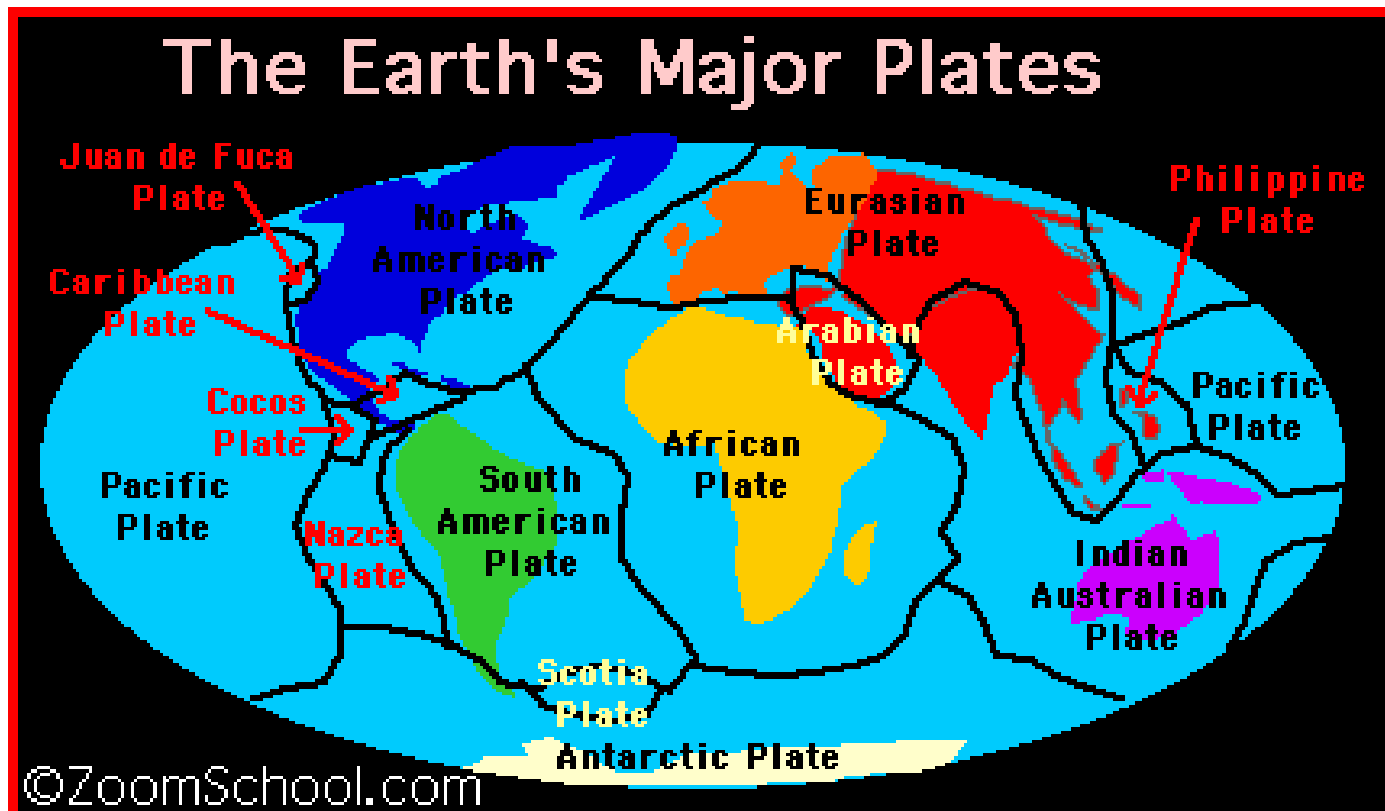


# Plate Tectonics

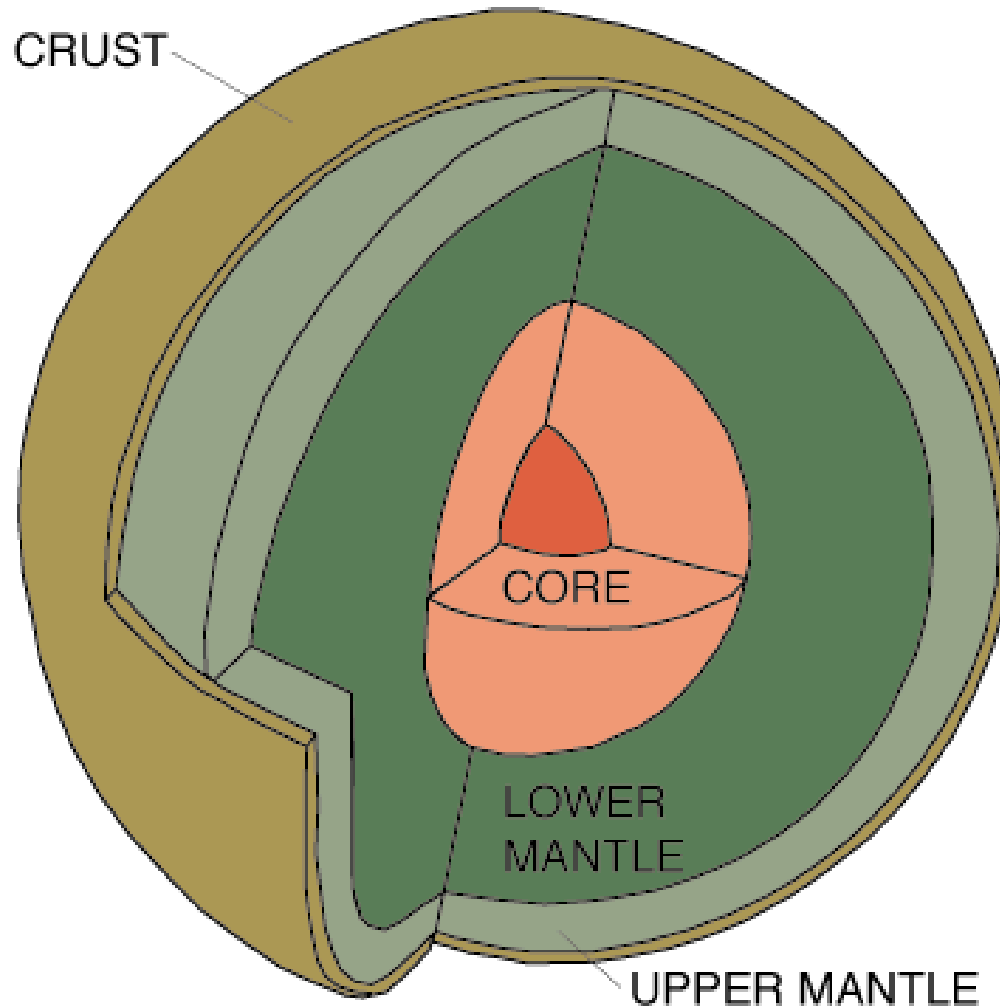
Geology Unit: Slides 51 - 71

# Plate Tectonics

- The theory of the formation and movement of the plates that cover the Earth's surface.



# 3 Main Layers of the Earth



# 3 Main Layers of the Earth

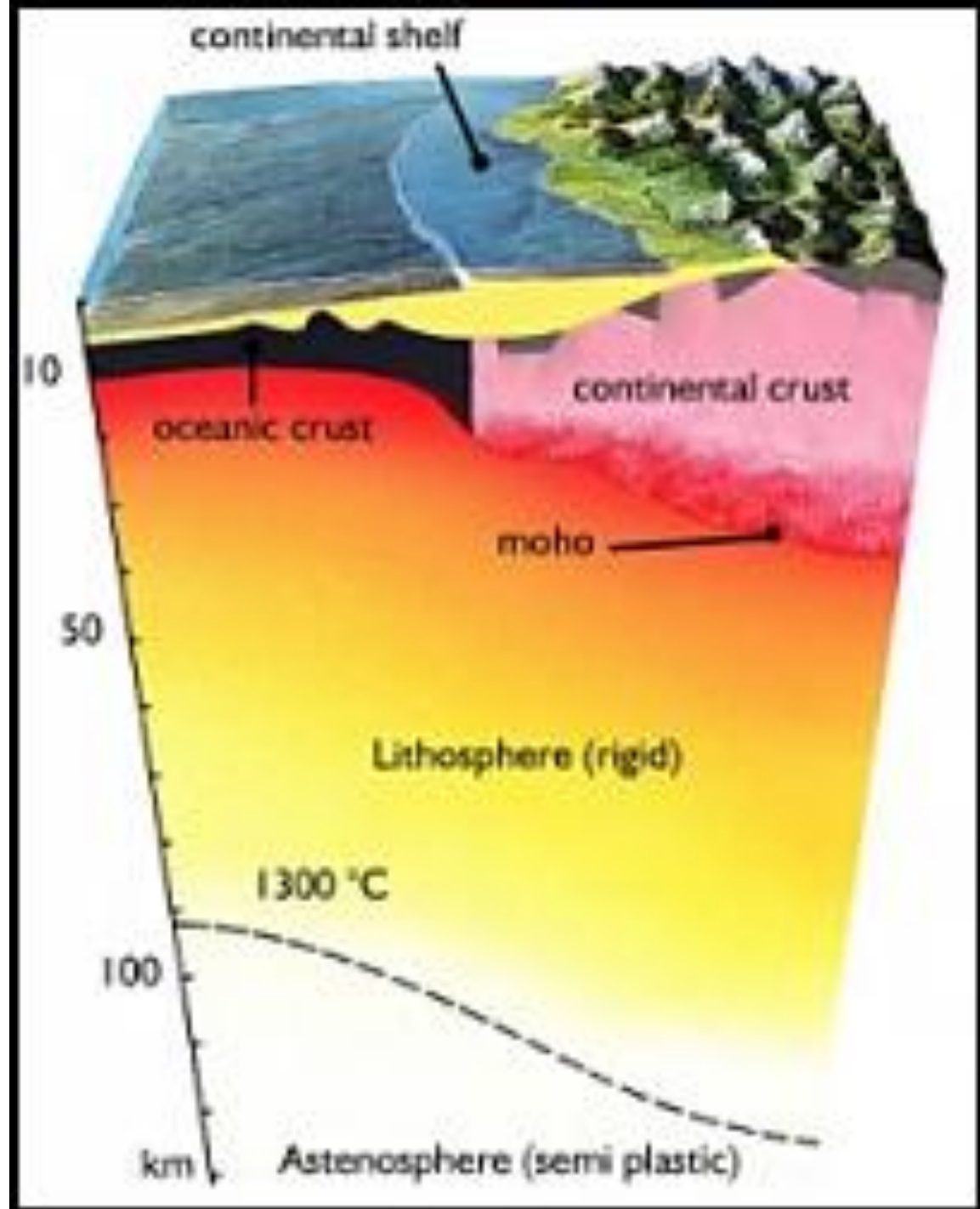
- Crust (outermost and thinnest layer)
  - Two Types of Crust:
    - Oceanic – makes up the ocean floor (high density)
    - Continental – Makes up the continents (low density)
    - Oceanic crust has a composition like basalt, while continental crust is more like granite.

# 3 Main Layers of the Earth

- Mantle – the second (and thickest) layer  
(The mantle can be split into many layers, but the upper two affect plate tectonics the most.)

Lithosphere – top, most solid layer (some geologists include the crust in this layer)

Aesthenosphere – second, more plastic layer of the mantle



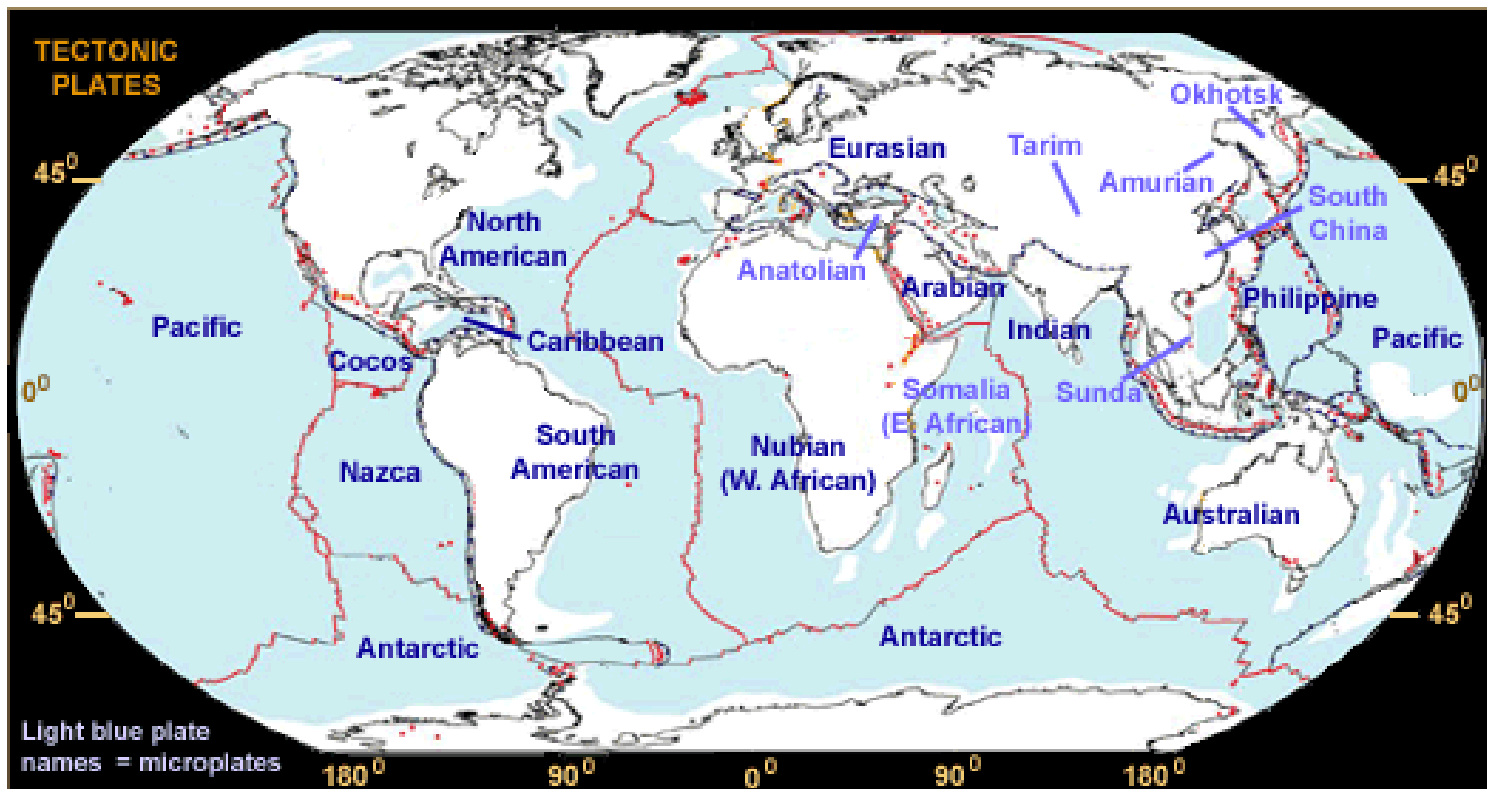
# 3 Main Layers of the Earth

- Inner and Outer Core (Innermost, and hottest layers)
  - These areas are composed of both molten (outer) and solid (inner) nickel and iron.
  - Temperatures in the Inner Core can reach ~ 7000°C (hotter than the surface of the Sun)

# Continental Drift

- Basics

- The Earth's crust is made up of about 20 different plates.
- These plates move due to convection of molten rock in the mantle.





# Continental Drift

- Alfred Wegener  
(German Meteorologist)

Theorized that the Earth's continents were once together and slowly drifted apart over the last 250 million years.

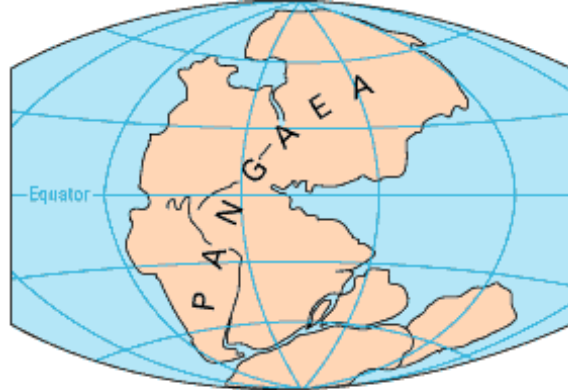


# Continental Drift

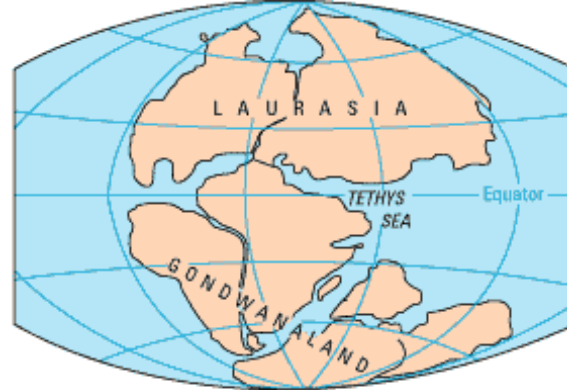
- Wegener's Evidence
  - The continents seem to fit together like a large jigsaw puzzle.
  - Certain areas on Earth that were now deserts had evidence of glaciers and coal (only formed in tropical environments) was found in the Arctic.
  - Fossils of certain dinosaurs were found on continents on opposite sides of the ocean.

# Continental Drift

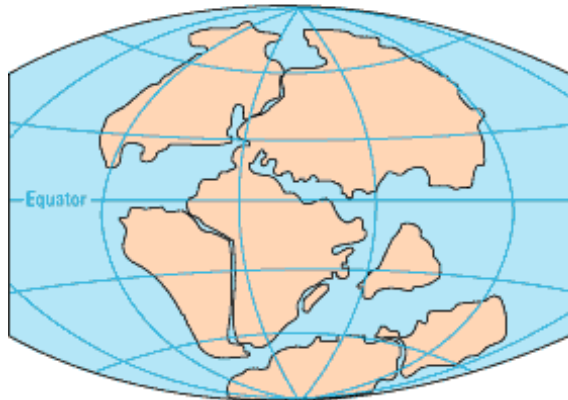
- Pangaea
    - Wegener called it a “Supercontinent”
    - After ~ 65 million years it splits into two smaller continents:
      - Laurasia (north)
      - Gondwanaland (south)
- These two continents continued to move and split until the continents we have today were formed.



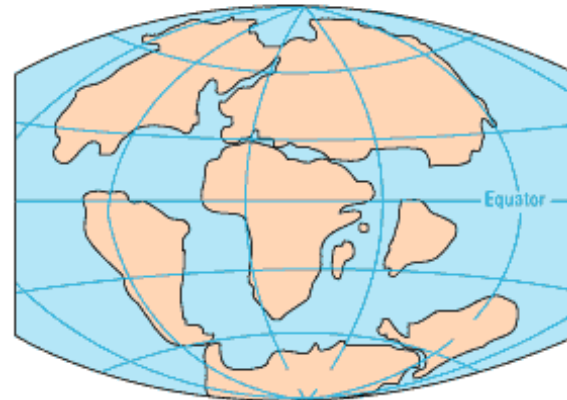
**PERMIAN**  
225 million years ago



**TRIASSIC**  
200 million years ago



**JURASSIC**  
135 million years ago



**CRETACEOUS**  
65 million years ago

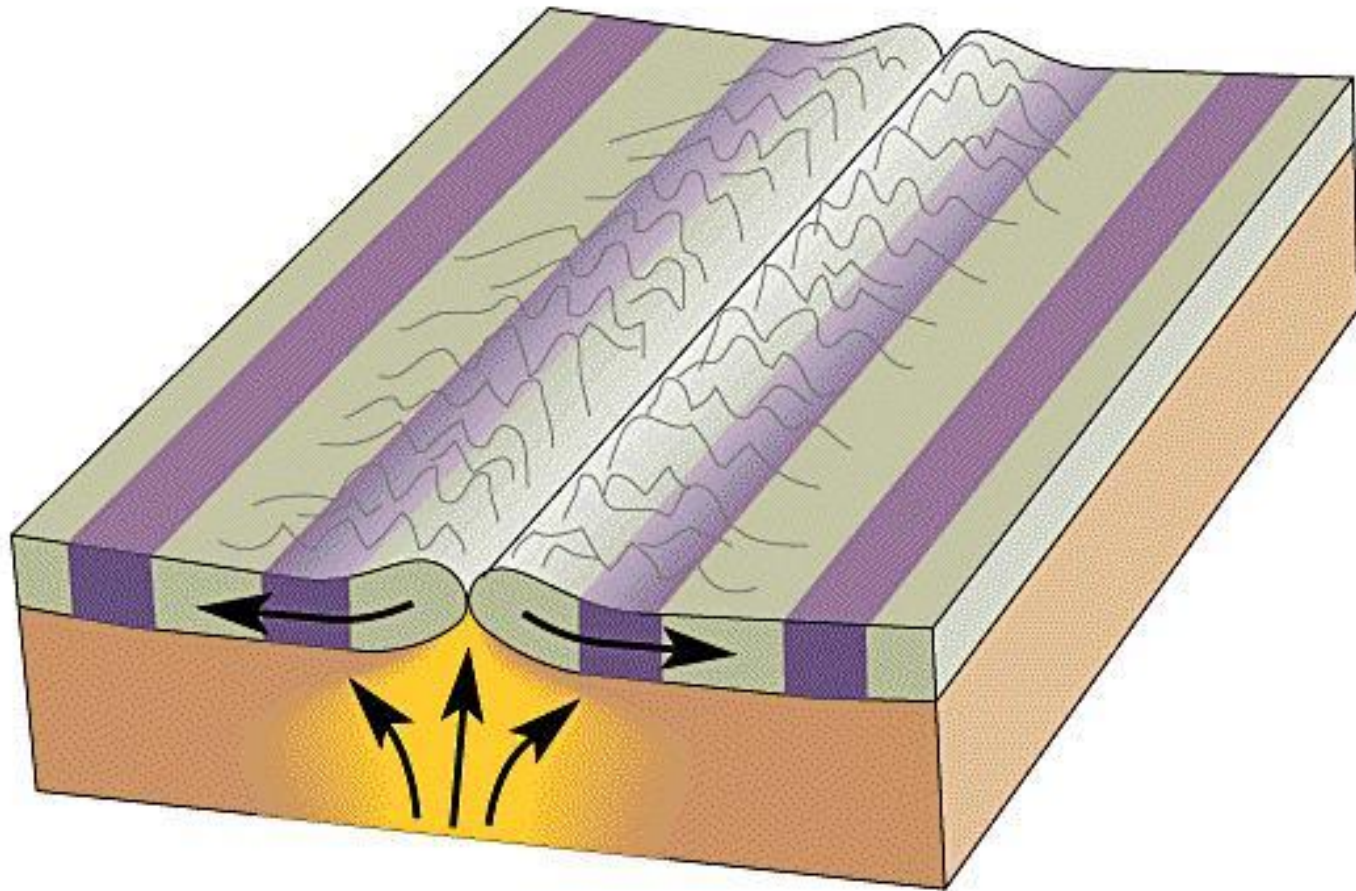




**PRESENT DAY**

# Seafloor Spreading

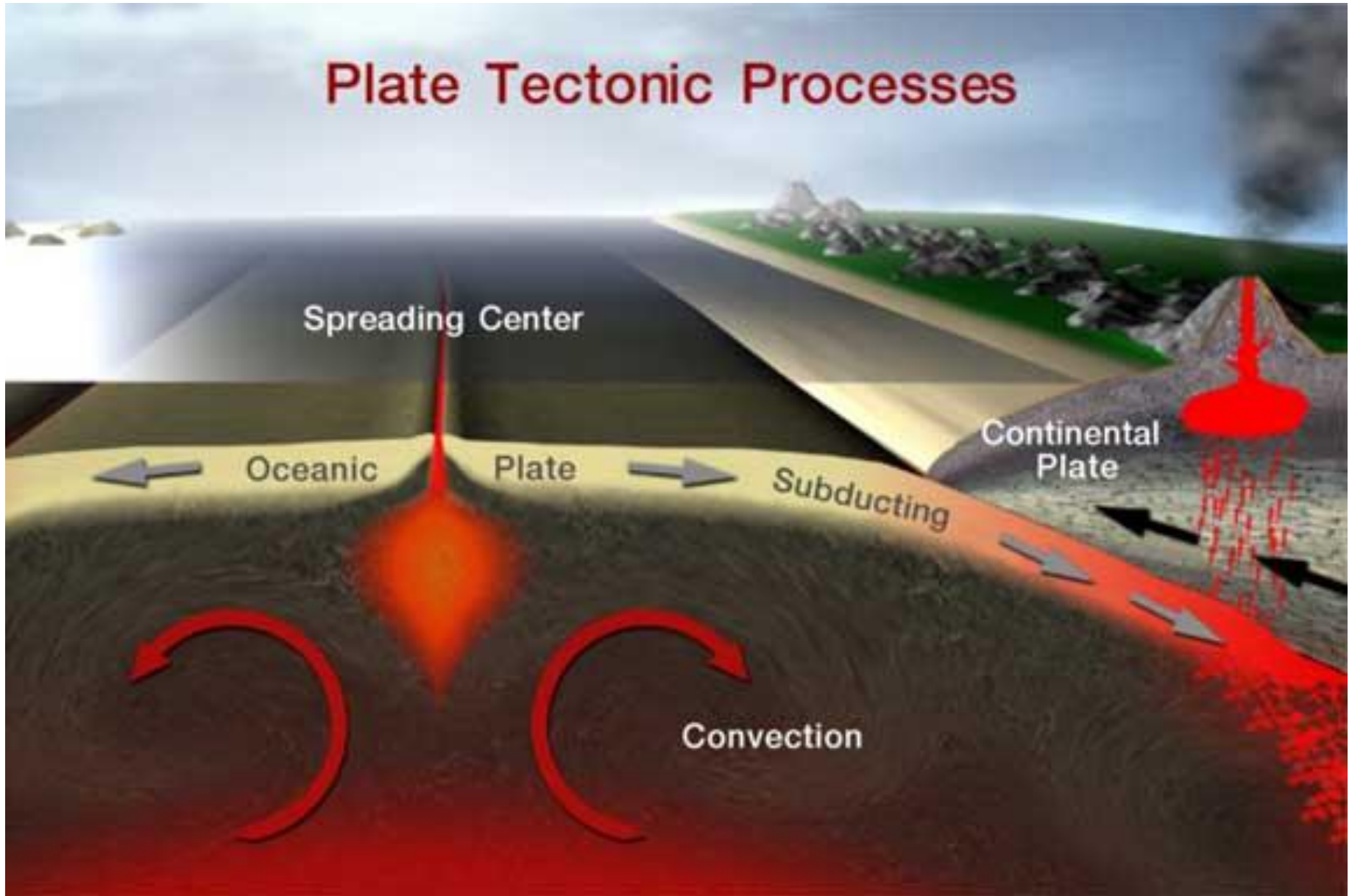
- Harry Hess (Naval Geologist)
  - By studying the ocean floor he determined that the ocean floor moves like a giant conveyor belt.
  - He determined that plates move apart at ridges and together at trenches.





-  Magnetic field oriented as it is today
-  Magnetic field reversed

# Plate Tectonic Processes



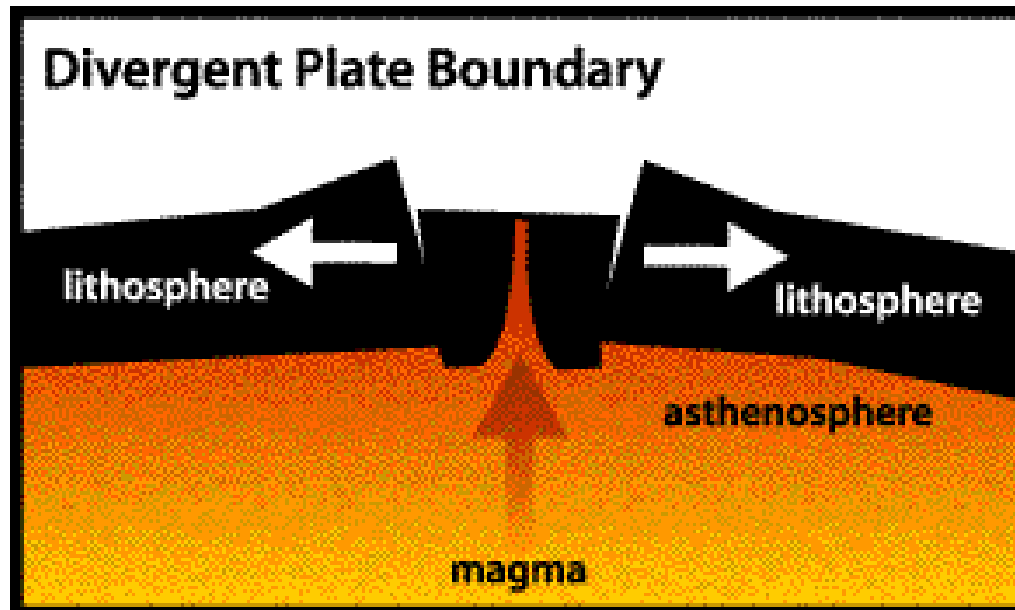
# Plate Boundaries

- Where two plates meet is called a plate boundary.
- There are three different types of boundaries depending on how the plates are moving.



# Plate Boundaries

- Divergent Boundary
  - Area where two plates are moving away from each other. (creates volcanoes)

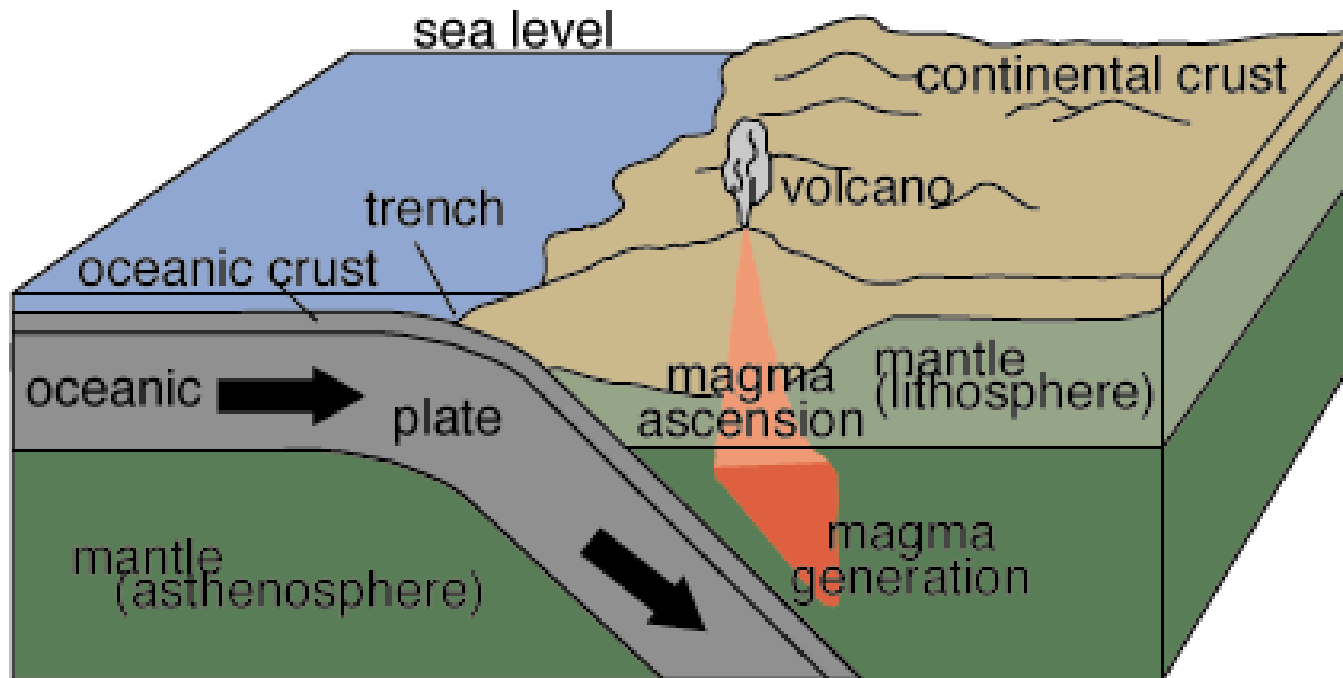


# Plate Boundaries

- Convergent Boundary
  - Area where two plates are coming together.
  - There are three types depending on the types of crust that are involved.

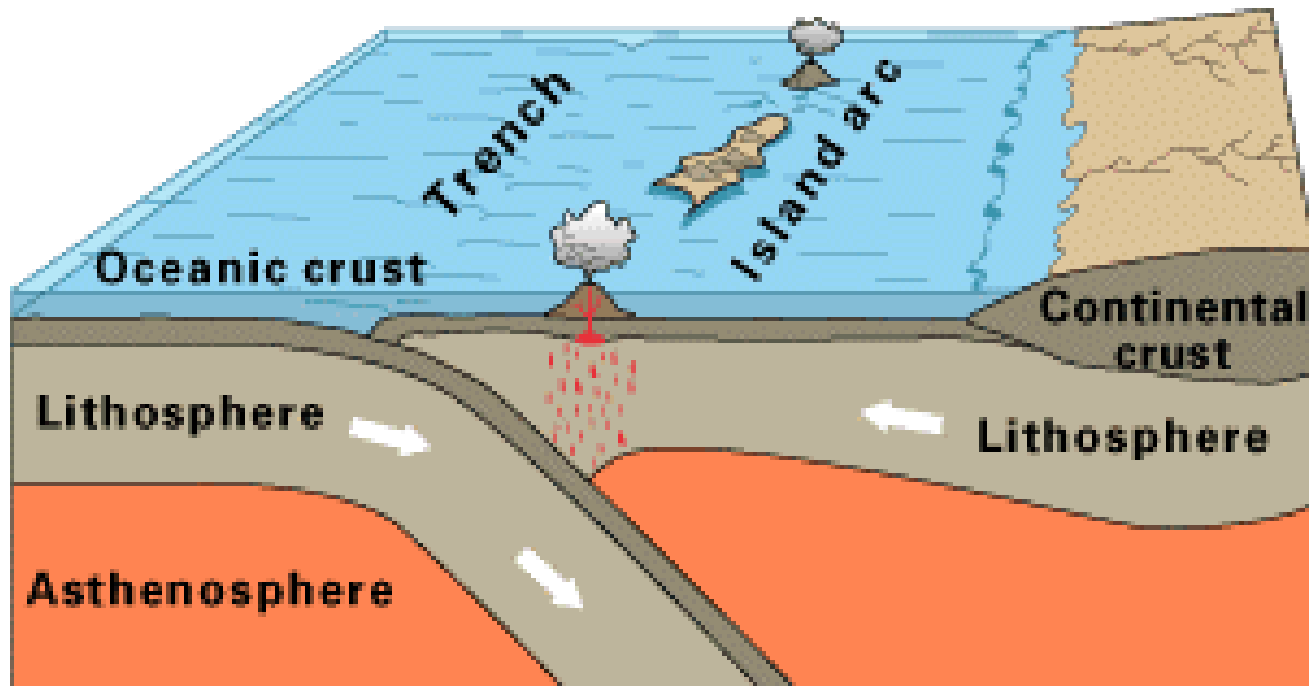
# Plate Boundaries

- Convergent Boundary
  - Continental-Oceanic (creates volcanoes)



# Plate Boundaries

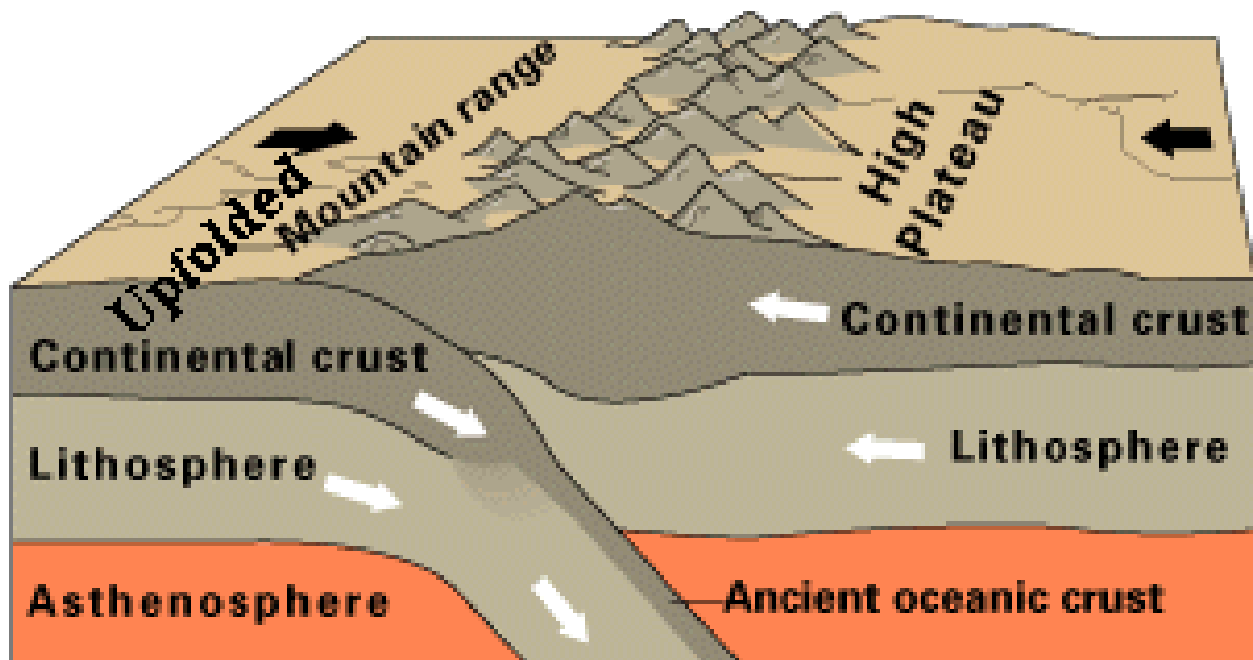
- Convergent Boundary
  - Oceanic-Oceanic (creates island arcs)



Oceanic-oceanic convergence

# Plate Boundaries

- Convergent Boundary
  - Continental-Continental (creates mountains)



Continental-continental convergence USGS

# Plate Boundaries

- Transform Boundary
  - Area where two plates meet and move laterally (slide past one another)

