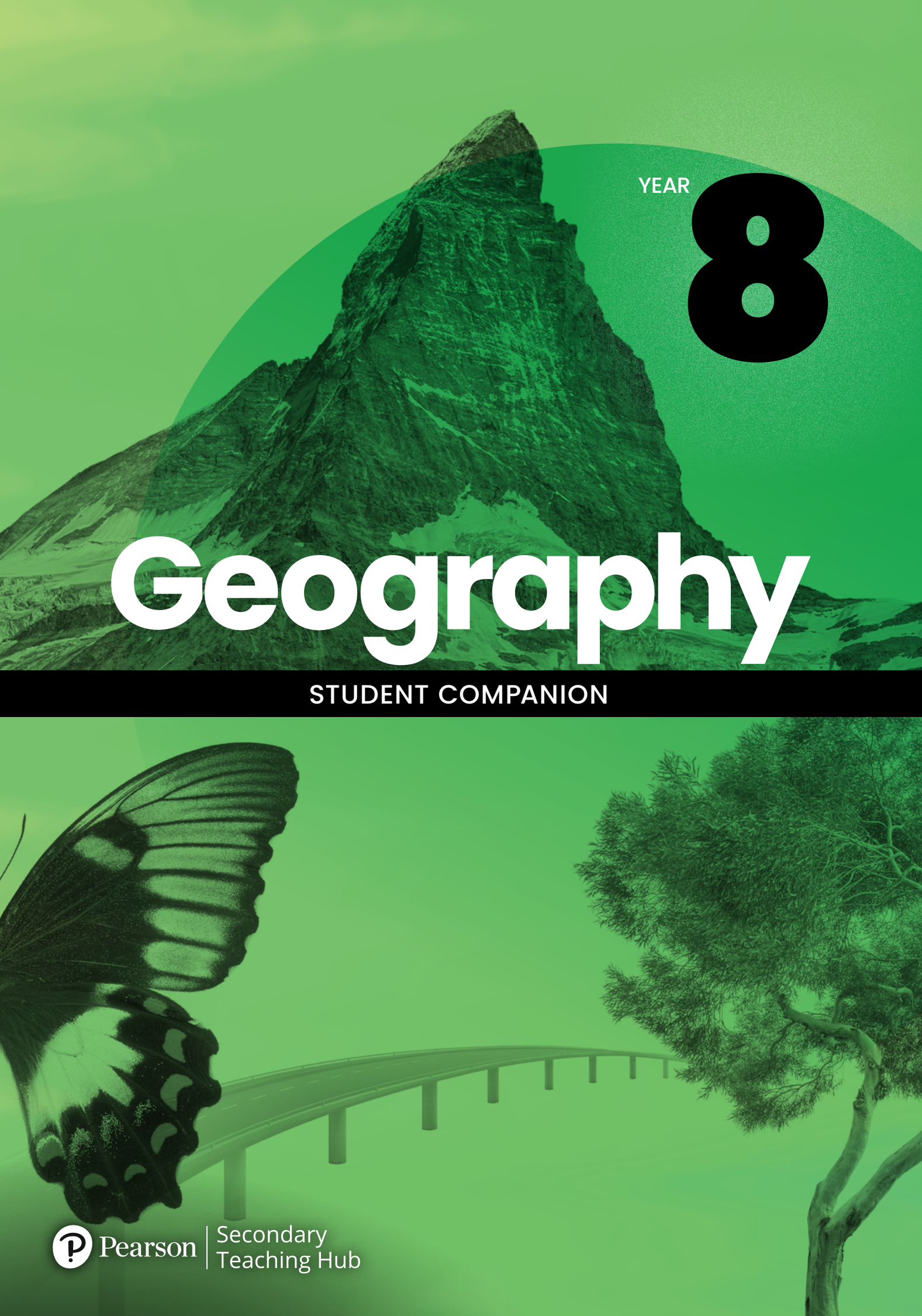

YEAR 8

Geography

STUDENT COMPANION

Pearson | Secondary Teaching Hub

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Pearson Secondary Teaching Hub Geography 8

Student Companion

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We pay our respects to Elders, past and present.

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How to use this Student Companion

This Student Companion is a complementary resource that offers a print medium for corresponding lessons in Pearson Secondary Teaching Hub. It is designed to support teaching and learning by providing learners with a place to create a portfolio of learning to suit their individual needs, whether you are:

- supporting a blended classroom using the strengths of print and digital
- preparing for exams by creating a study guide or bound reference
- needing a tool to differentiate learning or
- looking for meaningful homework tasks.

Learners can develop their portfolio of learning as part of classroom learning or at home as an additional opportunity to engage with the knowledge and skills from the lesson. This could be done as prior learning in a flipped classroom environment or as an additional revision or homework task.

Learning intention and success criteria

A learning intention is provided for every lesson. The learning intentions are goals or objectives that describe what learners should know, understand or be able to do by the end of the lesson.

Success criteria clarify expectations and describe what success looks like. The success criteria are specific, concrete and measurable so learners can actively engage with and reflect on the evidence of their learning within each lesson.

Learning intention: To be able to identify the methods used in geographical investigations

Success criteria:

- ☐ **SC 1:** I can identify how studying geography is relevant to real life.
- ☐ **SC 2:** I can describe the steps in a geographical investigation.

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Worked examples

Worked examples provide learners with a step-by-step demonstration of how a skill or concept is applied in a geographical context. The worked examples in the Student Companion are provided to:

- scaffold learning
- support skill acquisition
- reduce cognitive load.

Worked examples are an effective tool to demonstrate what success looks like. The format of the worked examples in the Student Companion supports the gradual release of responsibility.

Practice activities

Practice activities are provided at the end of each lesson so that learners can apply the knowledge and skills obtained in the worked example.

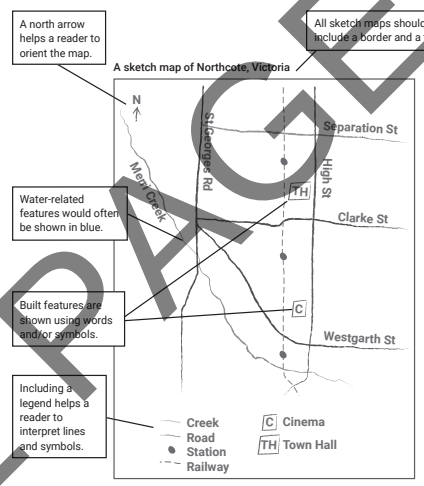
Practice activities are designed to ensure learners build confidence and demonstrate efficiency with the skills and concepts.

Identifying relevant primary data in the local area

Maps are one of the geographer's most important tools. A map is a representation of the whole, or a part, of the Earth's surface.

Sketch maps are one way to identify and display relevant primary data from a local area. A sketch map is a simple, hand-drawn map that shows the important characteristics and features of a place.

Here is an example of a sketch map.



This sketch map shows the local area of Northcote, which is a suburb of Melbourne.

Drawing a sketch map to capture primary data in the local area

Now it's your turn.

1 Draw a sketch map of your neighbourhood. First, you need to make some decisions about the primary data you will record:
   - What places will you choose as the boundaries of your neighbourhood?
   - Which roads and streets will you include?
   - Which features of your neighbourhood are most important to you and should be included?
   - What reference points will you include so the map is meaningful to someone else?

Each lesson in the Student Companion also contains a space for students to reflect on their understanding. The simple and intuitive design of the **lesson reflection tool** allows students to scale their confidence, reflect on their learning and identify areas in which they need support.

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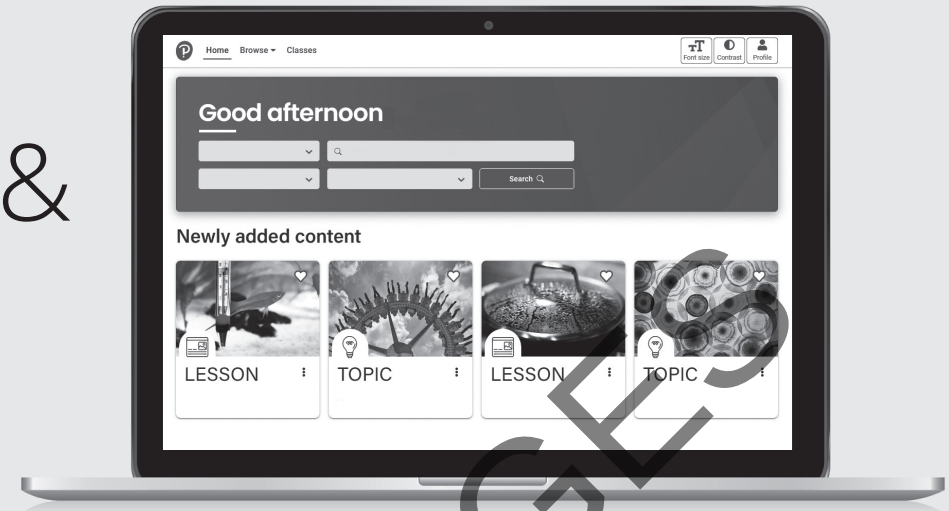

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Pearson Secondary Teaching Hub has been designed to simplify teaching and energise learning across multiple subjects. Every *Secondary Teaching Hub* subject offers best-practice learning design delivered in flexible formats for the modern classroom, plus uniquely developed content structures and features for each subject.

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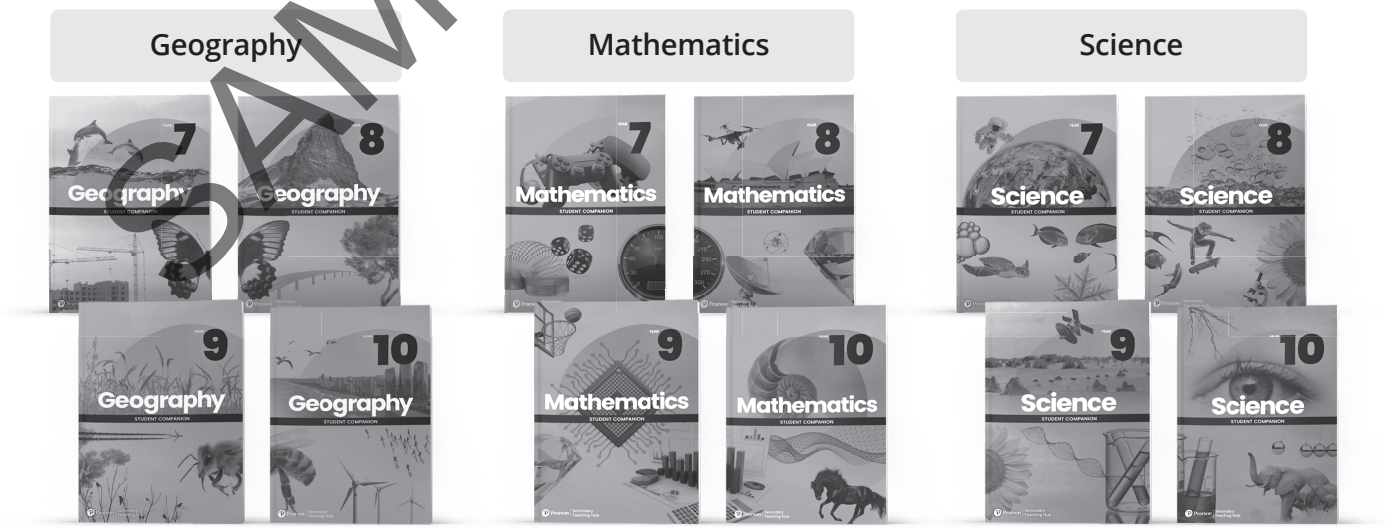

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Using map scale

Learning intention: To be able to explain differences in map scale

Success criteria:

- ☐ **SC 1:** I can explain the meaning of small scale and large scale.
- ☐ **SC 2:** I can differentiate between small scale and large scale.

A scale is used on a map to show the relationship between the distance from one point to another on the map and the distance between those points on the ground. You can use a scale to measure a distance on a map and calculate the distance it represents on the Earth's surface.

Explaining the meaning of small scale and large scale

Maps can be created for different purposes and using different scales. Maps can range in scale from small to large depending on the detail that the map shows.

The concept of scale applies any time something has been reduced from its size in real life. Consider the following example of a car shown at three different scales.

Real-life car

In real life, you would see this car at its actual size.

Toy car

This is a small-scale version of a car.

Ride-on car

This is a large-scale version of a car.

You can categorise maps by their scale, as follows.

- Small scale:

  These maps show a relatively large area without much detail. (Hint: think of this as 'small scale, small detail'.) An example is a political map of the world showing the different continents and their countries.

- Large scale:

  These maps show a relatively small area with lots of detail. An example is a road map showing the streets in your suburb. (Hint: think of this as 'large scale, large detail'.)

- Medium scale:

  These maps provide a 'mid-point' between small- and large-scale maps. They show a moderate area of the Earth's surface in moderate detail. An example is a topographic map. A topographic map scale typically ranges from 1:25 000 to 1:100 000.

1 **(a)** Which car is the larger scale model: the toy car or the ride-on car? _____

(b) Explain your answer to part **(a)**. _____

_____

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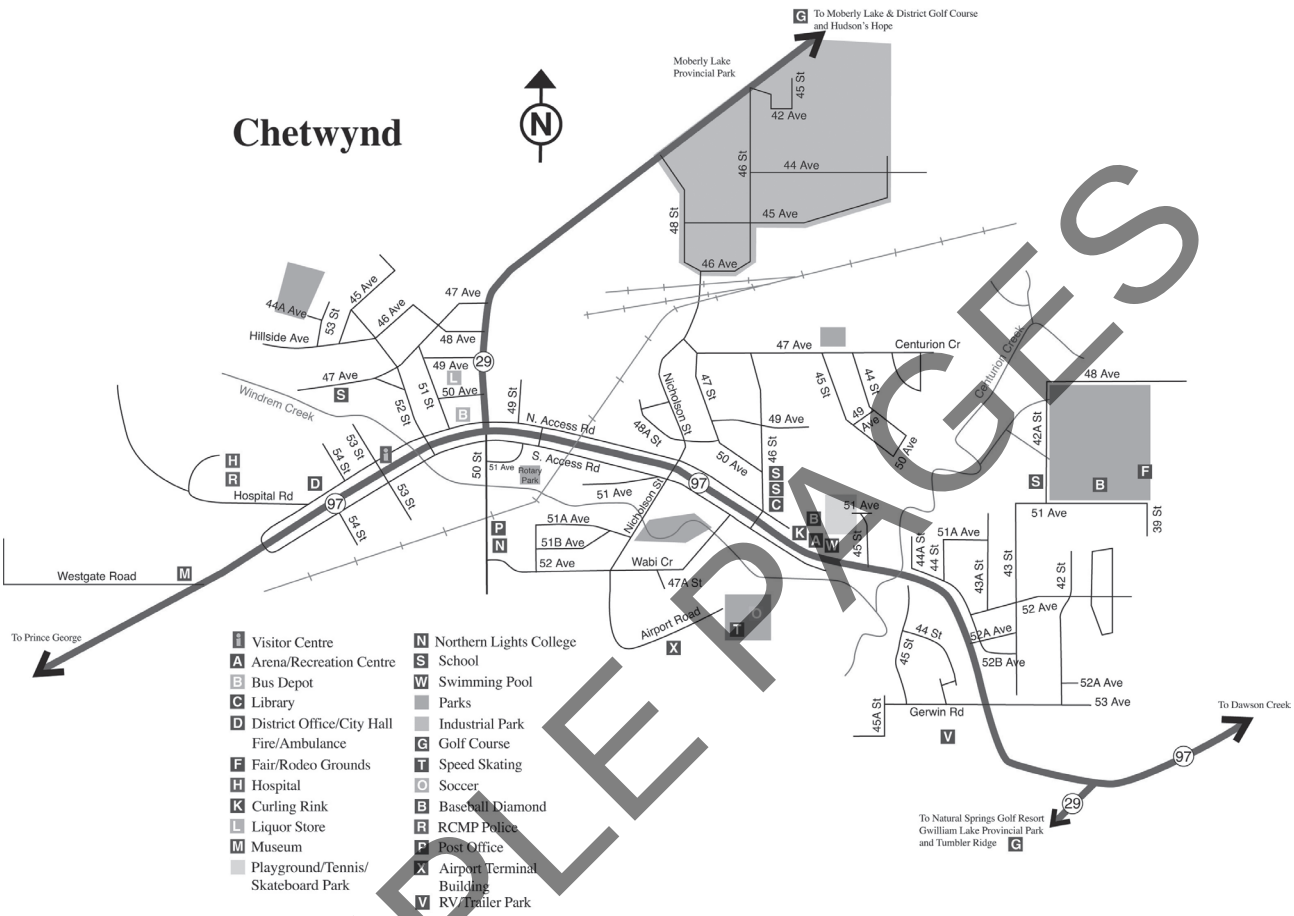
Differentiating between small scale and large scale

Now it's your turn.

2 Consider the scale used for each of the maps below and answer the questions.

Map 1



This is a map of Chetwynd in British Columbia in Canada.

(a) Is this map small, medium or large scale? _____

(b) How do you know? _____

_____

(c) What is one advantage of using this scale of map?

_____

_____

_____

(d) What is one disadvantage of using this scale of map?

_____

_____

_____

_____

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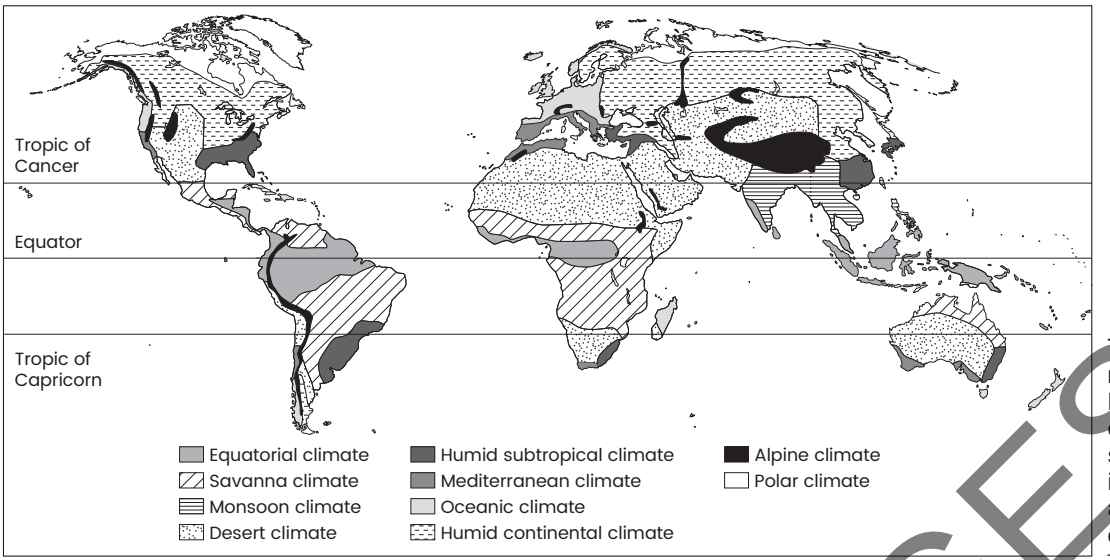
Map 2



This world map uses the Köppen climate classification system to give information about global climate patterns.

(a) Is this map small, medium or large scale? _____

(b) How do you know? _____

_____

(c) What is one advantage of using this scale of map?

_____

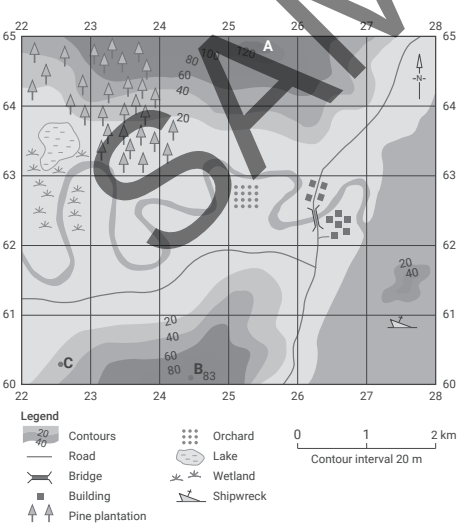
_____

(d) What is one disadvantage of using this scale of map?

_____

_____

Map 3



This is a topographic map.

(a) Is this map small, medium or large scale? _____

(b) How do you know? _____

_____

(c) What is one advantage of using this scale of map?

_____

_____

(d) What is one disadvantage of using this scale of map?

_____

_____

_____

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Direction and orientation

Learning intention: To be able to use a compass rose to indicate direction

Success criteria:

- ☐ **SC 1:** I can recognise the 16 points of a compass rose.
- ☐ **SC 2:** I can use a compass rose to determine direction.

Most maps are orientated with north at the top of the map. You can find the direction of one place from another by using the points of a compass.

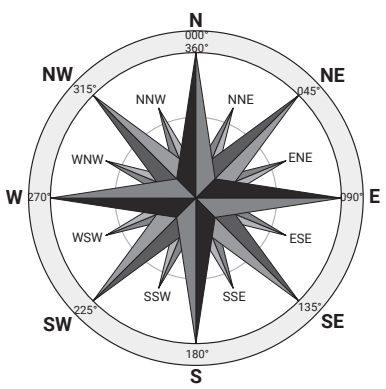
Recognising the 16 points of a compass rose

The 16 points of a compass rose allow you to specify a general direction. To find the direction of one place from another on a map, follow the steps below.

Step 1 Imagine that the compass rose is centred on the place you are travelling 'from' (origin).

Step 2 Ensure that the north point on the compass rose aligns with north on the map.

Step 3 Determine which point of the compass rose is pointing towards the place you are travelling 'to' (destination). This point on the compass rose indicates the direction of travel from the origin to the destination.

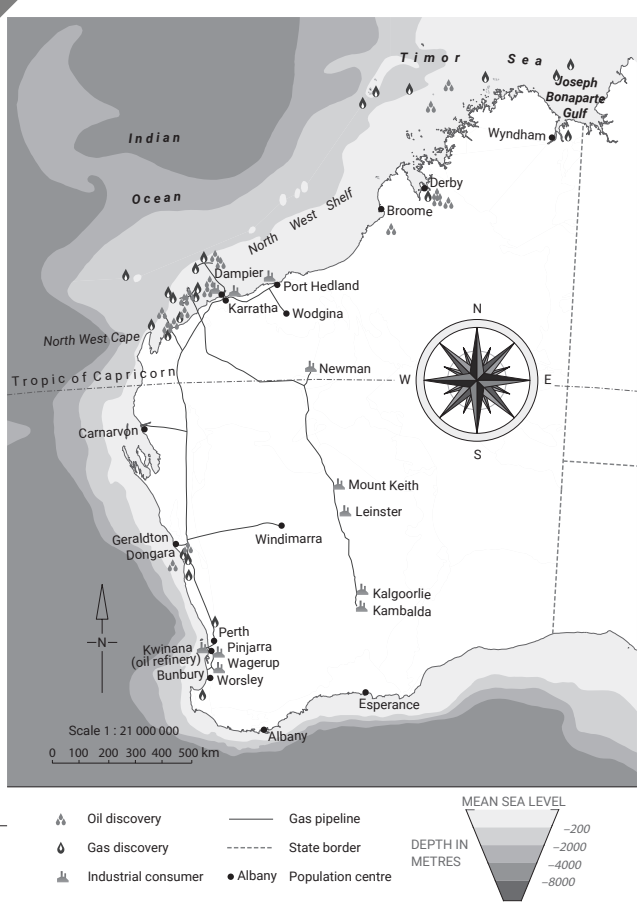


This is a 16-point compass, known as a compass rose.

Using a compass rose to determine direction

Consider this map that shows oil and natural gas locations and infrastructure in Western Australia. Imagine that you are leaving Perth as part of a team inspecting the gas pipeline between Perth and Geraldton and you need to determine which direction you will be travelling.

Using the compass rose, you can see that Geraldton lies to the north-north-west of Perth and that the gas pipeline runs between these places in an approximately straight line. Therefore, you would be travelling in a north-north-west direction as you inspected the gas pipeline.



This map shows the location of oil and natural gas reserves in Western Australia.

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Using a compass rose to determine direction

Now it's your turn. Use the map of Western Australia and the compass rose on the previous page to answer the following questions.

1 Determine your direction of travel if you were inspecting the gas pipeline between the following locations. (Hint: there will be more than one direction involved.)

Origin ('from')	Destination ('to')	Direction(s)
Geraldton	Carnarvon	
Carnarvon	Karratha	
Karratha	Wodgina	

2 If you started at Newman and travelled in a general south-south-east direction as far as you could along the gas pipeline, at what location would you end up?

3 Is the following statement true or false? 'The Northwest Cape is located south-west of the Northwest Shelf.'

4 If you were asked to describe the general orientation of the gas pipeline, what would you say and why?

5 Explain one advantage and one disadvantage of using a compass rose to find the direction or orientation of one thing from another.

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Distribution patterns

Learning intention: To be able to compare distribution patterns using different maps

Success criteria:

- ☐ **SC 1:** I can interpret distribution patterns on a map.
- ☐ **SC 2:** I can describe spatial associations using information from different maps.

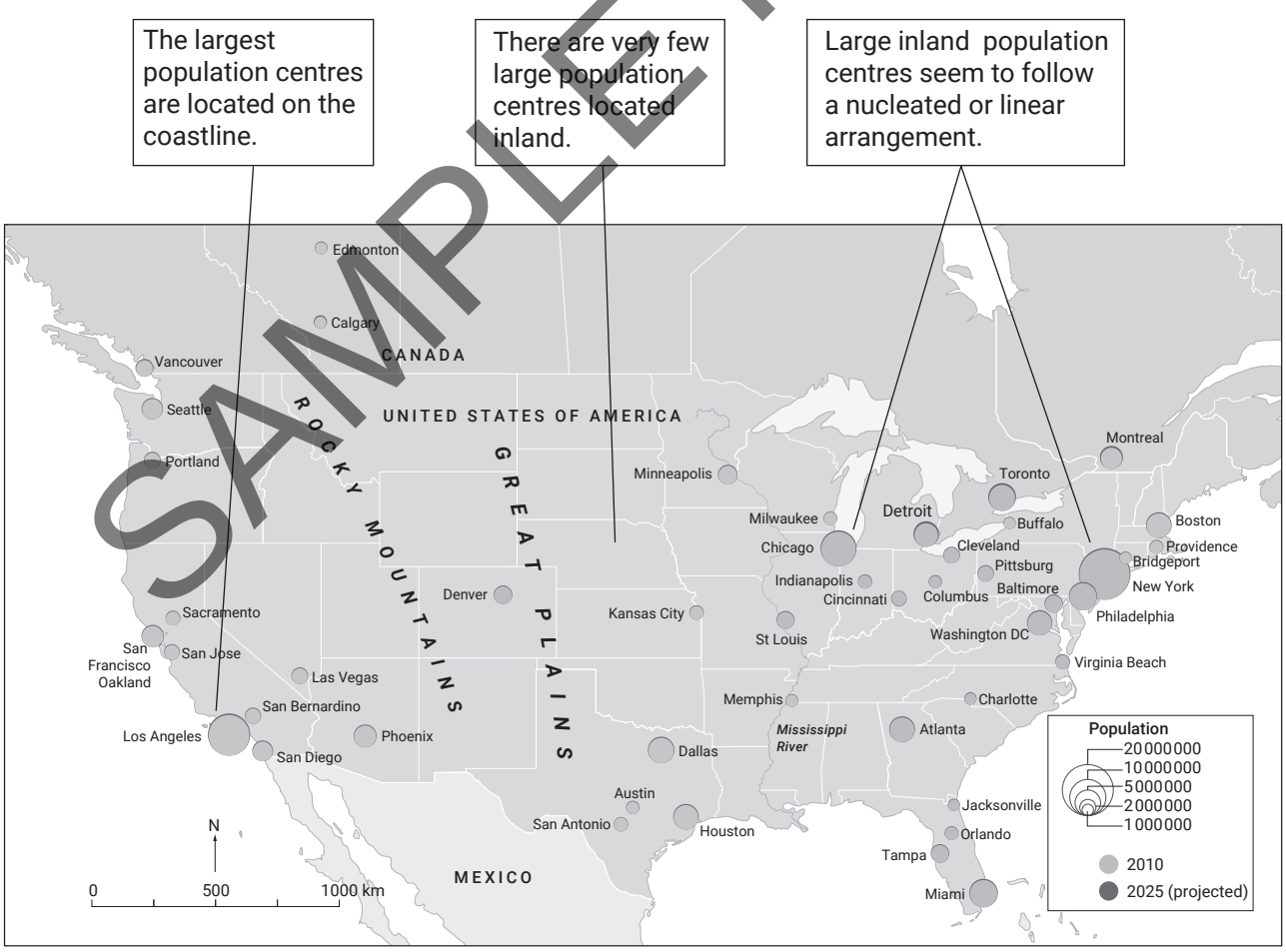
'Distribution pattern' is the term used to describe the way geographical features or phenomena are arranged in space at a particular time.

There are four main distribution patterns that you can observe on maps:

- nucleated (clustered or grouped)
- linear (following a line)
- dispersed (random, scattered or spread out)
- uniform (regular).

Interpreting distribution patterns on a map

The following map shows the projected (estimated) distribution of cities in North America that are likely to have populations greater than 1 million by 2025. The annotations explain how you can interpret the distribution pattern of the population using this map.



This map shows the distribution of North American cities predicted to have populations larger than 1 million by 2025.

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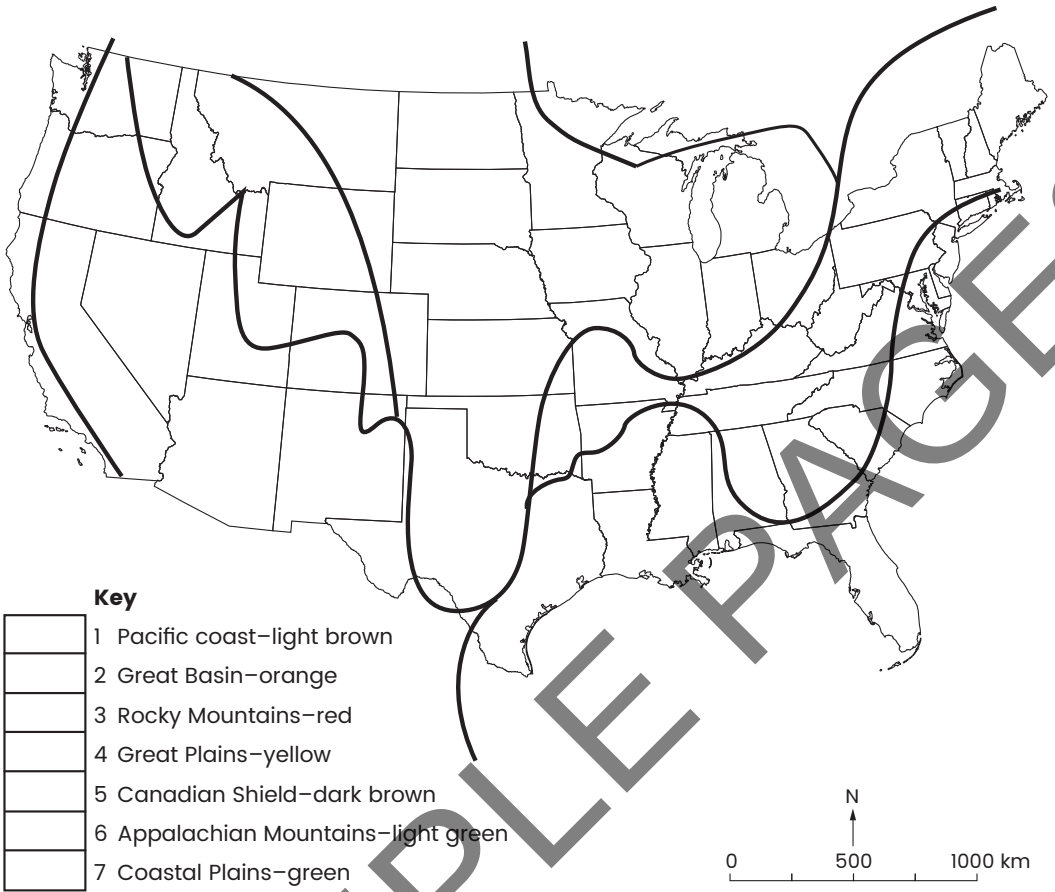
Describing spatial associations using information from maps

To explain a distribution pattern, consider other features that may be associated with the pattern.

1 Identify the physical regions (biophysical environments) indicated in the key and on the map of the United States mainland below. Use different colours to fill in the regions on the map and in the key. Use an atlas to help you.



The thick lines on this map outline the seven physical regions of the United States of America that are listed in the key.

Now let's describe the spatial association between population and environment. You can compare the population distribution in the United States (the pattern of how population is spread out) with the physical regions (what the biophysical environment is like) of this place.

2 Complete the paragraph by filling in the missing words from the box below.

east	population	strong	isolated	physical	west	sparsely

There is a _____ spatial association between _____ density and the _____ regions of the United States. The Pacific Coast on the _____ coast and the Coastal Plains on the _____ coast are the most densely populated areas. Mountainous areas, where it is difficult to build, and the Great Plains, which are relatively _____ from the major population centres on the coast, are the most _____ populated regions of the United States.

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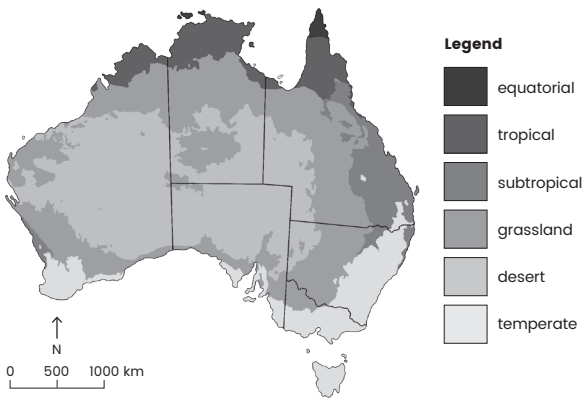
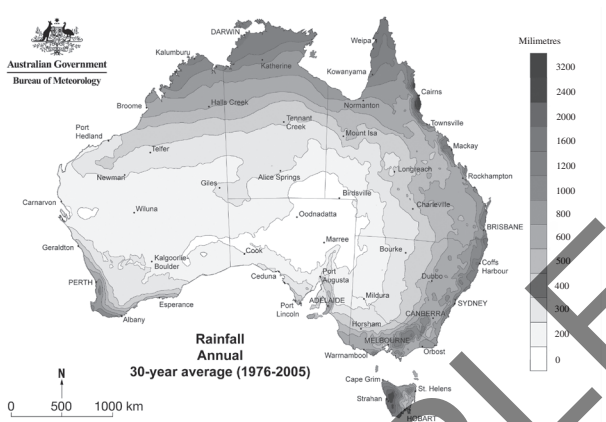
Describing spatial associations using information from maps

Now it's your turn. Consider the maps below and answer the questions that follow.



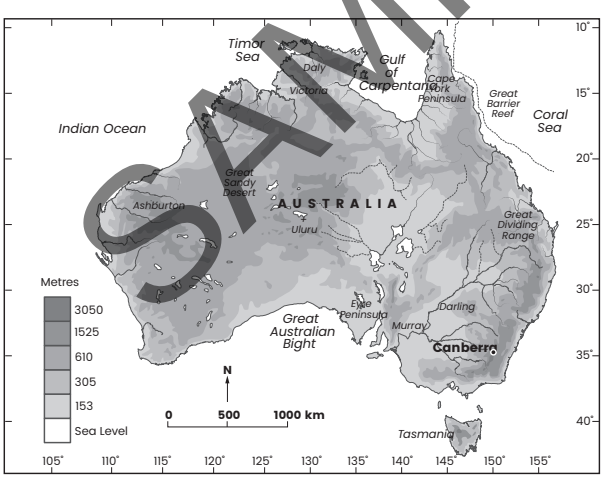
Map 1: This map shows Australia's climate regions.

3 Describe the distribution pattern of climate regions in Australia.



Map 2: This map shows Australia's rainfall distribution.

4 Describe the spatial association between rainfall and the distribution of Australia's major cities.



Map 3: This is a physical map of Australia.

5 Describe the spatial association between other environmental factors in Australia and the distribution of Australia's major cities.

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Area and grid references

Learning intention: To be able to identify and plot area and grid references on a map

Success criteria:

- ☐ **SC 1:** I can identify area and grid references on a topographic map.
- ☐ **SC 2:** I can plot area and grid references on a topographic map.

You can locate places on a map by using the map's grid lines. The grid on a topographic map can be used to plot locations using four-digit area references and six-digit grid references.

Identifying area and grid references on a topographic map

An area reference (AR) is a way of showing the approximate location of a feature on a map. An AR uses the coordinates of the lower left-hand corner of the grid square in which a map feature is located. Let's use an AR to describe the location of point A on the map below.

Step 1 Find the easting (first two digits). Eastings are the vertical grid lines because they increase in value as you move east. The easting to the left of point A is 33.

Step 2 Find the northing (next two digits). Northings are the horizontal grid lines because they increase in value as you move north. The northing below point A is 63.

Step 3 Write the letters 'AR' followed by a space, then write the easting (33) followed by the northing (63) with no space between them. Point A is located at AR 3363.

A grid reference (GR) is a more precise way of showing the location of a feature on a map. Grid references are made up of two sets of three-digit coordinates. The first two digits of each coordinate are the relevant easting and northing. The third digit is found by dividing each grid square into tenths. A GR gives the coordinates of the centre of a map feature according to its exact position within the grid. In this example, point A is located at GR 335638.

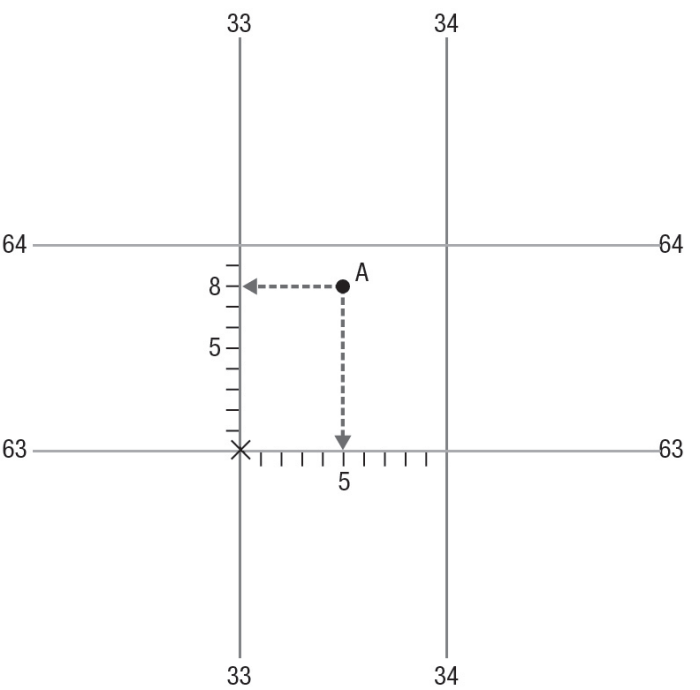
Step 1 Find the easting. The easting to the left of point A is 33.

Step 2 The third digit indicates the position of the centre of the map feature along the easting if it were divided into tenths. In this example, this number is 5 (5 tenths past the 33 easting).

Step 3 Find the northing. The northing below point A is 63.

Step 4 The last digit indicates the position of the centre of the map feature along the northing if it were divided into tenths. In this example, this number is 8 (8 tenths past the 63 northing).

Step 5 Write the letters 'GR' followed by a space, then write the three digits of the easting (335) followed by the three digits of the northing (638) with no space between them. Point A is located at GR 335638.



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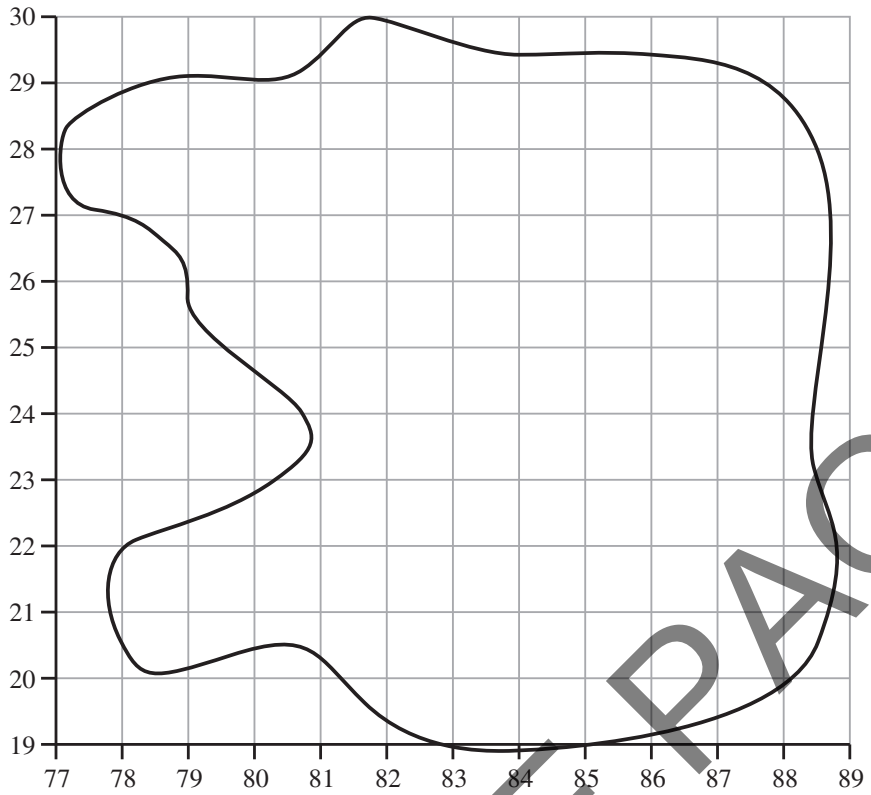
Plotting area and grid references on a topographic map

Now it's your turn. Follow the steps on the previous page and use the legend provided to create a treasure map for the island shown on the map below.



Legend					
arrival point		oasis		mountain	
river		walking trail		treasure	

1 **(a)** Draw an anchor at GR 780210. This is the best spot to arrive on the island by boat.

(b) Draw a palm tree to represent an oasis in AR 8420.

(c) Draw a mountain in AR 8622.

(d) Draw a river that runs from the top of the mountain through GR 865230, then through GR 819268 before reaching the sea at GR 807290.

(e) Draw a walking trail that takes you from the arrival point to the oasis, continues on past the western side of the mountain, crosses the river at GR 855235 and finally reaches GR 851285.

(f) Mark GR 851285 with an 'X' as the place where the treasure is located.

(g) Complete the legend.

(h) Add a north point and a title.

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Contour lines

Learning intention: To be able to recognise landform features from contour lines

Success criteria:

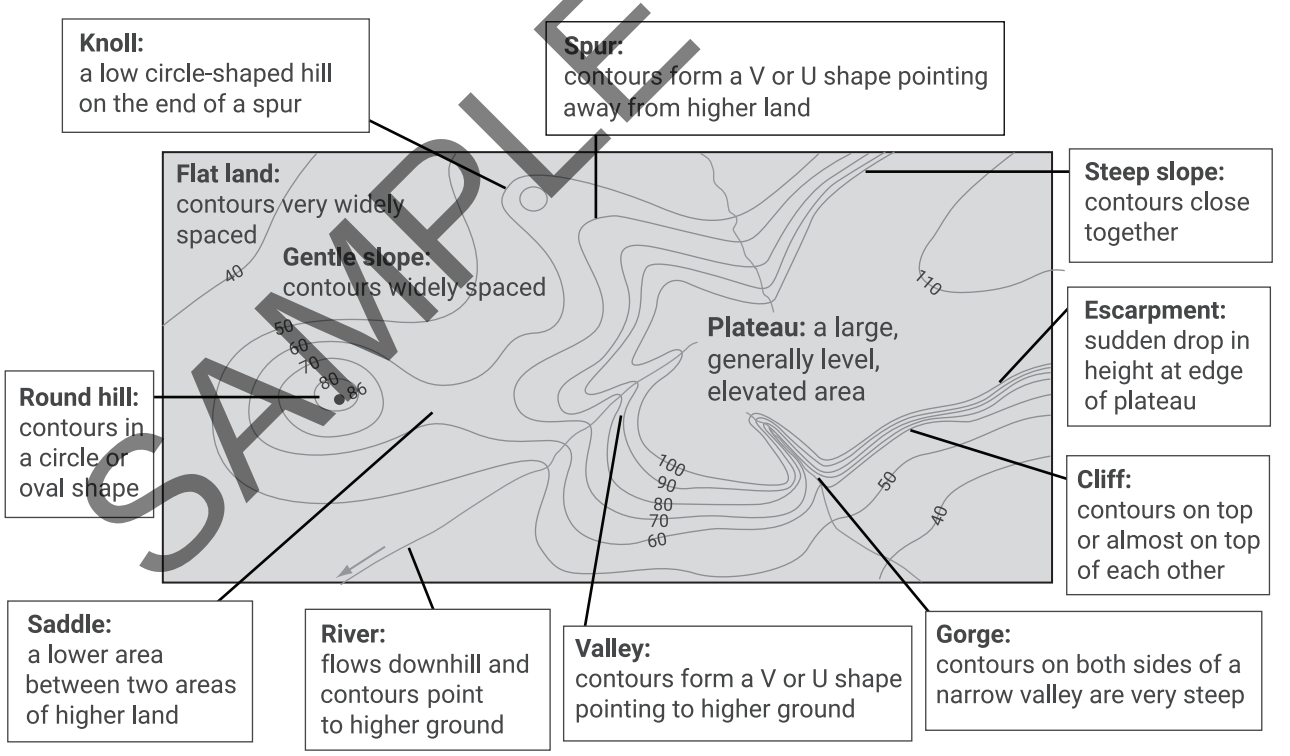
- ☐ **SC 1:** I can identify different types of contour patterns.
- ☐ **SC 2:** I can describe the contour patterns of different types of landform features.

Contour lines are lines that join points of equal elevation (height above sea level) on a topographic map. Every point along the line has the same elevation. Contour lines give geographers information about the shape and slope of the land and its height above sea level. The contour interval, or vertical interval, is the difference in height between two contour lines that are adjacent (next to each other).

Identifying different types of contour patterns

On a topographic map, the spacing of the contour lines indicates the steepness of the slope of the land. Contour lines that are close together show that the area has a steep slope. Widely spaced lines indicate that the area is relatively flat. Each type of landform feature has a recognisable contour pattern. With practice, you can visualise the shape of the land by interpreting the patterns of the contour lines on a map.

Study the annotated topographic map below to see how each type of landform feature can be recognised by its contour pattern.



Reading contour lines and patterns can tell us a lot about the shape and height of landforms.

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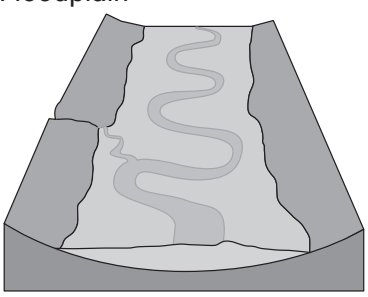
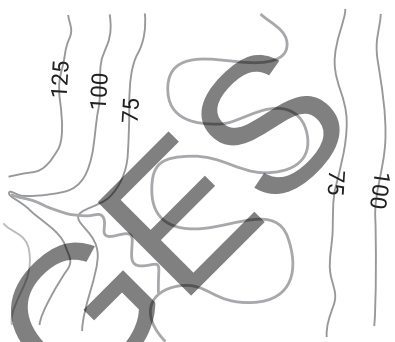
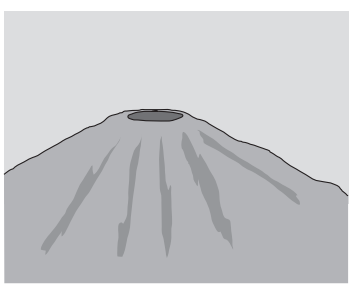
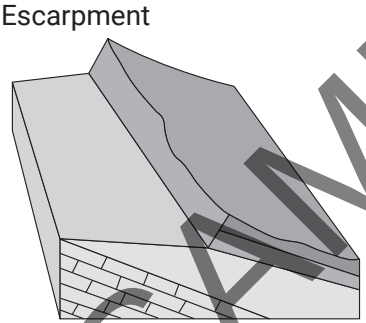
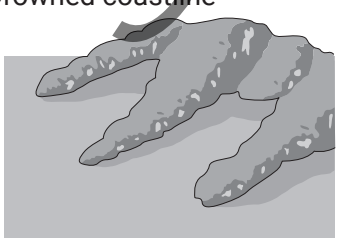
Describing the contour patterns of different types of landform features

Now it's your turn. Complete the activity below to explain how contour patterns relate to landform features.

1 Complete the table by describing the contour pattern made by each of the landform features. Draw the contour pattern alongside your explanation. The first one has been done for you.

Landform feature	Description of the contour pattern	Drawing of the contour pattern
Floodplain 	The flat floodplain is shown by widely spaced contour lines on either side of the river. Tributaries flow downhill toward the floodplain, with the contour lines pointing towards higher ground.	
Conical mountain 		
Escarpment 		
Drowned coastline 		

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Topographic maps

Learning intention: To be able to interpret information from topographic maps

Success criteria:

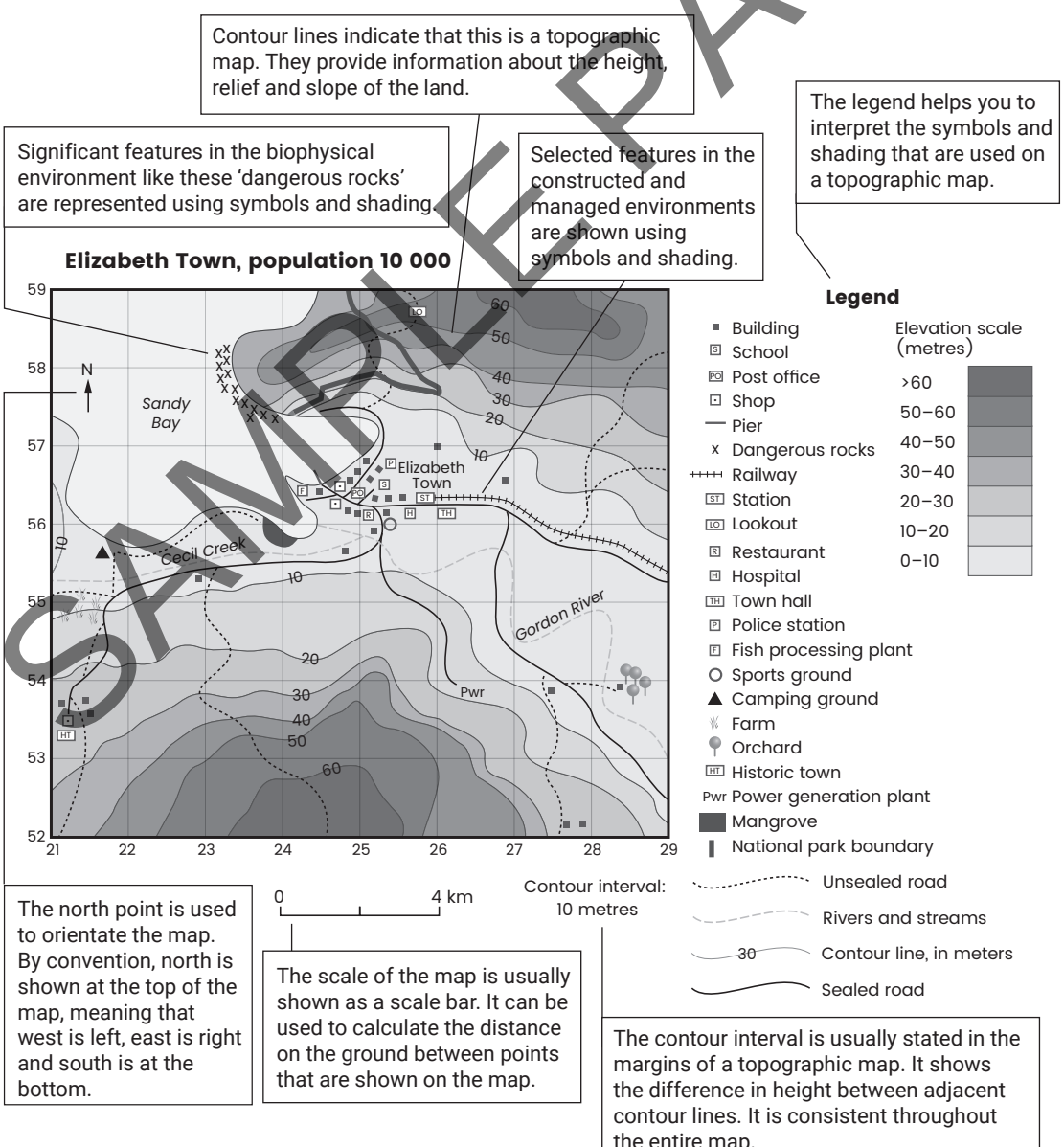
- ☐ **SC 1:** I can read the information provided on a topographic map.
- ☐ **SC 2:** I can interpret the features shown on a topographic map.

Topographic maps represent part of the Earth's surface in detail. They show features of:

- biophysical environments – the living and non-living parts of the natural environment
- managed environments – where humans have altered the biophysical environment
- constructed environments – where things have been built by humans.

Reading the information provided on a topographic map

Below is a simple topographic map showing a town next to the sea. The annotations explain how to read the information provided on a topographic map.



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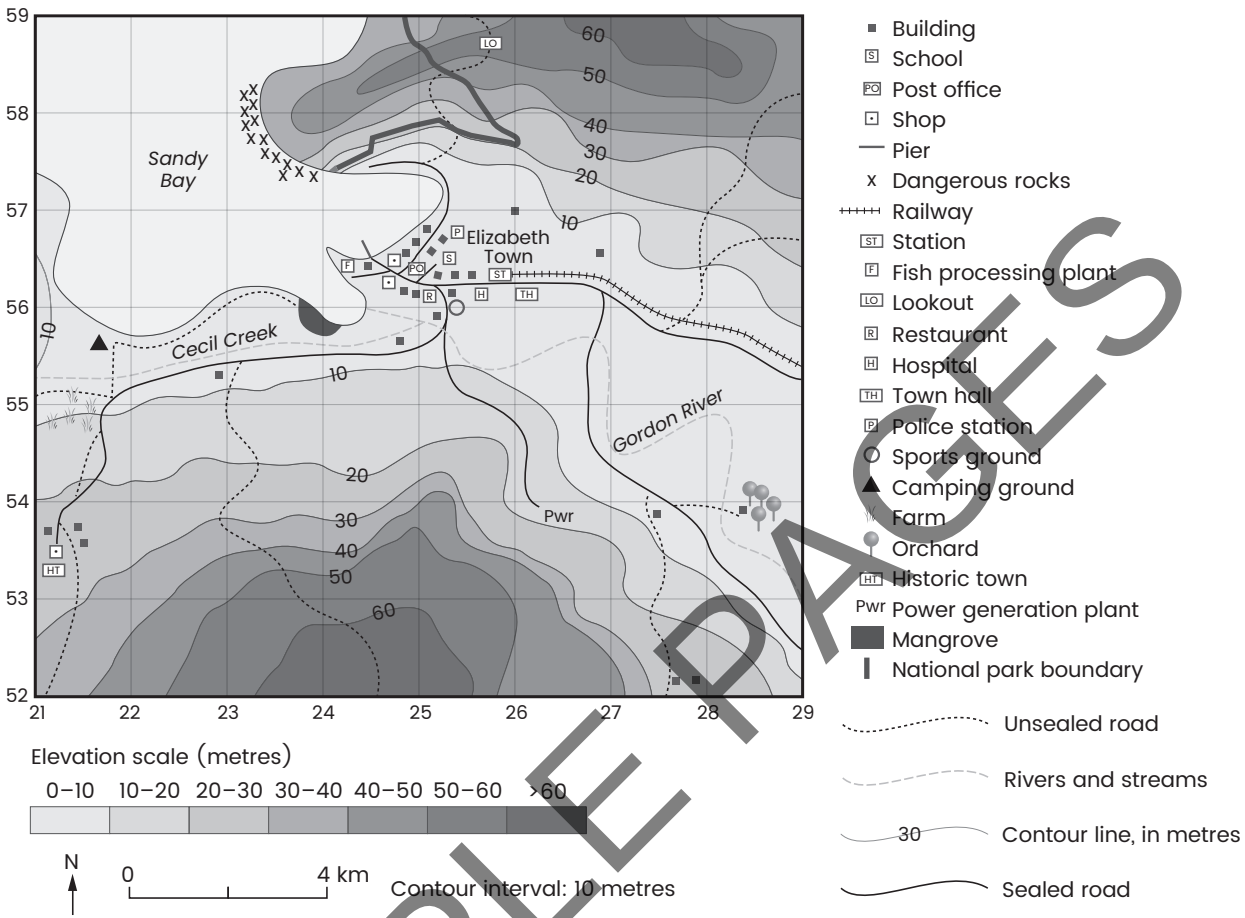
Interpreting the features shown on a topographic map

Now it's your turn. Examine the topographic map and its legend and answer the questions below.

Elizabeth Town, population 10 000



1 State the scale of the map in words.

_____

2 Identify the contour interval used on the map. _____

3 Identify the features found at the following locations:

(a) AR 2257 _____

(b) GR 285539 _____

4 What is the direction of Elizabeth Town from the orchard? _____

5 Is the distance across the map from east to west closest to 12 km, 14 km or 16 km?

_____

6 Name the two water courses shown on the map.

_____

7 Identify the main centre of economic activity in AR 2456.

_____

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Cross-sections

Learning intention: To be able to construct a cross-section and interpret the landscape features of a place

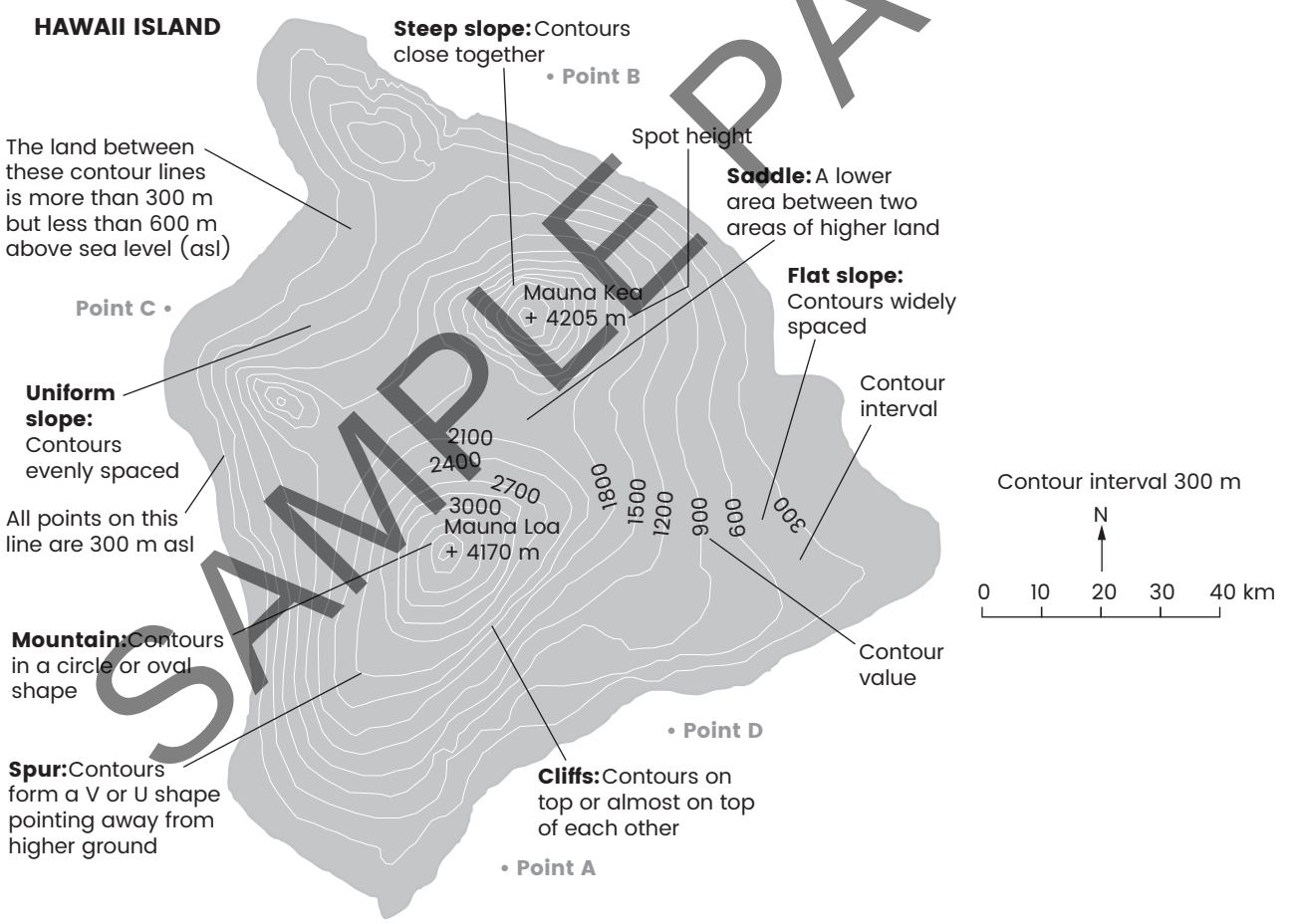
Success criteria:

- ☐ **SC 1:** I can construct a cross-section.
- ☐ **SC 2:** I can interpret the landscape features of a place from a cross-section.

A cross-section is a side view, or profile, of a landscape. It gives a visual idea of the shape of the land. Information about land use, settlement, drainage and vegetation can be added to a cross-section to create a transect. Transects show how the shape of the land influences the features of a place.

Constructing a cross-section

Below is a topographic map of the island of Hawaii in the United States. The annotations explain how to identify landform features by looking at the contour patterns shown on the map.



Reading contour patterns can tell us about the landform features of a particular place.

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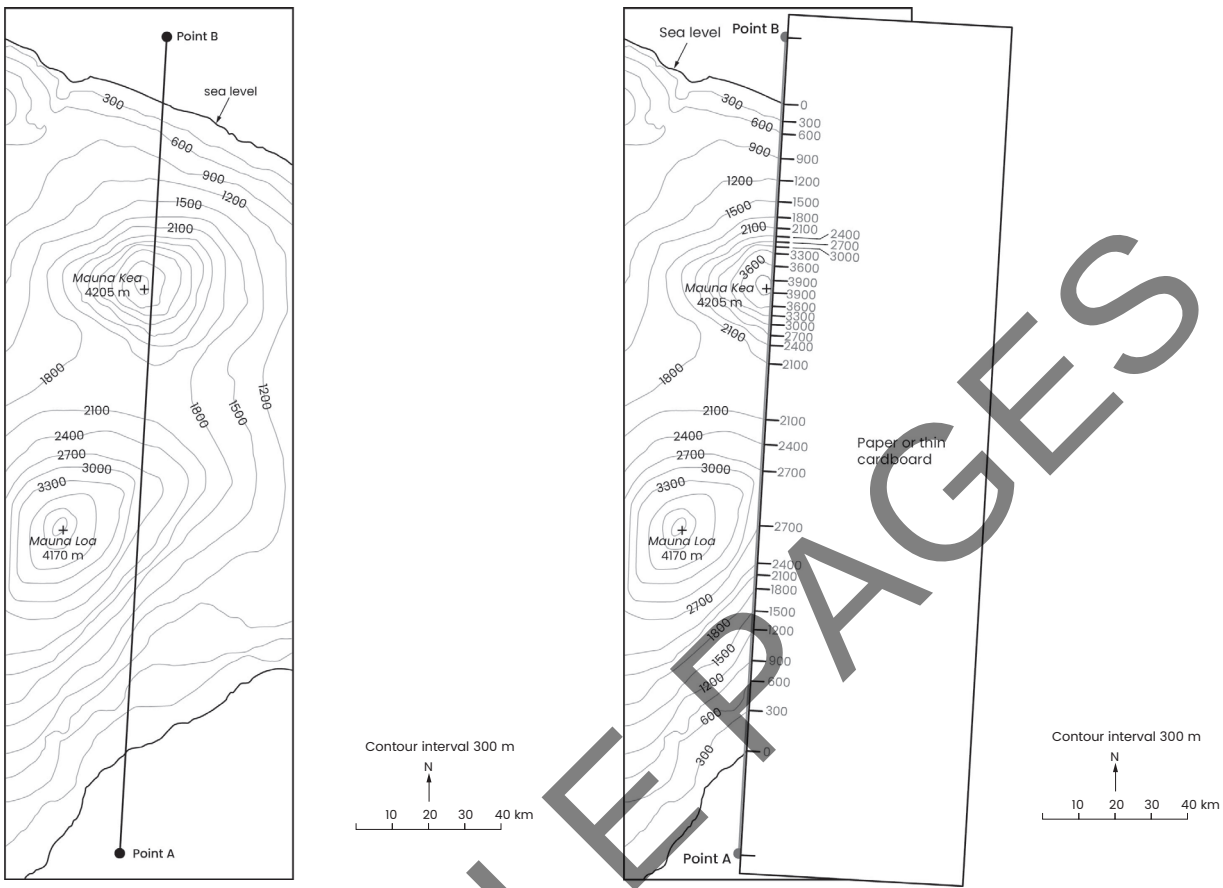
Constructing a cross-section

Imagine that you want to draw a cross-section from point A to point B on the map on the previous page to illustrate the landform features of Hawaii Island. These are the steps that you would follow.



Step 1 Locate the two end points of the cross-section on the map. Label these points A and B.

Step 2 Place the straight edge of a blank piece of paper along an imaginary line joining points A and B. Mark points A and B on your paper. Mark the position where your paper crosses each contour line. Write the value of each contour line on your piece of paper.

Step 3 On graph or squared paper, draw the horizontal and vertical axes for your cross-section. The length of the horizontal axis should equal the distance between points A and B. Place your piece of paper along your horizontal axis. In pencil, plot the height of each contour line.

Step 4 Join the dots with a smooth, curved line. Label any features intersected by your cross-section. Finish your cross-section by shading in the area below the landform, labelling the scale on the horizontal and vertical axes and giving it a title.

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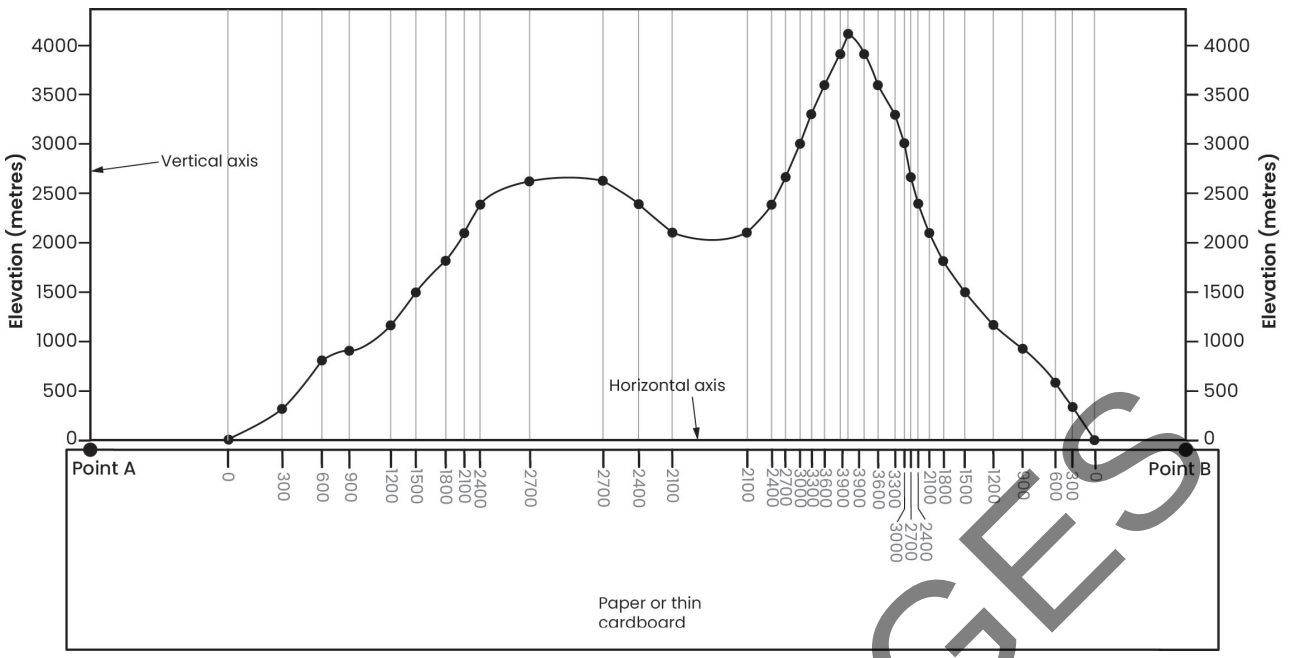

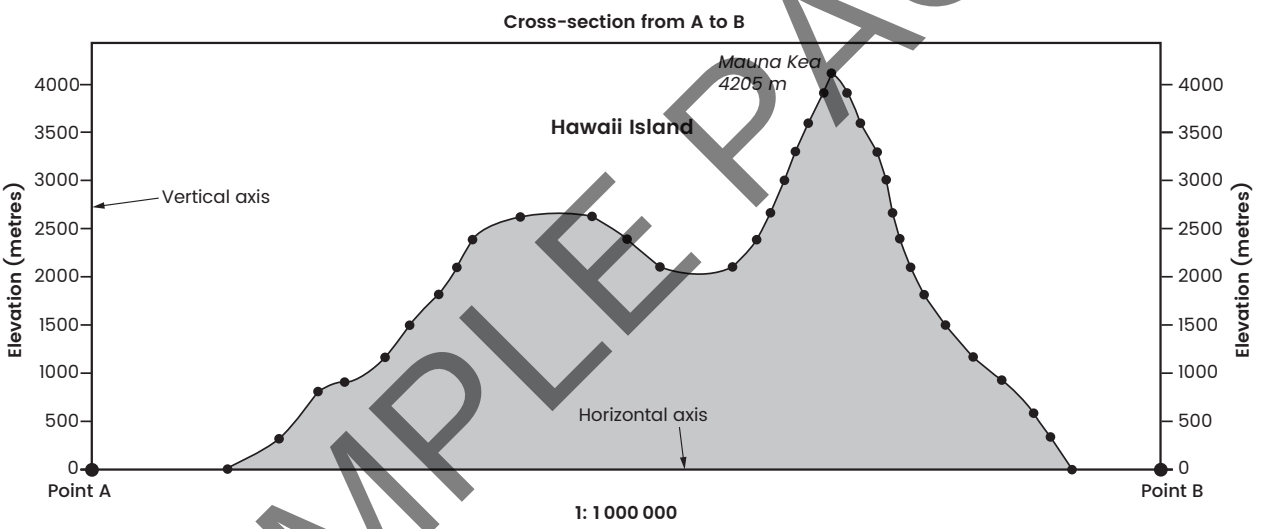

When you draw or look at a cross-section, it's important to understand that the shape of the land may appear 'stretched' depending on the difference between the horizontal scale (which is determined by the scale used on the map) and the vertical scale (which you choose for the vertical axis of your cross-section). The amount of stretch is known as vertical exaggeration.

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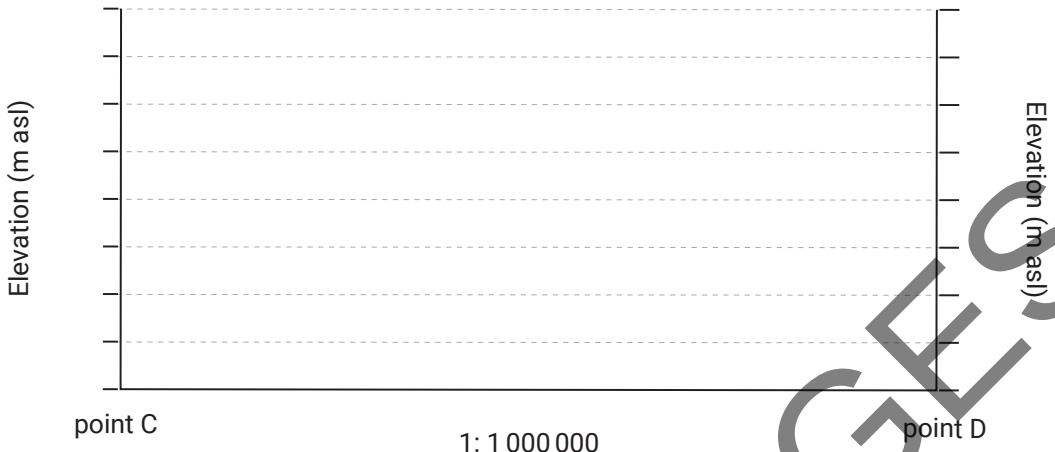
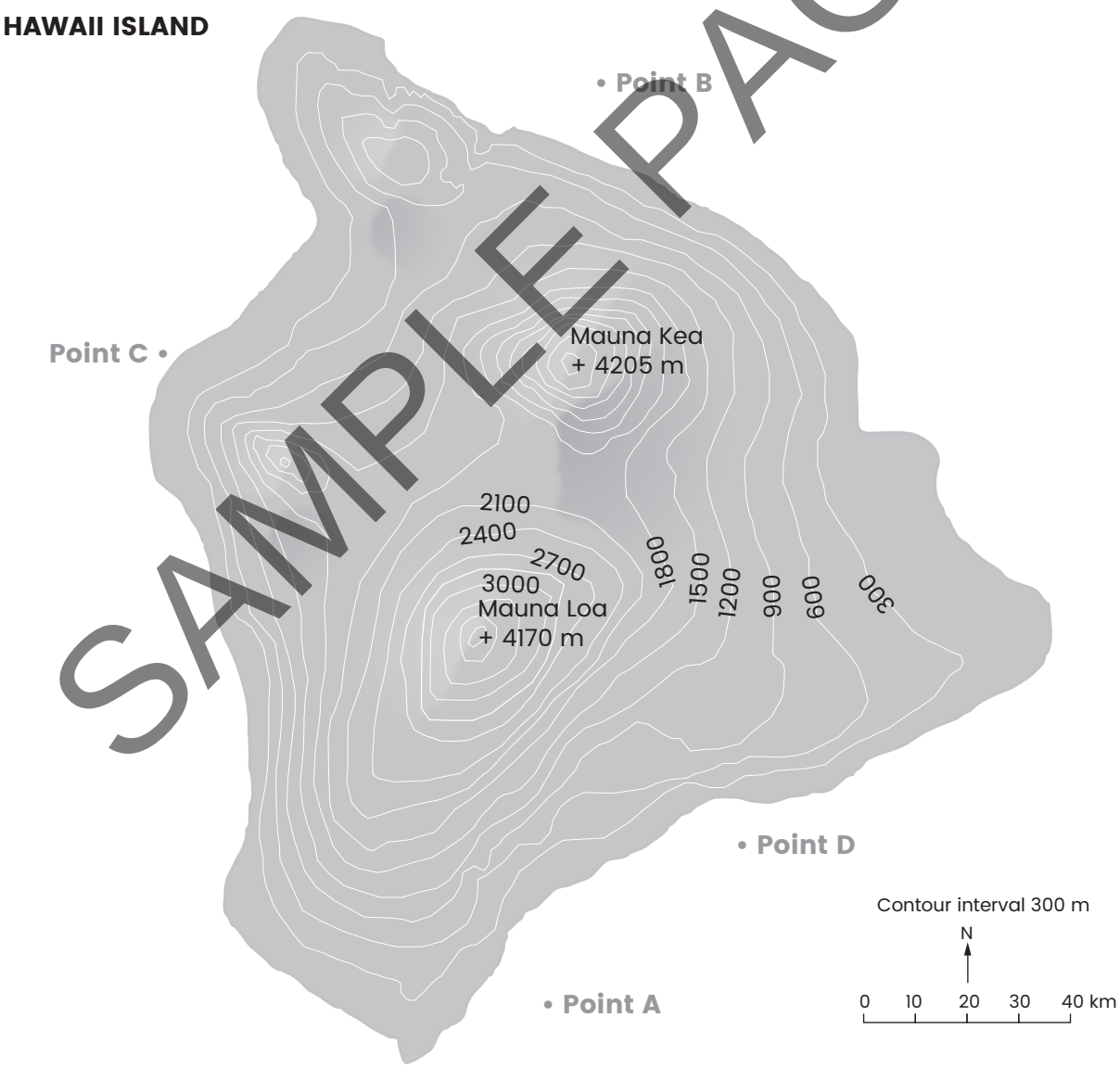
Interpreting the landscape features of a place from a cross-section

1 Now it's your turn. Construct a cross-section from point C to point D on the map using the axes provided below. Label any features intersected by your cross-section. Finish your cross-section by labelling the scale on the vertical axes and giving it a title.





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Choropleth maps

Learning intention: To be able to compare different characteristics using choropleth maps

Success criteria:

- ☐ **SC 1:** I can determine appropriate data ranges for a choropleth map.
- ☐ **SC 2:** I can map multiple data sets and compare results using choropleth maps.

Choropleth maps use shading to show the average amount of data (something that can be measured) in an area. Usually, choropleth maps use the deepest shade for the highest value (amount), the lightest shade for the lowest value and shades in between for middle values.

Determining appropriate data ranges for a choropleth map

Before you can create a choropleth map, you need to determine appropriate data ranges for the information that you will represent on your map. You should aim to separate the data into four, five or six ranges so that the map will show a pattern if one exists in the data.

It is best that each data range is equal in size but this is not always possible. For example, with age ranges, it is ideal to leave the last age group open (such as '80 years old and above').

Consider the information in the table below. Follow the steps to determine ranges for the data in the column labelled 'Life expectancy at birth – male'.

Country	Life expectancy at birth – male	Life expectancy at birth – female
China	76	81
India	66	70
Indonesia	71	76
Japan	82	88
Philippines	67	74
Vietnam	73	79
Thailand	75	81
South Korea	80	86
Kazakhstan	67	78
United Arab Emirates	78	81
Lao PDR	67	70
Singapore	84	89
Mongolia	67	76
Qatar	78	82

Source: CIA World Factbook, 2023

This table shows life expectancy at birth for several Asian countries in 2023.

Step 1 Determine the highest and lowest values. In this example, the highest value is 89 and the lowest is 66.

Step 2 Calculate the difference between the highest and lowest values. In this example, 89 – 66 = 23.

Step 3 Add two or three to the difference calculated above to make a number that is divisible by four, five or six. To make full use of your choropleth shades, check that there are data points in each range. If not, consider changing the number of ranges.

In this example, you can make 23 divisible by 5 by adding 2 to make it 25. Dividing 25 by 5 creates five data ranges. Each data range will contain 5 years. This becomes your choropleth key, as shown below.

	Age range (years)
	86+
	81-85
	76-80
	71-75
	66-70

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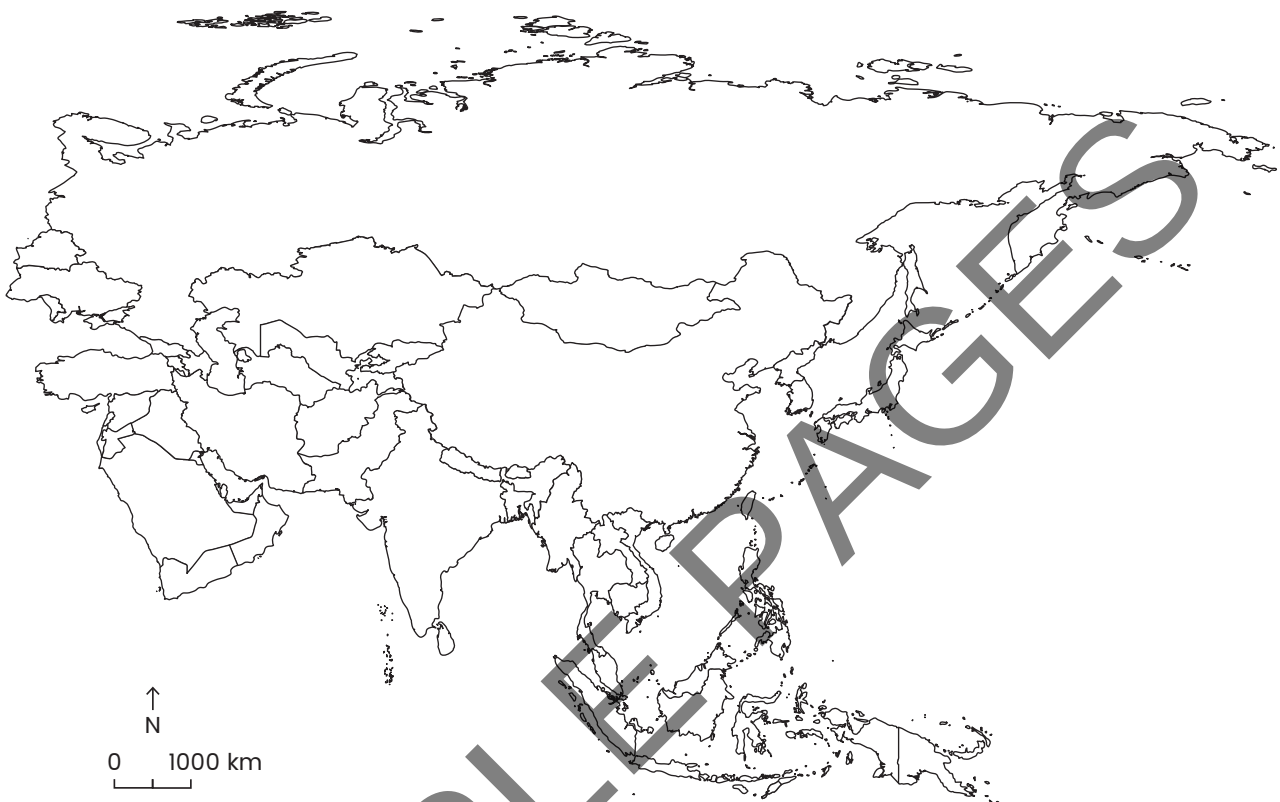
Mapping multiple data sets and comparing results on choropleth maps

Now it's your turn. Use the outline maps below to produce two choropleth maps displaying the data shown in the table on the previous page.

1 (a) 'Life expectancy at birth – male' (Note: you can use the data ranges from the example).

Life expectancy at birth in selected Asian countries for males, 2023



	Age range (years)
	86+
	81-85
	76-80
	71-75
	66-70

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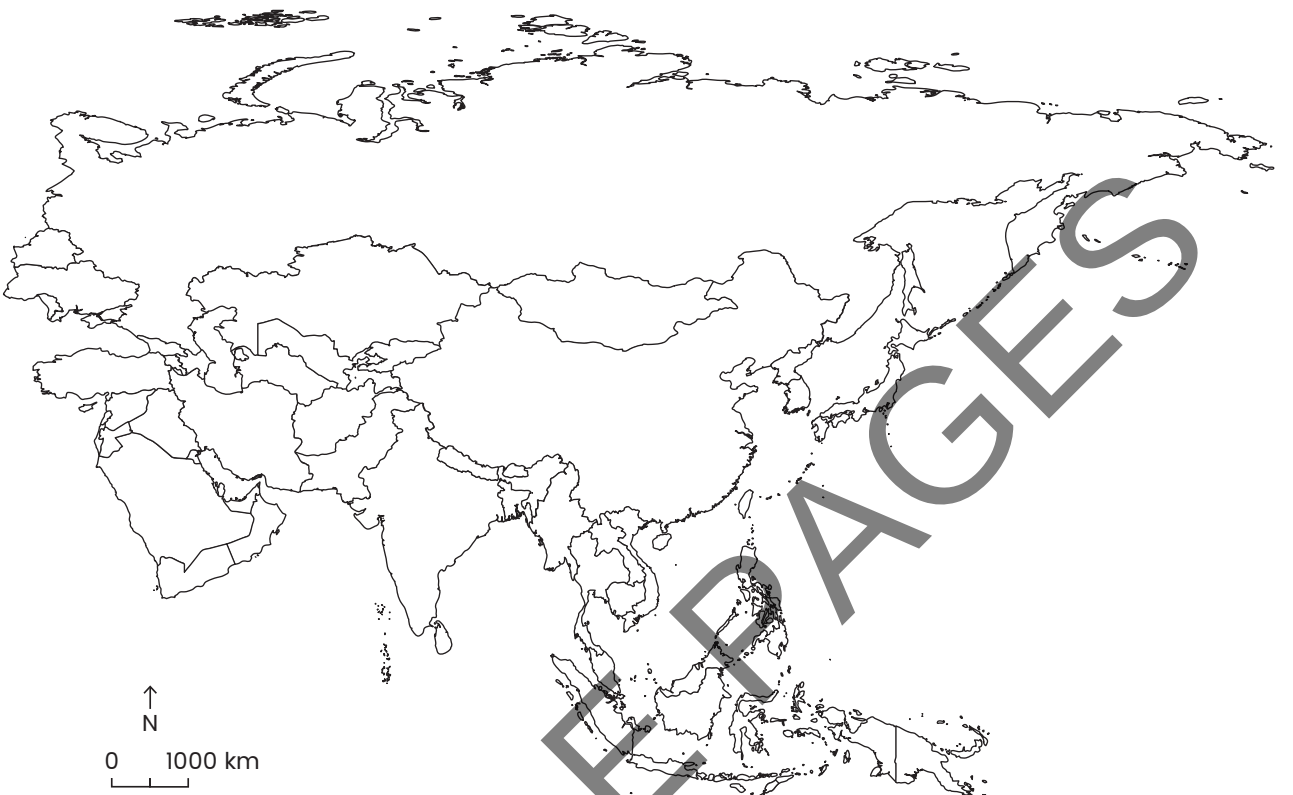
Mapping multiple data sets and comparing results on choropleth maps

(b) 'Life expectancy at birth – female' (Note: to make accurate comparisons between the maps, the age ranges used on each map should be the same).

Life expectancy at birth in selected Asian countries for females, 2023



	Age range (years)
	86+
	81-85
	76-80
	71-75
	66-70

2 Write a paragraph that compares the distribution patterns of life expectancy at birth for males and females throughout Asia in 2023.

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Weather maps

Learning intention: To be able to interpret information from a weather map

Success criteria:

- ☐ **SC 1:** I can explain the meaning of symbols used on a weather map.
- ☐ **SC 2:** I can use a weather map to explain weather conditions.

A weather map, or synoptic chart, is a record of the weather conditions happening across part of the Earth's surface or atmosphere at a point in time. They allow us to predict with reasonable accuracy the weather we are likely to experience over the next two or three days.

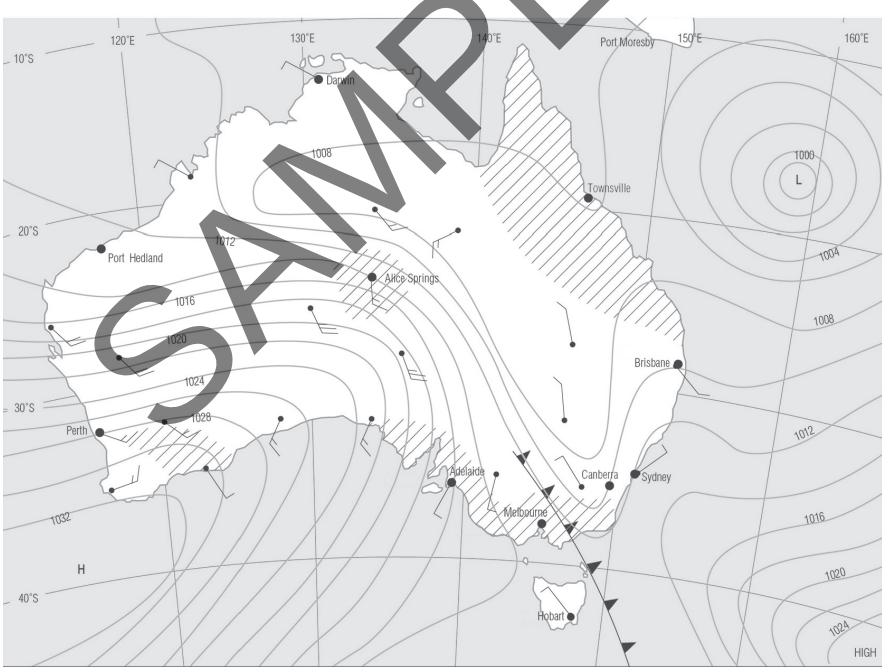
Explaining the meaning of symbols used on a weather map

Weather maps give information about air temperature and pressure, wind speed and direction, and the distribution of rainfall. Understanding the symbols used on a weather map helps you to explain the weather conditions.

Warm fronts occur when warm air overtakes a colder, denser air mass. Warm fronts are not common in Australia.

Cold fronts occur when cold, dense air pushes under a warm air mass, forcing it to rise. As the warm air rises, it cools and condensation takes place, which can lead to precipitation. Temperatures drop as the cold front passes. Cold fronts are most common in Australia during the winter months.

Ⓛ Low-pressure systems form when air rises rapidly away from the Earth's surface. They are associated with unstable weather conditions: cloud, rain and relatively strong winds. Low-pressure systems are typically experienced in southern Australia during winter and northern Australia during summer.



Movement of pressure systems in Australia typically occurs across the continent from west to east. Weather conditions move with these systems. Low-pressure systems move relatively quickly but high-pressure systems can persist for longer periods.

Ⓗ High-pressure systems are associated with stable weather conditions: gentle or no winds, clear skies and little chance of rain. High-pressure systems are typically experienced in southern Australia during summer and northern Australia during winter.

Areas of rain are shown by shading or cross-hatching.

—1212— Isobars join places of equal pressure. Isobars that are further apart indicate areas with gentle wind. Isobars that are close together indicate areas with relatively strong wind.

Wind direction and strength are shown using lines with small barbs or tails; the more barbs there are, the stronger the wind. Winds are named after the direction they blow from, so a southerly wind blows from the south.

Bushfires are common when weather conditions include high temperatures, low humidity and strong winds. These conditions correspond with the summer months in southern Australia and the winter months in northern Australia, which are relatively warm and dry.

This weather map shows a synoptic pattern that is typical of an Australian summer.

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Using a weather map to explain weather conditions

Now it's your turn. Read the information below about a bushfire in south-west Western Australia in February 2013 and answer the questions that follow.

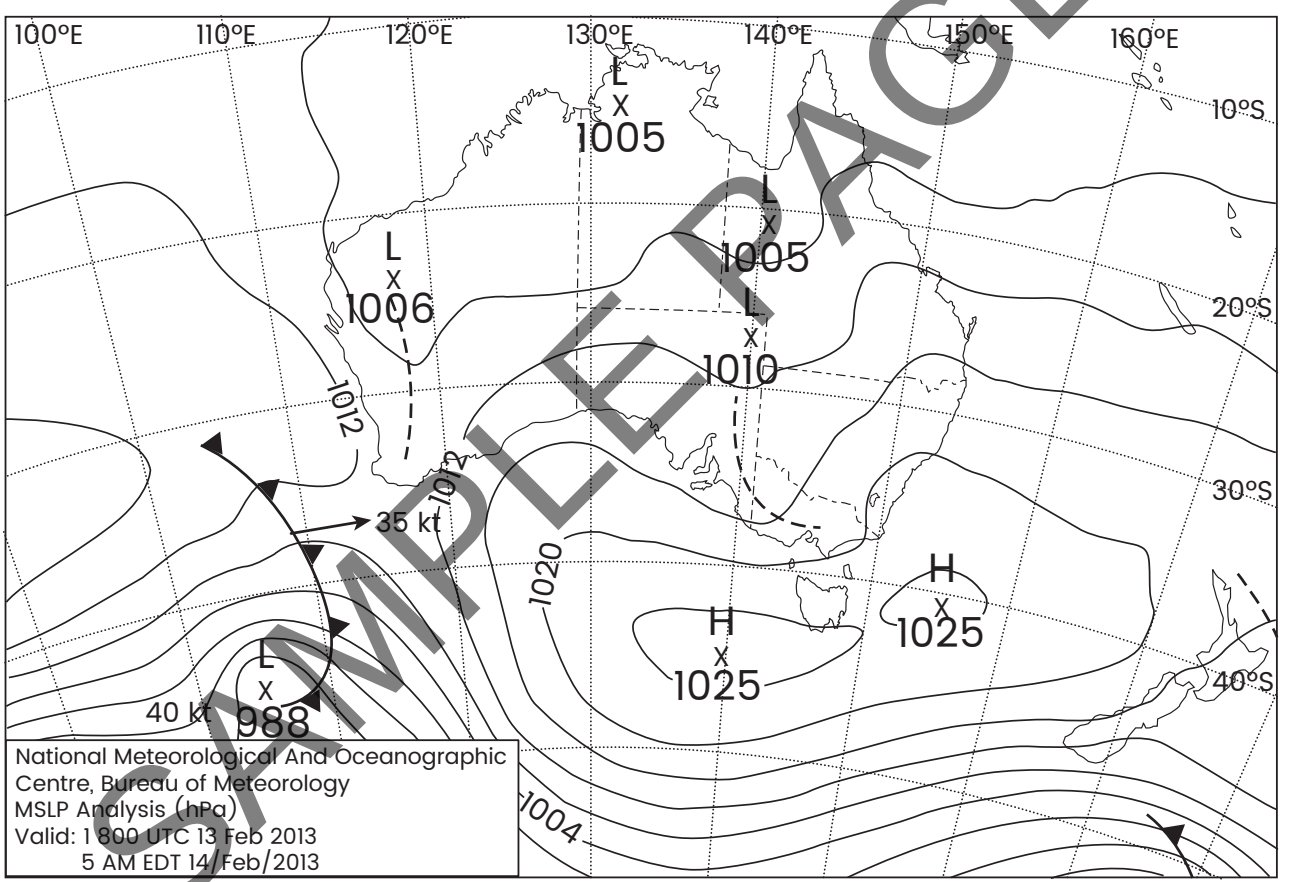
Two homes lost in 'deadly' south-west fire

A bushfire that has destroyed two homes in Western Australia's south-west is threatening five towns in the Donnybrook and Bridgetown areas.

A string of bushfires sparked by lightning strikes on Tuesday have swept through the region. The Department of Fire and Emergency Services said homes are under direct threat by fire and has warned residents to act immediately. Bridgetown and Balingup residents have been placed on a watch-and-act alert, meaning they should leave or get ready to actively defend their properties as the bushfire approaches.

A homestead in Southampton, 12 km south of Balingup and built in 1862, has burnt down. A home some 900 m away has also been destroyed. More than 200 firefighters are working to contain the fire, assisted by six water bombers and two helicopters. About 3000 hectares have been burnt so far.

Source: The West Australian, 13 February 2013.



This is a weather map of Australia from 13 February 2013.

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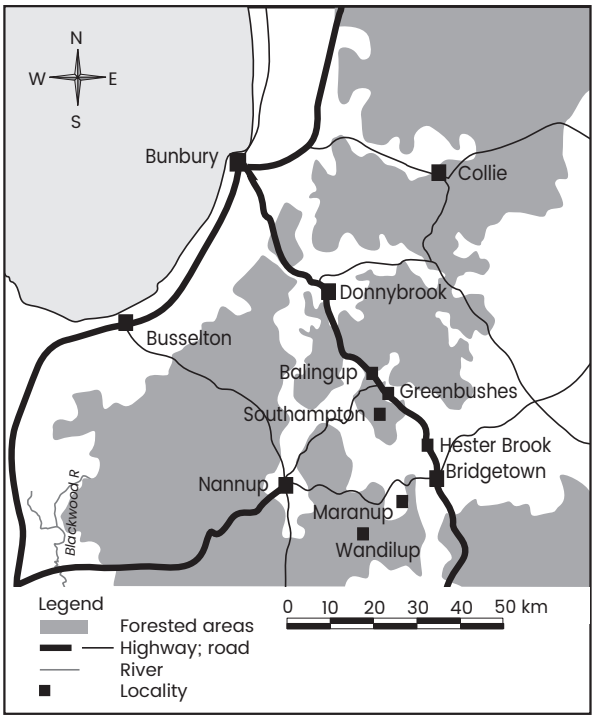

This map shows the location of the Donnybrook and Bridgetown areas in south-west Western Australia.

1 According to the article, how did the fire start? What evidence on the weather map could be used to corroborate (support) this claim?

2 Use the weather map to help you describe what weather conditions at this location might have been like in the days immediately before the fire started.

3 Explain how weather conditions at this location might have changed in the 24 hours after the time shown on the weather map. Suggest whether or not this would have helped firefighters to contain the blaze.

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Climate graphs

Learning intention: To be able to interpret a climate graph

Success criteria:

- ☐ **SC 1:** I can identify relative differences in climate based on the information contained in climate graphs.
- ☐ **SC 2:** I can describe the climate of a place from its climate graph.

A climate graph shows average temperature and precipitation (usually rainfall) for a location over a 12-month period. It combines a line graph to show temperature with a column graph to show precipitation.

Identifying relative differences in climate based on the information contained in climate graphs

Some places are hotter than others, while some places are drier or have very wet months at different times of the year. There are some simple ways to identify the relative differences in climate in different places using the information that is contained in climate graphs.

The following tables provide some examples of how you can describe climate patterns.

MONTHLY AVERAGE TEMPERATURE	
If the monthly average temperature is…	**then that month can be described as…**
above 30°C	very hot
between 20°C and 30°C	hot
between 10°C and 20°C	warm
between 0°C and 10°C	cool
between –10°C and 0°C	cold
below –10°C	very cold

MONTHLY AVERAGE PRECIPITATION	
If the monthly average precipitation is…	**then that month can be described as a…**
below 50 mm	dry month
between 50 mm and 150 mm	wet month
above 150 mm	very wet month

ANNUAL PRECIPITATION – COLD TO WARM CLIMATES	
If the annual precipitation is…	**then the annual precipitation can be described as…**
below 250 mm	slight
between 250 mm and 500 mm	small
between 500 mm and 1000 mm	adequate
between 1000 mm and 1500 mm	large
above 1500 mm	very large

ANNUAL PRECIPITATION – HOT TO VERY HOT CLIMATES	
If the annual precipitation is…	**then the annual precipitation can be described as…**
below 375 mm	slight
between 375 mm and 625 mm	small
between 625 mm and 1125 mm	adequate
between 1125 mm and 1750 mm	large
above 1750 mm	very large

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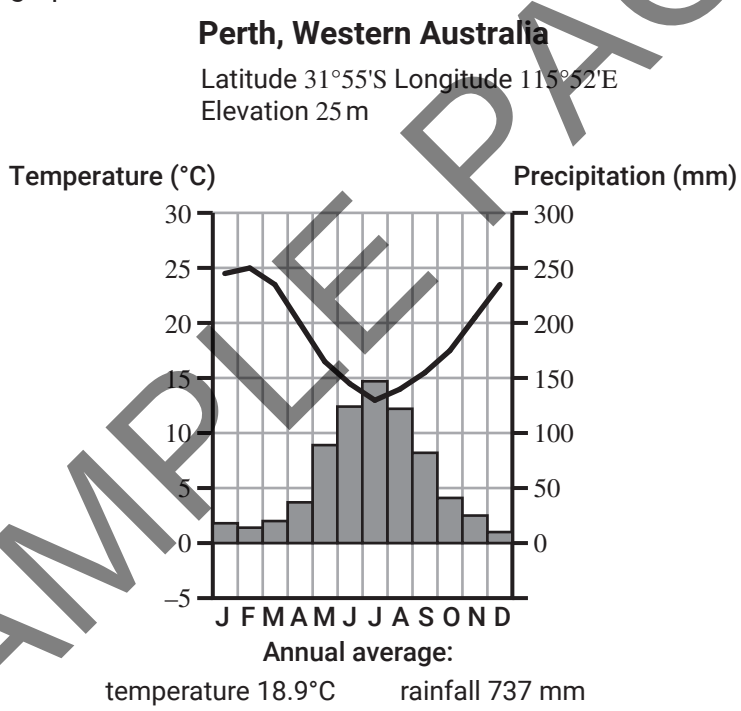
SEASONAL PRECIPITATION	
If…	**then the seasonal distribution of precipitation can be described as…**
over 60% of annual precipitation is received in the summer half of the year	a summer maximum
over 60% of annual precipitation is received in the winter half of the year	a winter maximum
neither of the above is true	evenly distributed

HEMISPHERE	
If…	**then you know the place is located…**
the temperature increases midyear, so the warmest time of year is in the middle of the year	in the Northern Hemisphere
the temperature decreases midyear so the coldest time of year is in the middle of the year	in the Southern Hemisphere
there is little or no seasonal variation in temperature	near the Equator

Consider the climate graph for Perth below.



This climate graph shows the average temperature and rainfall across one year for Perth.

The following paragraph shows how you can describe the climate pattern seen on the graph using the information in the tables.

> The climate graph shows that Perth has distinct seasons. Perth experiences warm winter months (Jun–Aug, 10°C–20°C) and hot summer months (Dec–Feb, 20°C–30°C). The seasonal precipitation pattern shows a winter maximum, with most of Perth's rainfall occurring during the winter months. June and July are very wet months, while May, August, September and October can be classified as wet, and the other months are dry. As a warm climate with 737 mm of precipitation in a year, Perth's annual precipitation can be described as adequate. We know that Perth is in the Southern Hemisphere but this is supported by the climate graph, which shows the temperature decreasing in the middle of the year, making this the coldest time of year.

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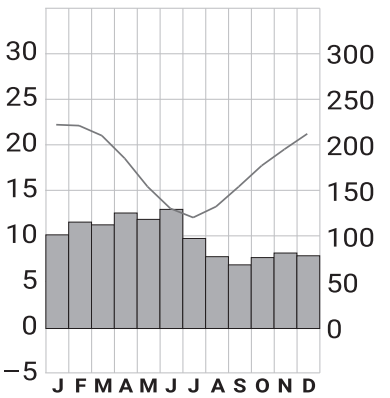
Describing the climate of a place from its climate graph

Now it's your turn. Consider the climate graph for Sydney and answer the following questions.

Sydney

Latitude 33°52'S Longitude 151°12'E Elevation 42 m

Temperature (°C) Precipitation (mm)



Annual average:

temperature 17.5°C rainfall 1201 mm

This climate graph shows the average temperature and rainfall across one year for Sydney.

1 Write a description of each of the following aspects of Sydney's climate. Refer to the tables showing climate pattern descriptions on pages 78 and 79 to help you with this task.

(a) seasonal distribution of precipitation

(b) monthly average temperature

(c) monthly average precipitation

(d) annual precipitation

2 We know that Sydney is located in the Southern Hemisphere. What pattern on the climate graph supports this fact?

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Pie graphs

Learning intention: To be able to interpret and compare information from a pie graph

Success criteria:

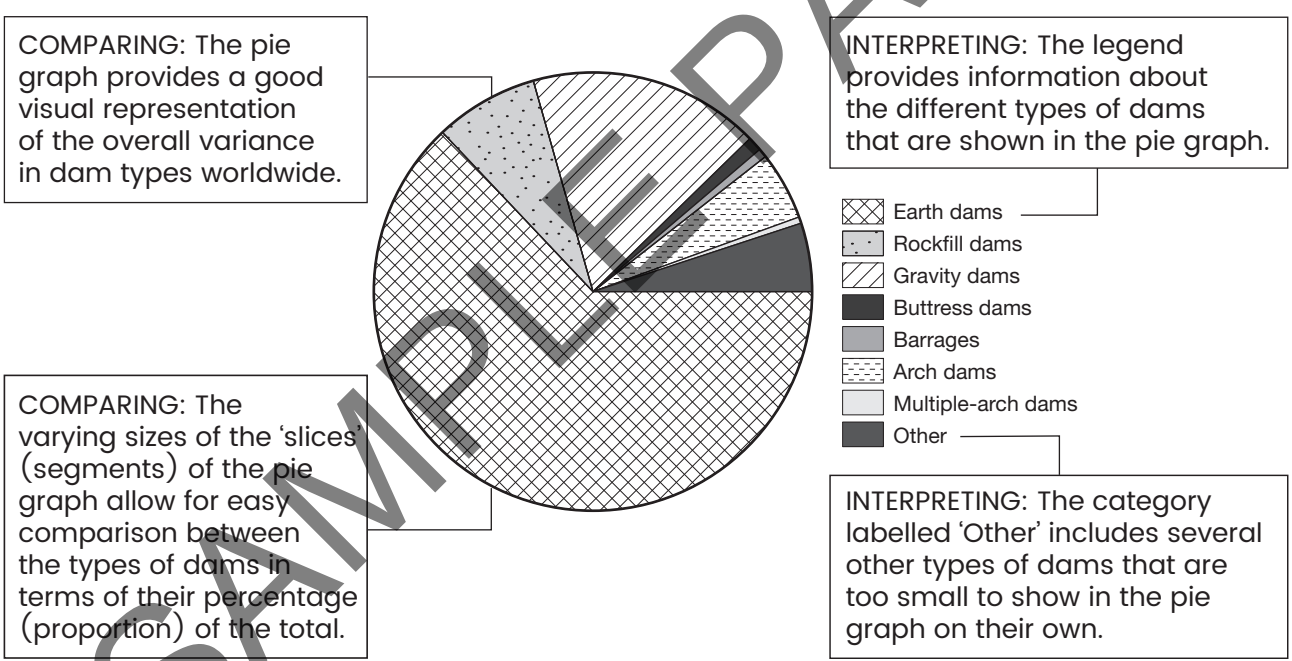
- ☐ **SC 1:** I can interpret information from a pie graph.
- ☐ **SC 2:** I can compare information from a pie graph.

Pie graphs provide an effective way to present geographical data visually and are easy to interpret. They can be analysed to obtain a more detailed understanding of the data presented.

Interpreting information from a pie graph

In a pie graph, a circle is divided into segments (slices) by lines radiating out from its centre. The size of each segment shows the proportion of the total that it represents.

Consider the following pie graph, which shows the worldwide proportion of the different types of dams based on their design and structure. The annotations explain how you can interpret the pie graph and compare the information it contains.



This pie graph shows the worldwide proportion of different dam types based on their design and structure.

To compare the information in a pie graph more accurately, you can calculate the exact percentage of the total that each segment represents by following these steps.

Step 1 Place the centre of a protractor on the centre of the pie graph.

Step 2 Measure the angle made by the segment that you want to calculate. As an example, for 'gravity dams', the angle is 60°.

Step 3 Divide this number by 360 and then multiply by 100 to find the percentage of the total.

percentage = angle ÷ 360 × 100

For 'gravity dams' that would be 60 ÷ 360 × 100, which gives a percentage of 16.67%.

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Comparing information from a pie graph

Now it's your turn. Interpret the information about dams built for different purposes provided in the table below and complete the activities that follow.

1 Complete the table by:

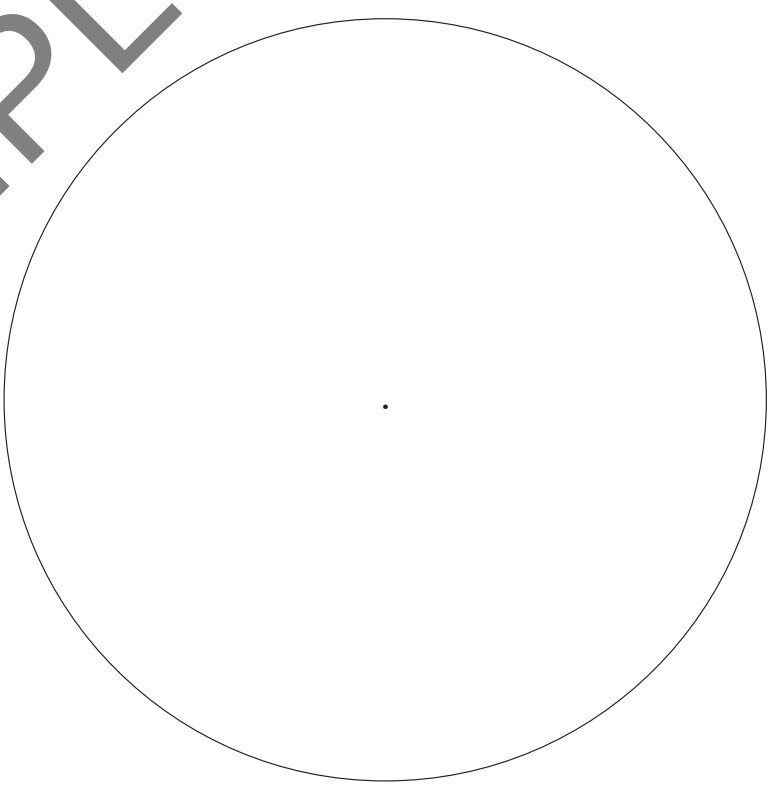
(a) calculating the total number of single-purpose dams

(b) calculating the percentage of the total that each dam type represents. Do this by dividing the number of each type of dam by the total number of dams and then multiplying by 100.

Dam type	Number of single-purpose dams (worldwide)	Percentage
Irrigation	13 468	
Hydropower	4914	
Water supply	3205	
Flood control	2603	
Recreation	1338	
Other	1410	
TOTAL		

This table gives information about different types of dams based on their purpose.

2 Use the information in the table above to complete a pie graph showing the different purposes of dams. (Hint: to calculate the angle of a pie graph segment, you can rearrange the formula as angle = percentage ÷ 100 × 360.)



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