questions.

- What emotions are the people feeling?
- Why are they feeling like this?
- Is change always bad? Give some examples in your own life where change has been good.

1.2 Changes in rural communities

Environmental problems (such as salinity, soil erosion and introduced weed species) make it increasingly difficult to maintain crop yields and raise livestock.

Family farms are being taken over by large companies, which then combine properties into bigger farming units that use expensive equipment and facilities to produce crops such as cotton or grain-fed beef, for export markets.



Many of the shops are empty because people now travel to the supermarkets and variety stores found in larger regional centres, or shop using the internet.

Rail services are being withdrawn and banks are closing.

People are forced to move to the larger coastal cities due to growing levels of unemployment and a lack of confidence in the community's future.

Some families are being forced to sell their farms because of drought, lower prices for their products or competition from cheaper imported products.

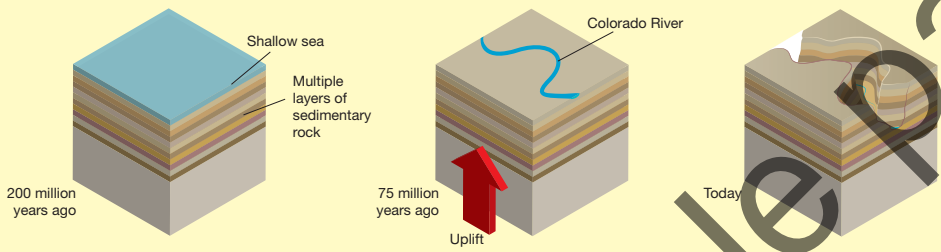
SPOTLIGHT

The Grand Canyon

The formation of the Grand Canyon is shown in Figure 1.3. Beginning about 200 million years ago, nearly forty layers of sedimentary material were deposited on top of volcanic rocks in the shallow seas that then existed in western North America. Uplift of the region began about 75 million

years ago during a major mountain-building event. In total, the Colorado Plateau was uplifted by an estimated 3.2 kilometres. The Colorado River and its tributaries cut their channels through layer after layer of rock while the region was slowly uplifted. Because the region is relatively dry, there is little or no vegetation holding the soil together, so the Colorado River and its tributaries cut downwards at a faster rate than they cut horizontally. As a result, deep canyons rather than wide river valleys developed. Today, the canyon stretches for 446 kilometres, and is up to 29 kilometres wide and 1800 metres deep.

1.3 North America's Grand Canyon took two billion years to develop.



ACTIVITIES

Knowledge and understanding

- 1 Explain what is meant by 'change over time and space'.
- 2 Outline the benefits you get from studying geography.

Applying and analysing

- 3 Study Figures 1.1 and 1.2. Identify the changes taking place in cities and rural communities. Can you think of any other changes?
- 4 List the changes taking place in your own neighbourhood or community. Construct an annotated illustration to record the changes you have identified.

1.1

Spotlight support

Taking it further

The Student Book describes the physical changes that have occurred to form the Grand Canyon. Another major change worth investigating is the impact of tourism as annual visitor numbers have increased to more than four million people.

Students should look at the National Park Service (NPS) website and familiarise themselves with the layout of the region and the main visitor locations (generally in the southern region of the park). In class discussions, highlight how vulnerable the Grand Canyon is to erosion and how this has the potential to cause harm to fragile soil systems. In turn, this places plant and animal communities at risk of habitat damage.

Referring to the NPS website, students plan a three-day visit to the Grand Canyon, which leaves the lightest footprint possible. Students should plan activities which cause the least harm to the biophysical and cultural environment, choosing accommodation, travel and tourist activities that will achieve this outcome. Students should use the park area map on the website.

Activity answers

Knowledge and understanding

- 1 'Change over time' and space refers to the study of change that occurs in places.
- 2 Geography helps us to understand these changes and to predict what might occur in the future.

Applying and analysing

3 Sample answer:

Changes taking place in cities:

- Houses being demolished to make way for townhouses and units

- Large shopping malls being built while local shops disappear
- Factories are moving to South-East Asia
- New freeways
- Old port facilities are being abandoned and new port facilities built in their place
- Pollution of waterways
- People moving back into old inner-city areas
- New suburbs extend the edge of the city.

Changes taking place in rural communities:

- Environmental problems reduce crop yields and make it difficult to raise livestock
 - Family farms are being taken over by large companies
 - Many shops are empty because people now travel to supermarkets in larger towns
 - Rail services are being withdrawn
 - People forced to move to larger cities due to unemployment
 - Families forced to sell farms due to drought and greater competition
- 4 Student answers will vary.

Geographical inquiry and skills

Geographic inquiry activity

Cultural worldview

MI: visual-spatial

The Student Book highlights a stewardship worldview, describing Indigenous people as stewards of their land and its creatures.

Students explore the Cultural Survival organisation website. This organisation partners with Indigenous peoples to defend their land, language and cultures. In pairs, students go to the 'What we do' section and conduct an inquiry into one of the cultures supported by this organisation.

A suggested inquiry sequence is:

- Where in the world does this Indigenous group call home?
- What is this group's connection to land, language and culture?
- What challenges does this group face?
- How is this group overcoming these challenges?

AC cross-curriculum priorities: Asia and Australia's engagement with Asia, sustainability

AC general capabilities: intercultural understanding

AC geographical concepts: place, sustainability

Geoskills

Group work: worldview survey

MI: verbal-linguistic, interpersonal

Planning the survey—group work

Building on activity 6, students design a survey to gather data about worldviews from different age groups and gender groups. After class discussion, define a hypothesis such as 'Human-centred worldviews will be predominately held by people older than 60 years' or 'Nature-centred worldviews will be mostly held by people younger than 30 years'.

Using a copy of the descriptors in Figure 1.4, students design a survey collation sheet.

Conducting the survey—individual work

Students show the descriptors to six males and six females from a range of predetermined age groups. Age groups may include: 0–15 years, 15–24 years, 25–34 years, 35–44 years, 45–60 years, 60+ years.

1.2

Environmental worldviews

Knowledge of people's environmental worldviews is important because it helps geographers understand the various attitudes that people have towards the natural world and its resources. Worldviews determine how people see their place in this world and are reflected in their behaviour and the decisions they make.

Perspective

A worldview is a point of view, or **perspective**. It can be held by individuals, though when accepted and shared by many it becomes a belief system that is widely acknowledged. An environmental worldview is concerned with how the earth and all its species and resources are managed.

Establishing worldviews

Conflicts arise when people hold different environmental worldviews. People will often disagree, for example about whether an environmental problem should be solved or ignored. People have different points of view or opinions about the worth of other species and the extent to which they should be protected.

A person's environmental worldview is determined by:

- how they think the world works
- what they think their role in the environment is
- what they think is the correct environmental behaviour.

Different worldviews

There are a number of competing environmental worldviews. These views may be classified as human-centred, stewardship-based and nature-centred. These views are explained below and summarised in Table 1.4.

Human-centred worldview

This worldview is based on the belief that humans are the most important species and have several traits that set them apart from other species. For example, they possess intelligence and, through technology, they try to control nature. They are the masters of nature and other species have a value only if they are considered useful to humans.

As human needs are considered the most important, the impacts of economic growth and development on the natural world are not important. Technology is seen to be the solution to problems of potential environmental damage.

Stewardship-based worldview

People with this worldview believe that humans should be caring managers, or stewards, of the natural world. They recognise that humans use resources but are aware that these resources may run out and should be managed carefully. Any development must not threaten the earth's life support systems on which humans and other species and ecosystems depend.

Indigenous people acted as stewards, as they had a close spiritual connection with the land and its creatures. They were grateful for what they were able to take and treated the natural world with respect. Any hunting or gathering was done well within the recovery limits of species and they managed the environment successfully for thousands of years.

Nature-centred worldview

People with this worldview believe that nature exists for the benefit of all species on earth, not just humans. Humans are considered equal with other species, and all species have a value separate from any material benefit humans may get from them. Every species has a right to life and does not have to be useful to humans to justify its continued existence. Humans also have a moral and ethical responsibility to guard against the extinction of any species.

The Deep Ecology movement goes even further, claiming that humans have no right to interfere with the richness and diversity of the natural world.

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Students choose a male and a female from each age group. They present the descriptors to survey respondents with the simple question 'Which of these statements is most like your own worldview?' Students note the response on the survey response sheet.

Class collation of the survey responses—group work

This is probably best done on an interactive whiteboard. Display a master sheet of the collation sheet. Students add their responses onto the master collation sheet. Students calculate the total numbers from each age group and percentage values of responses.

Presenting the survey responses—individual work

Students generate a series of age-specific and gender-specific graphs, which display the responses. Graphs should display all graphic conventions (appropriate title, labelled axis, neat and clear line work). Individual summaries should accompany each graph, such as 'This graph shows that 80 per cent of people aged sixty years and over hold a nature-based worldview.' Student answers should quote evidence from the graph.

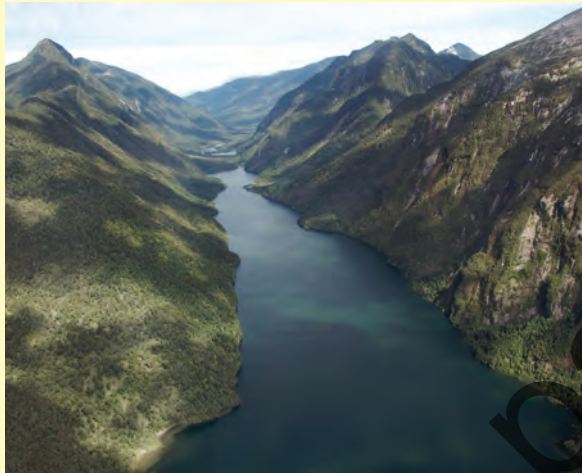
1.4 Comparing worldviews

Human-centred worldview	Stewardship-based worldview	Nature-centred worldview
Humans are separate from the rest of nature and can manage nature to satisfy their ever-increasing needs and wants.	Humans have an ethical responsibility to be responsible stewards of the earth and its resources.	Humans are part of nature and totally dependent on it for our wellbeing.
Technological advances will enable humanity to overcome any adverse impact on the natural environment.	The supply of natural resources is plentiful but they should be used carefully to avoid waste.	The earth's resources are limited and should not be wasted.
There is no limit on future economic growth.	Sustainable forms of economic growth should be encouraged ahead of those that are environmentally damaging.	Sustainable forms of economic activity should be encouraged. Activities that degrade the earth's resources should be discouraged.
Our future wellbeing depends on how well we manage the earth's life-support systems.	Our future wellbeing depends on how we manage the earth's life-support systems for our benefit and that of the rest of nature.	Our future wellbeing depends on our developing an understanding of how nature sustains itself.

SPOTLIGHT

Douglas Tompkins

Douglas Tompkins is a wealthy American environmentalist and former businessman who founded the clothing companies North Face and Esprit. He went on to sell these businesses when he became very concerned about the environmental impact of the fashion industry. Tompkins used his wealth to promote the importance of conservation, especially the protection of areas of exceptional environmental quality. His first project was Pumalin Park in Chile, where he purchased a 3200 square kilometre area of temperate rainforest, high peaks, lakes and rivers (see Figure 1.5). Without Tompkins's intervention, this area might have been exploited for power generation, industry or agriculture. The Chilean government has since declared it a nature sanctuary. Tompkins also established the Foundation for Deep Ecology.



1.5 Pumalin Park, Chile, is an area of exceptional beauty and unique forest ecosystems.

ACTIVITIES

Knowledge and understanding

- 1 Define the term 'worldview'.
- 2 Explain how a person's environmental worldview is determined.
- 3 Describe the three different types of environmental worldviews.
- 4 Explain why conflicts arise between people with differing environmental worldviews.

Applying and analysing

- 5 Determine your own worldview by considering the following: What is more important, the health of the earth's natural world or the wellbeing of people? Write a short explanation of your opinion.
- 6 Study Table 1.4. Which of the various descriptions most closely matches your worldview? Which of them most closely reflects the worldview of your parents?

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Survey conclusion—individual work

Students prepare a written answer to the hypothesis.

AC cross-curriculum priorities: sustainability

AC general capabilities: literacy, numeracy, information and communication technology (ICT) capability, critical and creative thinking, personal and social capability

AC geographical concepts: environment, interconnection

EAL/D support

Oral rehearsal

To help students understand the information on these pages, use the Jigsaw model.

Split the class up into three groups and allocate one of the subheadings to each group ('Human-centred worldview', 'Stewardship-based worldview' and 'Nature-centred worldview'). Each group discusses, defines and makes sure everyone understands all the key points under their subheading. Then, two people from each group join each of the other groups. As the 'expert' for their subheading,

Spotlight support

Taking it further

The Foundation for Deep Ecology, Land for Wildlife, Greening Australia and the Steve Irwin Wildlife Reserve are all examples of environmental philanthropic activities. Sponsored by or inspired by advocates for the natural environment, these exemplify a nature-based worldview as outlined in Unit 1.2.

In small groups, students research each of these organisations. Students participate in two class debates on the topics 'Personal wealth should be used to fund conservation projects' and 'Governments should be solely responsible for conserving our natural landscape'.

each person explains their information in their own words to their new group. Students return to their seats and write a summary of each subheading in their own words, based on the explanations from the students in their group.

Activity answers

Knowledge and understanding

- 1 A worldview is a point of view, or perspective that is accepted by many people. When enough individuals share a worldview, it can be identified as a belief system.
- 2 A person's environmental worldview is determined by how they think the world works, what they think their role in the environment is and what they think is the correct environmental behaviour.
- 3 The human-centred worldview is based on the belief that humans are the most important species on the planet, the stewardship-based worldview is based on the belief that humans should be caring managers of the natural world, while the nature-centred worldview is based on the belief that nature exists for the benefit of all species on earth, not just humans.
- 4 Sample answer: Conflicts sometimes arise when people with opposing environmental worldviews advocate different courses of action in relation to an environmental issue. Some will want the issue solved; others will want it to be ignored.

Applying and analysing

- 5 Student answers will vary.
- 6 Student answers will vary.

Geographical knowledge and understanding

Evaluate understanding

Good maps have BOLTSS

MI: visual-spatial

Students refer to Figures 1.6, 1.8 and 1.9. Recalling the importance of BOLTSS (border, orientation, legend, title, scale and source), students analyse which of these maps meet the criteria for a good map. Students will find 1.8 meets all the criteria. They should note what is missing from the other maps.

Alternatively, students use copies of the maps to annotate the missing BOLTSS elements.

AC general capabilities: literacy, critical and creative thinking

AC geographical concepts: place scale change

Geographical inquiry and skills

Geoskills

Learning about spatial association

MI: visual-spatial

Using the following information, students deepen their understanding of spatial association before they attempt the activities on page 9.

Spatial association is the connection that can be made between two geographic characteristics or phenomena that are arranged or distributed over the earth's surface. Geographers describe the degree to which two or more things are similarly arranged over an area. For example, a pattern of rainfall drawn on a map may be similar to the pattern of tropical vegetation occurrence. Such distribution patterns are described as having a strong spatial association.

For example, when introducing this concept to students it may be helpful to remind them of another version of this idea: when they were given two diagrams and had to 'spot the differences'.

In a similar way, students learning about spatial association have to imagine one map overlaid by another and then spot the similarities and differences in distribution of two or more phenomena. People using Geographical Information Systems (GIS) utilise this skill regularly. Students could find two maps that have very simple phenomena

1.3

Maps

Maps play a very important role in the study of geography. They tell us about places and help us to identify patterns and changes in the landscape. A map is a graphic representation of part of the earth's surface drawn to scale on a flat surface. The amount and type of detail shown on a map depends on the scale and purpose of the map.

Types of maps

Maps range from the very simple to the very complex. Cartographers (map makers) use symbols, shading and colour to simplify reality and show how the features of the earth's surface are arranged and distributed. Some common types of maps are:

- topographic maps
- weather maps
- thematic maps (see Figure 1.6)
- street maps.

Elements of maps

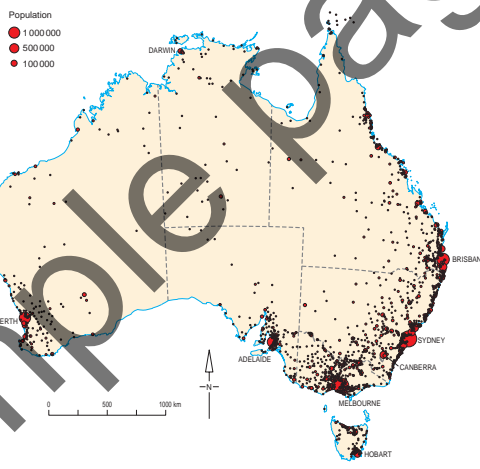
Map essentials are a title, a direction indicator, a scale, a legend and a border. A good way to remember the essential elements of a map is the term 'BOLTSS' (Border, Orientation, Legend, Title, Scale and Source).

Quadrants

To help us to locate features on maps, geographers sometimes express location in terms of quadrants (see Figure 1.7). The quadrants are named for the points of the compass.

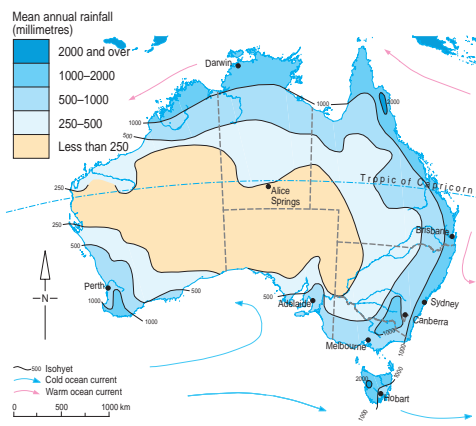
1.7 The quadrants of a map

North-west quadrant	North-east quadrant
South-west quadrant	South-east quadrant



1.6 Australia's population distribution

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1.8 Australia's annual rainfall

drawn on them (or one map with two phenomena showing). Using a map of Australia with the capital cities marked, students answer the following questions.

- Is there a spatial association between the coast and the location of capital cities?
Yes
- Is the spatial association strong or weak?
Strong
- What evidence can you see on the map to prove this?
All but one capital city are located on the coast.

- Is there an example on the map where the two patterns don't connect?
Yes, Canberra

It is worth giving students many examples of this activity. As their confidence grows, their responses will become more sophisticated and their use of correct geographic language will become routine.

AC general capabilities: literacy

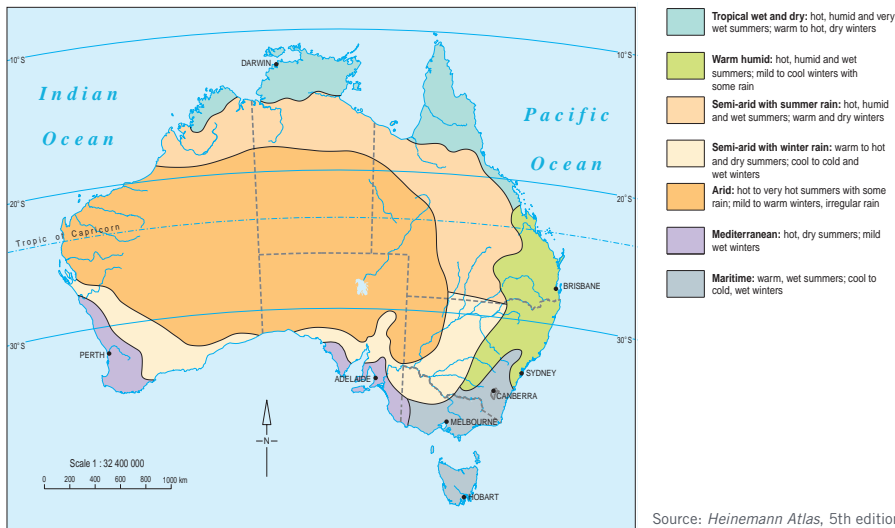
AC geographical concepts: place, interconnection

Patterns between maps

Maps help us to identify distribution patterns in landscapes. Figures 1.8 and 1.9 show a strong link between arid zones in Australia and regions that receive

less than 250 millimetres of rainfall per year. Locations that receive over 2000 millimetres of rainfall per year have a tropical or maritime climate. In contrast, areas that receive less than 250 millimetres of rainfall per year have a semi-arid climate.

1.9 Climate regions of Australia



Source: Heinemann Atlas, 5th edition

ACTIVITIES

Knowledge and understanding

- 1 Name four types of maps.
- 2 List the elements of a map.

Geographical skills

- 3 Study Figure 1.6 and do the following tasks.
 - a Name the quadrant/s that include cities of over 1 000 000 people.
 - b Name the quadrant/s in which the least people live.
- 4 Study Figure 1.9 and do the following tasks.
 - a Name the quadrant/s in which the maritime climate zone is located.
 - b Name the quadrant/s in which the Mediterranean climate zone is located.
- 5 Study Figures 1.8 and 1.9 and do the following tasks.
 - a Is there a link between tropical zones and areas receiving more than 1000 millimetres of rainfall per year? Explain.

- b Is there a link between semi-arid zones and areas receiving 250 to 500 millimetres of rainfall per year?
- 6 Study Figures 1.6 and 1.9 and answer the following questions.
 - a Is there a link between areas with low population and arid zones? Explain.
 - b Is there a link between areas with low population and warm-humid climate zones? Explain.
 - 7 Study Figures 1.6 and 1.8 and discuss the following statement.
There is a strong link between rainfall areas greater than 500 millimetres per year and the location of large cities in Australia.

EAL/D support

Geographical concepts

Students practise drawing their own maps and incorporating BOLTSS, with the following kinaesthetic activity.

The class goes outside to a concrete or asphalt area. Students split up into groups of three. Using chalk, each group produces a large-scale map of Australia on the concrete. The map must include the following features: state and territory borders, capital cities and at least ten key features. Students can refer to an atlas and the following list of features.

- Murray River
- Nullabor Desert
- Kakadu National Park
- Great Barrier Reef
- Uluru
- Blue Mountains
- Cradle Mountain
- Cape York Peninsula
- Twelve Apostles
- Tropic of Capricorn

Activity answers

Knowledge and understanding

- 1 Topographic maps, weather maps, thematic maps and street maps
- 2 BOLTSS (border, orientation, legend, title, scale and source)

Geographical skills

- 3
 - a South-west and south-east quadrants
 - b North-west quadrant
- 4
 - a South-east quadrant
 - b South-west quadrant and south-east quadrant
- 5
 - a Strong spatial association between tropical zones and areas receiving more than 1000 mm of rainfall per year
 - b Strong spatial association between semi-arid zones and areas receiving 250 to 500 millimetres of rainfall per year
- 6
 - a Strong spatial association between areas of low population and arid zones
 - b Low spatial association between areas with low population and warm-humid climate zones
- 7 The location of large cities has a strong spatial association with areas that receive more than 500 mm of rainfall a year. Australia's large cities are all on the coast, particularly the east coast, and it is these areas that receive the most rainfall.

Evaluate understanding

Matching patterns on maps

MI: visual-spatial, logical-mathematical

Choose two maps from an atlas to test students' understanding of spatial association.

Students complete a cloze activity or write their own assessment of the spatial association between two mapped phenomena.

Important features of a good spatial association description are to describe

the extent to which two patterns are 'matched' (strong, medium, weak) and quantify with evidence from the map. Any places where the patterns are not the same should also be noted and quantified.

AC general capabilities: literacy, critical and creative thinking

AC geographical concepts: place, interconnection

Geographical knowledge and understanding

Vocabulary builder

Matching meanings

MI: visual-spatial

Students play a matching game with the following terms and their meanings. Package a set of the terms and their meanings in a zip-lock bag, for students to match them.

Topography	the shape of the land
Distribution	the pattern or spread of a feature/ phenomenon over an area
Spot height	marks an exact height above sea level on a map
Contour line	a line on a map which joins together places of equal elevation
Contour interval	the distance between one contour line and another. It is always consistent on a topographic map.
Elevation	the height of the land above sea level. In Australia, it is measured in metres.

AC general capabilities: literacy, critical and creative thinking

AC geographical concepts: place

Helpful hints

Practice makes perfect

MI: visual-spatial

Maps are flat, 2-D representations of the shape of the land. It takes practice to 'see' the shape of the land. It is important to choose very simple maps to begin. They must display consistent conventional colours and symbols so that students become familiar with the structure and form of a topographic map.

Draw or find a series of simple topographic maps similar to Figure 1.10. Choose samples that show only one or two landforms and that have contours that are easy to read. Usually, contours that are far apart over a long distance indicate a gentle slope. Contours that are close together over a small distance indicate a steep slope. Remind students that contour lines never cross each other.

Plan activities so that students master 'reading' simple maps before being given a real topographic map to work on. Class sets of topographic maps can be purchased from map shops or from the Geography Teachers

1.4

Geoskills: Relief

An understanding of relief is central to the study of landscapes and landforms. 'Relief' is the term geographers use to describe the shape of the land, including height and steepness. The main techniques used by cartographers to show relief on topographic maps are spot heights, contour lines and patterns, and layer colouring and landform shading.

Topographic maps

Figure 1.10 is a topographic map showing relief features.

Spot height

A spot height is shown on a map as a black dot with the height written next to it. Spot heights give the exact height above sea level of particular locations or features.

Contour lines

A contour line joins points of equal height above sea level. Thus, every point along the line has the same value.

Contour lines provide geographers with information about the shape and slope of the land and the height of features above sea level. The contour interval, or vertical interval, is the difference in height between two adjacent contour lines. This interval is normally stated in the map's legend or near the edge of the map.

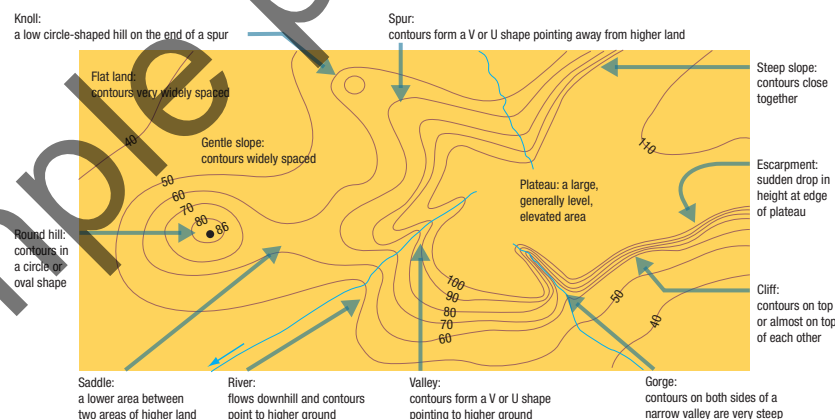
Contour patterns

Each type of topographic feature is represented by its own distinctive contour pattern.

- The spacing of the contours on a map shows the steepness of slopes. Contour lines that are close together show that the area has steep slopes. Widely spaced contour lines indicate that the area is very flat.
- The spacing of contour lines on a map shows the shape of a slope. Evenly spaced contours indicate a uniform slope. When the spacing of contour lines reading from high to low decreases, the slope is convex; that is, curved like the outside shape of a circle. When the spacing of contour lines reading from high to low increases, the slope is concave; that is, like the inside shape of a circle.

With practice, you can gain a visual impression of the shape of the land by interpreting the patterns made by the contour lines on a map.

1.10 Reading contour lines can tell us a lot about the nature of landforms.



10 PEARSON geography 8

Association in your state. These sometimes come with ready-made worksheets. Once students are confident at investigating the lines on a map, encourage them to draw a map themselves and formulate questions to accompany the map.

Students should use pencils when making maps. Their maps should use conventional colours, symbols and BOLTSS.

AC general capabilities: literacy, numeracy

AC geographical concepts: place, scale

Layer colouring

Layer colouring is a simple and effective way of showing relief on maps. It involves colouring the area between selected contours in different colours. When it is used in combination with spot heights, and sometimes landform shading, layer colouring can tell you a good deal about the shape of the land.

Landform shading

Shading can be used on maps, with colours darkening as elevation increases. Shading may be used as if the

light is coming from one direction, so that one side of a hill is shown in a lighter shade than the other to give it greater definition. Landform shading is sometimes used together with contour lines.

Aspect

Aspect refers to the direction that a slope faces. The aspect of a particular slope can be determined by examining the height and pattern of contour lines.

Skillsbuilder

Estimating heights of landform features

Sometimes you will need to know the height of a map feature, such as the top of a hill or a plain. If there is no spot height on the feature, it is possible to estimate the height by studying the contour lines of the map. Use the following examples as a guide.

Example 1: Estimate the height of the hill at point A.

In Figure 1.11, point A lies more than 150 metres above sea level. However, it is obviously less than 200 metres above sea level. Your answer can be expressed in one of two ways:

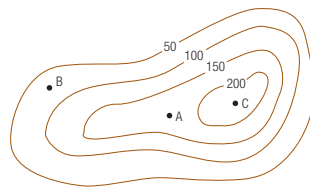
- as a statement—point A is more than 150 metres, but less than 200 metres, above sea level; or
- as an estimate—point A is 175 metres (or any number between, but not including, 150 and 200 would be acceptable) above sea level.

Example 2: Estimate the height of point B.

In Figure 1.11, point B lies between the 50 and 100 metres contour lines. Your answer can be expressed in one of two ways:

- as a statement—point B is more than 50 metres, but less than 100 metres, above sea level; or
- as an estimate—point B is 75 metres (or any number between, but not including, 50 or 100 would be acceptable) above sea level.

1.11 Contour heights



ACTIVITIES

Knowledge and understanding

- 1 Define the term 'relief'.
- 2 List the techniques to show relief on maps.
- 3 Explain what the spacing between contour lines tells us about relief.
- 4 Study Figure 1.10 and then answer the following questions.
 - a Describe the difference between a cliff and an escarpment.
 - b What is the spot height?

Geographical skills

- 5 Study Figure 1.10. What is the contour interval?
- 6 Study Figure 1.11. Estimate the spot height for C.

Investigating

- 7 Study Figure 1.10.
 - a List the different landform features.
 - b Find an image of each landform feature from your list.
 - c Copy Figure 1.10 and annotate your diagram with the landform images you have collected.

Options

Use a real topographic map when students feel confident with the concept. Nominate ten grid reference locations. Students give the spot heights at each location. Students might imagine the area between one contour and another as being a quarter, a half or three-quarters of the way between two contour lines. For example, if a spot height is found approximately a quarter of the way between the 50-metre contour and the 60-metre contour, then the spot height will be 52 or 53 metres above sea level. A spot height located nearly on the 50-metre contour line could be nominated as 51 metres above sea level. A little flexibility in answers is reasonable.

Answers should always be stated as 'metres above sea level'. It is incorrect to say '50 metres'. Students should use correct geographic terminology when writing or verbalising geographic information.

AC general capabilities: literacy, numeracy

AC geographical concepts: change

Activity answers

Knowledge and understanding

- 1 'Relief' is a term used by geographers to describe the shape of the land.
- 2 Relief is shown by using spot heights, contour lines and patterns and layer colouring and landform shading.
- 3 Closely spaced contour lines indicate that land is steeper than areas in which the contour lines are spaced further apart.
- 4 a An escarpment is a sudden drop in height at the edge of a plateau extending over a wide area, while a cliff refers to the actual drop in height.
 - b A spot height shows the actual surveyed height at one particular location on the map.

Geographical skills

- 5 10 metres
- 6 225 metres

Investigating

- 7 a Knoll, spur, slope, escarpment, cliff, gorge, valley, river, saddle, round hill, plateau
 - b Student answers will vary.
 - c Student answers will vary.

EAL/D support

Vocabulary assistance

Define unfamiliar words in a brief class discussion and then paraphrase the definitions, using simple language that is accessible to EAL/D students. Some sample definitions are provided below.

- Plain: flat land with low relief
- Plateau: a highly elevated landform with a fairly level surface

- Elevation: the height above sea level of a point on the earth's surface
- Hydrosphere: the earth's oceans, lakes, rivers and ice
- Biosphere: all living things
- Lithosphere: the solid rocky outer layer of earth
- Atmosphere: the gases that surround the earth

Geographical knowledge and understanding

Helpful hints

Constant repetition—the best advertisement

MI: visual-spatial

To help them become familiar with latitude and longitude, students should practise as much as possible during class time. Students should remember that:

- Latitude is always quoted before longitude. One way to remember this is that 'La' (as in latitude) comes before 'Lo' (as in longitude)
- Latitude is measured in the number of degrees north and south of the Equator
- Longitude is measured in degrees east and west of the Prime Meridian
- There is a conventional method of quoting location on a world map. For example, 31 degrees and 31 minutes South is written as 31° and 31'S—degrees, minutes, direction.
- Practise regularly by using student or class atlases at each lesson.

AC general capabilities: literacy, numeracy

AC geographical concepts: place, space

Geographical inquiry and skills

Geoskills

The great race

MI: visual-spatial

An essential geographic skill is the ability to read latitude and longitude on a map. The best resource to learn this is an atlas. Use an atlas to assemble a series of locations which students are required to find.

Students brainstorm a list of 'places I have visited/places I'd like to visit'. Then, students race to find and describe the location of each place. Students should provide the latitude and longitude (this can be found in the atlas index) and a brief description, stating:

- Which country the place is found in
- Proximity and direction to the nearest capital city—use the scale and compass
- Proximity to the coast—use scale and written description
- Proximity and direction to the nearest border.

An example: 'Paris is located in France. It is the capital of that country. It is situated on the Seine River, and the nearest coastline is

1.5

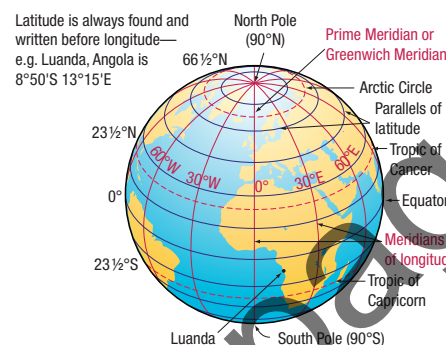
Latitude and longitude

Most of the maps you will use include latitude and longitude. These lines allow you to quickly and accurately locate places and features on the earth's surface. Latitude and longitude also play an important role in determining times and dates.

Latitude

Lines of latitude are imaginary lines that run in an east-west direction around the earth. Because the lines of latitude are parallel to each other they are often referred to as parallels of latitude.

Important lines of latitude are shown in Figure 1.12.

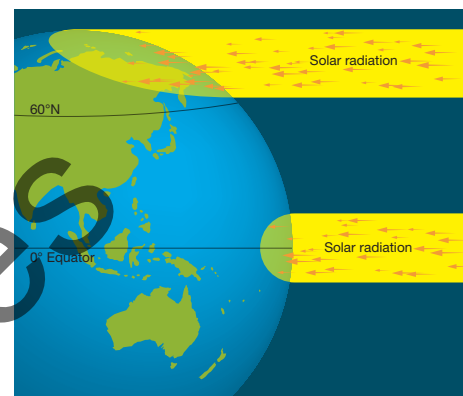


1.12 Parallels of latitude, meridians of longitude and the grid lines created by lines of latitude and longitude

Impact of latitude on climate

Latitude plays an important role in shaping the global pattern of climate. In Figure 1.13 you can see how the temperatures decrease as you move away from the Equator towards the poles. Incoming solar radiation (insolation) is the energy that reaches the earth's surface from the sun. Insolation is greatest at the Equator because the sun is directly overhead, which means that the sun's rays hit the earth at an angle of 90°. At higher latitudes the sun's rays strike the earth's surface at an angle. This means that the same amount of energy is spread over a larger area. Places near the Equator are, therefore, generally hotter than places near the poles.

1.13 Heating the earth's surface at the Equator and at higher latitudes



Longitude

Lines of longitude run in a north-south direction. They are not parallel to one another, but pass through both the North and South poles. Any number of these lines can be drawn but they all meet at the poles. These imaginary lines are called meridians of longitude. The most important line of longitude is the Prime Meridian (0°), which passes through Greenwich, England. All other lines of longitude are located to either the east or the west of the Prime Meridian.

Longitude and time

The Prime Meridian helps determine time. The earth's twenty-four time zones (one for each hour of the day) are organised according to Universal Coordinated Time (UTC), as shown in Figure 1.14. Places east of the Prime Meridian experience sunrise before UCT. Locations to the west of the Prime Meridian experience sunrise after UCT. Sydney, which is 115° east of Greenwich, has its sunrise before Greenwich.

approximately 2250 kilometres to the north. The nearest border is 200 kilometres east of Paris.'

This activity could occur within a defined time period or be used as an evaluative tool to gauge each student's effective use and understanding of latitude and longitude. This activity also lends itself to evaluation of a student's correct use of geographic skills and the language associated with location.

AC cross-curriculum priorities: Asia and Australia's engagement with Asia

AC general capabilities: literacy

AC geographical concepts: place, scale

EAL/D support

Starter activity

To help EAL/D students visualise the concept of latitude, students stand up and pretend to be the earth. Link each significant line of latitude with a body part to help students remember the order and then call out each line of latitude randomly and have students move that part of their body in a dance sequence.

- North Pole = head
- Arctic Circle = nose and ears
- Tropic of Cancer = shoulders
- Equator = hips
- Tropic of Capricorn = knees
- Antarctic Circle = shins
- South Pole = toes

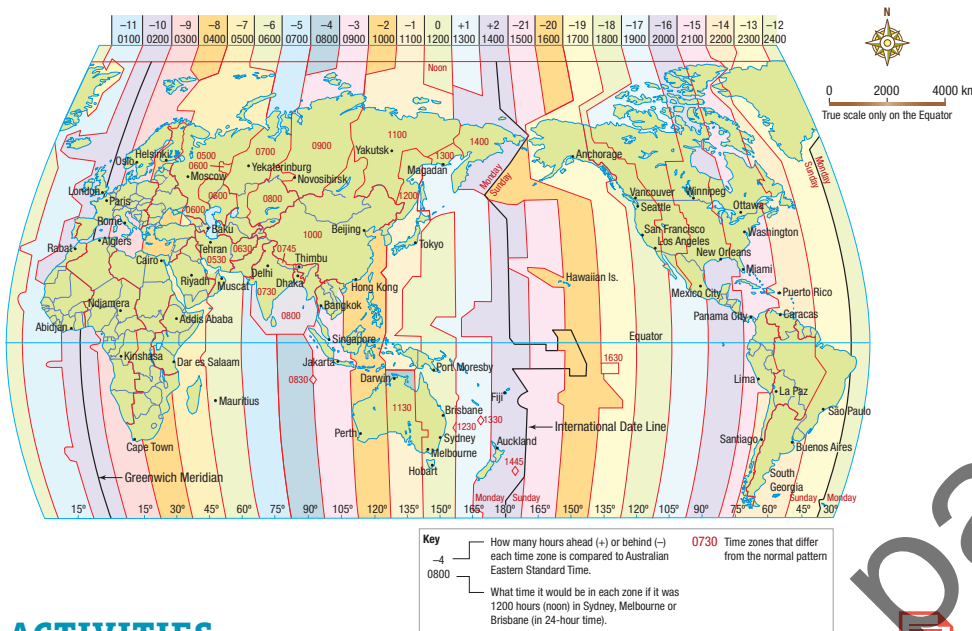
Another important line of longitude is the International Date Line (IDL), which is on the opposite side of the world to the Prime Meridian, at 180°. Together, the Prime Meridian and IDL divide the earth into two halves: the Western and Eastern hemispheres.

The IDL is the point at which the change of day takes place. When you travel from east to west across the

IDL, you gain a day. When you travel from west to east you lose a day. Australians travelling to the United States of America often arrive at their destination before their departure time. On the way back, however, they lose a day.

Australia has three time zones, while Russia has eleven. The zone boundaries zigzag in places so that people living in a region can operate on the same time (see Figure 1.14).

1.14 The world is divided into twenty-four time zones based on longitude.



ACTIVITIES

Knowledge and understanding

- 1 Define the terms 'parallel of latitude' and 'meridian of longitude'.
- 2 Describe the location and significance of the Prime Meridian and the International Date Line.
- 3 How many time zones is the world divided into? What does each zone represent?

Geographical skills

- 4 Study Figure 1.12. Write a paragraph describing the relationship between latitude and the global pattern of climate. Include in your response why the climate is hotter at the Equator than at higher latitudes.

- 5 Study Figure 1.14, showing the world's time zones.

- a Calculate what time it will be in London, Singapore, Los Angeles and New York when it is midday in Sydney.
- b What is the time difference between Sydney and Vancouver?
- c If you live in Sydney and want to phone a friend in London at 9 a.m. before she leaves for school, what time of day would it be in Sydney when you call?
- d Your Los Angeles flight leaves Sydney at 1.50 p.m. and takes 14 hours. What is the day and time when you land in Los Angeles?

Activity answers

Knowledge and understanding

- 1 Parallels of latitude are imaginary lines that run in an east–west direction around the earth, while meridians of longitude run in a north–south direction and are not parallel to each other but converge at the poles.
- 2 The Prime Meridian runs through Greenwich, London. It is from this point that all other lines of longitude are determined. It is also the point from which time is measured. The International Date Line lies at

180° opposite the Prime Meridian and is the point at which the change of day takes place.

- 3 The world is divided into twenty-four time zones and each represents an hour's time difference.

Geographical skills

- 4 Latitude plays an important role in shaping the global pattern of climate. Temperatures decrease as you move away from the Equator towards the poles. Insolation is greatest at the Equator because the sun is directly overhead. At higher latitudes the sun's

rays strike the earth's surface at an angle. This means that the same amount of energy is spread over a larger area. Places near the Equator are, therefore, generally hotter than places near the poles.

- 5 a London = 2 a.m., Singapore = 9 a.m., LA = 6 p.m., New York = 9 p.m.
- b 6 hours
- c 5 p.m. the same day
- d 10.50 a.m. the previous day

Review and reflect 1

Activity 1 answers

- a Student answers will vary.
- b The first statement most closely resembles a self-centred, earth-centred and sustainable worldview. Student statements will vary.

Activity 2 answers

- a 1 cm = 1000 metres (1 km)
- b i 4000 metres (4 km)
ii 8900 metres (8.9 km)
- c 1500 metres (1.5 km)
- d 4400 metres (4.4 km)
- e 2 km²
- f A = 80 metres, B = 60 metres
- g North
- h South
- i Escarpment / cliff
- j AR 3429
- k GR 366268
i Cemetery
ii Road

EAL/D support

Reading strategy

Students work on their understanding of the differences between human-centred and earth-centred worldviews. Students consider the following comprehension questions.

Human-centred

- Which is the planet's dominant species?
Humans
- This worldview focuses on the needs and wants of which species?
Humans
- Which species benefits from the management of the earth's resources?
Humans

Earth-centred

- What are people totally dependent on in this view?
Nature
- Besides themselves, what do humans have an obligation to?
The environment
- Are humans equal to or better than other species?
Equal to

Review and reflect 1

Activity 1

Worldviews

People often disagree on the seriousness of environmental issues. Take global warming, for example. Despite the overwhelming scientific evidence that the activities of people—especially their use of fossil fuels—is affecting global temperatures, there are those who believe that the dangers of climate change have been greatly exaggerated. Some others believe it is all just a hoax. Such disagreements generally arise out of differing environmental worldviews—how people think the world works and what they believe their role in the world should be. A person's environmental worldview also takes into account their **environmental ethics**—what they believe is right and wrong in terms of their behaviour towards the environment.

Human-centred

According to this view, people are the planet's dominant species and that we should manage the earth's resources and natural systems for our own benefit. This 'management-based' approach suggests that technological advances and better management can be used to address the environmental damage caused by the exploitation of resources and systems.

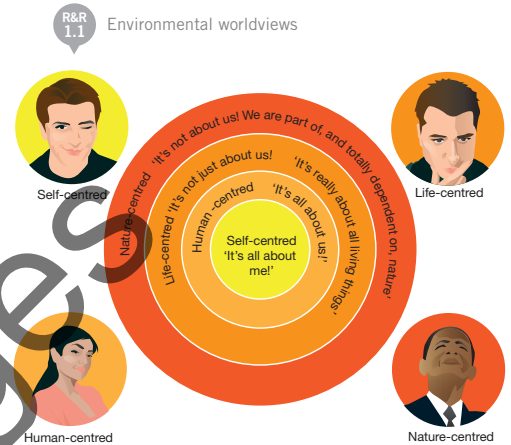
Nature-centred

People who hold such a worldview believe that humans have an obligation to the environment as well as themselves. They believe that all forms of life have the right to exist and that humans are not any different from other species—humans are equal to other species.

Sustainable

Somewhere in the middle of these extremes is the concept of sustainable development. **Sustainable development** involves the use of the earth's resources and natural systems in way that meets the needs of the present generation without affecting the ability of future generations to meet their own needs. It is a worldview that still see humans as the dominant species, but holds that they can and should manage the earth mostly for human benefit.

- a Study Figure R&R1.1. Which worldview fits your view of the relationship between people and their environment?
- b Study each of the worldviews expressed in Figure R&R1.2. Identify the statement that most closely resembles a self-centred, nature-centred and sustainable worldview. Write a statement that expresses your worldview.



R&R 1.2 Worldviews



Activity 2

Geographical skills

Study Figure R&R1.3 and do the following tasks.

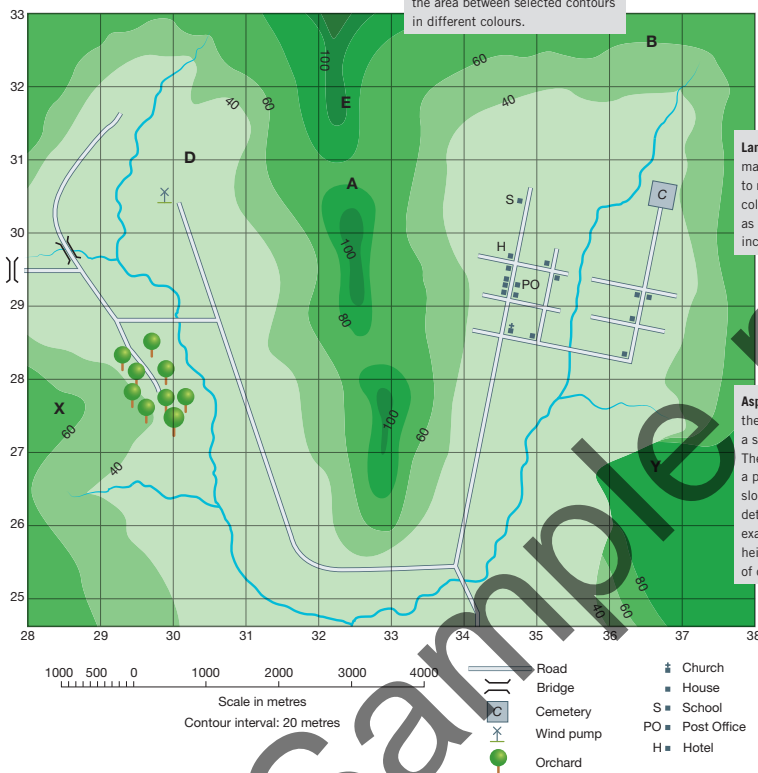
- State the scale of the map.
 - Calculate the straight-line distance between:
 - X and D.
 - X and Y.
 - Calculate the distance between the wind pump and the bridge.
 - Calculate the distance by road between the wind pump and the bridge.
- Estimate the area of the orchard.
 - What are the elevations of Points A and B?
 - What is the direction of the bridge (AR 2829) from the small creek hill (AR 2826)?
 - In what direction is the river flowing in AR 3529?
 - What landform feature is found in AR 3526?
 - In what area reference is the post office located?
 - What is the grid reference of point Y?
 - What features of the built environment are located at:
 - GR 366304
 - GR 302305?



R&R 1.3 Topographic maps show landform features

Layer colouring involves colouring the area between selected contours in different colours.

Contour patterns
Each type of topographic feature is represented by its own distinctive contour pattern. A saddle and cliff are shown



Landform shading
may be applied to maps so that colours darken as elevation increases.

Aspect refers to the direction that a slope faces. The aspect of a particular slope can be determined by examining the height and pattern of contour lines.