

## Deepening Understanding

### YR5 Explanation Text

#### How Earthquakes are Caused by Laura Curtis



The effects of an earthquake can be devastating: it can destroy settlements, change landscapes and cause many deaths. An earthquake is a natural phenomenon caused by the sudden release of built-up pressure inside the earth's crust but what factors make this event happen?

You might think that our Earth is one giant lump of rock but you would be mistaken: there is a hot, molten core bubbling away inside the outer crust which is surprisingly thin (only around 8 km under the oceans and 25 km under the continents). The countries we live in feel like they are safely anchored on solid rocky foundations but in reality they are fixed to enormous rocky slabs - called 'tectonic plates' - that can slide around on the molten rock beneath; it is when these plates move around and collide that earthquakes occur.

Earthquakes happen at places called faults (or fault lines) where the jagged edges of two tectonic plates grind against one another. Tectonic plates are constantly moving (in



incredibly slow motion) and we do not even notice this happening most of the time. However, every once in a while, two plates will suddenly jolt into a new position. As a result, pressure builds up between the plates and when this pressure is eventually released an earthquake tends to occur.

An earthquake starts at a point called the 'focus' where the moving plates are in contact; pressure then travels out through the ground as very low-frequency sound waves called shock waves (or seismic waves). The greatest damage happens at a place called the 'epicenter' which is the point on the Earth's surface directly above the focus. Earthquakes continue until all the energy released at the focus has been safely dissipated. Even then, there is still a chance that further earthquakes (known as aftershocks) will happen for some hours or even days afterward.

Most earthquake activity happens in the middle of the ocean where plates are pushing apart on the seabed. Some of the most violent earthquakes happen around the edges of a huge tectonic plate in the Pacific Ocean forming an intense area of activity known as the 'Ring of Fire' (so-called because there are many active volcanoes there too).

It is important that earthquake-prone countries (such as Japan) build houses and buildings which react well to earthquakes: the buildings need to be able to withstand the violent ground jolting that an earthquake can exert. Good engineering can help stop buildings collapsing under the stress of large earthquakes. There are a range of building designs that can withstand earthquakes: structures need to be built which can 'wobble' when an earthquake hits (they literally float on a base of ball-bearings or moveable cylinders); the roof, walls and floor can be 'tied' into a box-like structure;



and, most essentially, the building materials used need to be of a top quality.

Unfortunately, there is not much we can do to stop natural disasters like earthquakes: they are an inevitable part of living on a planet like Earth which is constantly seething inside with hidden power. What we can do, however, is monitor changes in the ground beneath our feet so we can predict when earthquakes will happen. We can design our buildings much more cleverly so they absorb the power of sudden shocks. Finally, we can prepare ourselves for the inevitable by planning for the time when (and not if) the next earthquake will strike.

