

Plate Tectonics

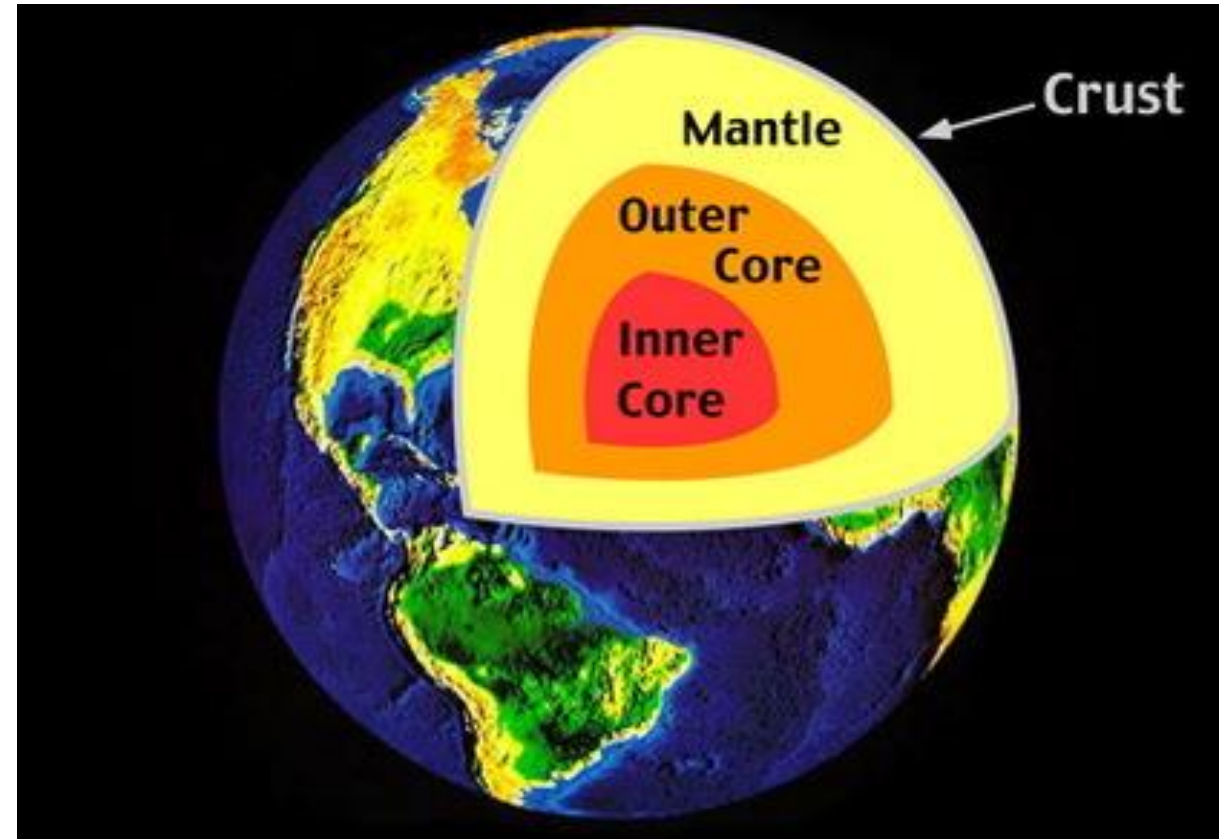
Chapter 8

Vocabulary

- Crust
- Mantle Core
- Lithosphere
- Continental Drift
- Plate Tectonics
- Plate Boundary
- Fault

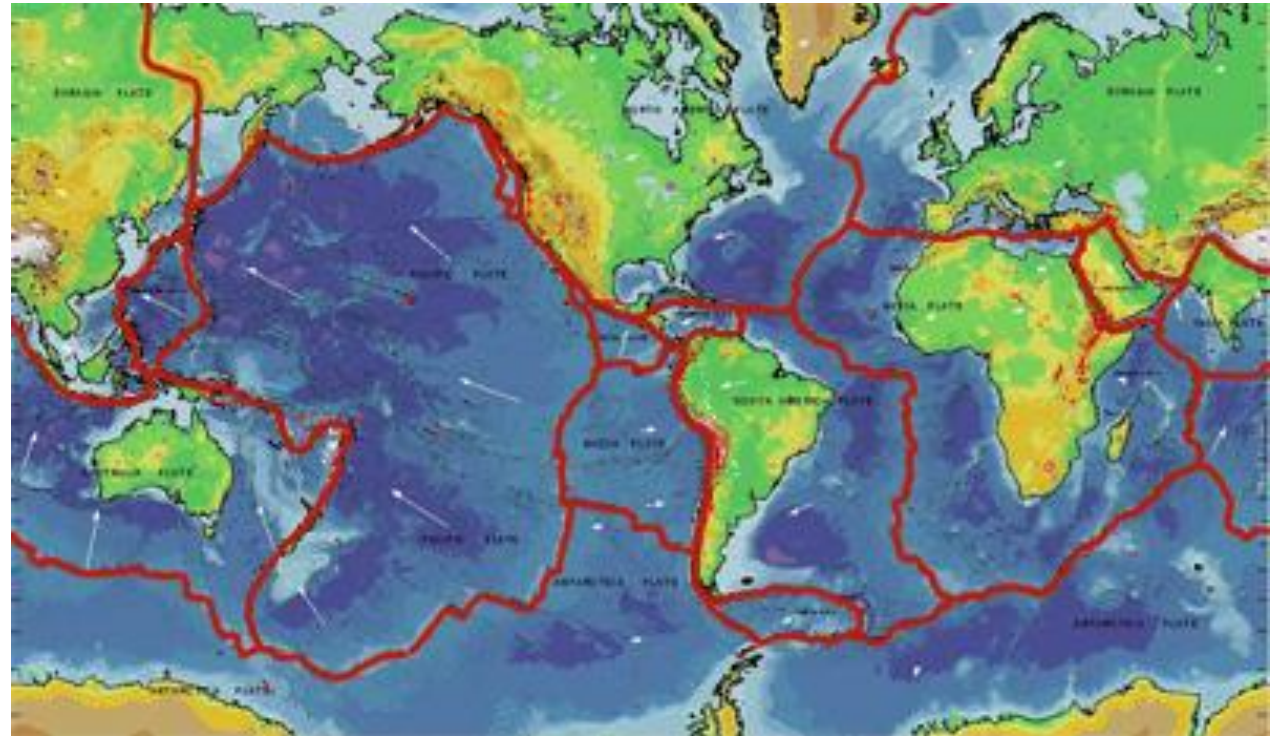
What Are The Earth's Layers Made Of?

- Atmosphere: Contains nitrogen, oxygen, carbon dioxide and water that cycle through the environment.
- Crust: Outermost layer. It includes the soil and rock that covers Earth's surface.
- Mantle: Second layer. Outer part is solid; the inner part is very hot, and rock can flow slowly.
- Core: Innermost layer. The core is thought to be as hot as the surface of the sun. The outer core is liquid. The inner core is mostly solid iron.



Earth's Plates

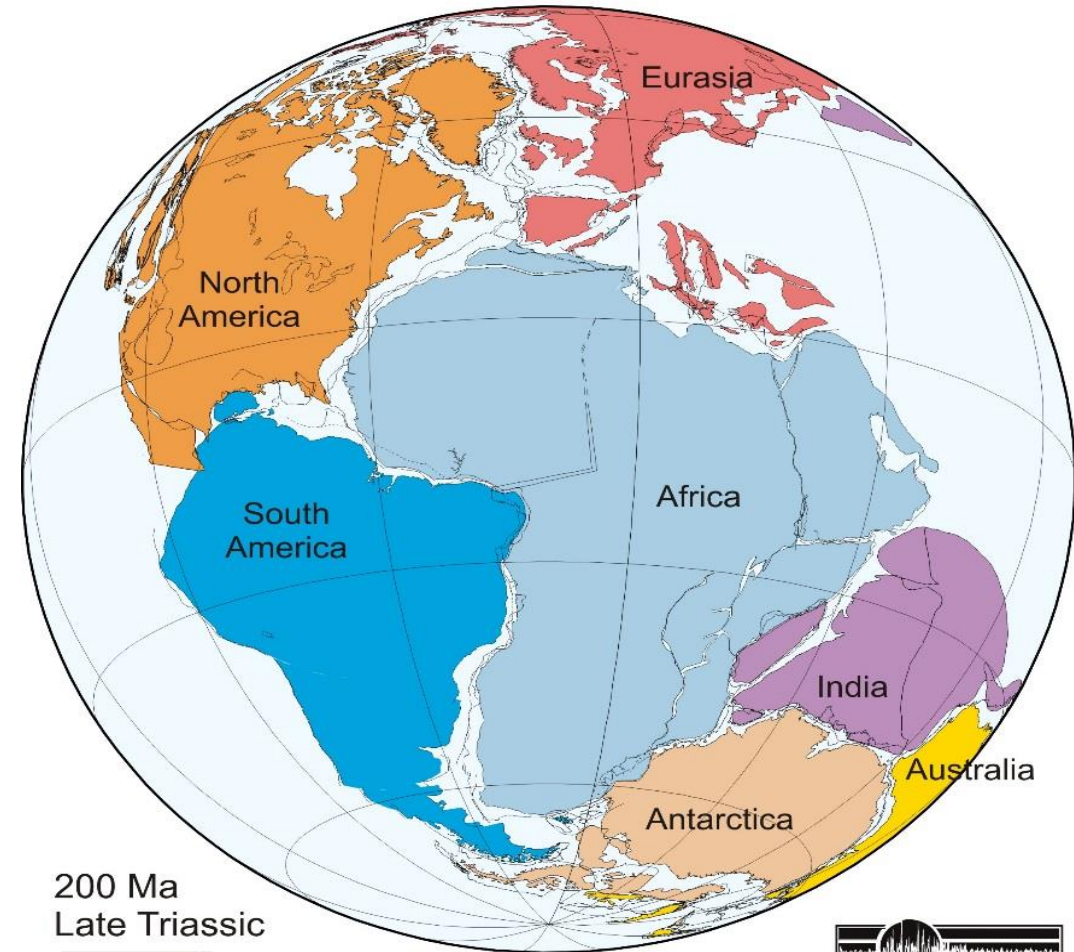
- The Lithosphere is the Earth's crust and upper mantle.
- The lithosphere is broken into pieces called Tectonic Plates.
- The plates have all different shapes and sizes, and fit together like a puzzle.
- The plates of the lithosphere float on top of the flowing rock layer of the outer mantle.
- Most plate boundaries are in the oceans.



Earth's Plate And Landforms

- Up until the 1600s, most people thought that Earth's continents were always in the same place.
- In 1912 Alfred Wegener theorized that 225 million years ago all continents were joined in one large continent he called Pangea (meaning “all Earth”).
- Wegener believed that Pangea broke apart, and the continents slowly drifted apart to form what we know as the continents today.
- Continental drift is the theory that continents drifted apart and continue to do so today.

PANGEA

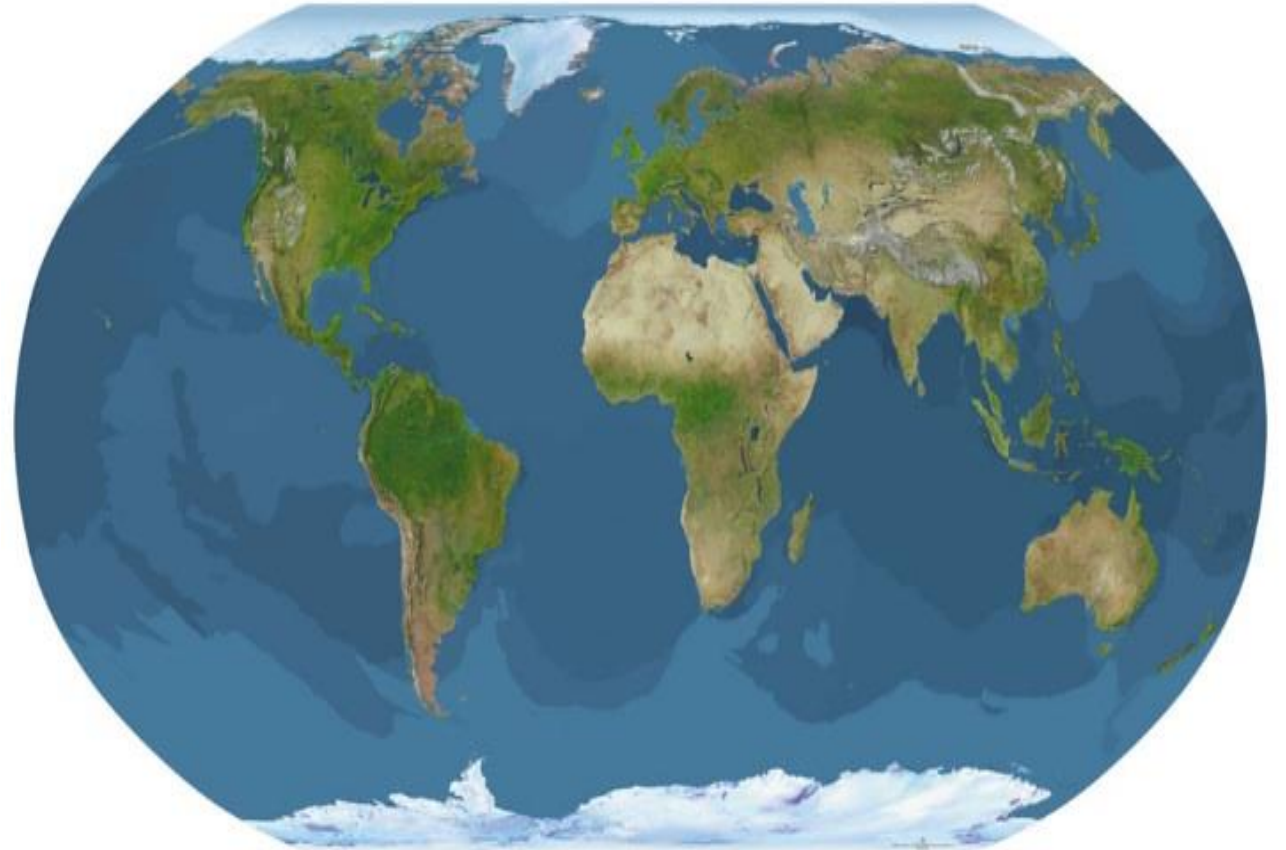


200 Ma
Late Triassic



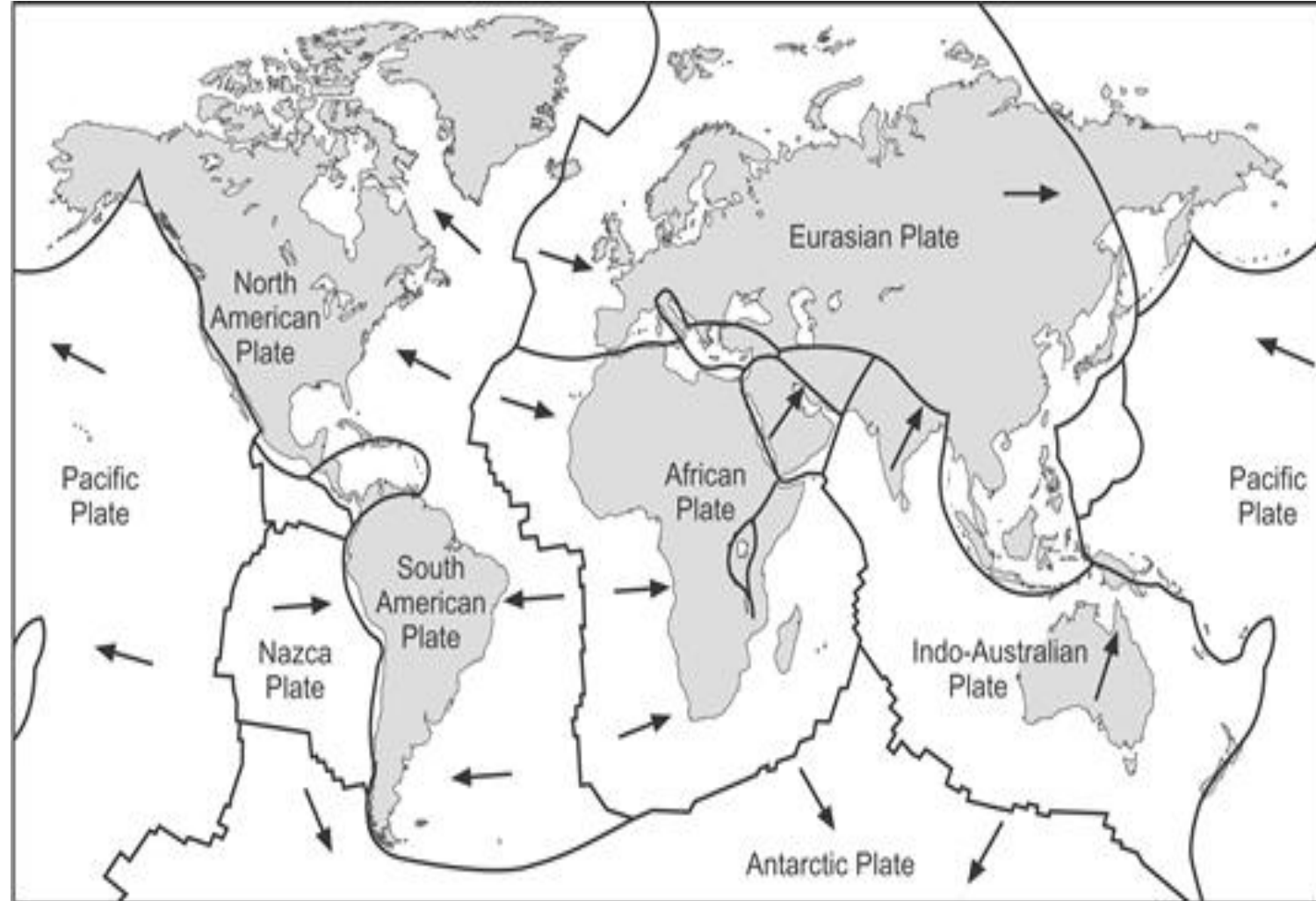
Evidence Of Continental Drift

- Continents fit together like a puzzle
- Plant and animal fossils on the east coast of South America closely match those found on the west coast of Africa.
 - These organisms must have lived side by side.
- Layers of rock on the east coast of South America match layers found on the west coast of Africa.
 - These layers must have been joined at some point.



The Theory Of Plate Tectonics

- Earth's lithosphere is made up of about 20 moving plates.
- Earth's plates move in a continuous process in different directions – away from, alongside, or toward each other.
- These movements have been confirmed by GPS.



Predictions

50 Million Years From Now

250 Million Years From Now

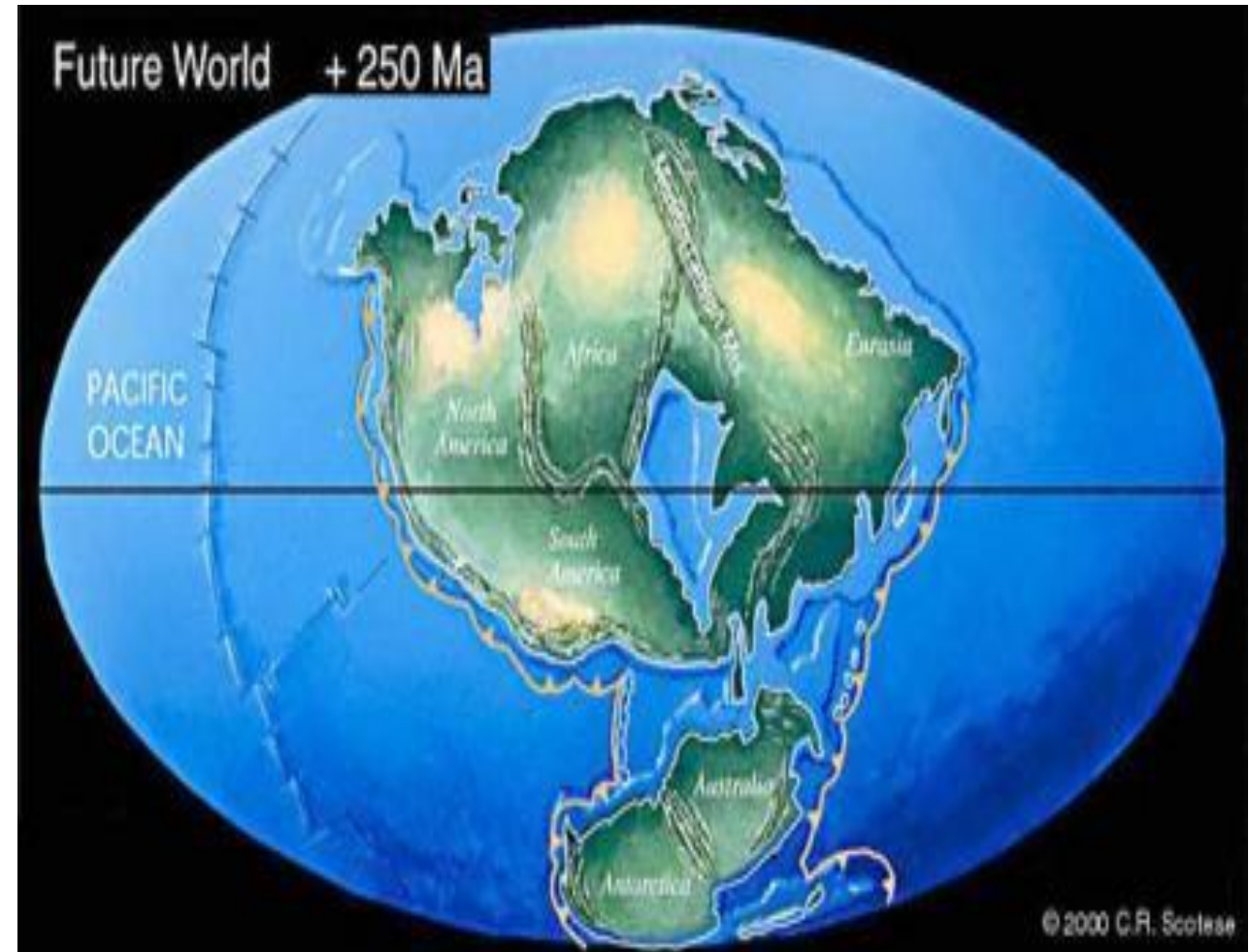
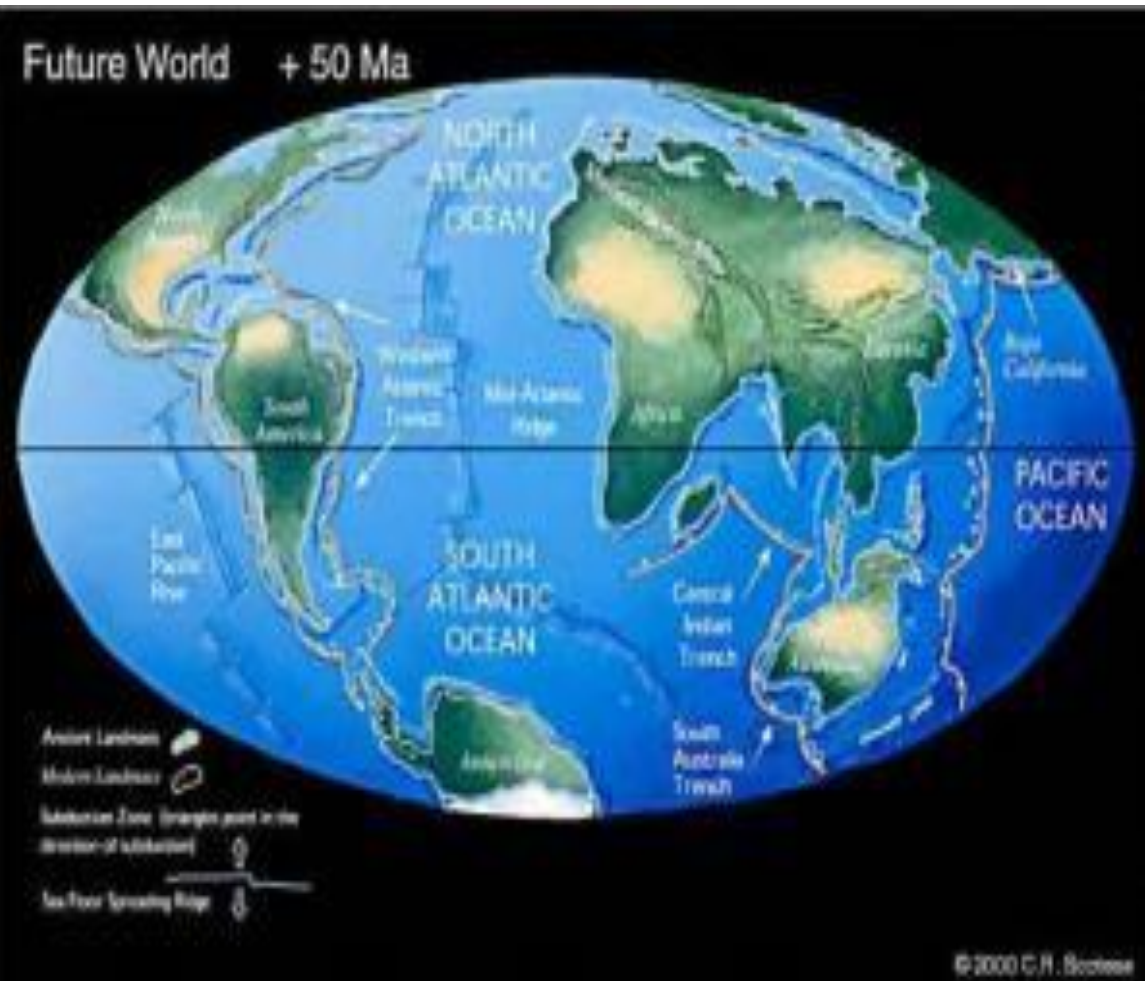


Plate Boundaries

- At spreading boundaries, plates move away from each other and gaps form between the plates. Magma rises from the mantle through the gaps.
- Sea floor spreading is caused by this.

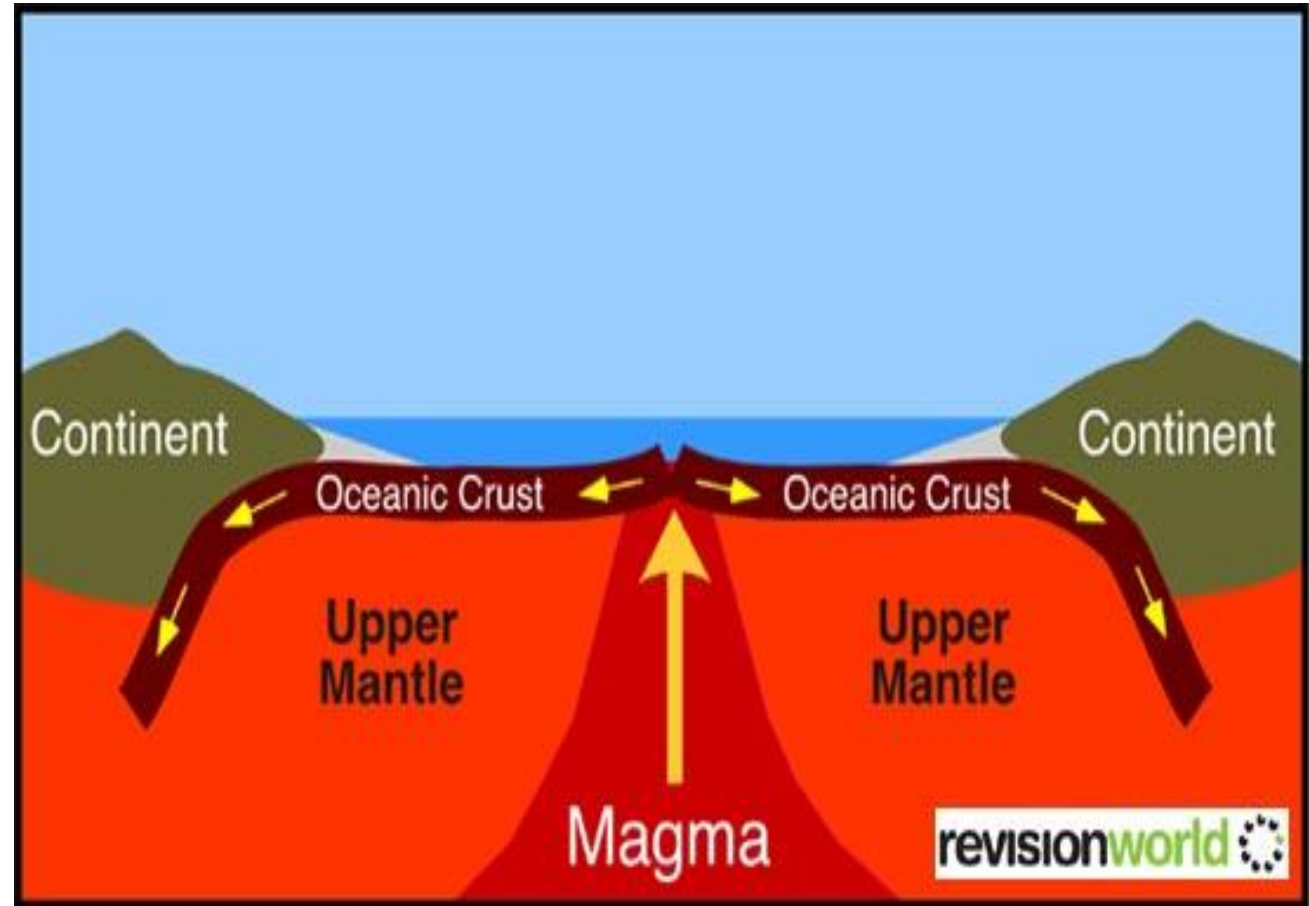


Plate Boundaries

- At fracture boundaries, plates slide past each other.
- The break in the Earth's crust is called a fault.
- The movement of plates past each other can cause earthquakes.

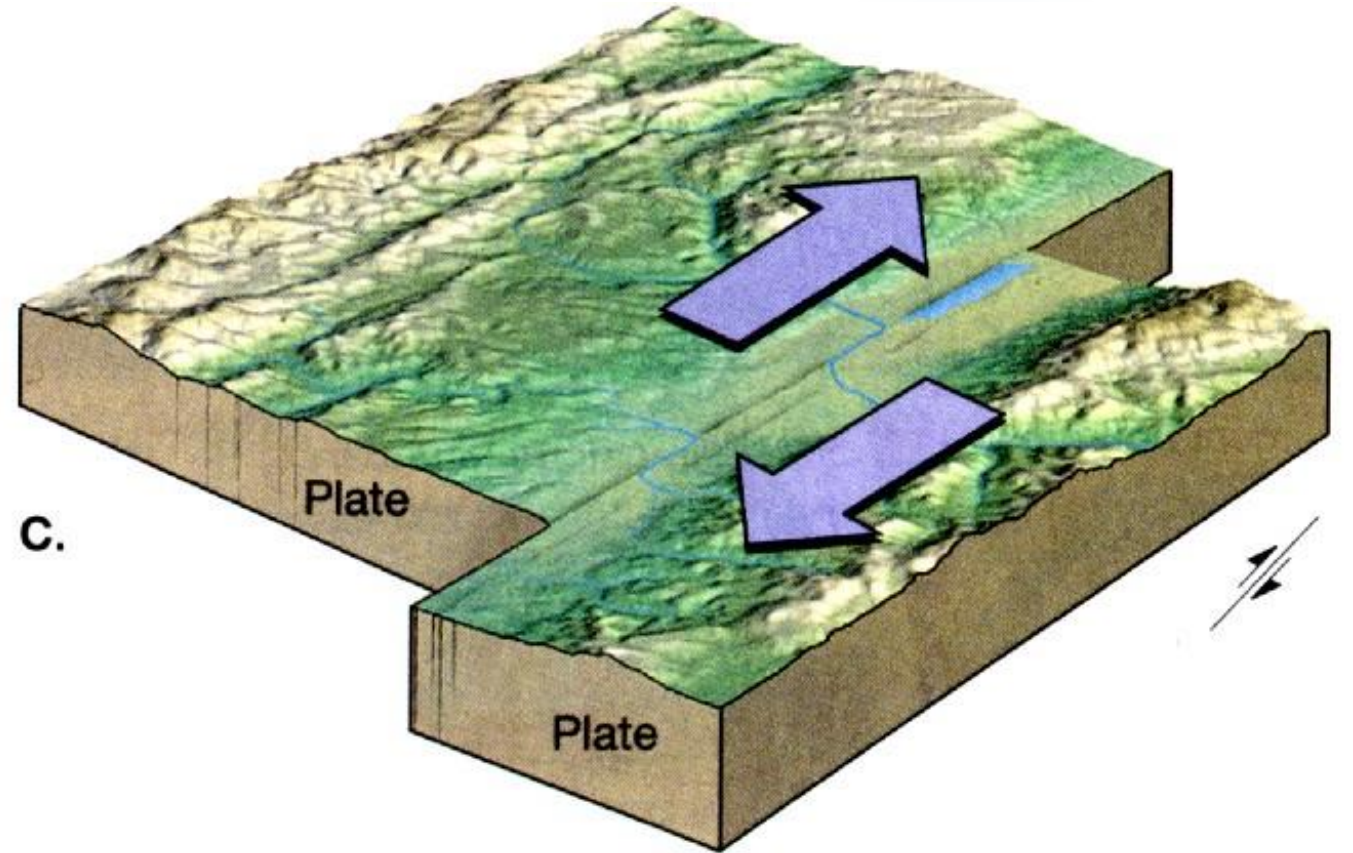
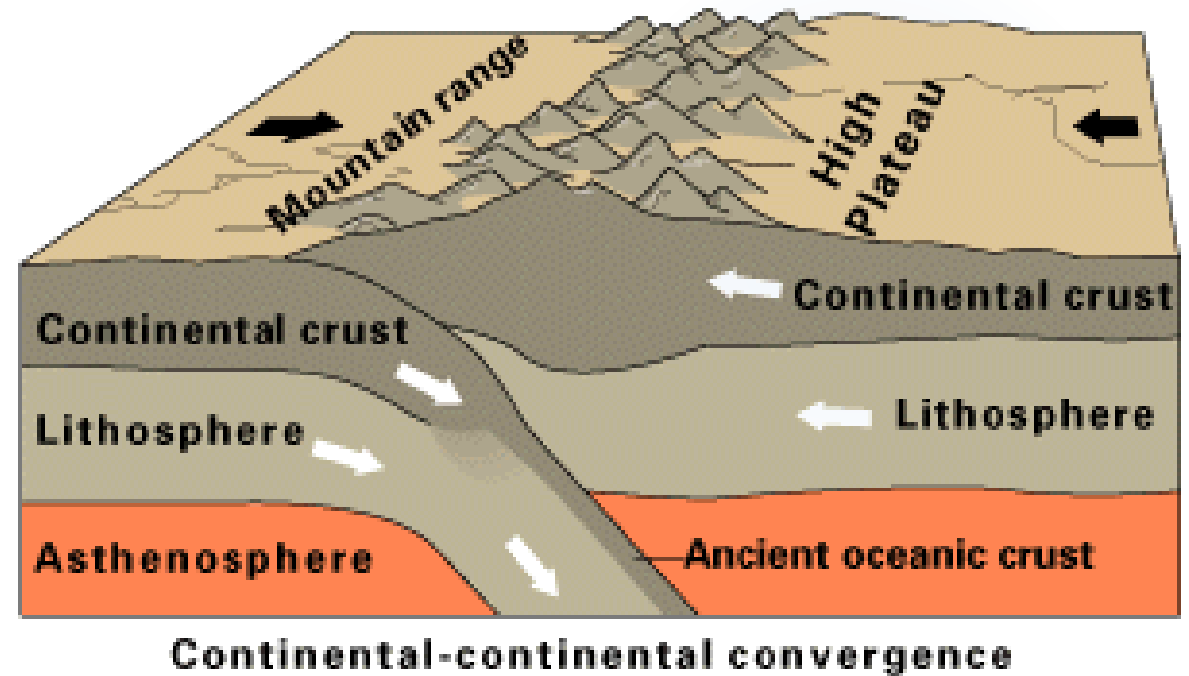


Plate Boundaries

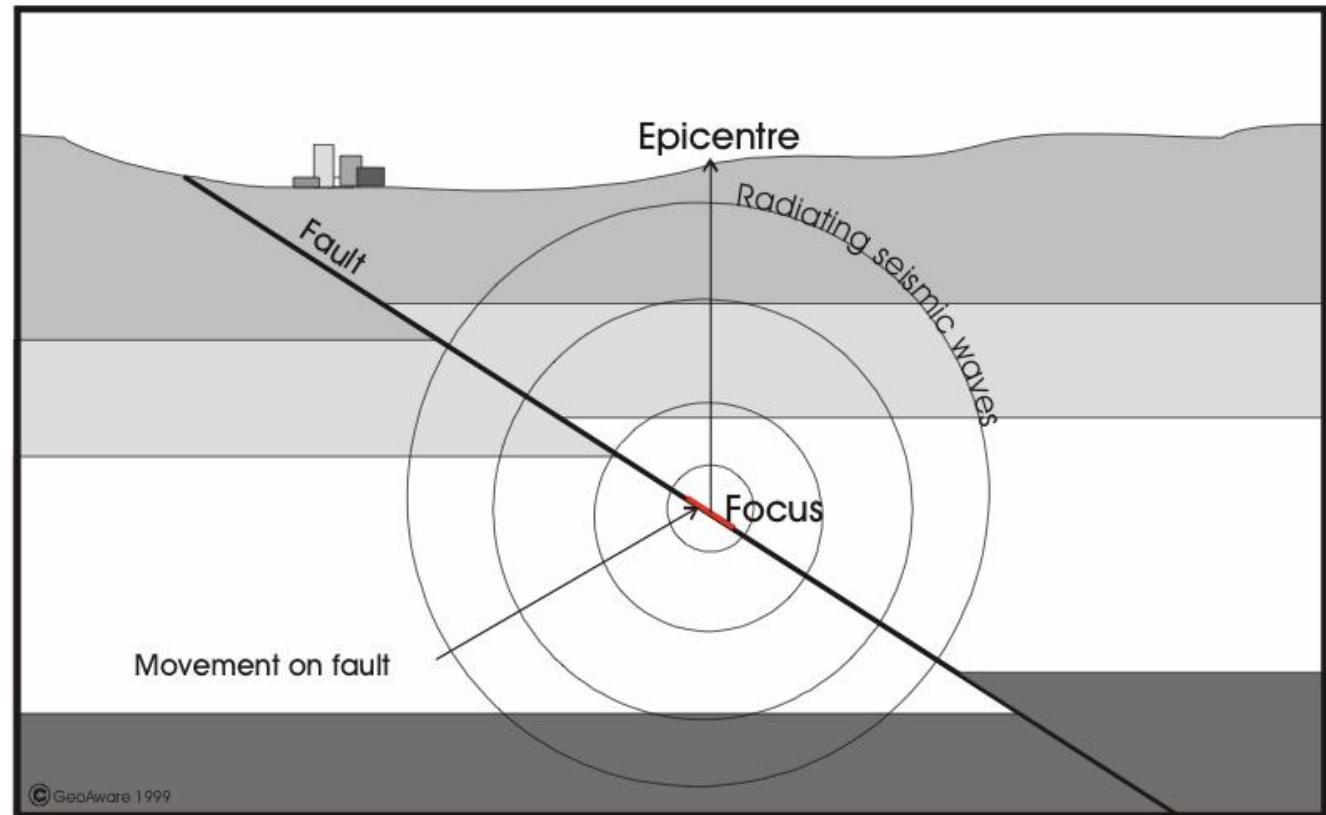
- At colliding boundaries, two plates push against each other.
- When plates collide, one plate might slip under the other one.
- When plates carrying continents collide, mountains may form.
- Other times, deep ocean trenches, earthquakes and volcanoes can form.



What Causes Earthquakes And Volcanoes?

Earthquakes

- Earthquakes are caused by sudden shifting of rock as tectonic plates shift positions.
- The underground point where the earthquake occurs is called the focus.
- The point on Earth's surface directly above the focus is called the epicenter.
- The energy from an earthquake is carried by waves.



Earthquake Magnitude

- As the waves spread out, they lose energy.
- Earthquake damage is greatest at the epicenter.
- The strength of an earthquake is given as its magnitude.
- Earthquake magnitude is measured on the Richter Scale.
- The Richter Scale goes from 1.0 and up.
- The highest recorded earthquake was 9.5.

What is the Richter scale?

0-2.0	2.1-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	8.0-8.9	9.0-10
Not measured, not felt	Measured, but not felt	Sometimes felt, no damage caused	Light shaking of items, little damage, if any	Slight structural damage possible	Potential for destructive tremors	Serious damage over large areas	Devastating damage over huge areas	Extreme destruction

SOURCES: U.S. Geological Survey

Earthquake Damage

- The amount of damage caused by an earthquake is determined by its magnitude and what structures are near it.
- In remote areas where there aren't a lot of buildings and people, an earthquake with a magnitude of 7.0 can cause a lot less damage than if there was an earthquake with a magnitude of 5.0 in a place like New York City.

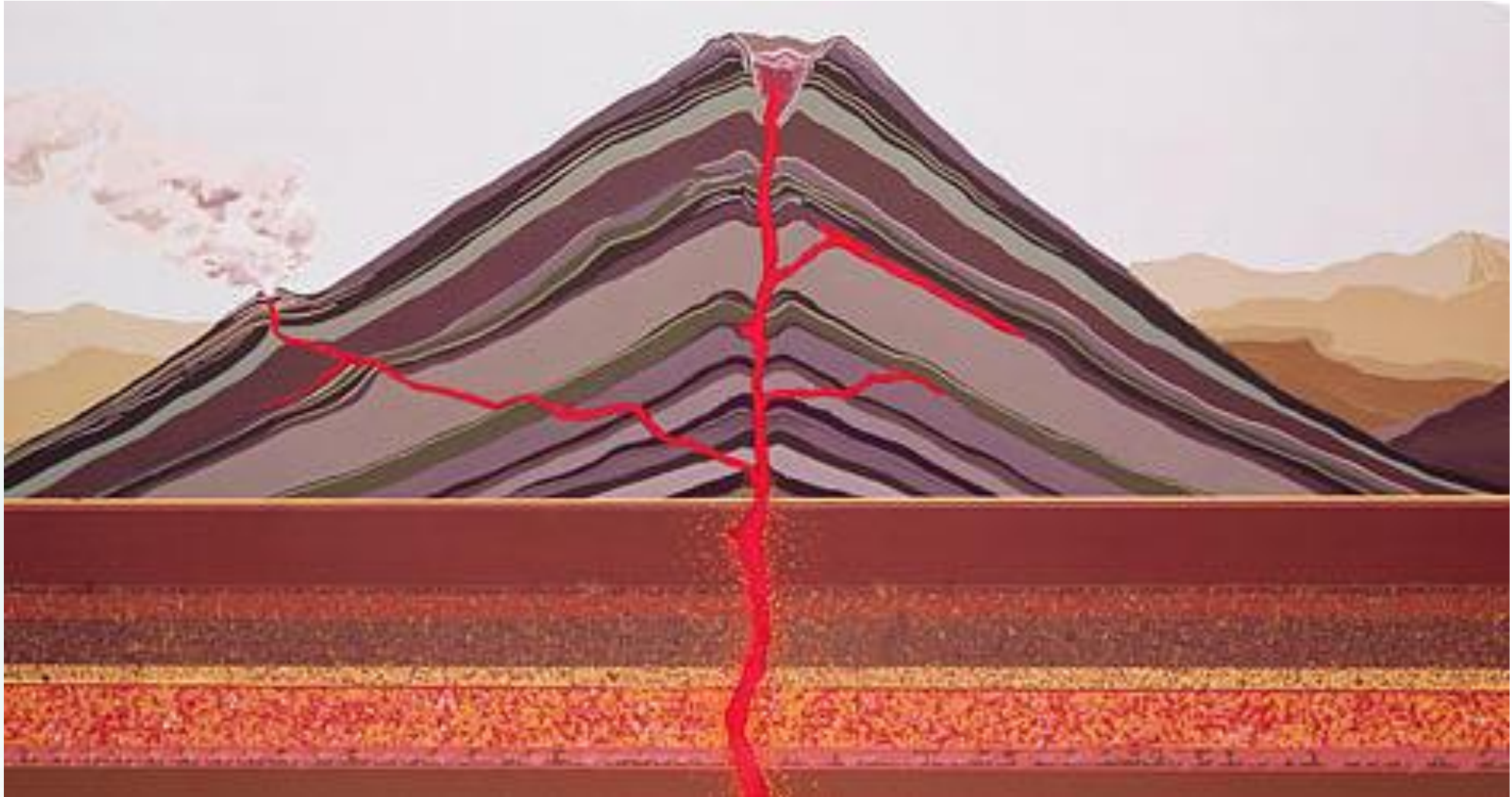


Volcanoes

- A volcano is an opening in the surface of one of Earth's plates that magma rises through.
- Magma is formed when one plate sinks beneath another at a plate boundary. The sinking plate melts into magma.
- Pressure builds up from gasses trapped in the magma.
- If the pressure is too much for the crust of the plate covering it, the magma will explode through it as a volcano.
- When magma reaches the Earth's surface, it is called lava.



Parts Of A Volcano



Types of Volcanoes

Shield Volcanoes

- Flat and broad in shape
- The lava in shield volcanoes flows in very broad, flat layers.
- Magma is deep below the Earth's surface
- Can also form where Earth's plates are separating



Types of Volcanoes

Cinder Cone Volcanoes

- Very steep and narrow in shape
- The lava in cinder cone volcanoes has a high gas concentration, which causes a violent eruption, sending ash high in the air.
- The lava cools and solidifies quickly, which falls back to Earth and causes the volcano's shape.
- Often form in groups near other larger volcanoes.



Types of Volcanoes

Composite Volcanoes

- Steep-sided volcanoes composed of alternating layers of lava and tephra
- Tephra is solidified lava, ash, and cinders
- Form where one plate sinks beneath another
- Mt. St. Helens is a composite volcano



Types of Volcanoes

Fissure Eruptions

- Magma that is highly fluid oozes from cracks or fissures in Earth's surface
- The lava spreads out and forms flood basalts
- The flood basalts erode over millions of years to form lava plateaus

