Create maps and other graphic representations

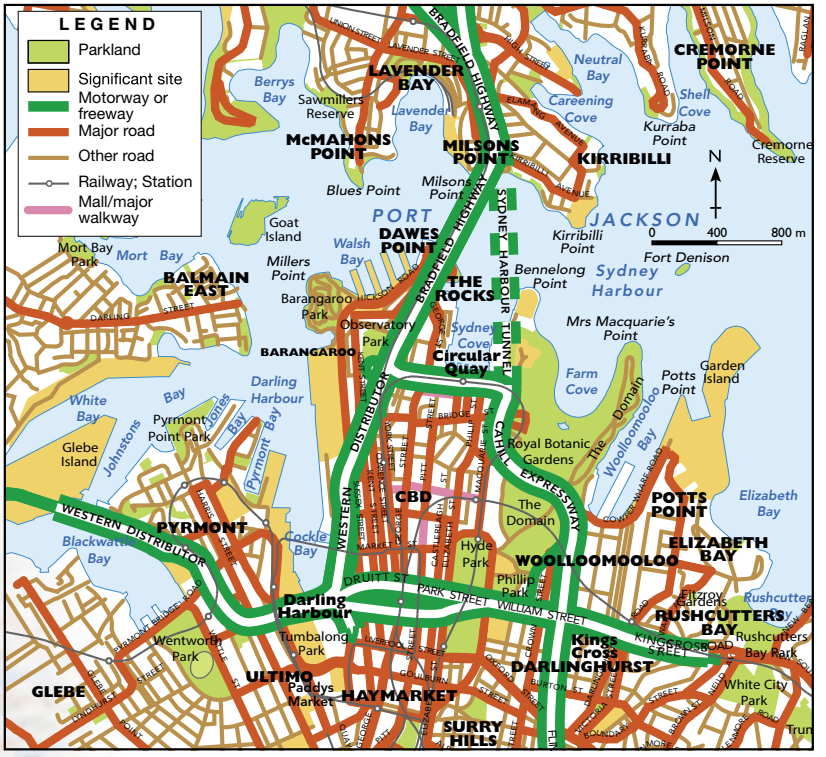
Geographers can collate information they gather during their inquiries in a number of different ways. They often make maps, create graphs and tables or even draw diagrams to help them gather information or look for patterns in the data they have gathered. These tools also help people who were not involved in the inquiry (such as the general public, the government or people in the media) understand the work that has been done.

Creating maps

One of the most useful tools that geographers use to process information is a **map**. A map is a simplified plan of an area. Maps are drawn in the **plan view** (directly from above) because this ensures the **scale** will be the same across the entire area. If maps were drawn from an angle, some parts of the mapped area would look distorted and so it would not be an accurate representation of the area. When properly used, maps can reveal a great deal about our planet and the ways in which we use it.

Source 6 A **vertical aerial photograph** of Sydney Harbour and the city. A map of the same area is shown in Source 7.

SYDNEY: HARBOUR AND CBD



Source 7 Source: Oxford University Press

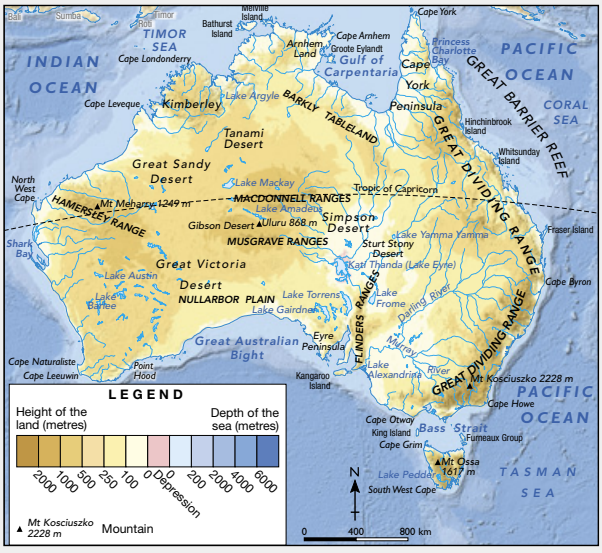
Simple maps

Geographers use different types of maps to show a whole range of different natural and built features – and the connections between them. This year you will be learning how to create a number of different types of maps and interpreting the information that they provide. These maps include:

Physical maps

Physical maps show the locations and names of natural features of the Earth. These may include deserts, mountains, rivers, plains, oceans, reefs, volcanoes and lakes.

PHYSICAL MAP OF AUSTRALIA SHOWING OCEANS AND MAJOR MOUNTAIN RANGES, RIVERS, LAKES AND DESERTS



Source 8 Source: Oxford University Press

Political maps

Political maps show the locations and names of built features of the Earth. These may include country borders, state and territory borders, cities and towns.

POLITICAL MAP OF AUSTRALIA SHOWING STATE AND TERRITORY BORDERS, CITIES AND TOWNS

Source 9 Source: Oxford University Press

Dot distribution maps

Dot distribution maps use dots (or shapes) to represent (and sometimes compare) a range of different features. The dots show the location of the chosen feature. The size and colour of the dots on the map can show different characteristics of that feature. For example, in Source 10 small towns are shown as small green dots and big cities are shown as big red squares. Other dot distribution maps show the location of a single feature, such as litter (see Source 3 on page 37). Dot distribution maps help to show patterns and links between features – geographers refer to this as spatial distribution.

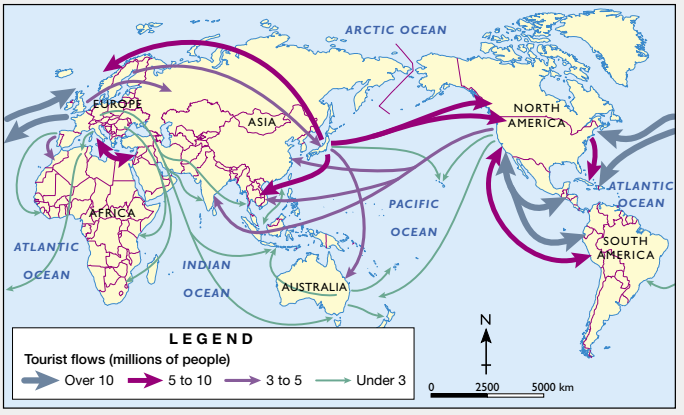
DOT DISTRIBUTION MAP OF AUSTRALIA SHOWING POPULATION

Source 10 Source: Oxford University Press

Flow maps

Flow maps show movement from one place to another. Arrows of different thicknesses or colours are used to show where different things (such as people or goods) are moving to and from, and to compare the numbers involved in the movement.

FLOW MAP SHOWING THE FLOW OF TOURISTS WORLDWIDE

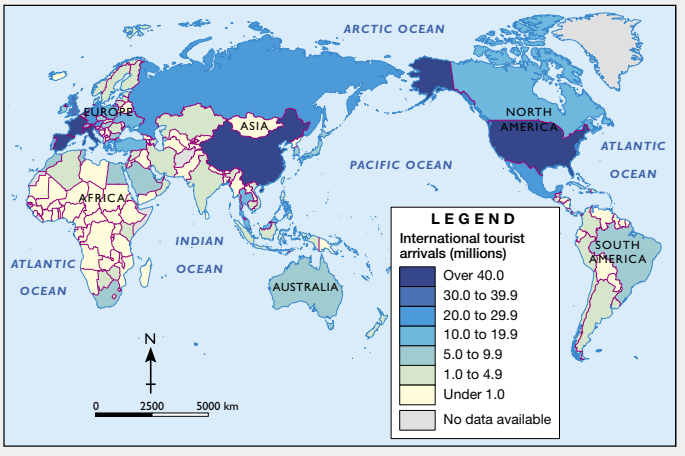


Source 11 Source: Oxford University Press

Choropleth maps

Choropleth maps use different shades of the same colour to give a quick impression of the pattern formed by the data being shown. Darker shades show the highest values or the greatest amounts, while lighter shades show the lowest values or the least amounts.

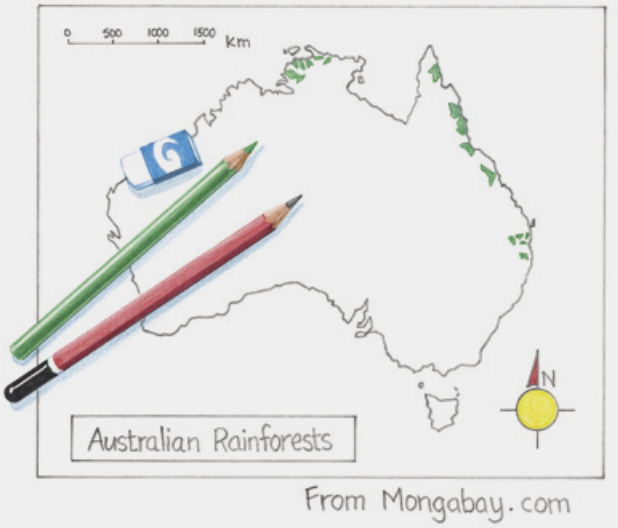
CHOROPLETH MAP SHOWING INTERNATIONAL TOURIST ARRIVALS WORLDWIDE

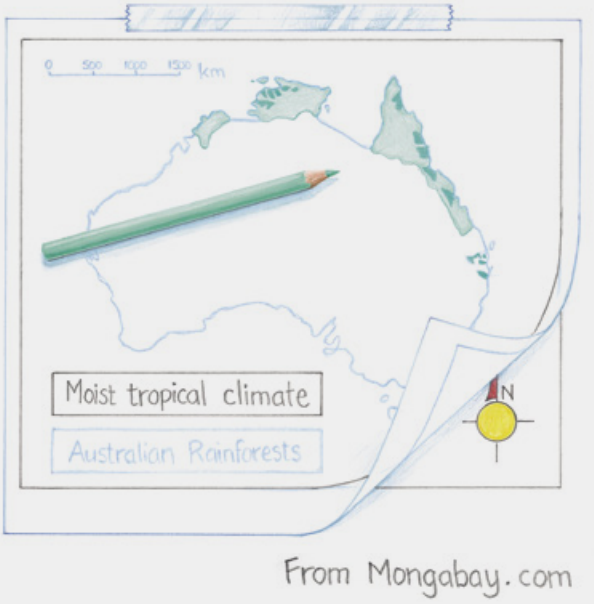


Source 12 Source: Oxford University Press

Overlay maps

Overlay maps show how features on the Earth's surface may be related to each other. To create an overlay map you first need to produce a base map showing one feature (such as the location of Australian rainforests) and then place a piece of tracing paper or plastic sheet over this base map showing the other feature you are investigating (such as areas with a moist tropical climate).





Source 13 An overlay map showing the location of Australian rainforests on a base map (top) and areas with a moist tropical climate on an overlay (bottom)

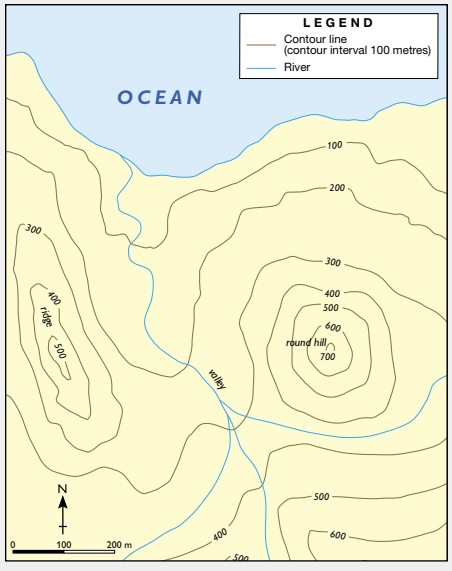
More complex maps

Over the course of the year you will also be working with a number of other, more complex maps. You won't necessarily be creating these maps yourself, but you will be learning how to make sense of the information they provide. These maps include:

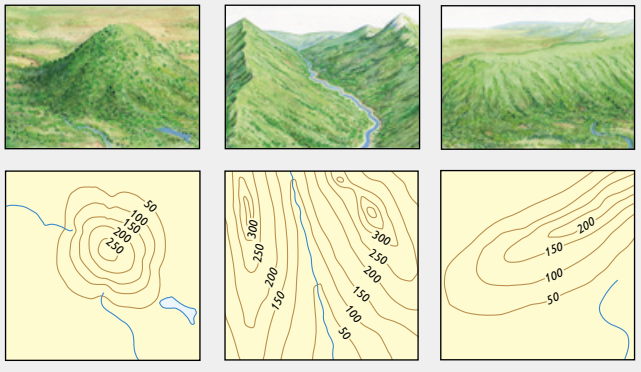
Topographic maps

Topographic maps show the shape of the land (such as the shapes formed by valleys, hills and ridges) by using **contour lines**. Numbers on some of the contour lines show the height of the land above sea level. The closer together the contour lines are, the steeper the land. Symbols and colours are also used on topographic maps to show other natural features (such as forests, rivers and lakes) and built features (such as towns, roads and mines). The contour patterns of three common features are shown below the topographic map in Source 14.

TOPOGRAPHIC MAP SHOWING A ROUND HILL, A VALLEY AND A RIDGE



A ROUND HILL | A VALLEY | A RIDGE



Source 14 Source: Oxford University Press

Weather maps

Weather maps show conditions in the atmosphere, such as air pressure, wind speed and wind direction. They also show the size and location of warm and cold fronts. Weather maps are also known as synoptic charts. They are most commonly seen on the nightly news.

Source 15 Weather maps feature in the nightly news on television

Thematic maps

Thematic maps show a particular theme or topic; for example, the distribution of resources (such as coal and gas), the different types of forests around the world, access to safe drinking water, or the types of crops and animals farmed in Australia.

THEMATIC MAP OF AUSTRALIA SHOWING TYPES OF ANIMALS AND CROPS GROWN

Source 16 Source: Oxford University Press

Geographic Information Systems (GIS)

Geographic Information Systems (GIS) are a way of creating, viewing, organising and analysing geographical information with the use of a software application. GIS are an exciting development in the world of geography because they allow geographers to access and share an incredible amount of data and look at the world in new ways. GIS are made up of three elements:

- digital base maps
- data that is layered over the base map (such as a chart, overlay or table)
- a software application or platform that links these elements together and allows the user to interact with all of this information.

GIS combine satellite images, graphs and databases to allow you to identify patterns and **trends** so that you can gain a better understanding of the world around you. They allow you to turn different layers of data on and off in order to isolate exactly what you are looking for. You can even create and share your own maps, look at 3D models of areas and record video simulations, known as flyovers.

GIS are already a part of many people's everyday life. Governments, companies and individuals all around the world use GIS. There are a number of GIS platforms available today, but one of the most commonly used and free GIS is Google Earth.

Essential features of maps

BOLTSS

Regardless of the type of maps you are creating or interpreting, all will share some common features. There are six features that ensure every map is drawn in a clear, concise and accurate way. To help you remember these features, you can use a mnemonic (memory aid) that consists of the first letter of each of the features. Together, these six letters make up the word **BOLTSS**.

Source 17 shows a map of Australia that is held together with BOLTSS.

B **Border** – an outline or box drawn around the map

O **Orientation** – an indication of direction, usually shown with a north arrow or compass rose

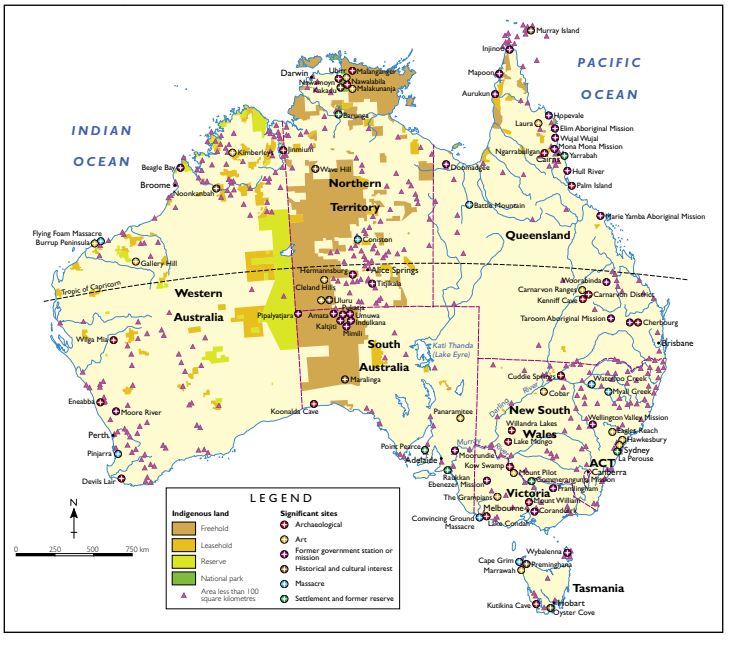
L **Legend** – an explanation of the symbols, colours and patterns used on the map (also known as a key)

T **Title** – a heading that describes the map and what it is showing

S **Scale** – a way of indicating what **distances** on the map represent in the real world. Scale can be shown in three different ways: as a written scale, a line scale or a ratio. Source 20 shows the three ways scale can be represented on a map.

S **Source** – where the information used to create the map came from. If these details are not known, simply write 'Source: unknown'. If you have created the map from your own data, simply write 'Source: own map' or 'Source: [add your name]'.

AUSTRALIA: INDIGENOUS LAND AND SITES, 2006



Source 17 A map of Australia showing all the features of BOLTSS
Source: Oxford University Press

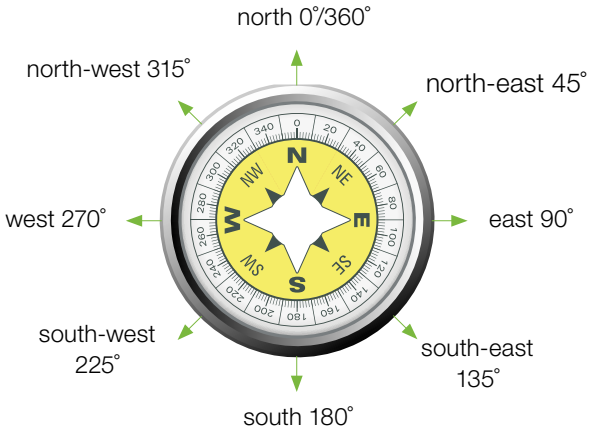
Direction

Direction must always be shown on maps because it enables the user to work out the location of features shown. Direction is shown on maps by the use of compass points. A **compass** is an instrument with a magnetised needle that will always point to the Earth's magnetic field near the north pole (known as **magnetic north**). The face of a compass shows a circle made up of 360 degrees (see Source 18).

The four main directions on a compass are north, south, east and west. These are known as **cardinal points**. Most maps are oriented to north. Once north has been established, you can find the other points of the compass.

Using compass points is an accurate way of giving directions because the compass always points to magnetic north no matter which direction you are facing.

Compass bearings provide an even more precise way to give directions. A bearing is an angle that is measured clockwise from magnetic north. The bearing of magnetic north can be either 0 degrees or 360 degrees, the bearing of south is 180 degrees, the bearing of east is 90 degrees and the bearing of west is 270 degrees. These bearings are also shown in Source 18.



Source 18 A compass face showing cardinal points and compass bearings

Scale

We use **scale** to shrink or increase real world features so they will fit into a space. Model cars are scaled down in size and proportion from real cars.

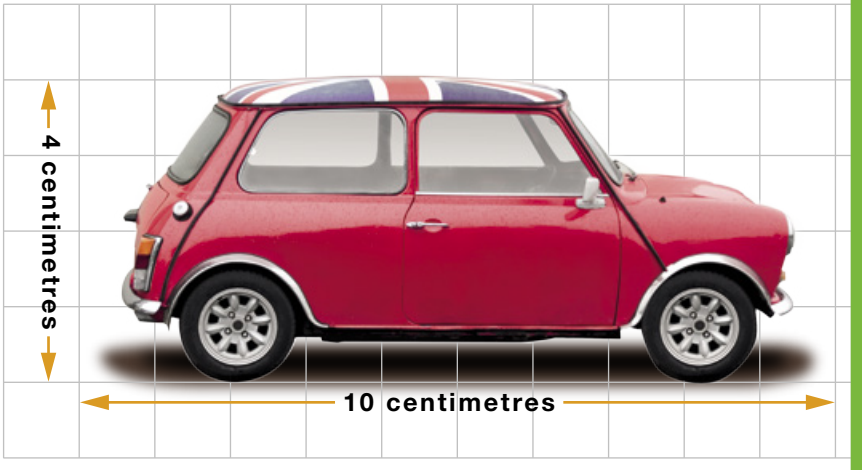
The model shown in Source 19 looks like the real car, only smaller. It is a 1:35 scale model. This means that 1 centimetre on the scale model is equal to 35 centimetres on the real car. If 1 centimetre represents 35 centimetres, then 10 centimetres (the total length of the model) represents a total length of 350 centimetres (or 3.5 metres) on the real car.

Scale on maps

Maps are scaled representations of real areas. These representations have been designed to fit on a piece of paper or on a computer screen. Maps look the same as the real areas they are representing, just reduced to a size you can work with. Scale on maps allows you to work out the distances in the real world.

Look at the map of Tasmania (Source 20). In the bottom left-hand corner it shows the three types of scale that can be used on maps and how they work:

- Written scale – A written scale tells you how much a distance on the map represents on the ground. The written scale on Source 20 is '1 centimetre on the map measures 30 kilometres on the ground'. Using this information we can easily work out that 5 centimetres on the map would be equal to 150 kilometres on the ground, and so on.
- Line scale – A line scale is a numbered line that acts like a ruler. You can use it to measure distances on the map. The Source 20 line scale shows 1 centimetre is equal to 30 kilometres.
- Ratio scale – A ratio scale shows scale in numbers. The ratio scale for Source 20 is 1:3 000 000, so 1 unit (that is, 1 centimetre) on the map represents 3 000 000 centimetres on the ground. Of course, 3 000 000 centimetres is equal to 30 kilometres.



Source 19 This model car is 35 times smaller than the real car. This scale is expressed as 1:35.

Using line scale to measure distances

Scale is a handy tool to help you study the world around you from inside your classroom. Look at Source 20. You will notice that all the features on the map have been shrunk by the same amount so that they fit on the page.

You can use the line scale to measure the distance between two points 'as the crow flies' (that is, in a straight line) by following these steps:

Step 1 Place the straight edge of a sheet of paper over the points you wish to measure.

Step 2 Mark the starting and finishing points on the paper.

Step 3 Hold the edge of the paper against the line scale to work out the real distance between the two points.

Apply the skill

1 Use Sources 20 and 21 to answer the following questions.

- **a** How far is it from the peak of Cradle Mountain to the centre of Hobart as the crow flies?
- **b** How far is it from Devonport in the state's north to Queenstown in the west as the crow flies?
- **c** How long is Lake Gordon from north to south?
- **d** How wide is the state of Tasmania at its widest point?

TASMANIA

Source 20 Source: Oxford University Press

Source 21 Measuring straight distances on a map using a sheet of paper