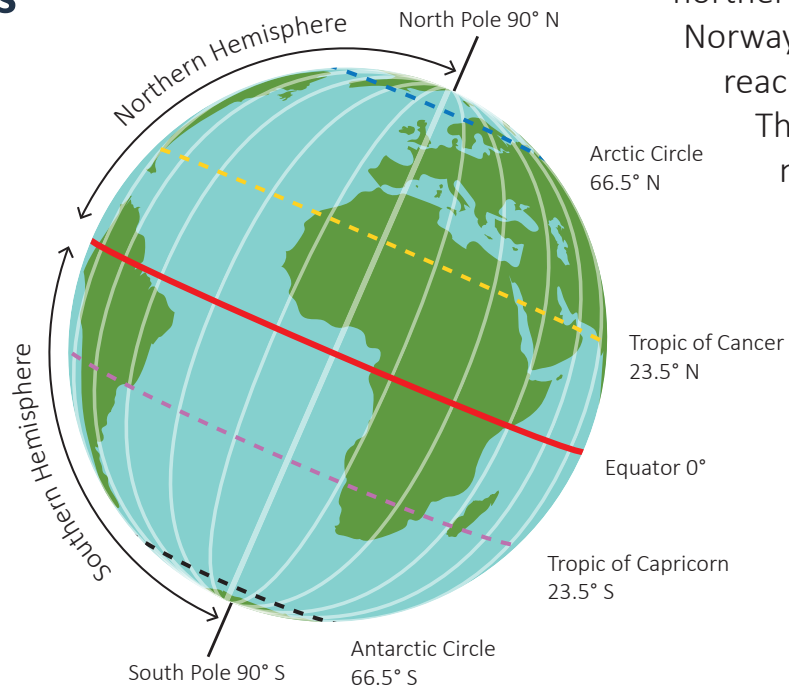


# Frozen Kingdoms

## The polar regions

The Earth has two polar regions: the Arctic Circle in the Northern Hemisphere and the Antarctic Circle in the Southern Hemisphere. Polar regions have long, cold winters and temperatures mostly below freezing. The weather can be very windy with little precipitation.



## Arctic region

The Arctic region consists of the Arctic Ocean and the northern parts of Canada, Alaska, Russia, Finland, Sweden, Norway, Greenland and Iceland. Winter temperatures can reach  $-55^{\circ}\text{C}$  and summer temperatures can reach  $10^{\circ}\text{C}$ .

The Arctic region has a varied landscape including mountains, tundra and boreal forest. It is home to small populations of people and an amazing variety of plants and animals including the polar bear, Arctic fox, Arctic hare and walrus.



polar bear

## Antarctic region

Antarctica is the world's fifth-largest continent and is covered in an ice sheet that is up to 4800m thick. It is the coldest, driest, highest and windiest continent on Earth. Temperatures can drop to  $-80^{\circ}\text{C}$ , there is little precipitation, and wind speeds can reach 80km per hour. There are only two native species of flowering plants in Antarctica, but there is a rich sea life, including the emperor penguin, humpback whale and leopard seal. No people live permanently in the Antarctic. However, scientists stay for part of the year to carry out research and tourists visit in the summer months to see the landscape and wildlife.



emperor penguin



humpback whale

## Polar landscapes

Much of the polar regions is covered with snow and ice all year round. Polar landscape features include glaciers, ice fields and icebergs.

### Glacier

Glaciers are slow-moving masses of flowing ice, formed by the compaction of snow. They can vary in depth from 50m to 1500m.



### Ice field

Ice fields are large areas of connected glaciers covering flat areas, such as valleys and high plateaus. They are made from compressed and frozen snow.



### Iceberg

Icebergs are chunks of ice that calve, or break off, from glaciers and ice sheets and float in the sea. Wind and water erode icebergs into sculptural shapes.



## Natural resources in the Arctic

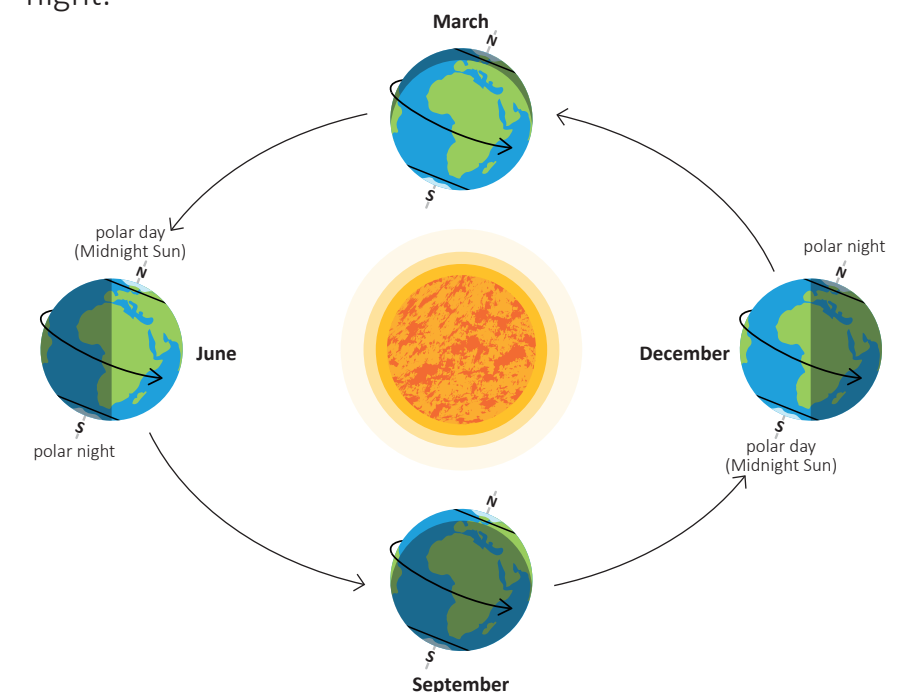
Natural resources in the Arctic include oil, gas, minerals, metals, fish, wood and freshwater. Arctic inhabitants use the natural resources available for fuel, food and to sell to other countries. However, many of the resources have not yet been touched as they are difficult to extract, especially those that underneath the frozen waters of the Arctic Ocean.

## Indigenous peoples of the Arctic

The indigenous peoples of the Arctic have inhabited the area for thousands of years. In the past, they adapted to the cold, harsh conditions by hunting and eating animals native to the area, such as seals, whales and walrus, and using reindeer skins to keep warm. Many lived nomadic lifestyles, following reindeer herds. Today, many indigenous peoples live in permanent settlements and have a modern lifestyle, but some still follow the traditional way of life.

## Polar day and night

Due to the tilt of the Earth, the poles experience nearly 24 hours of daylight during the summer months. This is called polar day, or Midnight Sun. In the winter, the poles experience nearly 24 hours of darkness. This is called polar night.





## Polar exploration

Due to the harsh and inhospitable conditions, the polar regions were the last places on Earth to be explored. During the golden age of polar exploration, between 1898 and 1916, explorers searched for the Northwest Passage in the Arctic and raced to reach the South Pole in Antarctica. Three famous polar explorers were Robert Falcon Scott, Roald Amundsen and Ernest Shackleton.

### Robert Falcon Scott

Robert Falcon Scott (1868–1912) was a British explorer who led two expeditions to the Antarctic. His second expedition turned into a race to the South Pole that Scott's team lost, losing their lives in the attempt.



Image from: Wikimedia Commons/Public domain

### Roald Amundsen

Roald Amundsen (1872–1928) was a Norwegian explorer. He was the first to discover the Northwest Passage in the Arctic that joined the Atlantic Ocean to the Pacific Ocean. In 1911, he led a successful expedition to be the first to reach the South Pole, beating Scott's team.

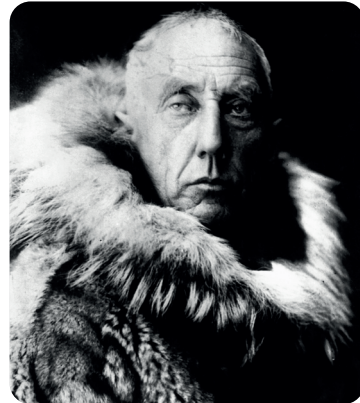


Image from: Wikimedia Commons/Public domain

### Ernest Shackleton

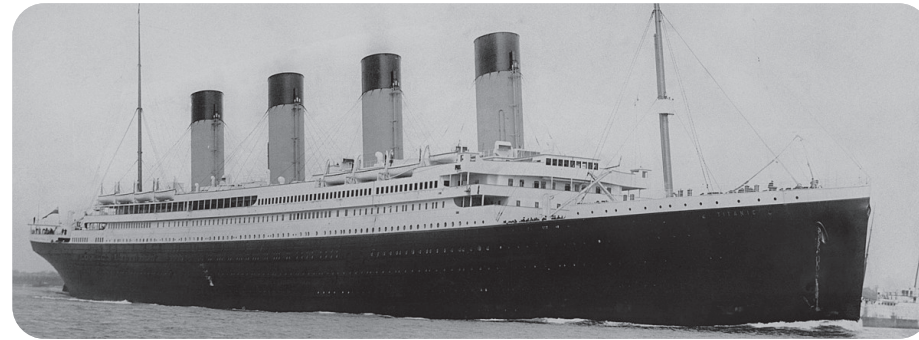
Ernest Shackleton (1874–1922) was a British explorer who led an expedition to attempt to walk across Antarctica. However, his ship became stuck in sea ice and sank. Shackleton and his men managed to survive for 18 months before making their way to safety.



Image from: Wikimedia Commons/Public domain

## Titanic

The RMS *Titanic* sank on 15th April 1912. Four days after leaving Southampton, UK and just 300 miles from its destination of New York, USA, the lookout crew spotted an iceberg in the *Titanic's* path. The ship collided with the iceberg, damaging its hull. At 2:20am on 15th April, the *Titanic* began to sink. Although the crew sent distress signals, none of the ships who responded were able to reach the *Titanic* before she sank. It is estimated that 1500 people were killed and only 700 survived.



RMS *Titanic*

## Climate change

Human activities such as burning fossil fuels and deforestation are releasing gases into the atmosphere that are causing the temperature of the Earth to rise and its climate to change. The Arctic landscape and wildlife are at risk due to this change. Scientists are concerned that the rising global temperature is causing the polar ice to melt. If the polar ice melts, sea levels and temperatures will rise, weather patterns will change and the polar regions will be damaged.



Arctic landscape

## Glossary

<b>Antarctic Circle</b>	An imaginary circle of latitude that lies 66.5° south of the equator. Everything south of this line is known as the Antarctic.
<b>Arctic Circle</b>	An imaginary circle of latitude that lies 66.5° north of the equator. Everything north of this line is known as the Arctic.
<b>boreal forest</b>	A large area of wetland covered in conifer trees. Boreal forests are found in countries that are in or near the Arctic Circle.
<b>climate</b>	The usual weather conditions that occur in a place over a long period.
<b>horizon</b>	The line where the sky appears to meet the Earth.
<b>indigenous</b>	Occurring naturally or originating in a particular place.
<b>native</b>	Referring to the animals and plants that occur naturally in a place.
<b>North Pole</b>	The most northern geographical point of the Earth.
<b>polar day</b>	Near constant daylight in the Arctic or Antarctic during the summer months when the Sun does not set below the horizon. Also known as Midnight Sun.
<b>polar night</b>	Near constant darkness in the Arctic or Antarctic during the winter months when the Sun does not rise above the horizon.
<b>precipitation</b>	Water that falls from clouds in the sky as rain, snow, hail or sleet.
<b>South Pole</b>	The most southern geographical point of the Earth.
<b>tundra</b>	An area of land where it is too cold for trees to grow and the ground below the surface is permanently frozen.





# Our Changing World

## Time zones around the world

The world is split into 24 meridians because there are 24 hours in a day. Each meridian is in the centre of a time zone. The times around the world are calculated from the Prime Meridian. The time at the Prime Meridian is known as Greenwich Mean Time, abbreviated to GMT. If time zones are to the east of the Prime Meridian on a map, the time is ahead of GMT (GMT+). If they are to the west of the Prime Meridian, the time is behind GMT (GMT-).



Prime Meridian, Greenwich

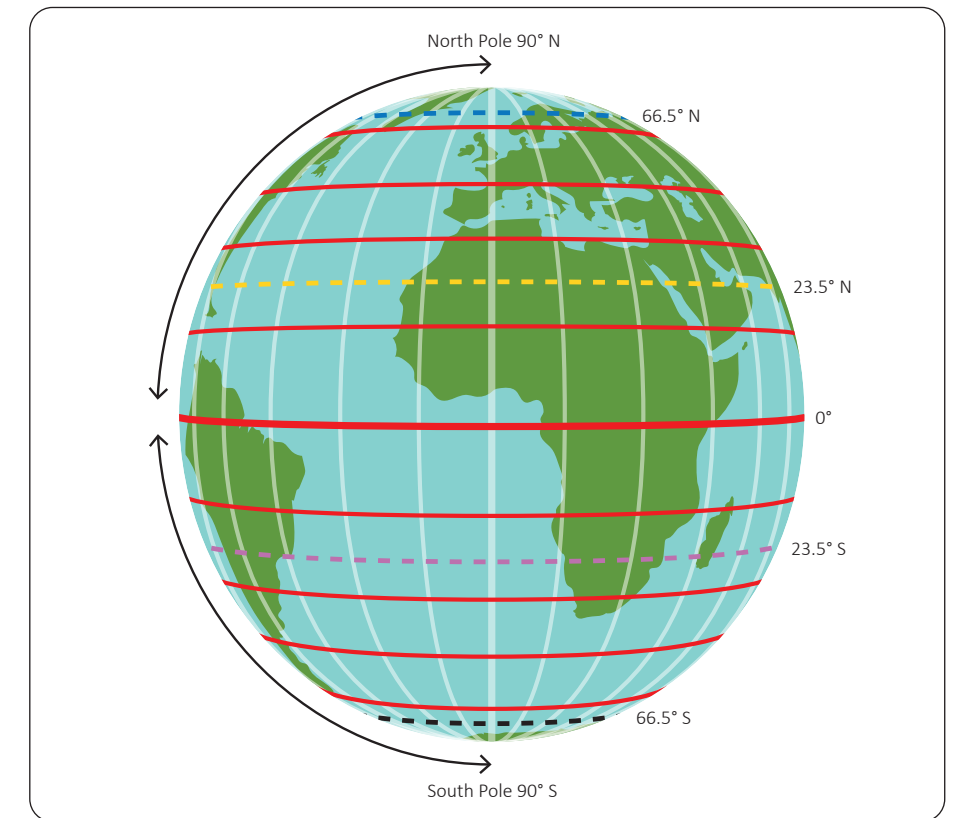
## Latitude and longitude

Lines of latitude and longitude are imaginary lines around Earth. They are measured in degrees and help us to pinpoint exact locations. The lines of latitude run horizontally and measure how far north or south a point is from the equator. The equator is the line of latitude at 0°. The lines of longitude run vertically and measure how far east or west a point is from the Prime Meridian. The Prime Meridian is the line of longitude at 0°. The point where a line of latitude and longitude cross can be written as a coordinate. For example, 30°N, 75°E.



Macau in China is 22°N of the equator and 114°E of the Prime Meridian

## Features of Earth



### Key

- equator
- lines of latitude
- lines of longitude
- Prime Meridian
- Tropic of Cancer
- Tropic of Capricorn
- Arctic Circle
- Antarctic Circle

The **equator** is the line of latitude around the middle of Earth. It is equidistant from the North Pole and the South Pole.

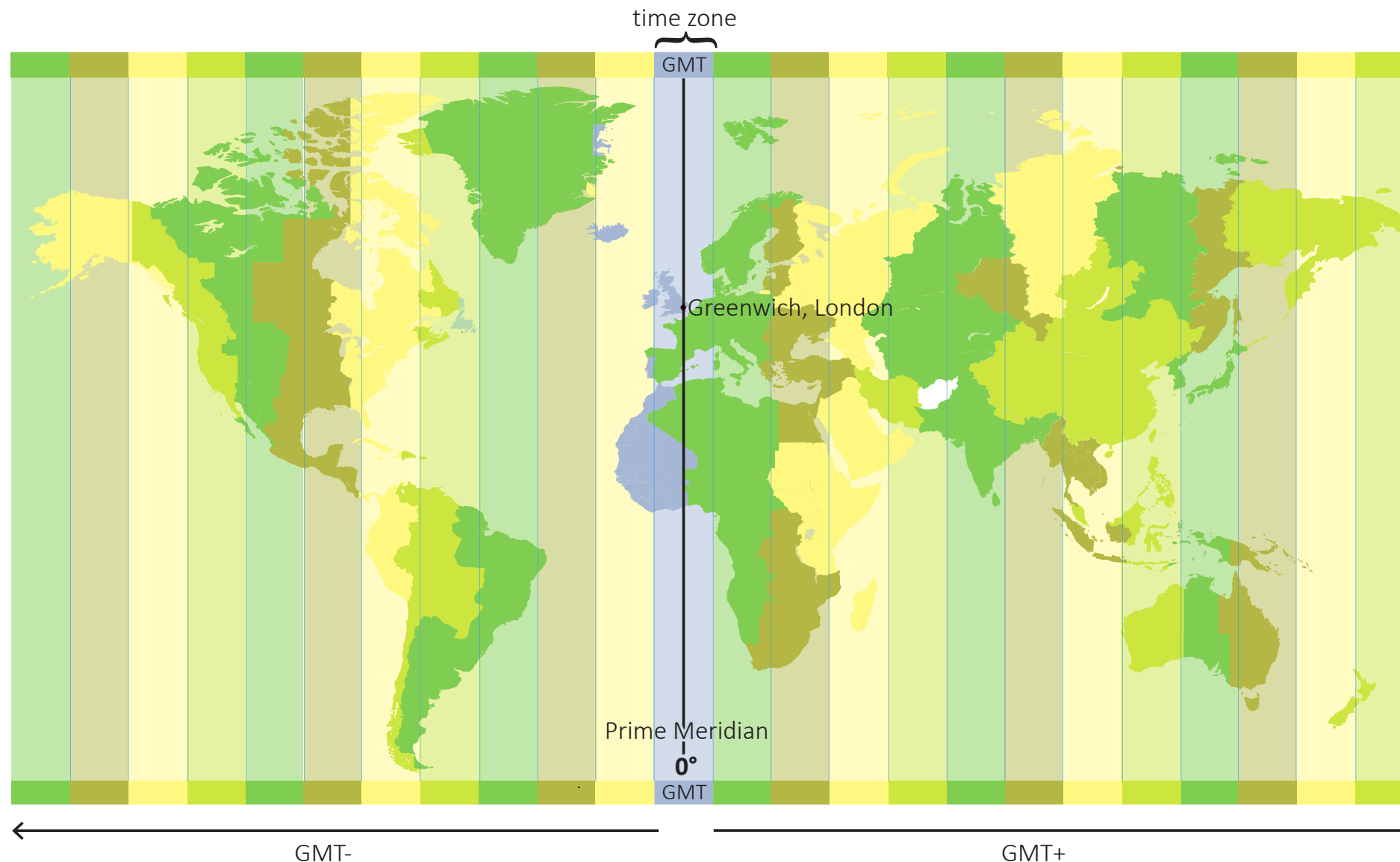
The **Southern Hemisphere** is the half of Earth south of the equator and the **Northern Hemisphere** is the half of Earth north of the equator.

The **Prime Meridian**, or Greenwich Meridian, is a line of longitude that runs through Greenwich, London. All lines of longitude are measured from the Prime Meridian.

The **Tropic of Cancer** is 23.5°N and the **Tropic of Capricorn** is 23.5°S of the equator. The area in between these lines of latitude is called the tropics.

The **Arctic Circle** is a line of latitude that is 66.5°N of the equator. The land inside the Arctic Circle is some of the coldest and least populated in the world.

The **Antarctic Circle** is a line of latitude that is 66.5°S of the equator. There is no permanent human population within the Antarctic Circle.



\* this map is simplified and shows approximate time zones





## Climate change and global warming

The climate is the usual weather conditions that occur in a place over a long time. The world's climate naturally changes over a long period of time; however, the current rate of change is unprecedented and has been linked to human actions. This large scale change to the climate is called 'climate change'. The main cause of climate change is global warming. The temperature on Earth has increased by about 1°C since 1880. Burning fossil fuels, deforestation and eating meat is likely to have the biggest effect on global warming and climate change.

## Extreme weather and people

Climate change is causing extreme weather events worldwide, including severe storms, cyclones, floods, sandstorms, heatwaves and droughts. Millions of people are affected by these extreme weather events every year.



Cyclone Idai moving towards Mozambique and Zimbabwe in 2019

The Global Climate Risk Index ranks the countries that are most affected by the effects of extreme weather related to climate change. The countries most affected in 2019 were Mozambique and Zimbabwe in Africa, and the Bahamas in North America.

## Trade around the world

Countries worldwide export and import fossil fuels, metal ores, food and manufactured products. The availability of natural resources, the climate and the type of soil in different countries can influence what they export. For example, Ecuador exports 30% of the world's bananas because they grow well all year round in the tropical climate.

## Traffic data

Data is information, including facts and statistics, that is collected, analysed and acted upon. Traffic data about road accidents in Great Britain in 2019 show that most fatalities happened on fast, rural roads. Reasons for this could include speeding, blind bends, people walking in the road, lack of cycle lanes, and motorcyclists overtaking or having little knowledge of the roads. Urban roads have more traffic, but are usually wider and have fewer bends. They can also have cycle lanes and more footpaths, so, even though there are more accidents, there are fewer fatalities.

## Human settlement patterns

A settlement is a place where people live permanently. Settlements can be rural or urban. Rural settlements are small in area and population. They include hamlets and villages. Urban settlements are larger than rural settlements. They include towns and cities.

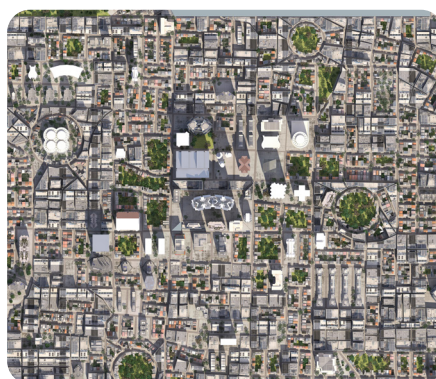
There are different settlement patterns, including linear, circular, Y-shaped, T-shaped and cross-shaped. Settlements can be compact, where many houses are built close to each other, or dispersed, where the houses are scattered across fields or hillsides. Sometimes, settlements grow and change over time. Hamlets become villages, villages become towns, and towns become cities.



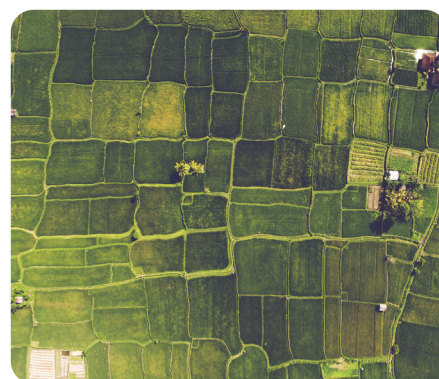
urban settlement



rural, linear settlement



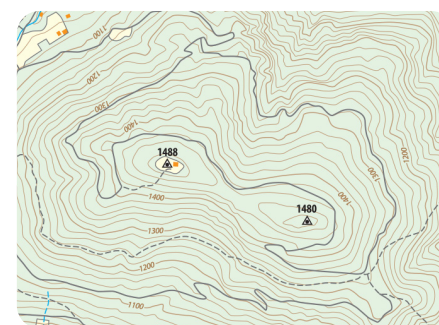
compact settlement



dispersed settlement

## Grid references, contour lines and map symbols

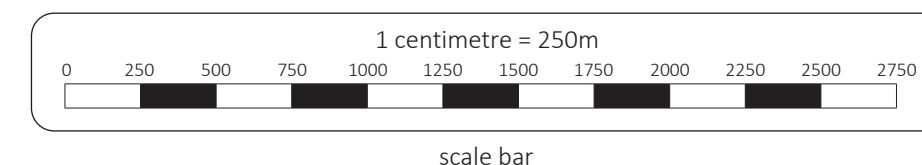
On a map, a grid reference is a set of numbers that describes a position. Contour lines join points of equal height above sea level and show the topography of an area. Map symbols are pictures or icons that represent physical and human features.



contour lines

## Map scales

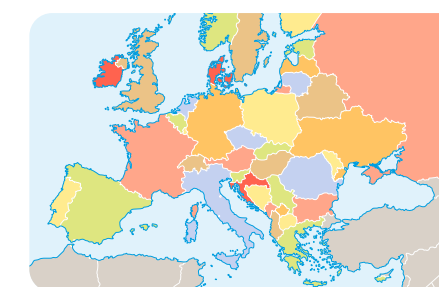
Maps are much smaller than the places they represent so they are drawn to scale. The scale is written as a ratio, for example, 1cm:250m, which means 1cm on a map is equal to 250m in real life. Maps also include a scale bar. The ratio and scale bar help a map reader measure the distance between features on a map or the length of a feature, such as a footpath.



scale bar

## Maps of different scales

Maps can be drawn to different scales. We describe maps as small scale or large scale. Small scale maps have large numbers in their ratio, such as 1cm:250km. They show continents or large areas of land or sea and contain little detail. Large scale maps have smaller numbers in their ratio, such as 1cm:250m. They show smaller areas of land in more detail and include the location and names of cities, towns and villages, as well as human and physical features.



small scale map



large scale map

## Glossary

<b>export</b>	To send goods to another country for selling.
<b>import</b>	To buy goods and bring them into one country from another.
<b>global warming</b>	The increase in world temperatures caused by gases, such as carbon dioxide, being released into the atmosphere.
<b>topography</b>	The physical appearance of an area of land, especially relating to its shape and surface.

