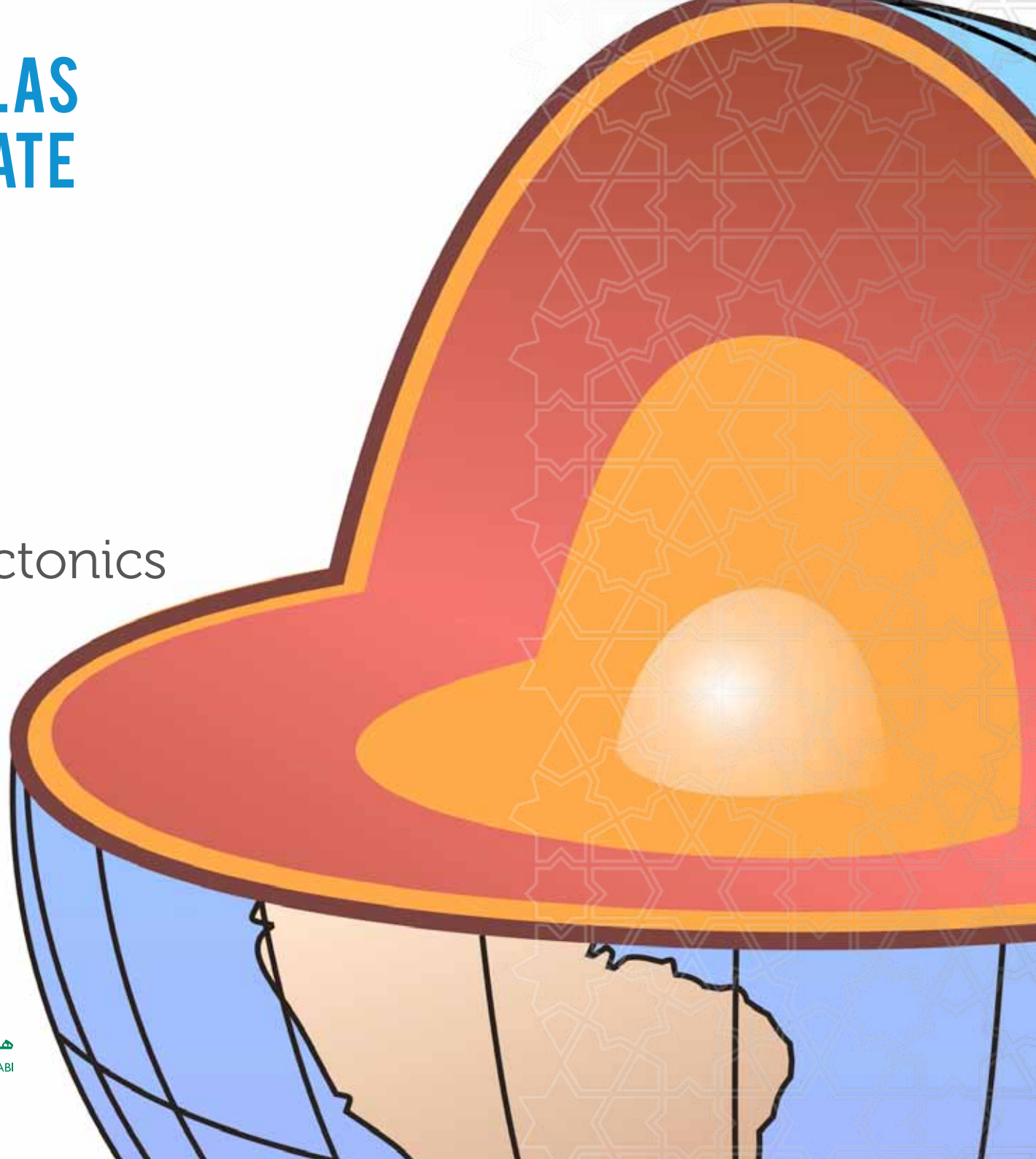


ENVIRONMENTAL ATLAS OF ABU DHABI EMIRATE

Lesson Plan: Plate Tectonics



Lesson Plan: Plate Tectonics

Lesson Plan Content:

This lesson plan and slide presentation is to be used in conjunction with:

- 1 x plate tectonics teacher briefing
- 1 x plate tectonics teacher fact sheet
- 1 x plate tectonics class work sheet

Lesson Overview:

Students will gain an understanding of plate tectonics and plate boundaries.

Estimated Time Requirement:

One 45 minute session.

Learning Objectives:

Students will be able to:

- > understand our planet is made of layers.
- > understand the movement and collision of plates on the surface of the Earth
- > identify the major tectonic plates
- > create their own tectonic plate map

Skills:

This lesson plan can aid students to demonstrate:

- > Classifying skills
- > Communicating skills
- > Observing skills

Preparation prior to the lesson:

Before commencing the lesson, download and read through the teacher briefing, fact sheet, work sheet and this presentation so you are fully conversant with the content and key terms. Also, ensure that the work sheet activity is possible to undertake in your classroom environment.

Lesson Sequence:

Here is a sequence of the lesson with suggested timings:

Preparation (5mins)

Inform the students that today they are all going to learn about the make up of our planet, plate tectonics, why earthquakes and volcanoes occur and take part in some fun activity. Elicit from the students some of the things they already know about what's inside the Earth.

Presentation (25mins)

Using a projector to present to the class, progressively run through the slides to impart all the key points about plate tectonics.

Activity (25mins)

Having completed the presentation,

undertake the participation and discussion exercise contained in the work sheet This activity enables students to discover in a hands on manner, the major tectonic plates.

Assessment (5mins)

Ask students to write and/or illustrate what they did during this lesson and what they learned from their participation in the activity.

Close of Lesson

Closure:

Ensure each group has completed the practical session and illustrated and labelled their tectonic plate maps.

Extending the Lesson:

Encourage students to do some research at home on plate tectonics and discover how the continents have changed over geological time.

Source of Lesson:

Abu Dhabi Global Environmental Data Initiative.

All supporting material can be downloaded freely at: www.environmentalatlas.ae

Classroom Presentation: Plate Tectonics

Inside the Earth

If for a moment we could look inside the Earth, we would see it's made of four concentric layers.

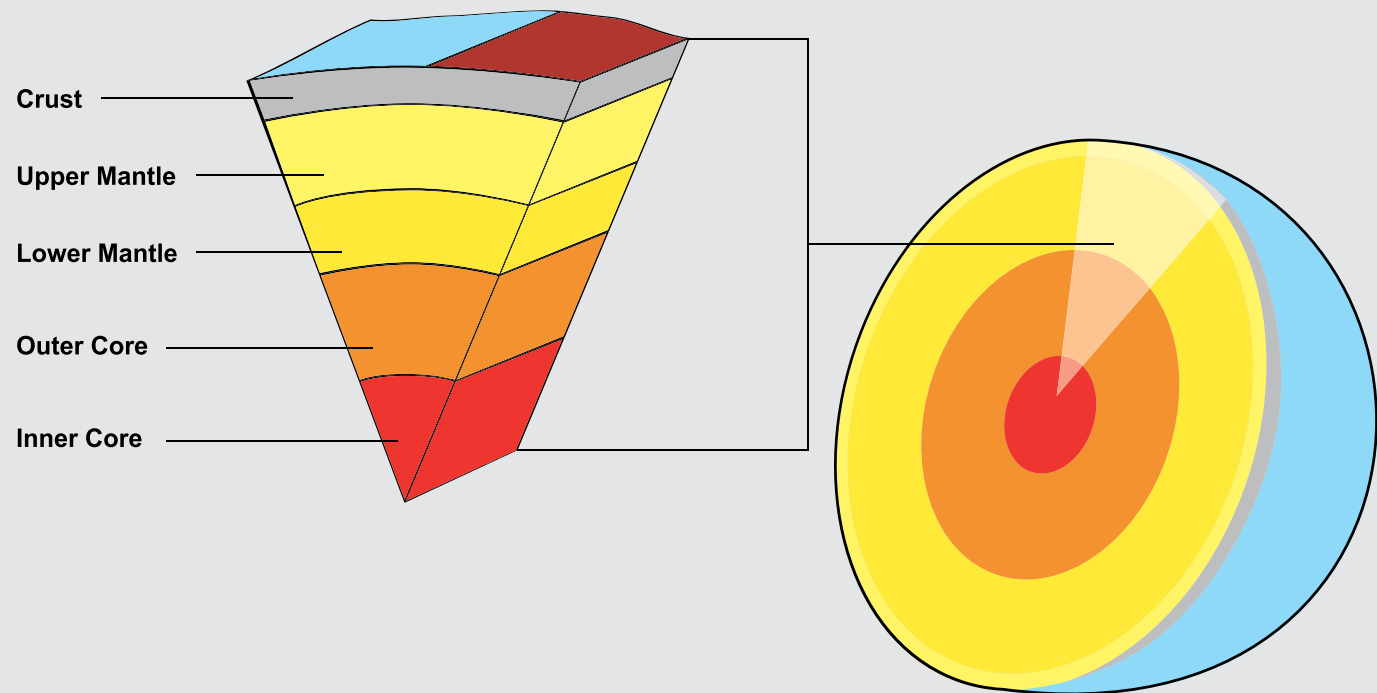


The inner core

The Earth's inner core is in the centre and is the hottest part of the Earth.

It is like a solid ball made up of the elements iron and nickel.

With immense temperatures of up to $5,500^{\circ}\text{C}$, the temperature at the inner core is thought to be similar to that of the surface of the Sun.

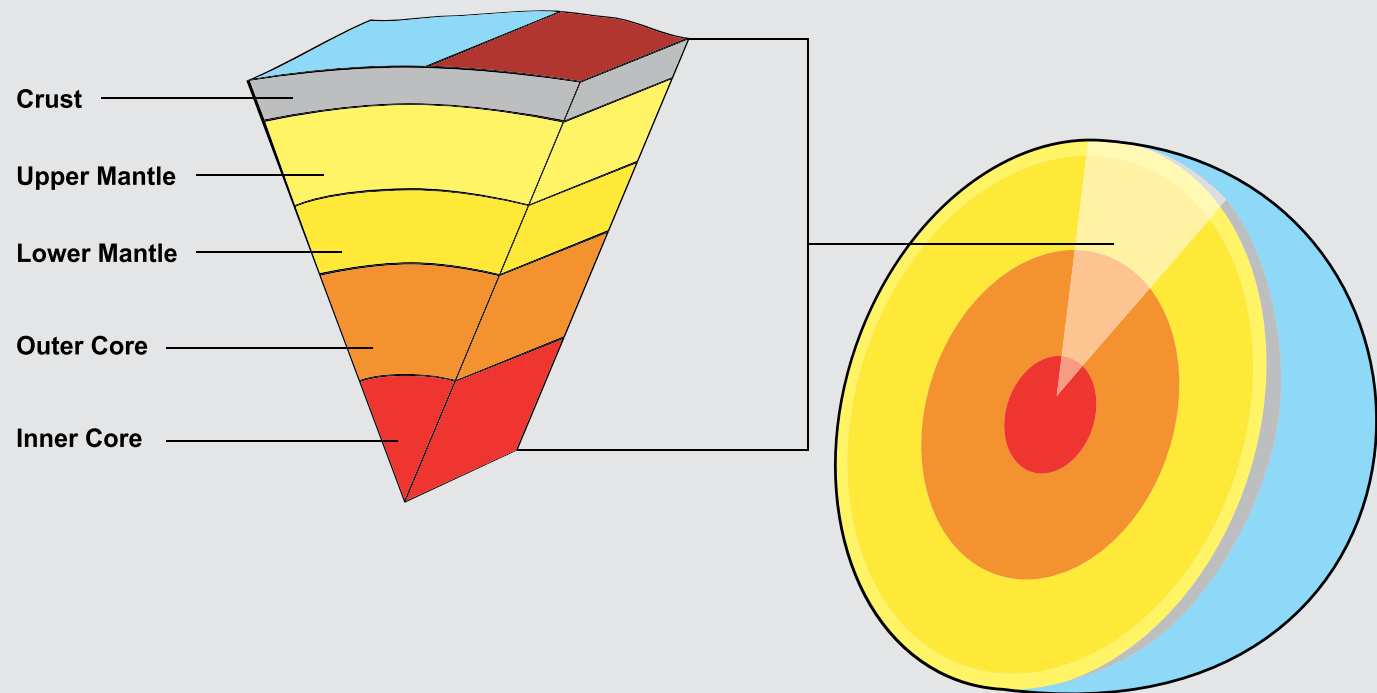


The outer core

The Earth's outer core is a liquid layer that surrounds the inner core.

This layer is about 2,250 kilometers thick and it is believed that this outer core is made up of super-heated liquid molten lava.

This lava is believed to be mostly iron, and nickel.



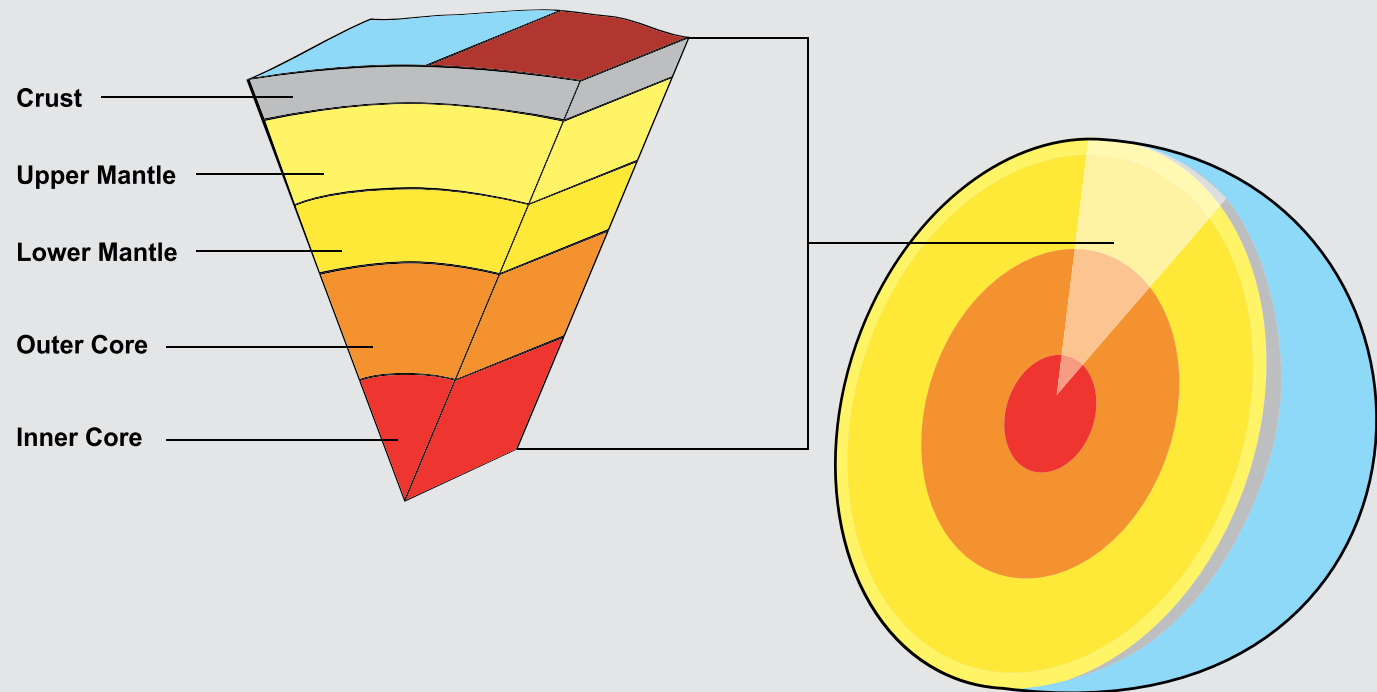
The mantle

The next layer is the Earth's mantle.

It is the widest section of the Earth.

It has a diameter of approximately 2,900 km and is about 85% of the total weight and mass of the Earth.

The mantle is made up of semi-molten rock called magma.

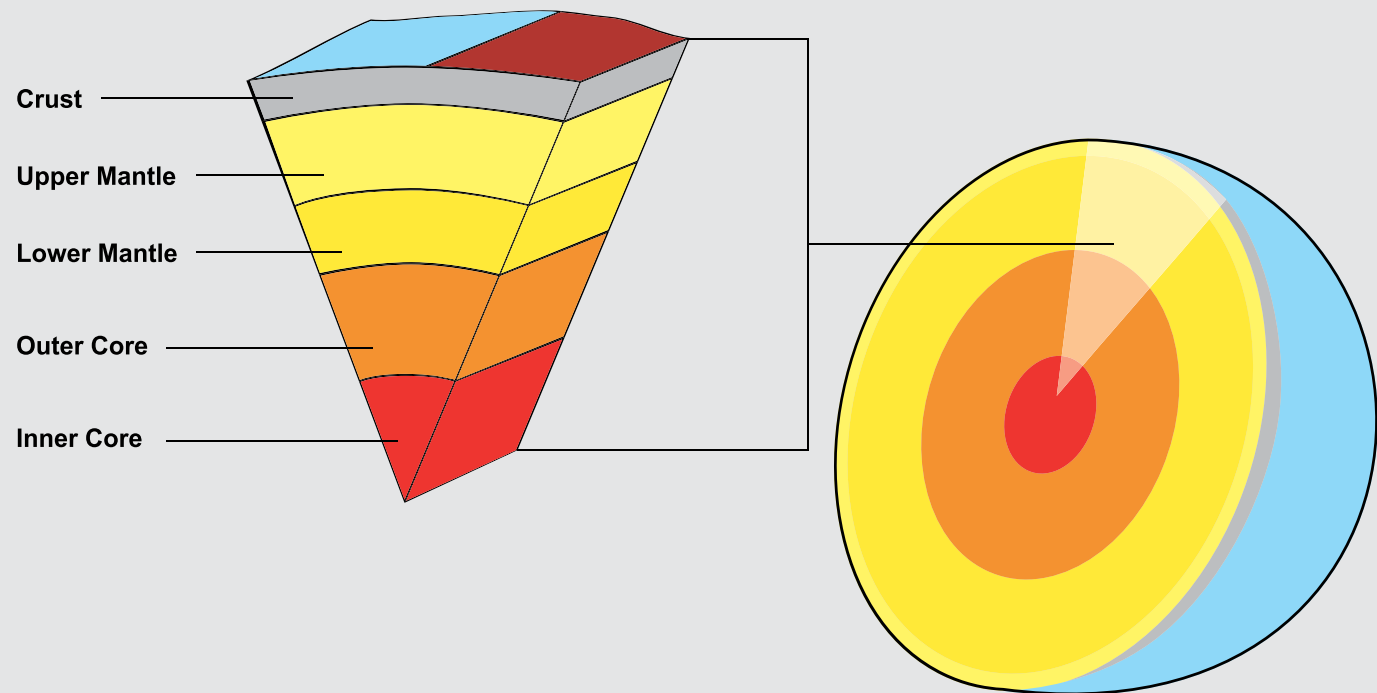


The crust

The Earth's crust is the solid outer layer of the Earth.

It is a thin layer between 0-60 km thick and makes up less than 1% of the Earth's mass.

The crust is the solid rock layer upon which we all live.

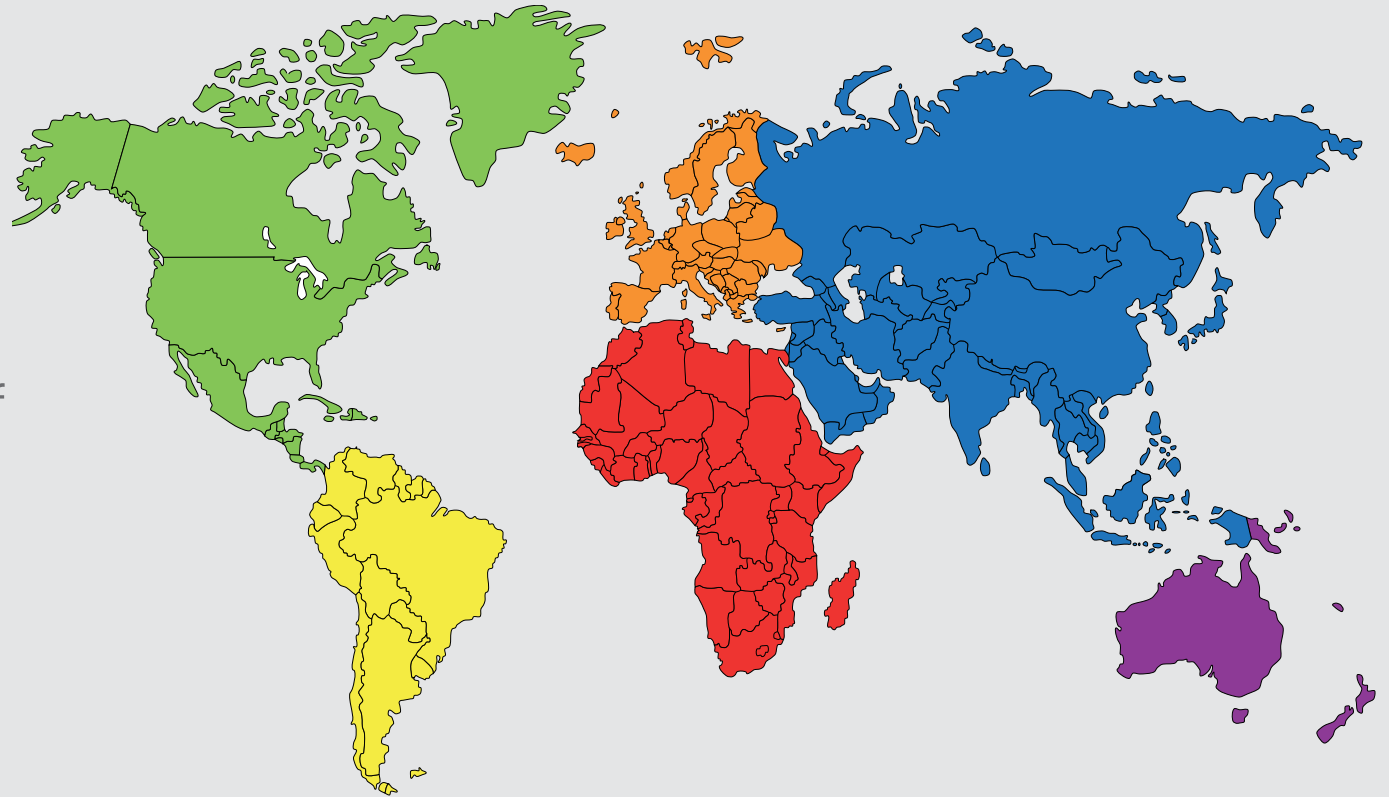


The continents

When you look at our planet, you see that the surface of the Earth consists of a lot of water (71%).

The other 29% consists of land.

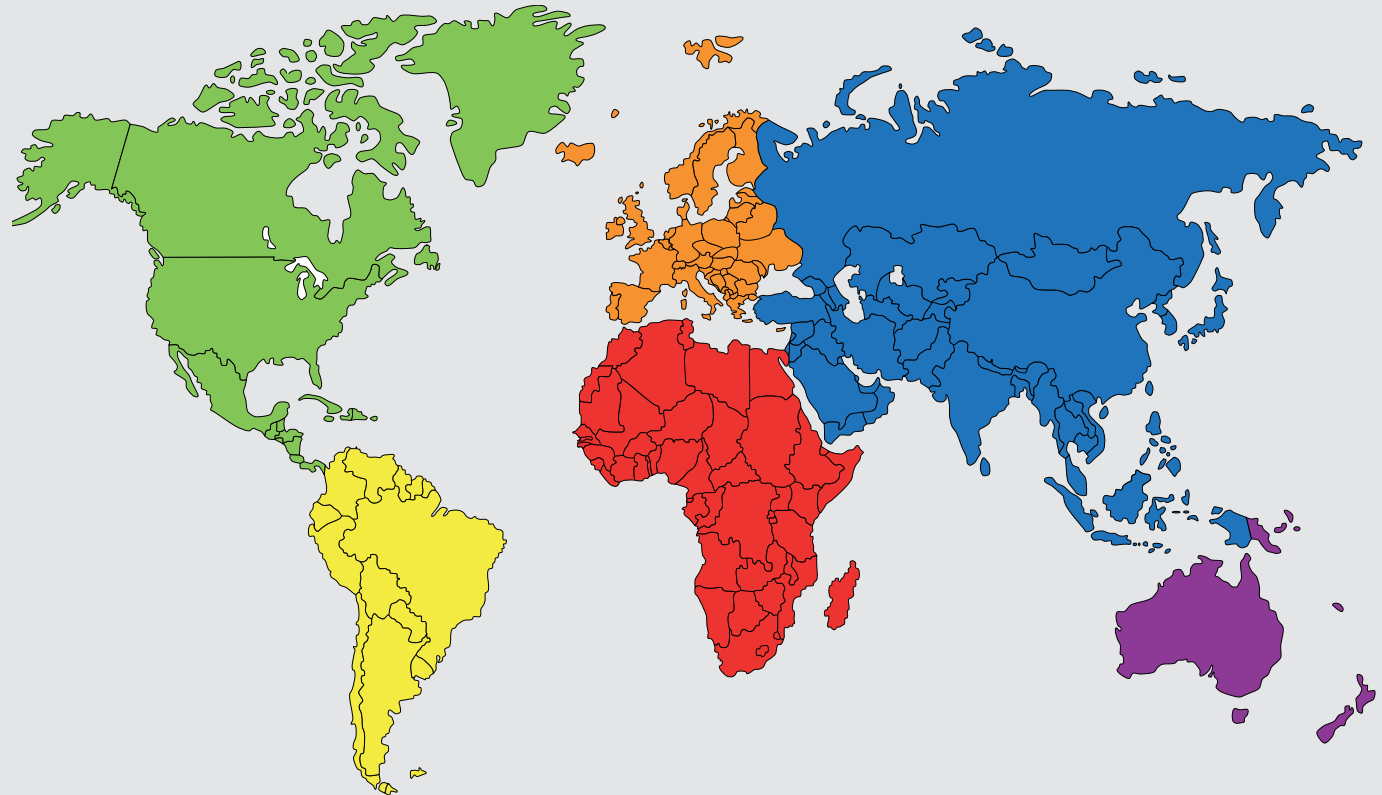
You can divide this land into six big pieces, which are called continents.



The continents

The different continents, arranged in decreasing order of size are:

- > Eurasia (Europe & Asia)
- > Africa
- > North America
- > South America,
- > Antarctica
- > Australia



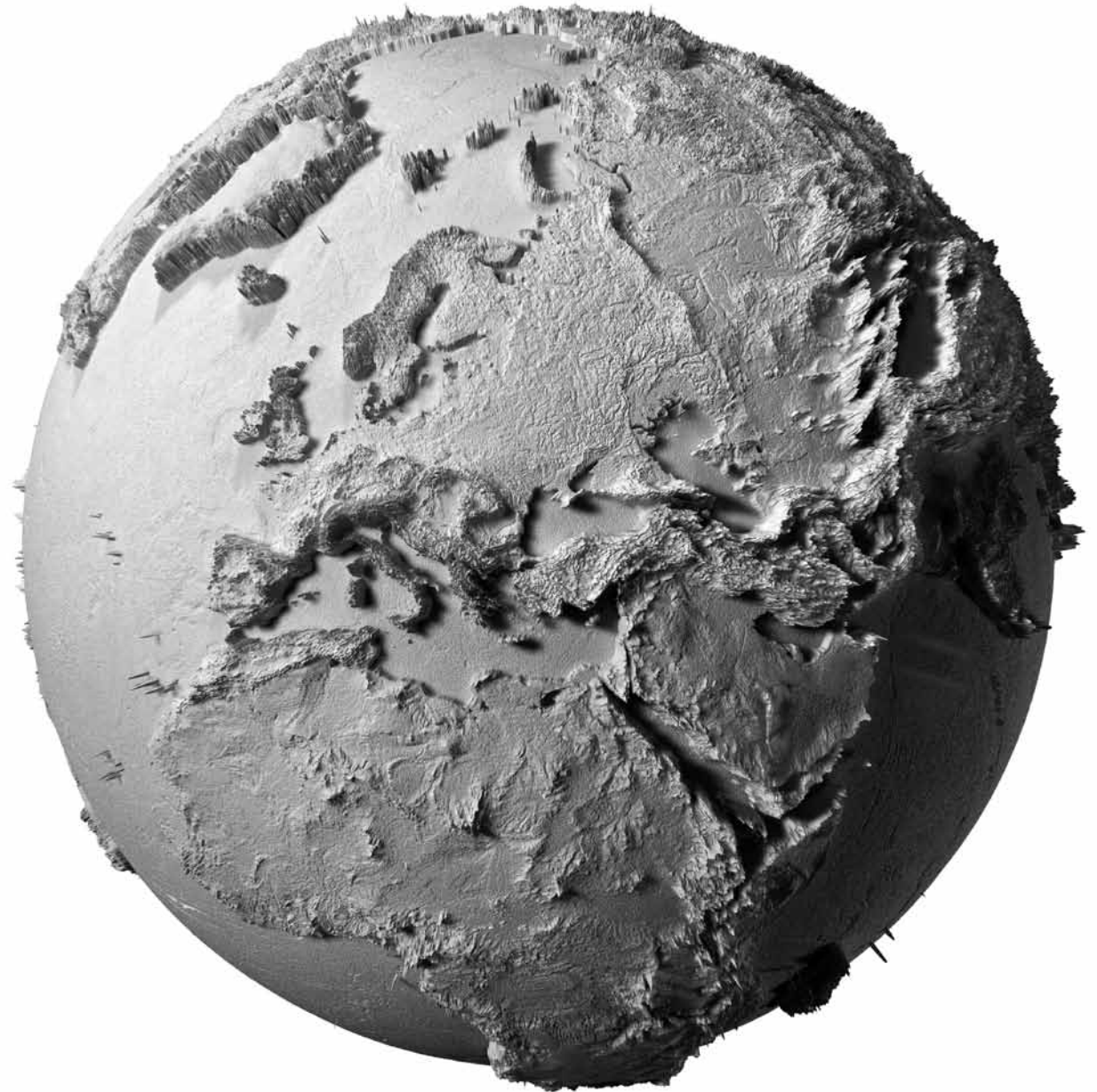
There are two different types of crust:

Oceanic crust

> The oceanic crust is the crust below the oceans.

> It is made up of extremely dense rock which scientists call Sima.

> Sima is made out of two basic substances. These substances are silica and magnesium.



Continental crust

The continental crust carries land.

> The rocks found in the crust of the continents is called Sial.

> Sial is made of silica, and aluminum, and is much lighter than the Sima beneath it.

> The continental crust is older than the oceanic crust, some rocks are 3.8 billion years old.

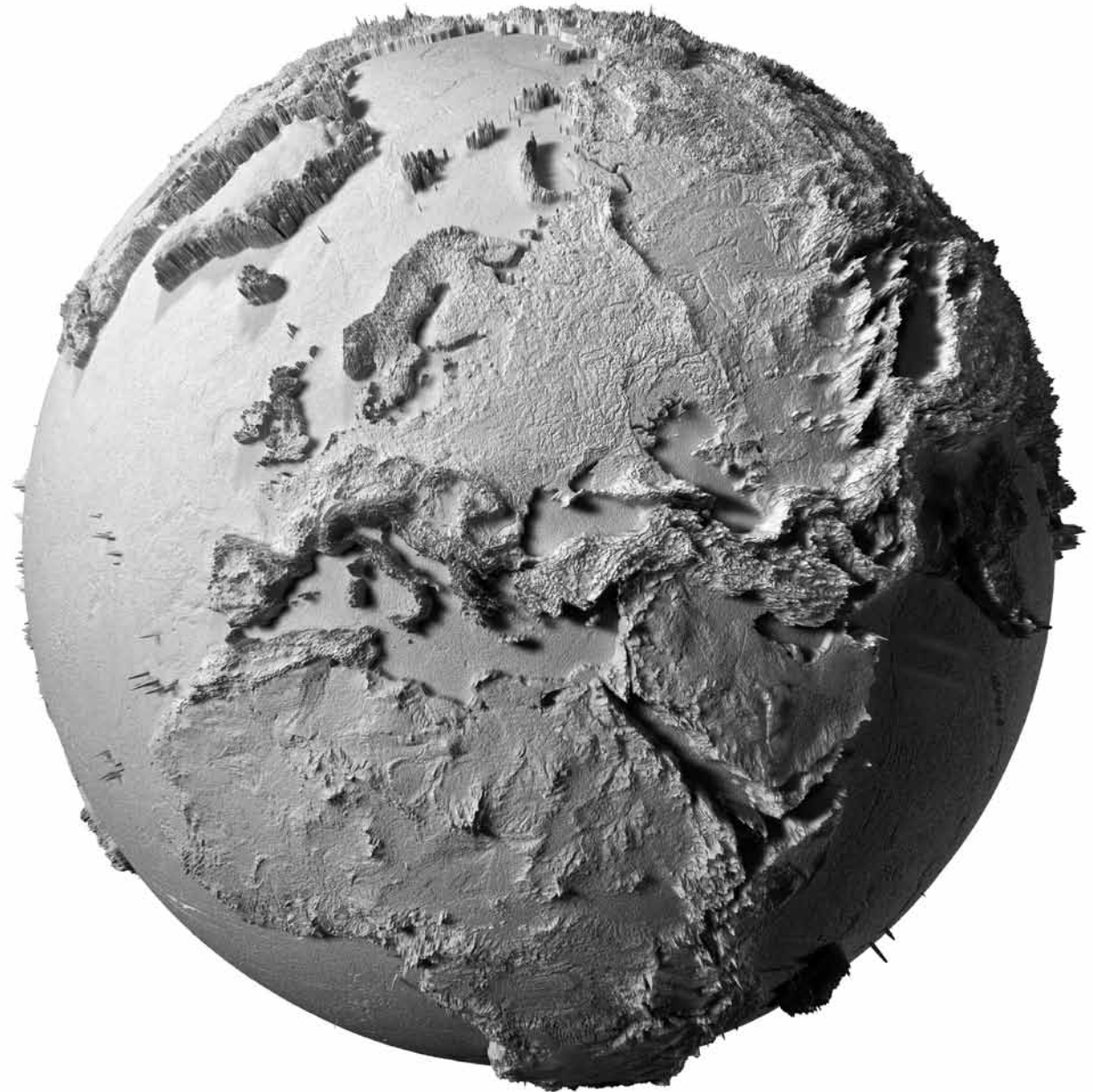


Plate tectonics

The Earth's crust is divided into a series of plates that are continually moving, colliding or pulling apart relative to each other.

The Earth's crust consists of nine large plates and twelve smaller ones.

The continents are in the continental plates and the oceanic plates make up much of the sea floor.



Plate tectonics

Heat rising and falling inside the mantle creates convection currents generated in the Earth's core.

The convection currents move the plates. Where convection currents diverge near the Earth's crust, plates move apart.

Where convection currents converge, plates move towards each other.

The movement of the plates and the activity inside the Earth is called plate tectonics.



Earthquakes & Volcanoes

Plate tectonics cause earthquakes and volcanoes.

The point where two plates meet is called a plate boundary.

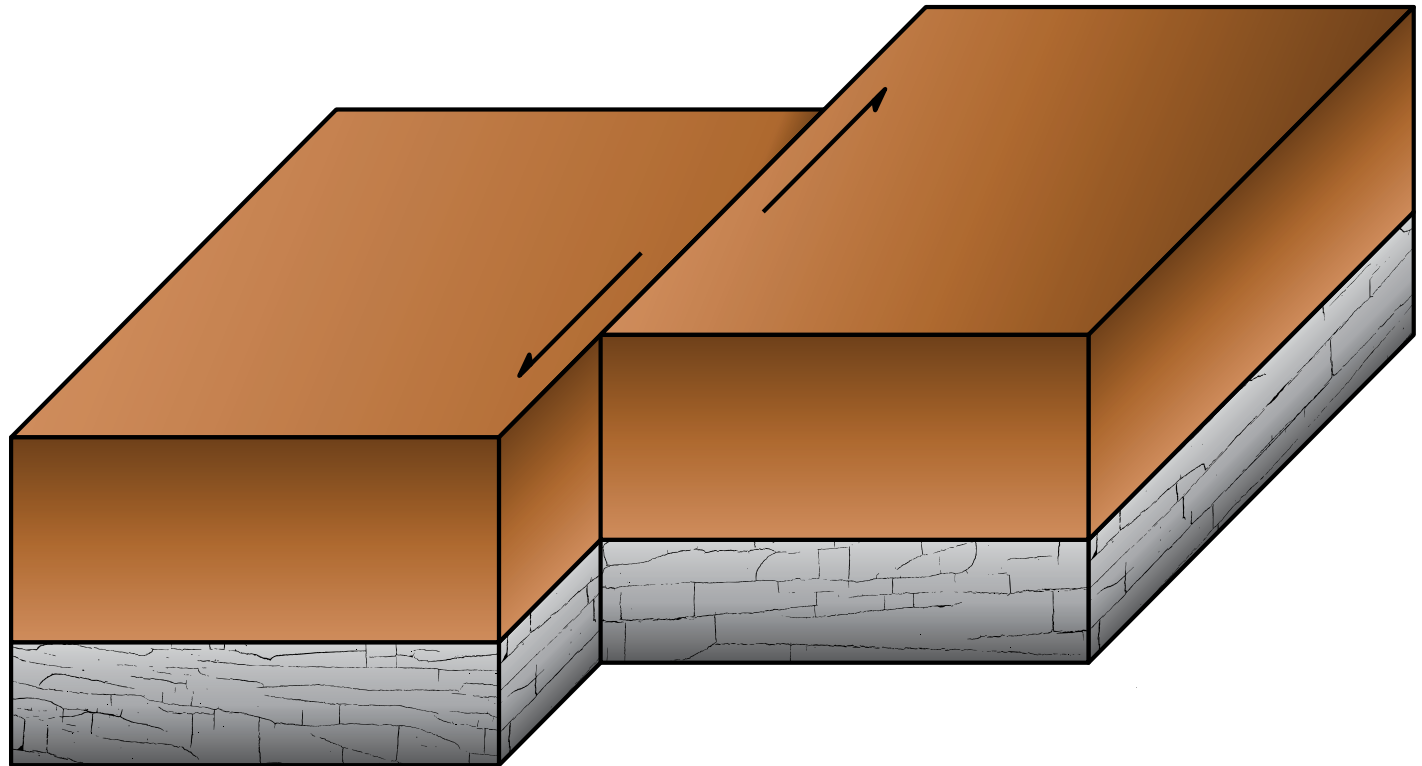
Earthquakes and volcanoes are most likely to occur either on or near plate boundaries.



Plate Boundaries

There are three types of boundaries that we can observe. These plate boundaries are:

- > Divergent Boundary
- > Convergent Boundary
- > Transform Boundary



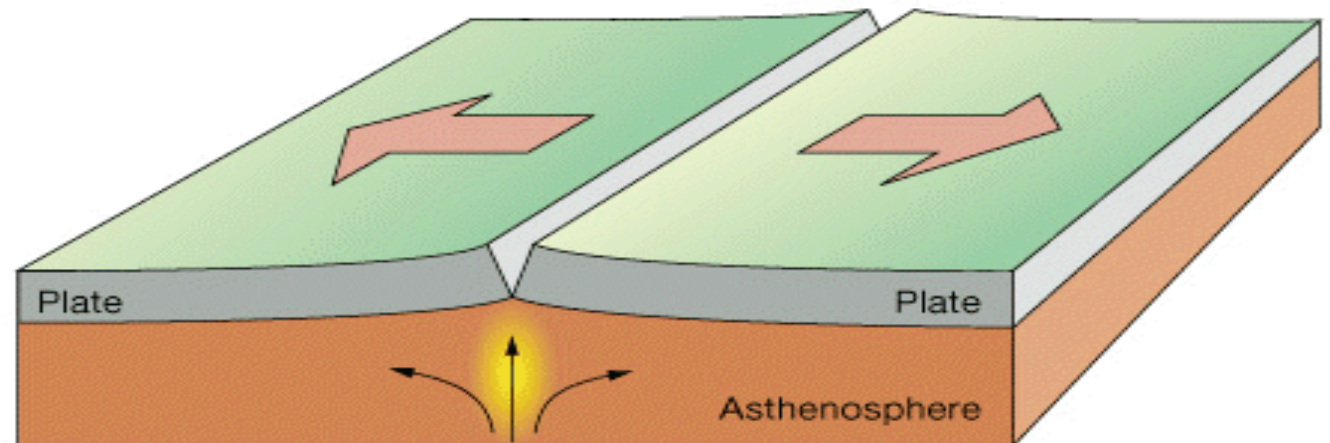
Divergent boundary

A divergent boundary is a boundary where two tectonic plates are moving away from one another.

Where plates pull apart, hot molten rock emerges as magma and so new matter is added to the plates.

This is also accompanied by earthquakes. When the magma reaches the surface, it cools and solidifies to form a new crust of igneous rock.

This process is repeated many times, over a long period of time. Eventually the new rock builds up to form a volcano. These boundaries tend to be found under the sea.

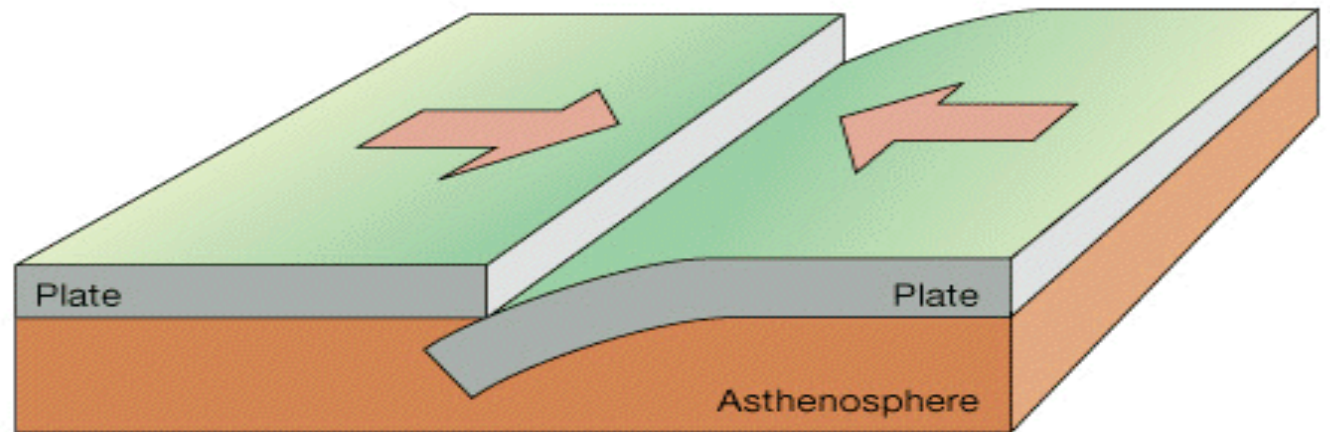


Convergent boundary

Convergent is another big word that scientists use to describe two objects that come together.

In the case of plate tectonics, the two objects coming together are plates of the Earth's crust.

As these two plates push against each other, one is eventually forced down beneath the other.



Transform boundary

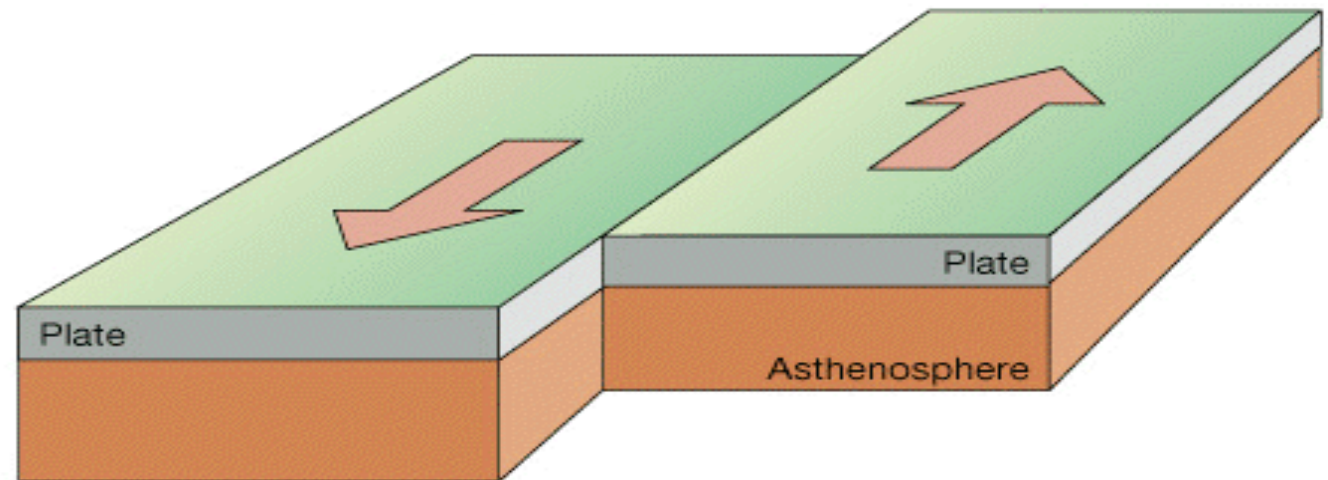
A transform boundary is where two plates slide against each other in a sideways motion.

These boundaries between plates is referred to as transform boundaries.

As two plates slide past one another, in a transform boundary, neither plate is added to at the boundary, nor destroyed.

The result of two massive plates pushing against one another is that massive amounts of energy build up.

Occasionally this energy is released suddenly in the form of large earthquakes.



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