



# Earthquakes, Mountains and Volcanoes



The Earth's outer shell, the lithosphere, consisting of the crust and uppermost mantle, is divided into a patchwork of large tectonic plates that move slowly relative to each other. There are 7-8 major plates and many minor plates. Earthquakes, volcanic activity, mountain-building, and oceanic trench formation occur along plate boundaries.

## Key Knowledge

### Layers of the Earth

The **crust** is the thin outer layer of cold hard rock that covers the world (10km-90km thick). The **mantle** (extremely hot rock that often flows like treacle) is 3,000 km thick. The **outer core** is mostly made of iron with some nickel. It is over 4000°C. It is mostly liquid with some rocky parts. Because the outer core moves around the inner core, Earth's magnetism is created. The **inner core**, which is made of iron and nickel, is the hottest layer at over 5000°C. It melts the metals in the outer core to form magma.

### Volcanoes and Earthquakes

The **'Ring of Fire'** is an area of the Pacific Ocean that is shaped like a horseshoe. It is home to 90% of the world's earthquakes and 75% of the world's volcanoes. It contains a string of 452 volcanoes, which stretches from the southern tip of South America, up along the coast of North America, down through Japan, and into New Zealand. Deep in the earth, it is so hot that rocks actually melt and form **magma**, which makes up the **mantle** of the earth. The upper mantle mixes and moves, which creates pressure underneath the crust. This pressure can sometimes cause the mantle to leak out onto the surface of the earth.

### Mountains

A mountain is defined as being a landmass that has a naturally occurring elevation. A hill is usually anything under 600m high and a mountain anything over 600m high. The top of a mountain is called **the summit**. The bottom of a mountain is called **the base**. When two tectonic plates collide they fold over each other, like a car crash collision, and rock is pushed upwards. This type of mountain is called a **'fold mountain'** and is the most common form of mountain. **Dome mountains** occur when the pressure from lots of hot magma under the Earth's crust push the earth upwards into a dome without the magma pushing through the surface. When plates move, large cracks called **faults** appear in the crust. If the crust on either side of two faults moves together, the block of land in-between is forced upwards. If the crust on either side of two faults moves apart, the land in-between slides downwards. These create **fault block mountains**.

**Famous Mountain Ranges - Pyrenees, Alps, Carpathians, Apennines, Urals, Balkans, Caucasus Mountains**

## Key Vocabulary

<b>Active volcano</b>	A volcano that has erupted recently and there is the possibility that it may erupt again.	<b>Mount Fuji, Japan</b>	An active volcano about 100 kilometers southwest of Tokyo. Commonly called "Fuji-san," it's the country's tallest peak, at 3,776 meters.
<b>Ash Cloud</b>	A cloud of ash. It is formed by volcanic explosions.	<b>Mauna Loa in Hawaii</b>	The largest, active volcano in the world. It is 13,677 feet above sea level. From its base below sea level to its summit, Mauna Loa is taller than Mount Everest
<b>Cinder cone Volcanoes Sunset Crater in Arizona, USA</b>	Cinder cones are circular or oval cones. They are made up of small fragments of lava, which are blown into the air through a single vent. When they cool down, they form rock around the vent.	<b>Mount Vesuvius</b>	Its base is 30 miles wide and it is estimated to be around 17,000 years old.
<b>Composite Volcanoes Mount St. Helens in Washington, USA</b>	Steep-sided volcanoes and are made up of lots of layers of volcanic rocks. They usually erupt in an explosive way because the magma in these volcanoes is quite sticky. It clogs up the passage that it has to pass through.	<b>Popocatepetl, Mexico</b>	Popocatepetl is an active stratovolcano, located in the states of Puebla, Morelos and Mexico, in central Mexico, and lies in the eastern half of the Trans-Mexican volcanic belt. At 5,426 m it is the second highest peak in Mexico, after Citlaltépetl at 5,636 m.
<b>Conduit</b>	An underground passage which magma travels through.	<b>Pyroclastic flow</b>	This is the most deadly of all volcano activities. It is a liquidised mixture of solid and part-solid fragments and hot, expanding gases. They look like a snow avalanche but are extremely hot and contain poisonous gases. They move at the speed of a hurricane.
<b>Crater</b>	The mouth of a volcano. It surrounds the vent.	<b>Shield Volcanoes</b>	Volcanoes that are bowl or shield-shaped in the middle. When they erupt, the lava is quite runny and it travels long distances down the side of the volcano before it cools down.
<b>Dormant volcano</b>	A volcano that has not erupted for a long time, however, it may still erupt in the future.	<b>Throat</b>	The entrance of a volcano. It ejects lava and volcanic ash.
<b>Extinct volcano</b>	A volcano which has erupted thousands of years ago, but it will probably never erupt again.	<b>Vent</b>	An opening in the surface of the Earth through which volcanic materials, such as magma, can escape.
<b>Magma Reservoir</b>	A large underground pool of liquid rock found beneath the surface of the Earth.	<b>What is the difference between magma and lava?</b>	Magma is liquid rock inside a volcano. Lava is the name for liquid rock that has flowed out of a volcano. Lava takes a long time to cool down as it is not a good heat conductor. As a lava flow cools down, it gets slower and thicker.

## The Richter Scale

Magnitude	Earthquake effects
Under 2.0	Micro-earthquakes, not felt
2.0 to 2.9	Generally not felt but recorded by a seismograph
3.0 to 3.9	Often felt but rarely causes damage
4.0 to 4.9	Noticeable shaking of indoor items, rattling noises, windows may break. Significant damage unlikely.
5.0 to 5.9	Furniture moves, chunks of plaster fall from the walls. Damage to poorly constructed buildings.
6.0 to 6.9	Major damage to poorly constructed buildings. Some damage to well-designed buildings.
7.0 to 7.9	Buildings displaced from foundations, cracks in the ground, underground pipes burst.
8.0 or greater	Near total destruction. Waves moving through Earth visible with the naked eye.

