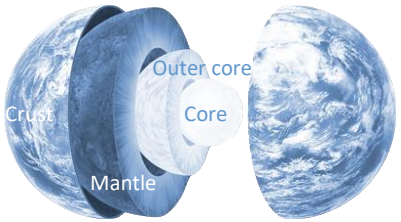
Earthquakes and volcanoes: plate tectonics

Quick summary

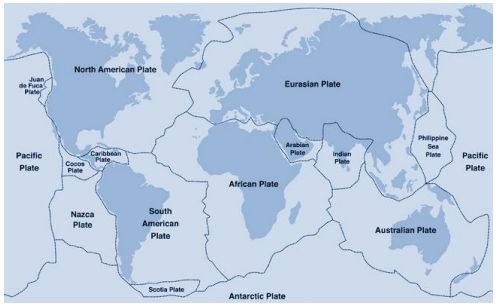
The Earth has an inner and outer core, a mantle and a crust. The crust is the rocky surface that makes up the surface of the Earth and floats on top of the mantle. The crust has 'cracks' in it and so it is actually in pieces. These pieces are called plates. The plates move very slightly – by no more than a few centimetres a year – and when they do, earthquakes occur and volcanoes form or erupt. Plate tectonics provides an explanation of how earthquakes, mountains, volcanoes and oceans are formed.

Physical features

The structure of the Earth



The main plate boundaries



Physical processes

The boundaries of the plates are called **fault lines** and movement along these lines causes earthquakes and volcanoes. The plates move in three different ways:

- away from each other, which forms ridges
- towards each other, which causes earthquakes and forms volcanoes and mountains
- side by side, which causes earthquakes.

Vocabulary

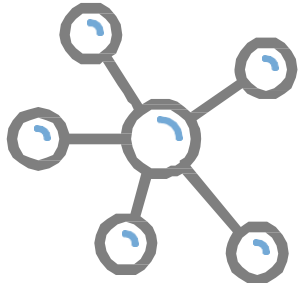
earthquakes: shaking of the ground caused by movement of the Earth's crust
volcanoes: mountains from which lava, gas, steam and ash from inside the Earth sometimes burst
erupt: to start suddenly or violently with great force

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Landscapes: mountains





Quick summary



A mountain is a large landform that rises above the surrounding land, usually in the form of a peak. A mountain is generally steeper than a hill but there is no one definition of the difference between a hill and a mountain. The official UK government's definition of a mountain is a summit of 600 metres (1,969 feet) or higher. A few mountains are isolated summits, but most occur in mountain ranges. High mountains produce colder climates than at sea level. These colder climates affect the types of plants and animals living on the mountain. The highest mountain on Earth is Mount Everest in the Himalayas of Asia, whose summit is 8,850 metres (29,035 feet) above sea level.

Physical processes

The Earth's crust is split up into sections, like the cracked shell of an egg. The sections of the Earth's crust are called tectonic plates, and they float on hot magma or molten rock. There are three main types of mountains: volcanic, fold and block. All three types are formed from plate tectonics: when portions of the Earth's crust move, crumple and dive.

Volcanoes are formed when a plate is pushed below another plate, which melts the rock and forms magma. When the magma reaches the surface, it often builds a volcanic mountain. One of the world's most famous volcanoes is Mount Vesuvius in southern Italy. Its most famous eruption took place in 79 CE and covered the city of Pompeii in ash.

Fold mountains occur when two plates collide. They push upwards, folding the rock into mountain peaks. Some of the most famous fold mountains are the Himalayas in Asia.

Block mountains are caused when plates move past each other. When rocks on one plate are higher than the other, this can form a mountain. Some of the most famous block mountains are the Sierra Nevada mountains that run from California to Nevada in the USA.

Vocabulary

landform: natural feature of the Earth's surface
summits: the tops of mountains
mountain ranges: series of mountains
magma: molten rock that is formed in very hot conditions inside the Earth
plate tectonics: the movements of portions of the Earth's crust

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Europe: mountains



Quick summary



Europe has many mountain ranges. Mount Elbrus in Russia (5,642 metres/18,510 feet) is the highest mountain in Europe. The mountain is part of the Caucasus mountain range. The highest peak in the European Alps is Mont Blanc. It is 4,810 metres (15,781 feet) high and sits on the border of Italy and France. The first winter Olympics was held near Mount Blanc in 1924.

Location

Some of Europe's major mountain ranges are:

- **Urals –** form the boundary between Europe and Asia and run approximately from north to south through Russia, from the coast of the Arctic Ocean to the Ural River
- **Caucasus Mountains** – separate Europe and Asia between the Black Sea and Caspian Sea
- **Carpathian Mountains –** a semi-circular mountain range in eastern Europe
- **Alps –** in central western Europe (Switzerland, Italy and France)
- **Apennines –** run for about 870 miles (1,400 km) through Italy (often referred to as the backbone of Italy due to its shape)
- **Pyrenees –** the border between France and Spain that extends for about 270 miles (435 km)
- **Cantabrian Mountains –** run across northern Spain
- **Scandinavian Mountains –** run through Scandinavia
- **Dinaric Alps –** a mountain range in the Balkans
- **Balkan Mountains –** a mountain range in the central Balkans
- **Scottish Highlands** – in the United Kingdom.

Physical features

The top of a mountain is called the summit. It means two different things to say how high and how tall a mountain is – measure from sea level to summit to find out how high a mountain is, and measure base to summit to find out how tall it is. Some very tall mountains aren't very high because a lot of the base is under the ocean.

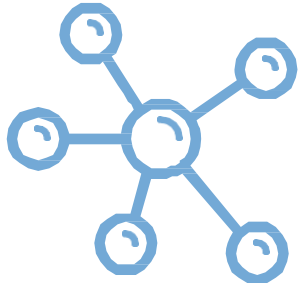
Vocabulary

mountain ranges: series of mountains joined together
peak: the pointed top of a mountain
boundary: a line that separates two countries
extends: reaches, stretches
summit: the top of a mountain

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Landscapes: rivers





Quick summary



A river is a natural **watercourse** flowing towards an ocean, sea, lake or another river. In some cases, a river flows into the ground and becomes dry at the end of its course without reaching another body of water. A river is part of the water cycle. Rivers carry rainwater from hills downhill to other rivers, lakes or the ocean. Rivers and streams often join together before they reach the mouth of the river. The smaller rivers and streams are called **tributaries.** Stream, creek, brook, rivulet, rill, beck and burn are all names for small rivers. The five longest rivers in the world are: Nile, Amazon, Yangtze, Mississippi and Yenisei.

Physical features

A river begins at a source (or more often several sources), follows a path called a course, and ends at a mouth. The water in a river runs through a channel, which is a river bed between two banks. In larger rivers there is often also a floodplain shaped by floodwaters escaping the channel. Rivers flow down mountains and through valleys.
The term 'upstream' refers to the part of the river nearest its source. Likewise, the term 'downstream' describes the part of the river near its mouth. The term 'left bank' refers to the left bank in the direction of flow, and 'right bank' to the right.

Rivers carve a V-shaped channel. In the middle reaches, where a river flows over flatter land, **meanders** may form. Sometimes the river will cut off a loop, shortening the channel and forming an **ox-bow lake**. Rivers sometimes develop **deltas** at their mouths. A river with its **mouth** in saline tidal waters will form an **estuary.**

Most but not all rivers flow on the surface. Subterranean rivers flow underground in caves or caverns.

Human features

Rivers are difficult and dangerous to cross. Cities and towns often develop where there are bridges to cross a river.

Vocabulary

watercourse: a channel of flowing water
tributaries: smaller streams that join a river
source: the start of a river
Mouth: the end of a river
channel: the course of a river river
bed: the bottom of a river
meanders: bends in a river
deltas: where a river splits and spreads out into several branches before entering the sea
estuary: the part of a river that meets the sea

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Europe: rivers



Quick summary



There are five primary rivers in Europe: the Volga, the Danube, the Rhine, the Elbe and the Loire. The Volga and the Danube are the longest rivers in Europe but there are longer rivers than the Rhine, Elbe and Loire. However, many see these three as very important rivers. Europe has numerous other rivers. For example, the Thames, which runs through London; the Seine, which runs through Paris and the Rhone, which flows through Germany and France. The Po is Italy's longest river, traversing the northern part of the country to the Adriatic Sea, and the Oder River stretches across the Czech Republic and Poland, ending in the Baltic Sea.

Location

The **Volga** is the longest river in Europe, stretching 2,294 miles (3,691 km) across Russia. It flows from its source in the remote Valdai Hills to the Caspian Sea, and half of Russia's river cargo is transported along the river. The **Danube**, at 1,780 miles (2,865 km) long, is the second longest river in Europe. The river stretches through ten countries: Germany, Hungary, Serbia, Croatia, Austria, Slovakia, Romania, Moldova, Ukraine and Bulgaria. It flows through several cities, such as Vienna and Budapest, and drains into its delta in the Black Sea. It is the most important commercial waterway in Europe. The **Rhine** flows 766 miles (1,233 km) from its source in the Swiss Alps. It flows northwest from the mountains into the lowlands, crossing Germany, France, the Netherlands and Lichtenstein before coming to an end in the North Sea. The **Elbe** has its source in the Czech Republic and flows through towns such as Prague. It then flows northwest through Germany to the North Sea. It is 724 miles (1,165 km) in length. The **Loire** runs north from its source in the the Massif Central (a highland region in the middle of southern France) to Orleans and then west to the Atlantic Ocean. It is 629 miles (1,012 km) long. The Loire Valley is famous for its wines and historic towns.

Physical features

The Black Sea, into which the Danube flows, and the Caspian Sea, into which the Volga flows, are both landlocked seas. This means that they are surrounded by land. Other landlocked seas include the Dead Sea between Jordan, Israel and the West Bank.

Vocabulary

primary: important
numerous: many
traversing: crossing
source: where something comes from
remote: far away from towns and cities
delta: where a river splits and spreads out into several branches before entering the sea or a lake
commercial: the buying and selling of goods

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Erosion and deposition: rivers



Quick summary



As well as weathering, the Earth also can be shaped by the action of water in rivers and at coasts. This is called **erosion, transportation** and **deposition**. **Erosion** is when rocks and soil are worn away, which puts lots of sand, mud, pebbles and silt into the river. T**ransportation** is the moving of the eroded material. The force of the flowing water moves the mud, sand, pebbles and silt created by erosion. Deposition is the dumping of material. The sand, mud, pebbles and silt being transported by the river is eventually dropped as the river slows.

Physical processes

A river has three main stages: youthful, near the source; middle-aged, further downstream and mature, near the mouth. Different types of erosion and deposition happen at each stage.

At the youthful stage, the mountains or hills are steep and the river is fast flowing. The direction of erosion is downwards in the river bed which forms a v-shaped valley. As the river is fast flowing there is very little deposition.

At the middle-aged stage, the river starts to slow down and the erosion is to both the river bed and the banks of the river. This causes the river to widen and to bend and twist, forming meanders and, sometimes, ox-bow lakes. Deposition of silt happens at the sides of the banks of the river as they are usually not as deep as the centre of the channel.

In the mature stage, the river is much wider because the land is flatter and so the river is much slower. This leads to erosion mostly to the banks and little or no erosion to the river bed. After heavy rain or melting snow, the river can flood at this stage. Although this is dangerous, the deposition brings nutrients which is good for agriculture. A delta is sometimes formed where a river meets the sea. This is formed because the river slows down quickly when it meets the sea and deposition happens quickly.

Vocabulary

erosion: the wearing away of rocks
transportation: the movement of rocks: the dumping of rocks
youthful: a river near its source
middle-aged: a river downstream from its source
mature: a river near its mouth
meanders: bends and changes to direction in a river
ox-bow lakes: parts of a meander cut off from the rest of a
river delta: where a river splits and spreads out into several branches before entering the sea

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