

Y6 Geography: Dangerous Earth - Volcanoes & Earthquakes

Layers of the Earth

Crust

The crust is the thinnest of the Earth's layers. It is made of solid, cool rock and is a bit like a hard shell all around our planet.

Mantle

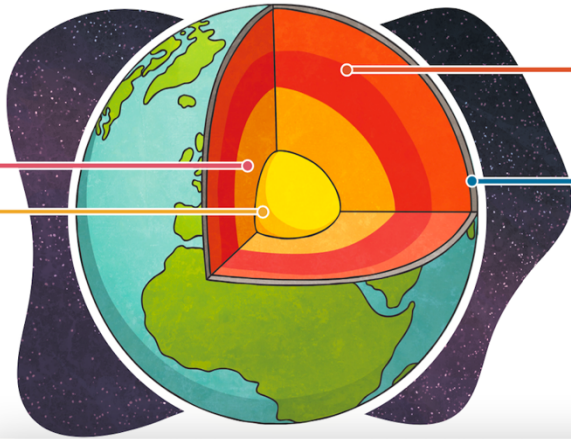
Many scientists believe the mantle layer is made up of a churning mass of magma, molten rock and solid igneous rock. As you go deeper into the mantle layer, the pressure and temperature increases and the layer becomes more solid.

Outer Core

The core of our planet is made up of heavy metals including nickel and iron. The outer core layer is believed to be a liquid with an approximate temperature of over 5000°C (9032°F). The liquid metal is very thin and churns continuously, with hotter metal rising up and cooler denser metal sinking down. This process creates the Earth's magnetic field!

Inner Core

The inner core has approximately the same temperature as the surface of the sun: around 5400°C (9800°F). The metal here appears to be solid but is actually a liquid under such immense pressure that the molecules cannot move around.



Key Vocabulary

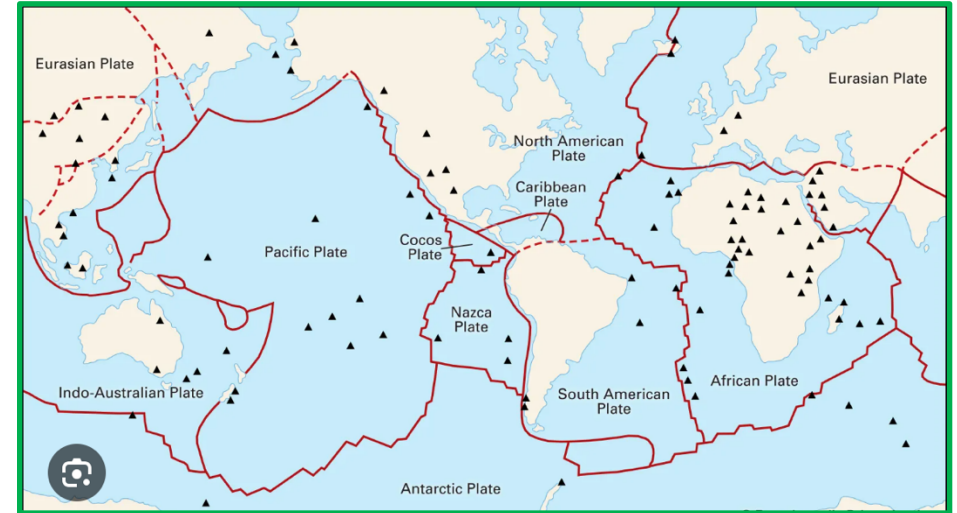
geology, core, mantle, crust, tectonic plates, plate boundary, fault, divergent, convergent, conservative, collision, subduction, earthquake, epicentre, focus, seismic, Richter Scale, tsunami, volcano, vent, composite, shield, fissure, erupt, lava, magma, dormant, extinct, pyroclastic flow

Prior learning that will help me

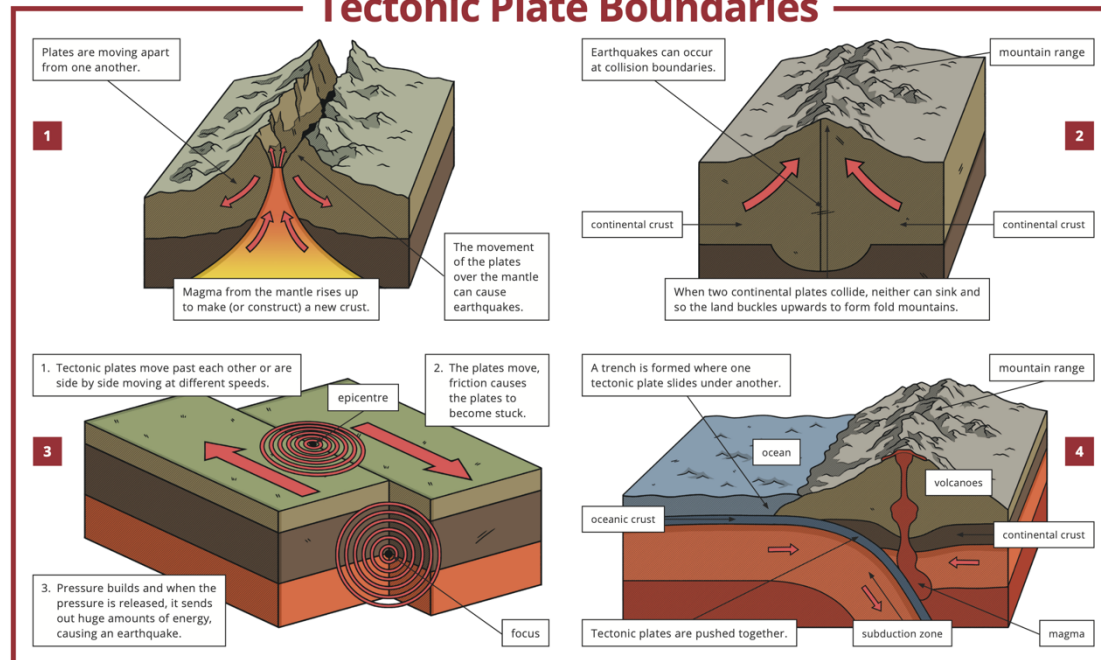
- Recall and understand key vocabulary from Y5: **mountain, tectonic plates, magma, lava, fold, block, dome, volcanic.**
- Recall and describe how mountains are formed as a result of movement beneath the earth's surface.
- Understand that physical geography can affect the way of life in a region – negatively and positively.
- Locate geologically significant regions around the world: Washington, USA (N. America) and Iceland (Europe).

Tectonic Plates

The crust (together with the upper layer of the mantle) is made up of huge pieces of continental and oceanic plate. These **tectonic plates** fit together like a jigsaw, and are moving at a rate of a few centimetres a year – in different directions and at different speeds.



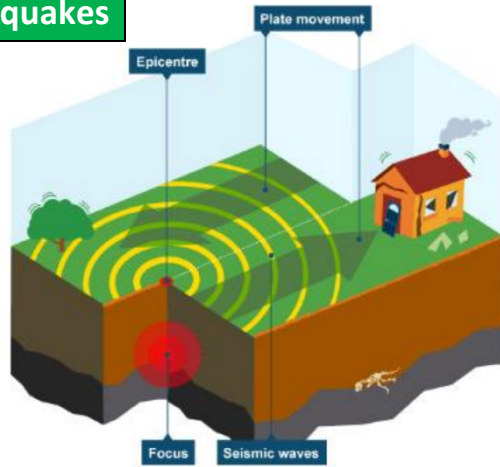
Tectonic Plate Boundaries



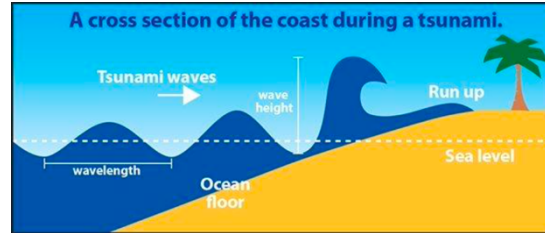
Some plates slide past each other, others move away from each other, and some collide – forcing one under the other, or pushing up the ground above.

- Constructive Plate Boundary
- Collision Plate Boundary
- Conservative Plate Boundary
- Destructive Plate Boundary

Earthquakes



- Earthquakes are caused when tectonic plates suddenly move - this is why most occur near plate boundaries. The San Andreas Fault (California, USA), lying on the east of the Pacific Rim, is a particularly active earthquake region.
- The power of an earthquake is measured on the Richter Scale (0-10). Point 7 on the scale is 30 times more powerful than point 6. Earthquakes can be barely noticeable at the surface, or strong enough to lead to huge devastation, causing buildings to collapse, and huge cracks to appear on the ground.



- A tsunami ('harbour wave' in Japanese) is the result of an underwater earthquake, which moves a large amount of water upwards very suddenly, causing a series of waves. These waves become bigger as they move through shallow water near land

- The tsunami caused by an earthquake off the coast of Indonesia on Boxing Day 2004, caused the deaths of 250,000 people, and devastated the coastline of 20 countries.



Volcanoes

- A volcano is an opening in the Earth's crust that allows magma, hot ash and gases to escape.
- **Composite volcanoes** were formed as layers of thick lava and ash built up around the vent. They can result in violent eruptions, such as those at Mount Saint Helens (Washington, USA), Mount Vesuvius (Naples, Italy) and Eyjafjallajokull (Iceland).
- **Shield** and **Fissure Volcanoes** do not have such explosive eruptions; the lava is more runny, which spreads and hardens over a wider area, resulting in gentle slopes. The south-western region of Iceland has had multiple fissure eruptions since 2021.
- Volcanoes may be **active** (have erupted in the last 10,000 years), **dormant** (may erupt again), **extinct** (will not erupt again).
- Eruptions can be very dangerous, producing floods (from melting ice) and landslides, as well as ash and gas clouds that can poison the air, block out the sun and disrupt air travel. **Pyroclastic flows** can occur, when a huge column of hot ash, gas and rock collapse and move at great speed over the ground – destroying everything in their path.

Mount Saint Helens, USA, May 1980



A fissure eruption in Iceland, March 2024

It's not all bad!

- Being a volcanic hotspot can also have a positive impact, and nowhere shows this better than the small island nation of Iceland, in the North Atlantic.
- Iceland was formed thousands of years ago, over one of Earth's natural magma 'hotspots'; it sits on top of the North American tectonic plate (moving west) and the Eurasian tectonic plate (moving east).
- Iceland's volcanic landscape attracts thousands of tourists every year, its natural springs provide free mineral water, and geothermal energy provides an endless supply of electricity.



The lava and ash from an eruption can break down to provide valuable nutrients for the soil, which is beneficial for growing crops. The slopes of Mount Vesuvius have been farmed for centuries, providing acres of fertile fruit orchards and vines, as well as forests and orchids.

