# VOLCANOES

Volcanoes occur where hot liquid rock pushes up through the Earth's crust and bursts out as an eruption. Boiling hot lava trails down the volcano's side burning everything in sight, and the most violent eruptions can fling ash, gas and boulders high into the sky!

There are about 500 active volcanoes in the world. These are all volcanoes which have erupted at least once in recent history. If a volcano hasn't erupted for thousands of years but could erupt again in the future, it is called a dormant volcano. If scientists think it hasn't erupted for more than 10,000 years and will never erupt again, it is classified as an extinct volcano.

**Geyser**
A geyser is a spring of hot water and gas, heated by volcanic activity.

**Fumarole**
This is a gap where hot gas leaks through the crust.

**Lava flow**
Lava can travel downhill faster than a person can run!

**Evacuate!**
People living near a volcano can study it to tell when it is about to erupt. They must be ready to evacuate in a hurry.

**Submarine volcano**
Around two-thirds of the world's volcanoes can't be seen because they are underwater. These are called submarine volcanoes.

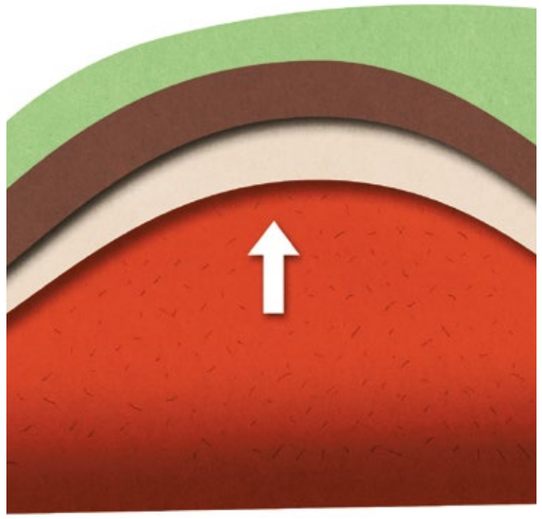
**Farming land**
The land around volcanoes is usually fertile because of all the minerals in ash and lava. People often farm there, despite the dangers of living beside a volcano!

**Main vent**
This is the place where lava bursts through the Earth's crust.

**Magma**
Molten, liquid rock inside the Earth is called magma. When it reaches the Earth's surface, it is called lava.

**Volcanic vent**

**Magma chamber**
The area where magma collects beneath a volcano is called a magma chamber.



**Epicentre**
This is the point above an earthquake's starting point.

**Hypocentre**
This is the exact point underground where a volcano starts.

**Pillow lava**
Underwater eruptions create lumpy looking pillow lava. When lava settles on the ocean floor it can build up to make underwater mountains, or islands that poke above the waves.

# MOUNTAINS

Mountains are huge rocky features, towering high over the surface of the Earth. Most formed over millions of years as tectonic movements crumpled rocks in the Earth's crust. Their jagged peaks and steep slopes were then slowly carved out by the erosive forces of wind, rain and ice.

Higher and steeper than hills, mountains are usually at least 600m tall. The highest of them all is Mt Everest, looming 8,850m above sea level. It is part of the Himalayan mountain range. Chains of mountains like these cover around 20 per cent of our planet's surface!

### Avalanche

Occasionally, snow piled up on mountains suddenly slips off, tumbling downhill at great speed. Avalanches can knock down trees and bury whole villages!

### Snow line

High mountains have snow and ice at their peak all year round – even in summer. The place where this starts is called the snow line.

### Skiing

Mountain slopes are popular holiday destinations, as they offer hiking in summer and skiing in winter.

### Mountaineering

Some mountains can only be climbed by experts, using equipment such as ice picks, crampon shoes and safety harnesses. Mountaineers face many hazards as they climb, including blizzards and falling rocks.

### Mountain weather

Mountains are often covered in clouds and have lots of rain.

Mountains are so big they can block rain so that one side of a mountain experiences much more rain than the other side!

### Peak

The mountain's highest point is its peak, or summit. On high mountains, it is an area of bare rock and snow, but on lower peaks it can still be grassy.

### Base

The bottom of the mountain is called the base. Mountains' heights are measured from sea level rather than from their base.

## Fold mountain

The most common type of mountains, these occur when huge layers of rock crash together making the plates buckle or fold – a bit like folding a piece of cloth. Fold mountains create long chains of mountains, like the Himalayas.

## Block mountain

Also known as fault mountains, these occur where there is a crack, or fault, in the Earth's crust. The crust splits into blocks, which are pushed up or down by the movement of tectonic plates. Block mountains usually have a steep front and a sloping back.

## Dome mountain

Dome mountains form where magma pushes up against Earth's crust, making it swell into a dome shape. The magma doesn't break the surface (as it would at a volcano), but instead gradually hardens into rock. Eventually the mountain's outer layer is worn away, revealing the dome-shaped rock beneath.

## Pyroclastic flow

Sometimes a fast cloud of very hot air, ash and rocks bursts out of a volcano, travelling at speeds of up to 200km/h and destroying everything in its path.

## Cone-shaped

Over many eruptions, layers of lava and ash build up to create a cone-shaped volcano.

## Build-up to eruption

Long before an eruption, magma starts to gather in the magma chamber under a volcano. It builds in pressure until it reaches bursting point and erupts through the main vent.

# GLACIERS

Glaciers are huge masses of ice, which form over hundreds of years as snow piles into layers and gets squeezed together. Some glaciers are like icy rivers winding downhill, while others cover huge areas of land or stretch over the sea.

Although glaciers are made of solid ice, they move very slowly as they are pulled along by their own weight. Moving glaciers drag rock and earth along with them – like sandpaper, this wears away the land around it. Eventually the glacier will come to a halt when it reaches warmer lands and melts, or if it gets to the sea and breaks up into icebergs.

**Accumulation zone**
The starting point of a glacier is a high, cold place where snow can build up without melting.

**Moraine**
As a glacier moves, it pulls grit and soil with it. This piles up in ridges called moraines along the glacier's edges.

**Advance and retreat**
Most glaciers move, or 'advance', at a pace of about 1m a day. If a glacier melts faster than it can move, it is called a 'retreating' glacier.

**Tributary glacier**
Tributaries are small glaciers that merge with a larger one.

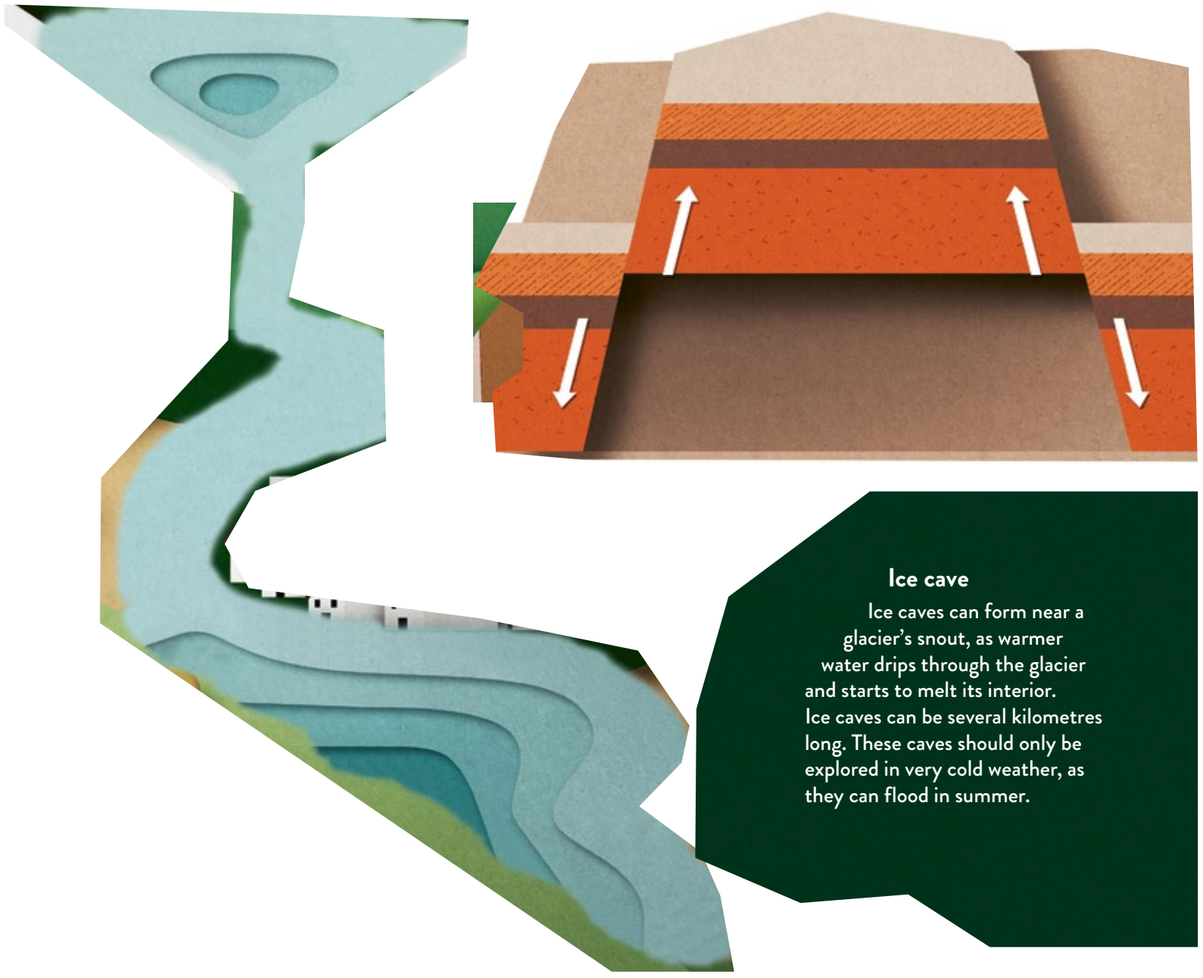
**Terminus**
The terminus (or snout) is where the glacier finally stops – either when it melts or when it reaches the sea. It is like a high, icy cliff.

**Tidewater glacier**
Glaciers that reach the sea break up into small icebergs which float away and eventually melt.

**Meltwater streams**
When a glacier melts, its meltwater pools into lakes or runs off in narrow streams. Meltwater is usually bright blue.

### Ice forming

Falling snow builds up layer after layer in an accumulation zone. The pressure of the upper layers makes snowflakes in the lower layer briefly melt before freezing again. Over hundreds of years, this process changes the snow into clear blue glacial ice.



### Ice cave

Ice caves can form near a glacier's snout, as warmer water drips through the glacier and starts to melt its interior. Ice caves can be several kilometres long. These caves should only be explored in very cold weather, as they can flood in summer.

# STORMS

When the wind picks up and dark clouds gather in, it looks like a storm is on the way. Storms can range from heavy rain and snow, to thunderstorms, sandstorms or twisting tornadoes. They usually happen when there are sudden changes in the atmosphere, with warm air rising rapidly.

The more severe a storm is, the faster its winds will be. The worst storms have winds faster than a jet plane – they can destroy homes and habitats, and even kill people. When a storm strikes, it is important to stay safe while you wait for it to pass.

### Hurricanes

These huge storms form over tropical oceans as hot air rises and spins. In the Indian Ocean they are called cyclones and in the Pacific they are called typhoons. They bring strong winds, heavy rain and huge waves. Their spinning clouds can be seen from space!

### Blizzards

Winter storms of wind and snow are called a blizzard. They can make it very difficult to see where you are going, and bring extreme cold.

### Weather forecasting

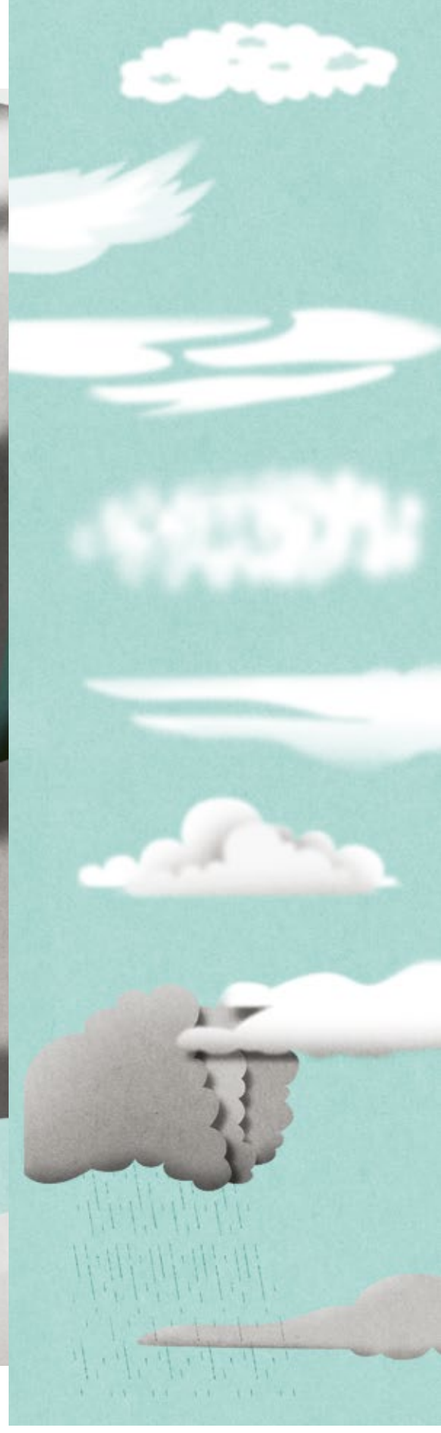
Scientists called meteorologists can predict the weather. They study photographs taken by weather satellites, and look at information gathered at weather stations: special buildings which record temperature, rainfall and wind speed.

## Tornadoes

A tornado is a spinning column of wind that weaves over the land at speeds of up to 400km/h. It forms when warm, moist air meets cool, dry air. The cold air moves downwards and the warm air spirals upwards, creating a suction effect. Most tornadoes are only around 100m wide, but they destroy everything in their path, pulling up trees, tearing apart houses and sending huge trucks flying into the air.

## Hail

Hailstones are pea-sized bits of ice – they are basically frozen raindrops, formed inside thunderclouds! Water droplets 'bounce' up and down inside the cloud, freezing as they rise, and picking up more water as they fall. They get bigger and bigger until they fall from the sky. The largest hailstone ever recorded was 20cm wide!

# GLOSSARY

**Atmosphere**
A blanket of gasses around Earth. It contains the air we breathe, keeps the Earth warm and protects us from the Sun's harmful rays.

**Avalanche**
A huge, fast cascade of snow down the side of a mountain.

**Boundary**
The point where two tectonic plates meet.

**Climate**
The weather over a long period of time.

**Core**
Earth's inner layer. The outer core is made of hot, molten iron. The inner core is a ball of solid iron at temperatures hotter than 6,000°C.

**Crust**
Earth's outer layer. The crust over Earth's continents is called continental crust; the crust over the oceans is oceanic crust.

**Deep sea trench**
Deep sea trenches occur where two oceanic plates converge (move towards each other). Alongside the trench is often a range of underwater volcanoes.

**Desert**
A very dry area which receives little or no rainfall.

**Erosion**
The wearing away of rock and soil caused by wind, water and the weather.

**Evaporation**
The process by which a liquid turns into a gas. Water turns into water vapour (gas) when it is heated up.

**Glacier**
A slowly moving mass of ice made of layers of compressed snow.

**Lava**
Molten liquid rock that has been expelled on to Earth's surface.

**Magma**
Molten, liquid rock inside the Earth.

**Mantle**
The thick middle layer of Earth's interior. Here the rock is so hot that it almost melts and can flow a bit like a liquid.

**Mid-oceanic ridge**
A long mountain range that forms where two tectonic plates move away from each other underwater.

**Mountain**
A high peak formed by tectonic movements in Earth's crust.

**River**
A channel of water that flows downhill towards a sea, lake or other river.

**Stalactite**
Stalactites hang down from cave ceilings. They build up from mineral deposits left behind by dripping water.

**Stalagmite**
Stalagmites point up from the ground. They form from mineral deposits left by dripping water.

**Tectonic plates**
Jigsaw-like pieces that make up the Earth's crust. The tectonic plates are constantly moving, creating mountains, deep sea trenches, and earthquakes.

**Volcano**
A gap in Earth's crust where magma bursts out in an eruption.

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