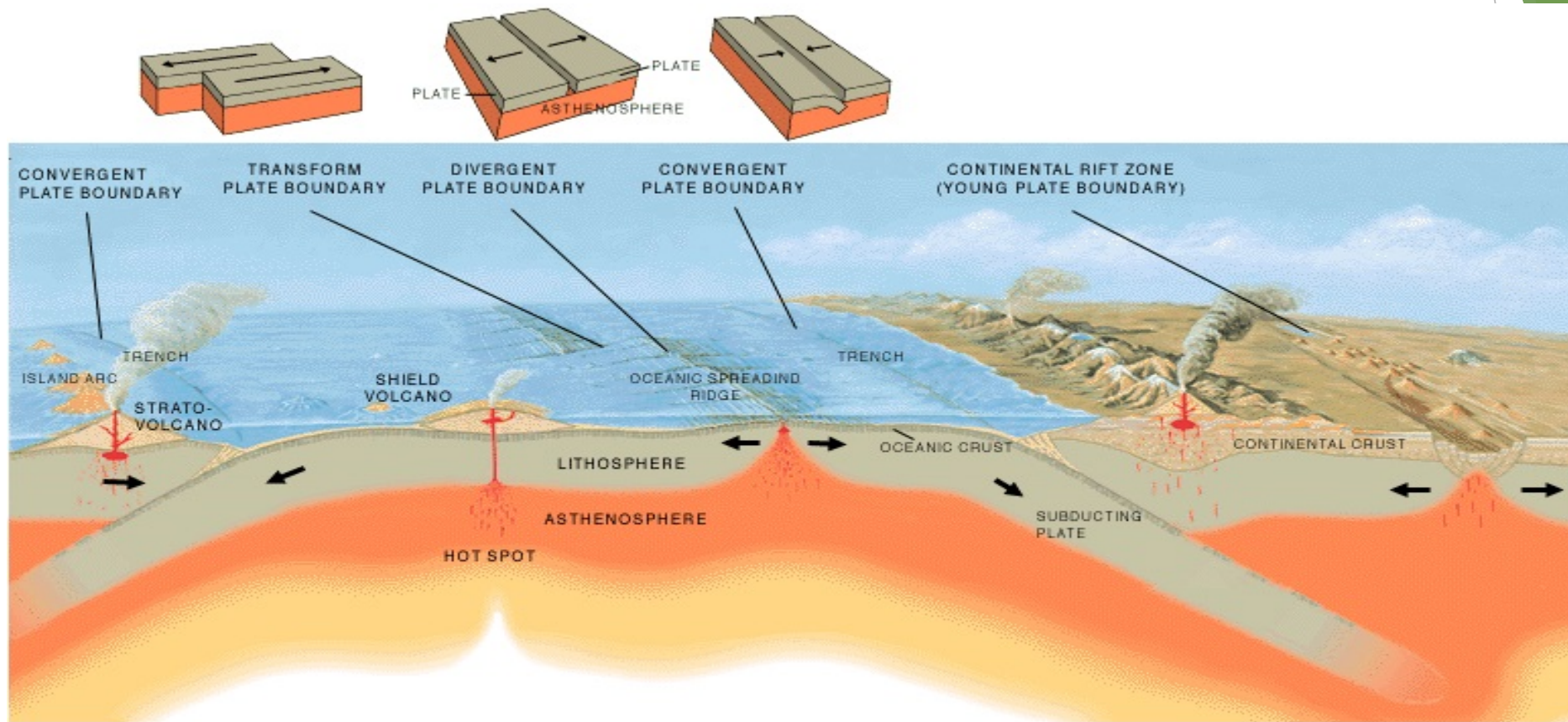


# Our Changing Earth

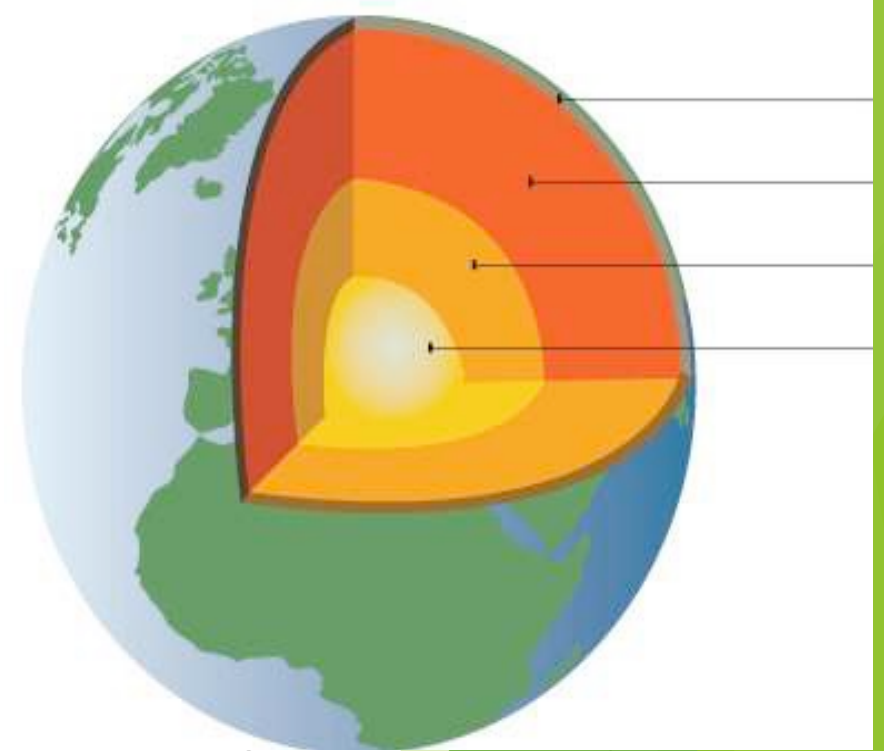


## Revision

## Earth is made up of four distinct layers:

1. **The inner core** is in the centre and is the hottest part of the Earth. It is solid and made up of iron and nickel with temperatures of up to 5 500°C. With its immense heat energy, the inner core is like the engine room of the Earth.
2. **The outer core** is the layer surrounding the inner core. It is a liquid layer, also made up of iron and nickel. It is still extremely hot, with temperatures similar to the inner core.
3. **The mantle** is the widest section of the Earth. It has a thickness of approximately 2 900 km. The mantle is made up of semi-molten rock called magma. In the upper parts of the mantle the rock is hard, but lower down the rock is soft and beginning to melt.
4. **The crust** is the outer layer of the earth. It is a thin layer between 0-60 km thick. The crust is the solid rock layer upon which we live. There are two different types of crust: **continental crust**, which carries land, and **oceanic crust**, which carries water

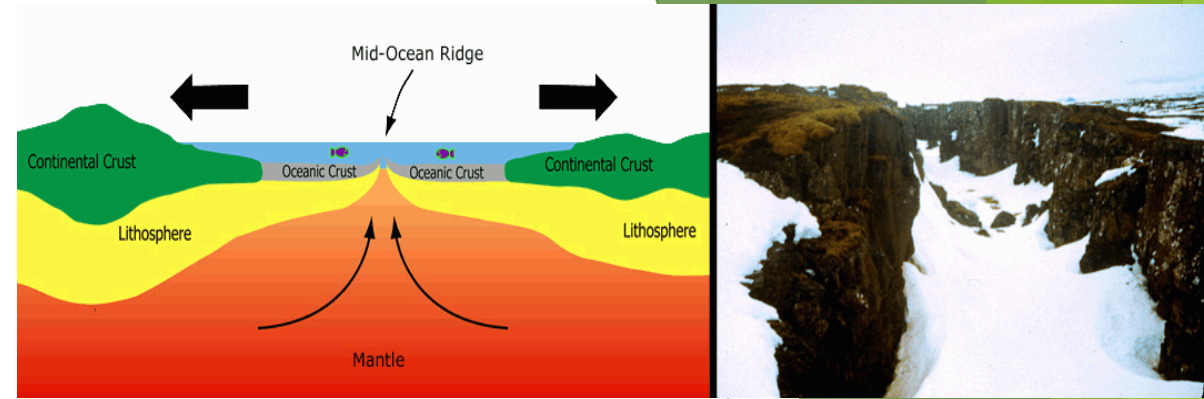
## Structure of the Earth



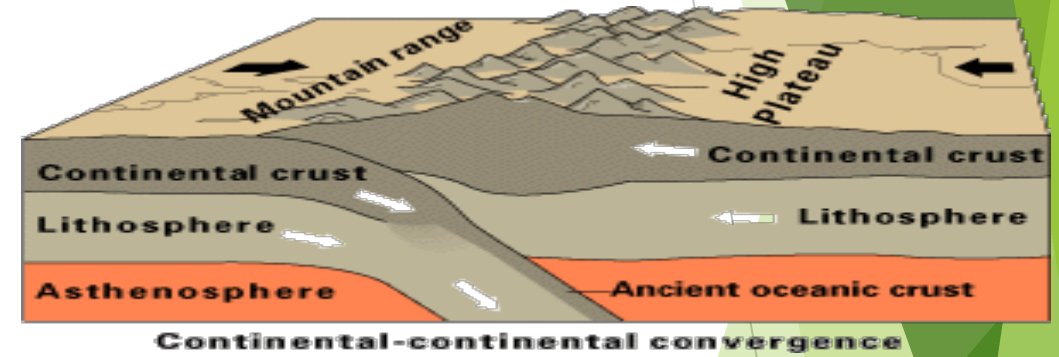
# How do the Earth's plates move?

At **DIVERGENT BOUNDARIES** the plates move apart. Pressure that builds up in the middle of the Earth can push two plates and cause them to spread apart.

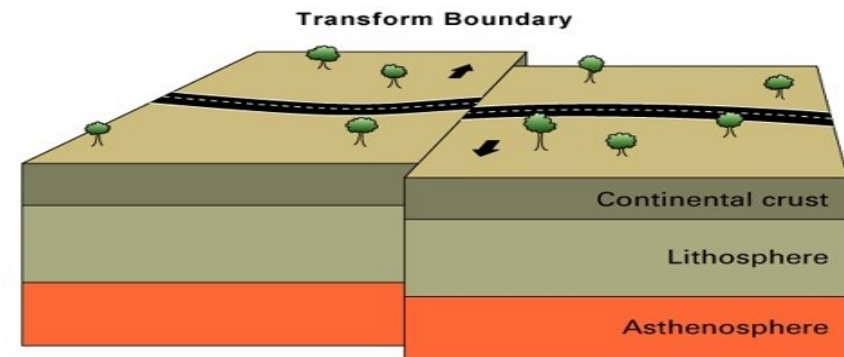
This usually happens under the ocean because the plate is thinner there, but can also happen on land. This forms mid-oceanic ridges (in the ocean) and rift valleys (on land).



At **CONVERGENT BOUNDARIES** the plates move towards each other. Pressure can cause two plates to push together. Over a very long time, this pushing can create mountains.



At **TRANSFORMING BOUNDARIES** the plates slide past each other. Plates can move past each other in opposite directions, or they can move in the same direction at different speeds. The plates are pushed together strongly so, as they move past each other, a lot of pressure builds up. An earthquake happens when this pressure is released



As plates move around on Earth's surface, there are places where, rather than converge or diverge, the plates grind past each other. This may occur as perpendicular offsets at spreading boundaries or as the boundary itself. The most well known example of this type is the San Andreas Fault in California.



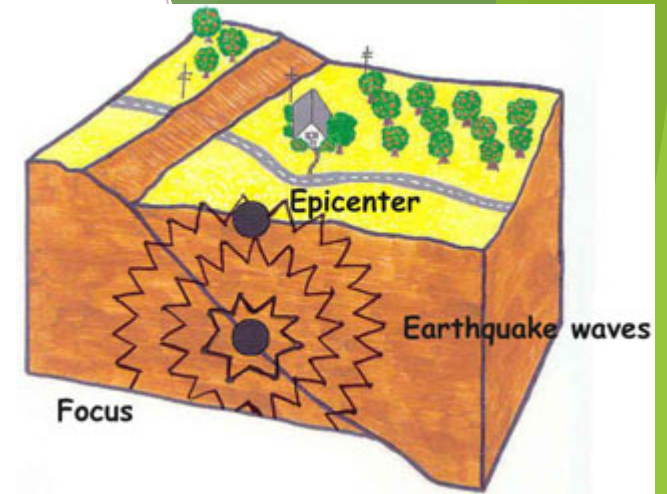
## How earthquakes form

When tectonic plates move against each other, they do not slide smoothly. The tectonic plates become stuck, even though they are under pressure to move.

The pressure builds up until suddenly, the tectonic plates give way and move, releasing the built-up energy. *Some of the energy is released in the form of 'seismic waves'* (energy that travels in the form of waves through the Earth).

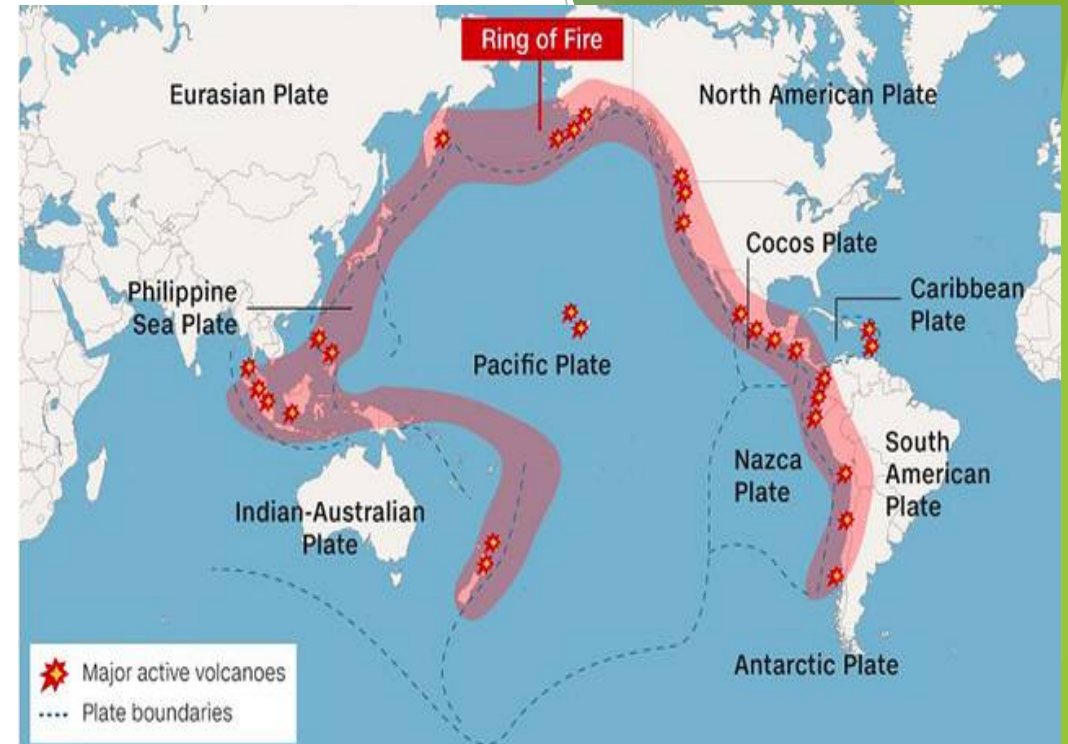
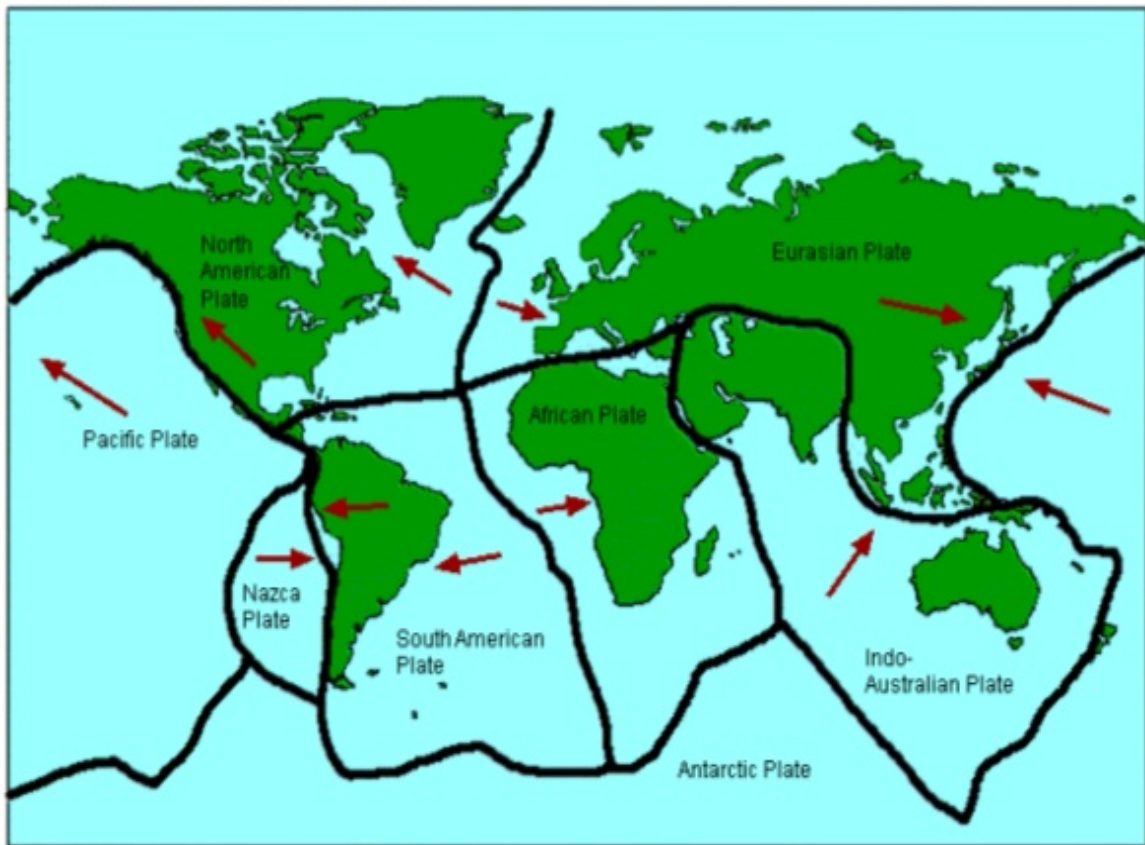
These waves radiate in all directions, including towards the Earth's surface, where they are felt as a shaking or displacement of the ground. We call these events earthquakes. *Aftershocks are tremors that follow the largest shock. They are smaller than the main shock and can continue over a period of weeks, months, or even years. And can cause tsunami's, a landslide or intense ground shaking.*

Most earthquakes occur on and adjacent to the boundaries of tectonic plates, but sometimes they are felt in the middle of tectonic plates. As tectonic plates continue to move and tectonic plate boundaries change over millions of years, weakened boundary regions become part of the interior of the tectonic plates. These zones of weakness within the continents can cause earthquakes in response to the stresses at the edges of the tectonic plate or inside the Earth's crust.



The main tectonic plates which cover the surface of the Earth. Pay specific attention to the movement of the plates and geological features formed due to this movement.

## PLATE TECTONICS



"There are always one or a few volcanoes acting up somewhere along the **Ring of Fire**, and there are frequent earthquakes. **Why?**"



A



B



C



Study these pictures carefully. What do you think has happened here?  
(Think about the movement of tectonic plates)



## What causes a tsunami?...

A tsunami is a large ocean wave that is caused by sudden motion on the ocean floor. This sudden motion could be an earthquake, a powerful volcanic eruption, or an underwater landslide. The impact of a large meteorite could also cause a tsunami. Tsunamis travel across the open ocean at great speeds and build into large deadly waves in the shallow water of a shoreline.

