

# Global Distribution of Earthquakes | Sample answer

## Examine how the tectonic cycle helps to explain the global distribution of one of the following: • Earthquakes

The theory of tectonic states that the lithosphere is broken into seven major plates and several minor plates. Plates are huge slabs of rocks that float on semi-molten rock of the upper mantle (asthenosphere) and are moved around by slow but powerful convection currents. An earthquake can be said to be a vibration within the earth's crust, caused by rocks snapping suddenly to release energy along a plate boundary. The plate boundary can either be destructive, constructive or transverse, leading to earthquakes being distributed across the globe.

Earthquakes commonly occur at destructive plate boundaries, where plates collide and crust is destroyed. These are called earthquake zones. When a heavier oceanic crust collides with a lighter continental crust, the heavier oceanic crust is pushed under the continental plate in the process of subduction. An example of a subduction zone would be the Nazca plate being subducted under the South American plate. As the convection current continues to pull the plate down into the mantle, it may become jammed against rocks of the opposing plate. Pressure will continue to build as the rock is pulled downwards. Eventually, the stress becomes so great the rocks will snap along the fault line and release built-up, stored energy. This is called elastic rebound. The energy is released as seismic waves that radiate towards the surface. Where the seismic waves originate from is called the earthquake's focus. The epicentre is the area directly above the focus; it is where the earthquake is at its strongest. Many of these earthquakes are deep focused meaning that the energy is released at depths exceeding 300 km within the earth crust. These earthquakes are most common at subduction zones. However, sometimes they are intermediate earthquakes - earthquakes that occur at depths of 70-300 km within the crust.

As plate slips past each other, they cause shallow focus earthquakes, where the earthquakes occur within 70 km of the surface. They tend to be more destructive than deep focused, as they occur closer to the surface. In California, USA, the Pacific plates moves northwestwards at a rate of 6cm a year whilst the North American moves the same direction at a rate of only 1 cm a year. Tension builds as rocks become slammed against each other. When rocks do snap, the plates

lurch past each other releasing shockwaves. According to the US geological survey the greatest earthquake to occur in this area was Fort Tejon, with a magnitude of 7.9 in San Francisco.

Plates separate at constructive boundaries and new crust is formed. The rocks snap as the plates split along fault lines causing the earth to tremor. These earthquakes are common along the Mid Atlantic Ridge, where the North American plate separates from the Eurasian plate.