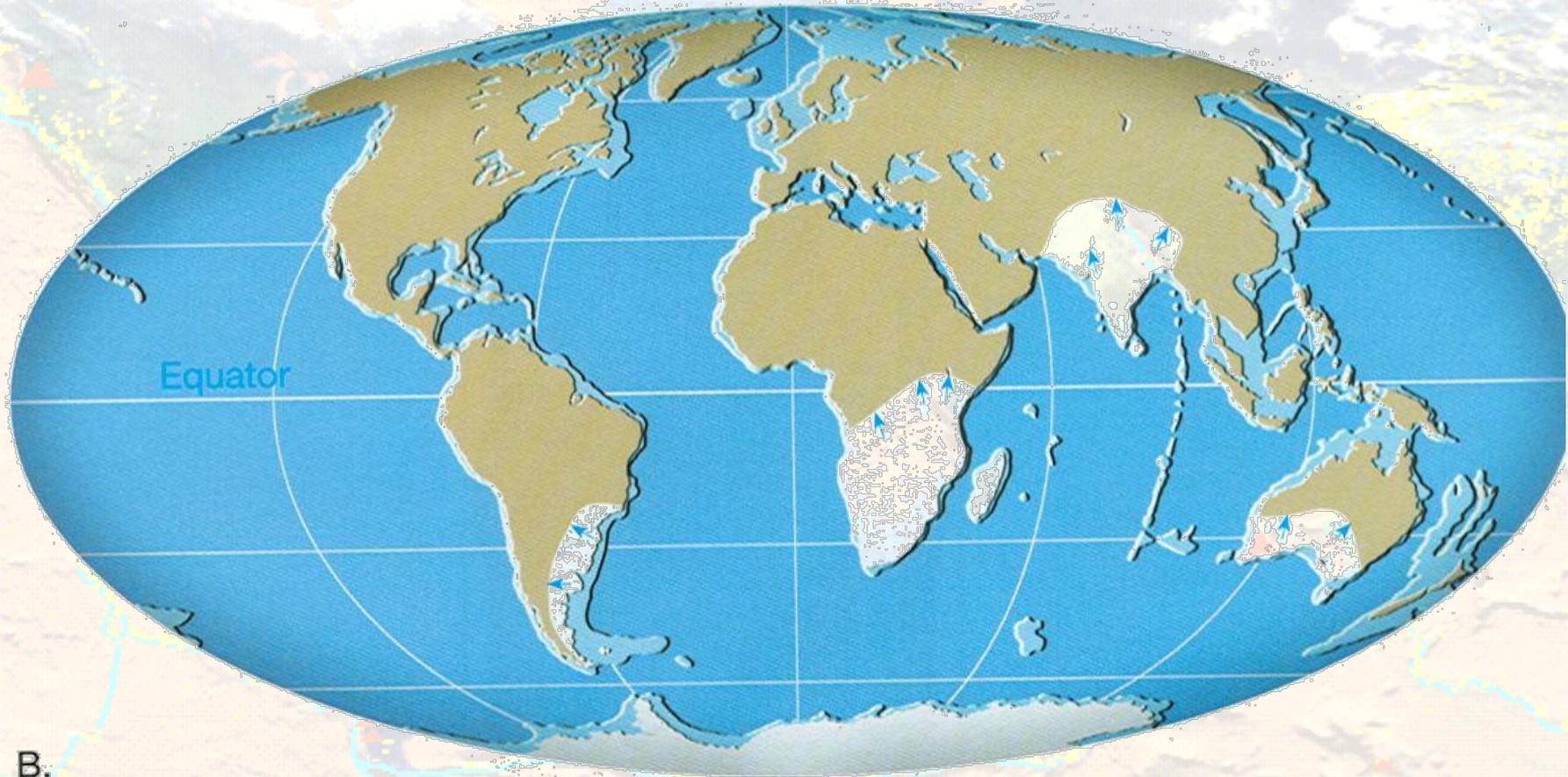
A world map illustrating plate tectonics. The map shows the boundaries of tectonic plates, with red triangles indicating convergent boundaries and yellow dots indicating divergent boundaries. The text "Plate Tectonics" is overlaid on the map.

# Plate Tectonics

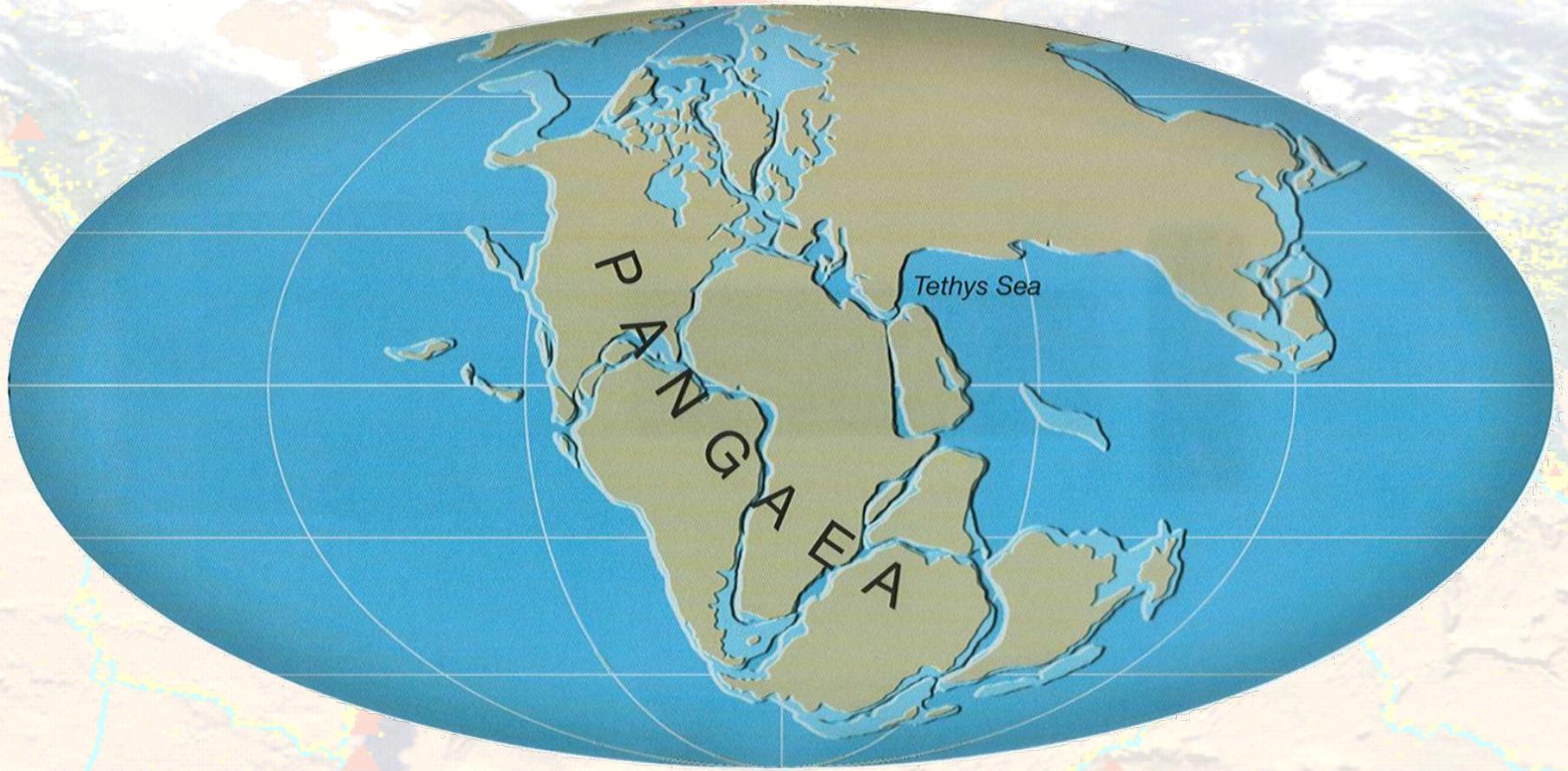
Ag Earth Science  
Ms. Clement

# Continental Drift

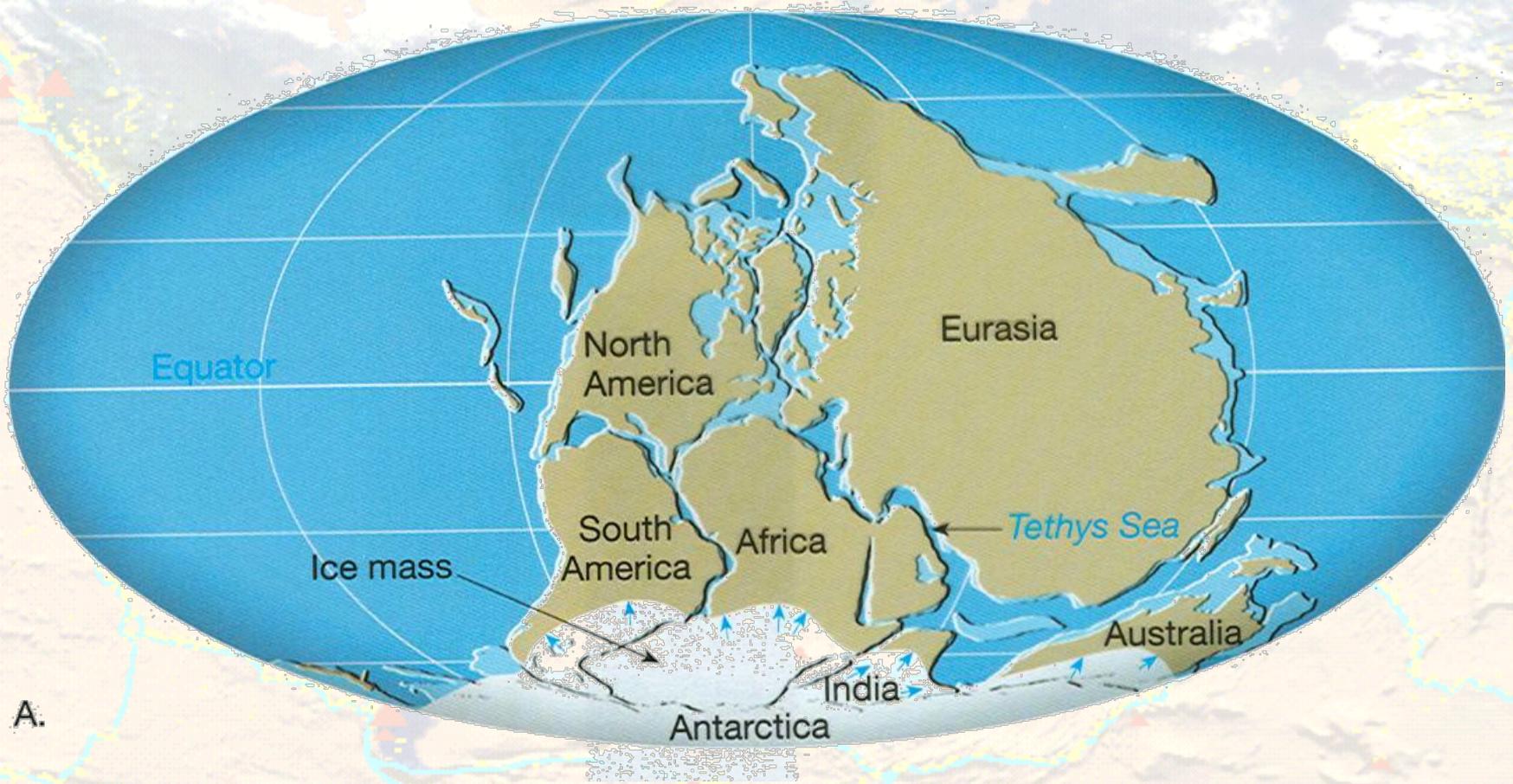
- In 1912 a German scientist named Alfred Wegener proposed a hypothesis called Continental Drift.
- He hypothesized that the continents once formed of a single landmass.
- He called it Pangaea, meaning “all land”



B.



Slide



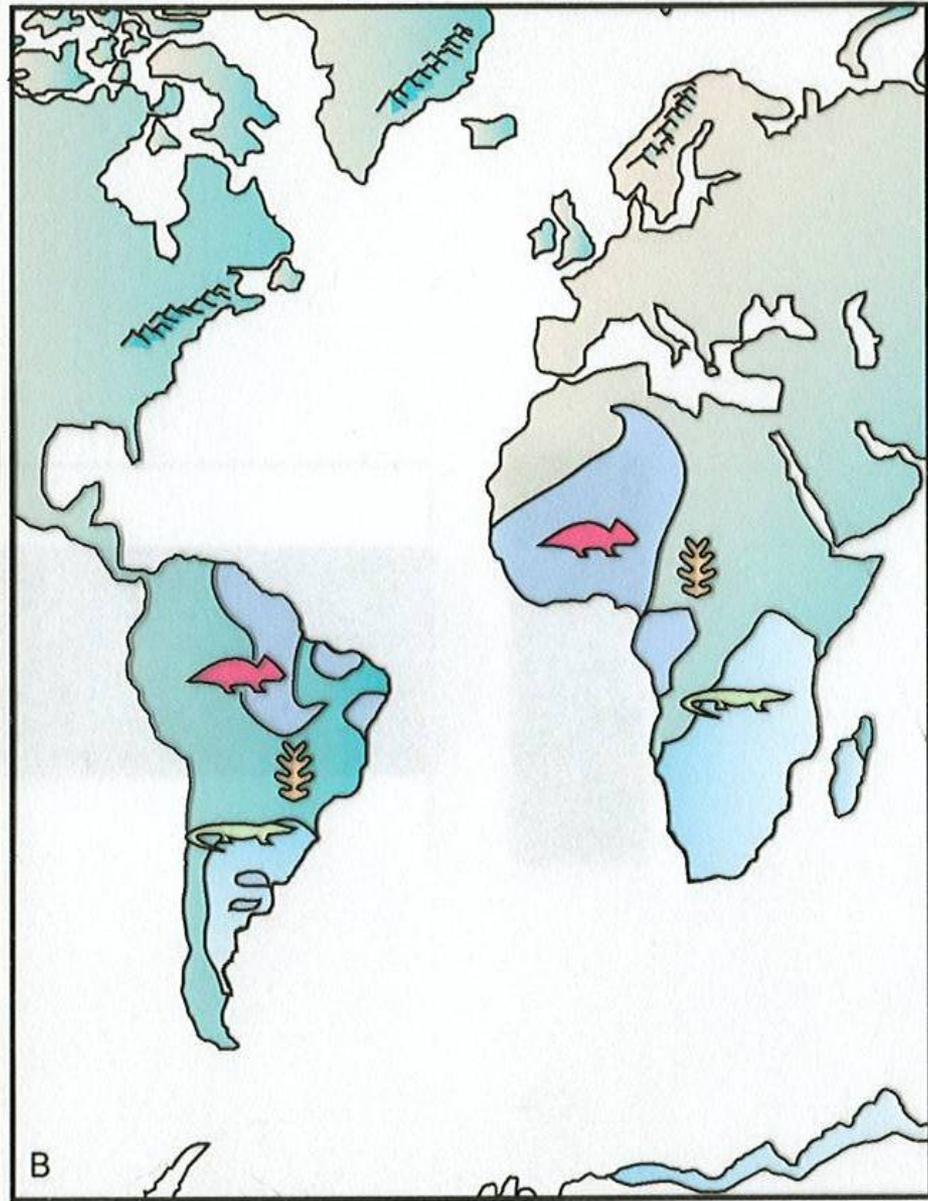
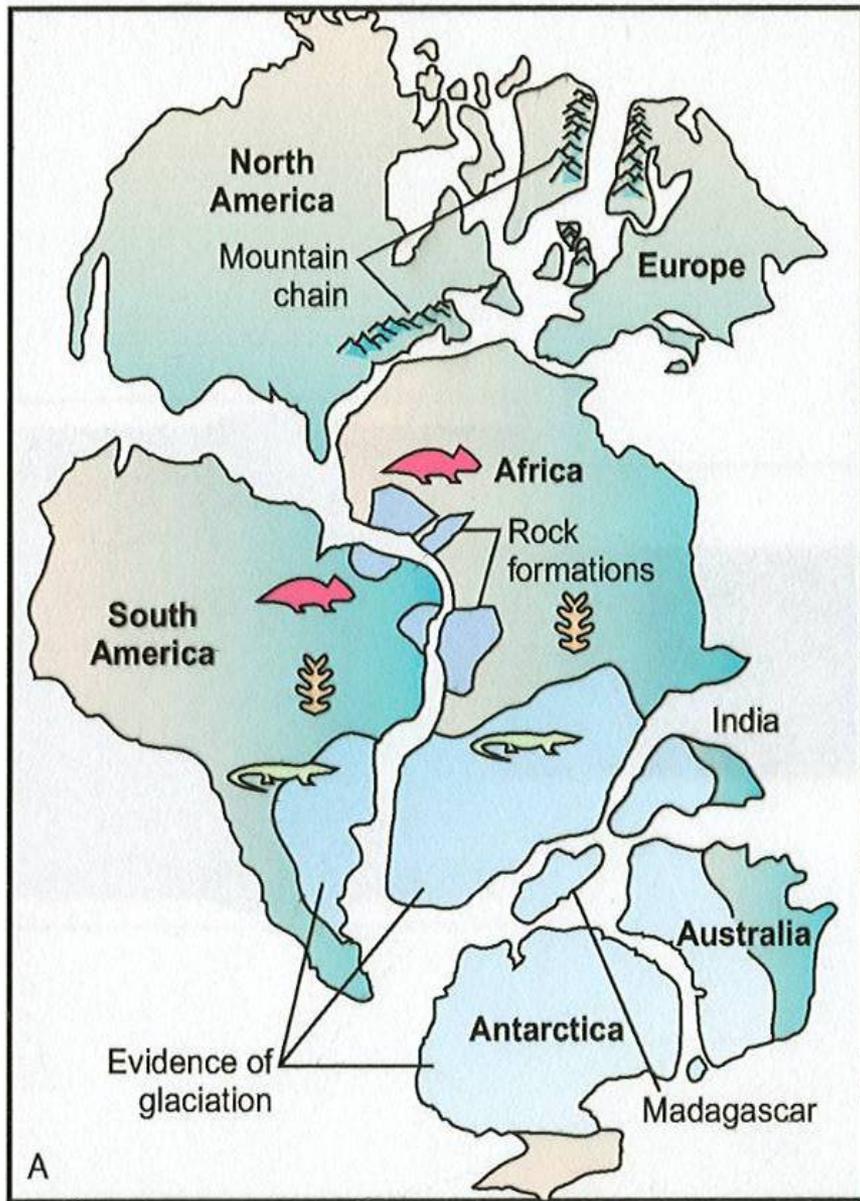
A.

# Evidence of Continental Drift

A. The shorelines of continents look as though they could fit together like a puzzle.

B. Fossil Evidence:

- Matching fossils of the same plants and animals were found on shorelines. (They couldn't swim across the ocean.)

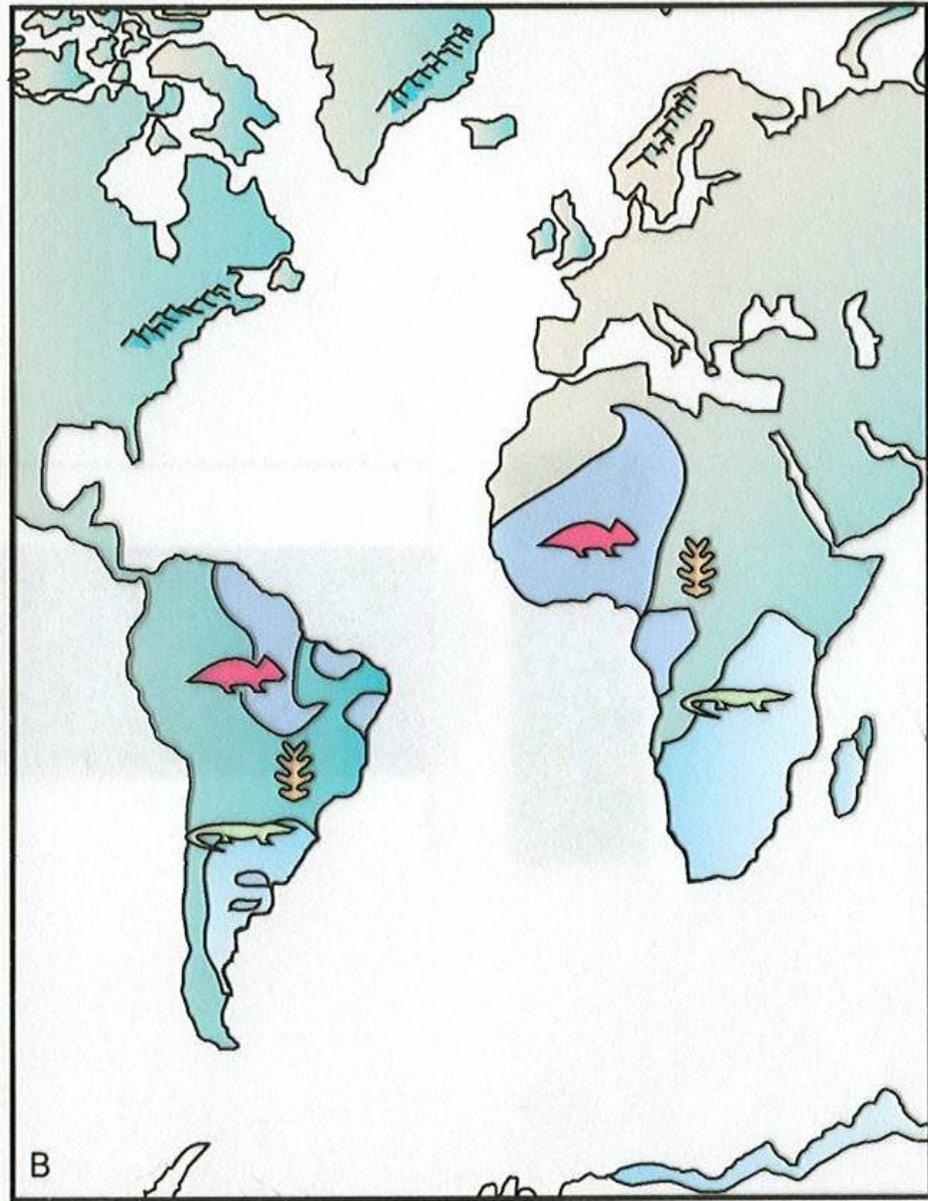
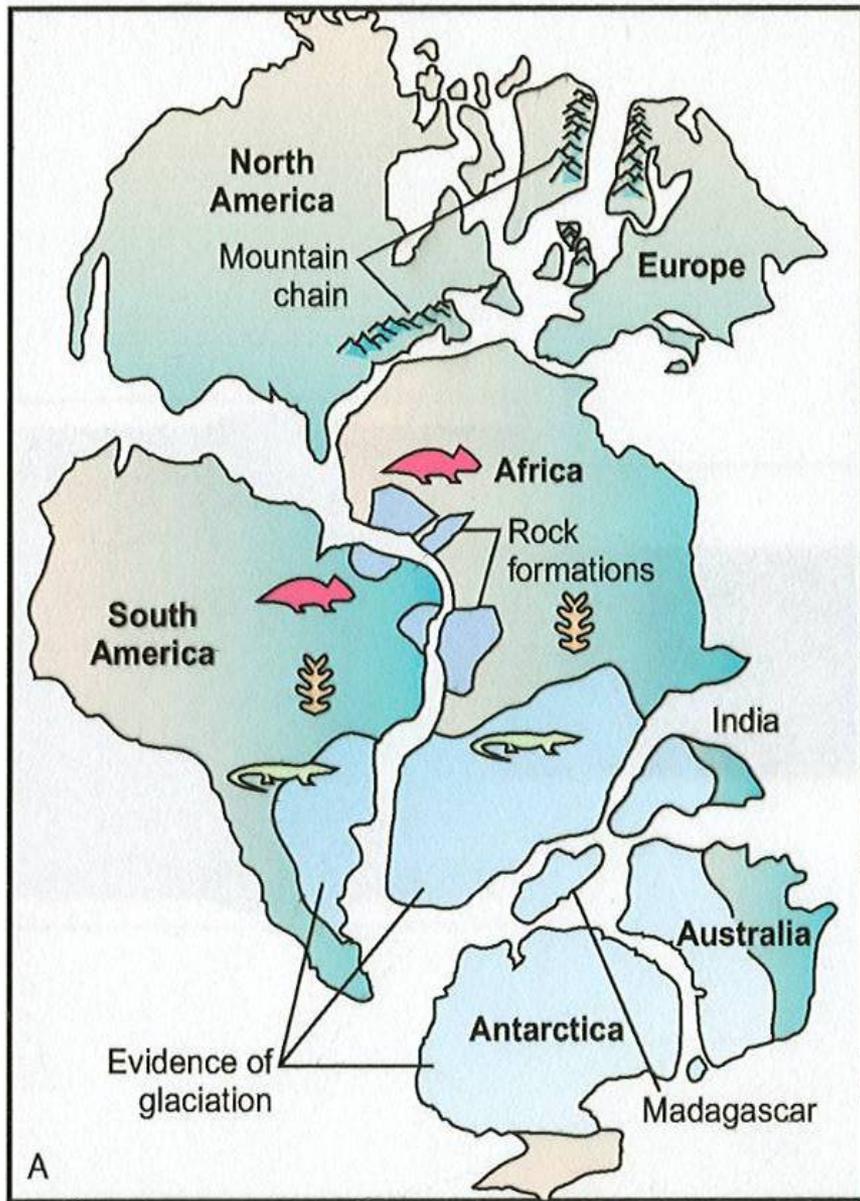


 Cynognathus   
  Mesosaurus   
  Glossopteris   
  Matching rock types   
  Glacial evidence

# Evidence of Continental Drift

## C. Geologic evidence:

- The age and type of rocks in coastal regions that were far apart from each other matched closely.
- Mountain chains appear to continue on landmasses across the ocean.

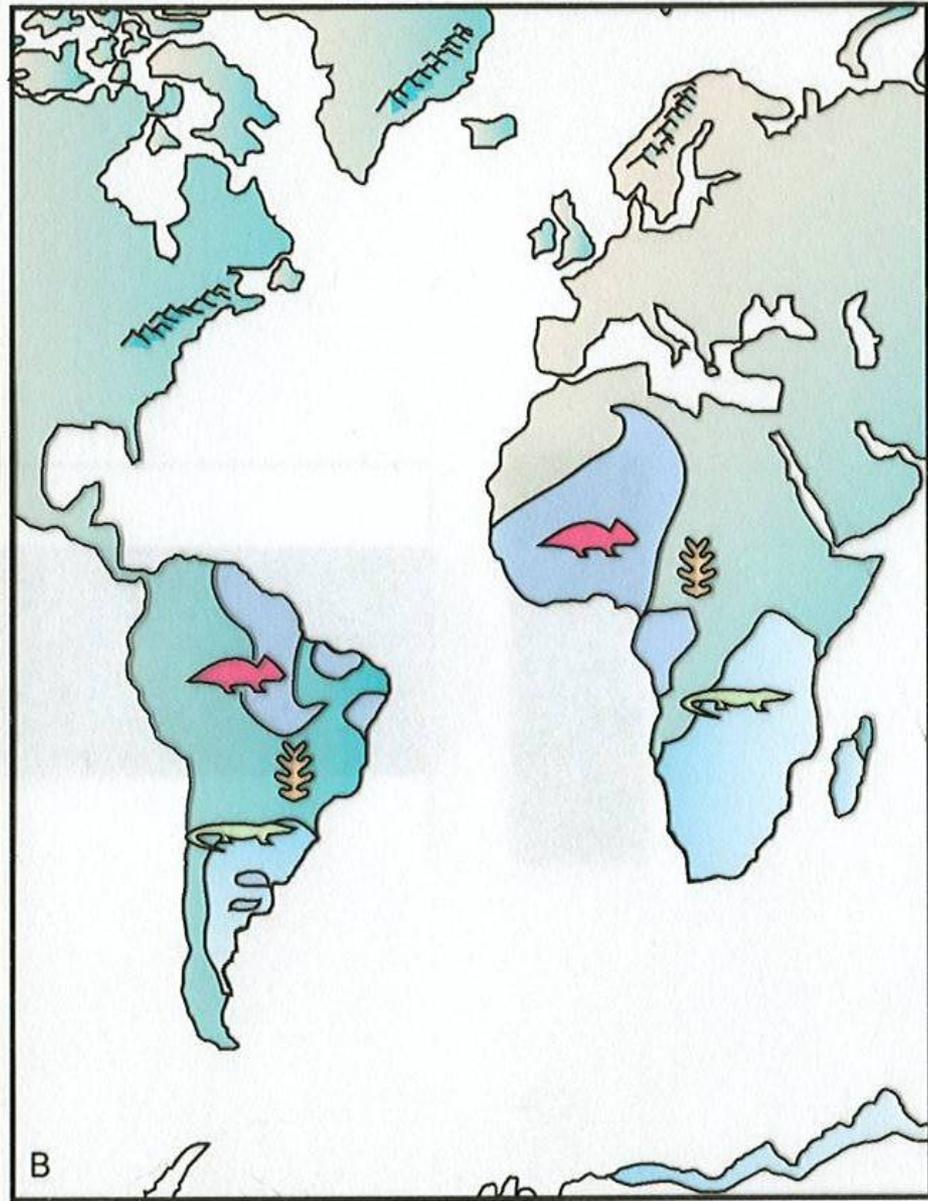
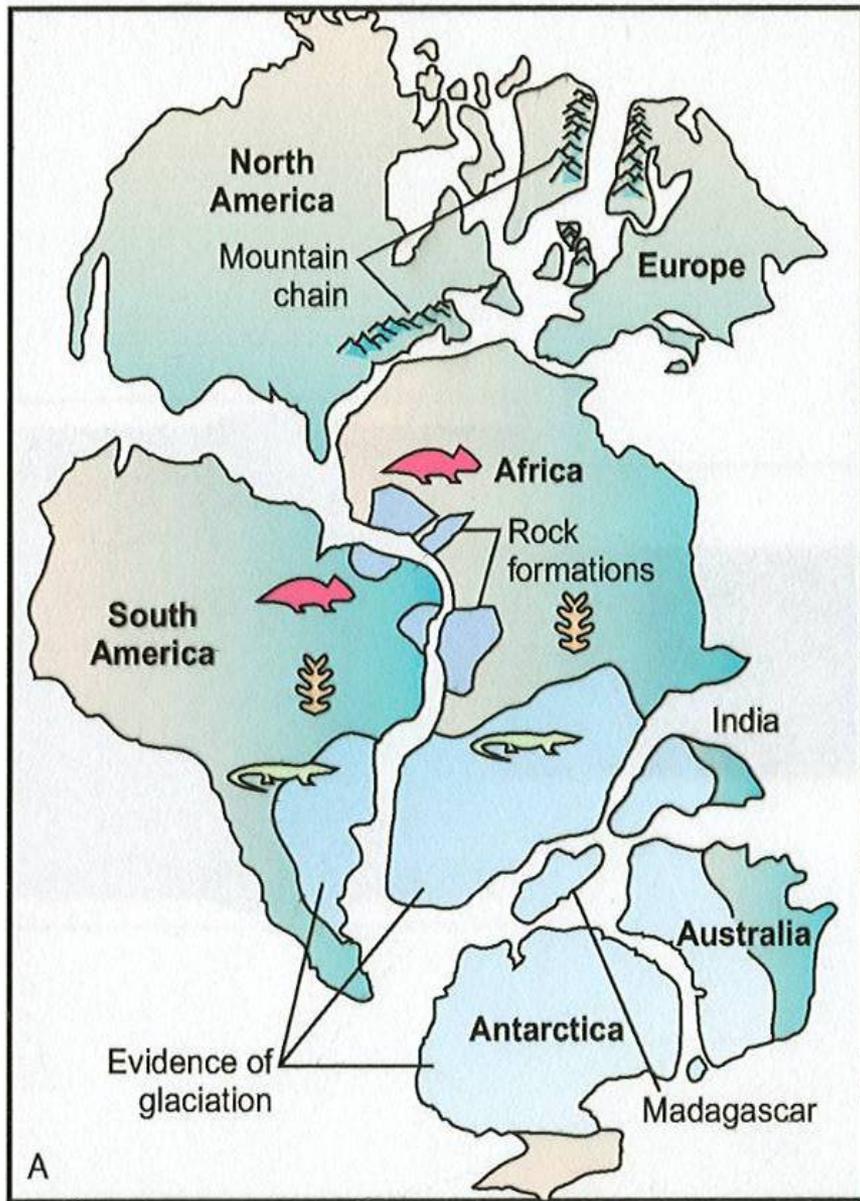


 Cynognathus   
  Mesosaurus   
  Glossopteris   
  Matching rock types   
  Glacial evidence

# Evidence of Continental Drift

## D. Climatic (climate) evidence:

- Debris from glaciers in areas that are now hot. (Too hot to have glaciers).
- Plant fossils found in areas where it is too cold for plants to grow.
- Continents must have \_\_\_\_\_ to their present locations



 Cynognathus   
  Mesosaurus   
  Glossopteris   
  Matching rock types   
  Glacial evidence

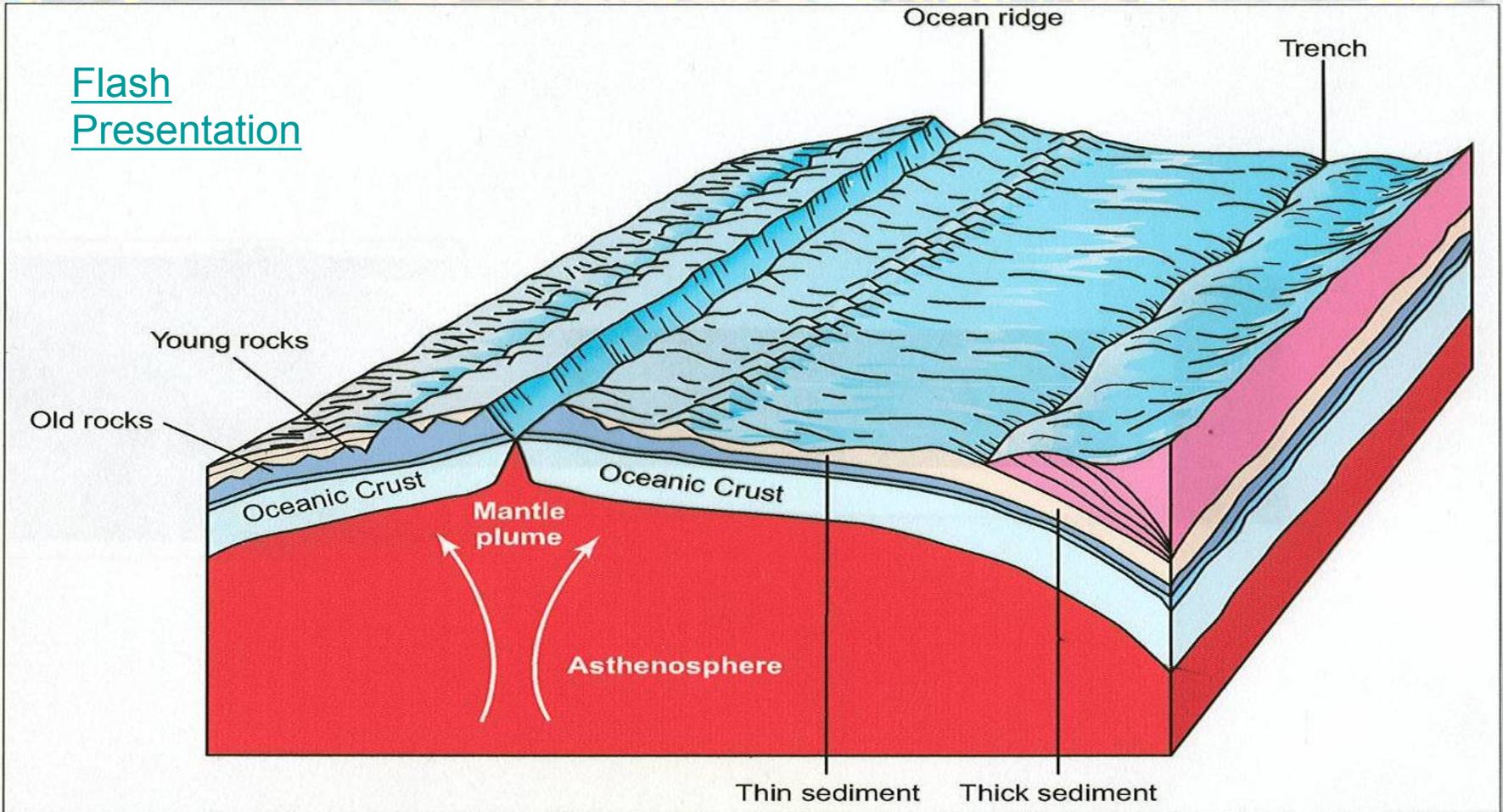
# Seafloor Spreading

## Mid-Atlantic Ridge

- Mapped in 1947
- An undersea mountain range with a steep, narrow valley running down the center
- Ocean floor was young compared to the age of continental rocks
  - Oceanic rocks: younger than 175 million years old
  - Continental rocks: about 4 billion years old

# Mid- Atlantic Ridge

## Flash Presentation



# The Renewal of the Ocean Floor

- a. Developed by Hess
- b. The idea that the valley along the top of the Mid-Atlantic Ridge was actually a break in the earth's crust where magma welled up through
- c. This happened because the ocean floor was moving away from both sides of the break (ridge)
- d. The open area was replaced by the magma that cooled and solidified into new rock
- e. Thus, the continents might also be moving

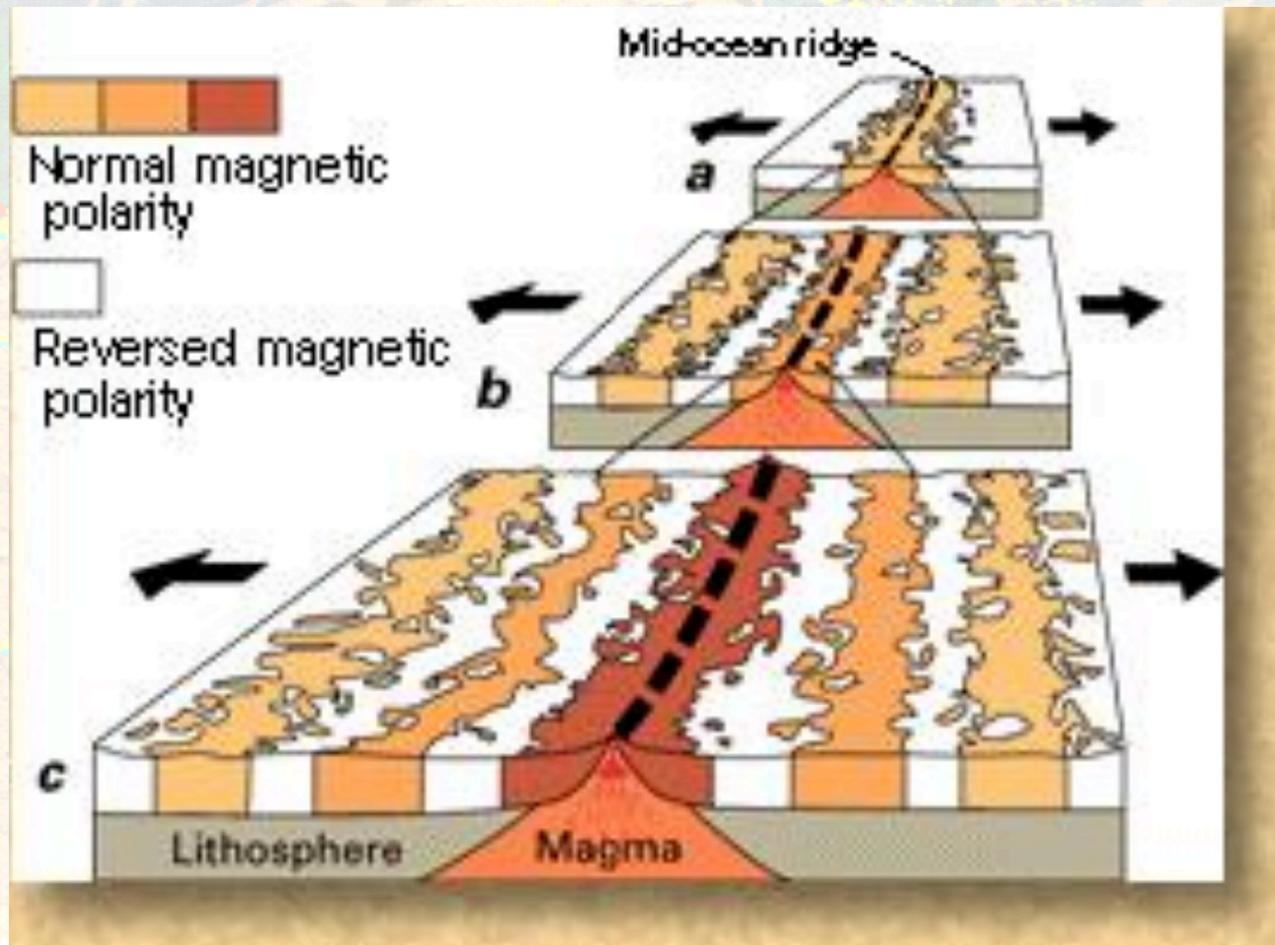
# Paleomagnetism of the Ocean Floor

- The earth acts like a giant magnet, with both north and south pole.
- When rock harden, the magnetic orientation of the minerals becomes permanent and points to the north.
- Scientist have been finding rocks with a magnetic orientation that points south.

# Paleomagnetism of the Ocean Floor

- Scientist concluded that the earth's magnetic field has reversed.
- They found that all rocks with a south magnetic field fell into similar time periods.
- Scientist have discovered that throughout history, the earths magnetic pole have reversed.

# Magnetic Polarity



# 4.2 The Theory of Plate Tectonics

- Is a theory of why and how the continents move.
- The earth consist of two types of crust.
  - Oceanic Crust
    - Material on the ocean floor
  - Continental Crust
    - Crust that makes up land masses

# The Theory of Plate Tectonics

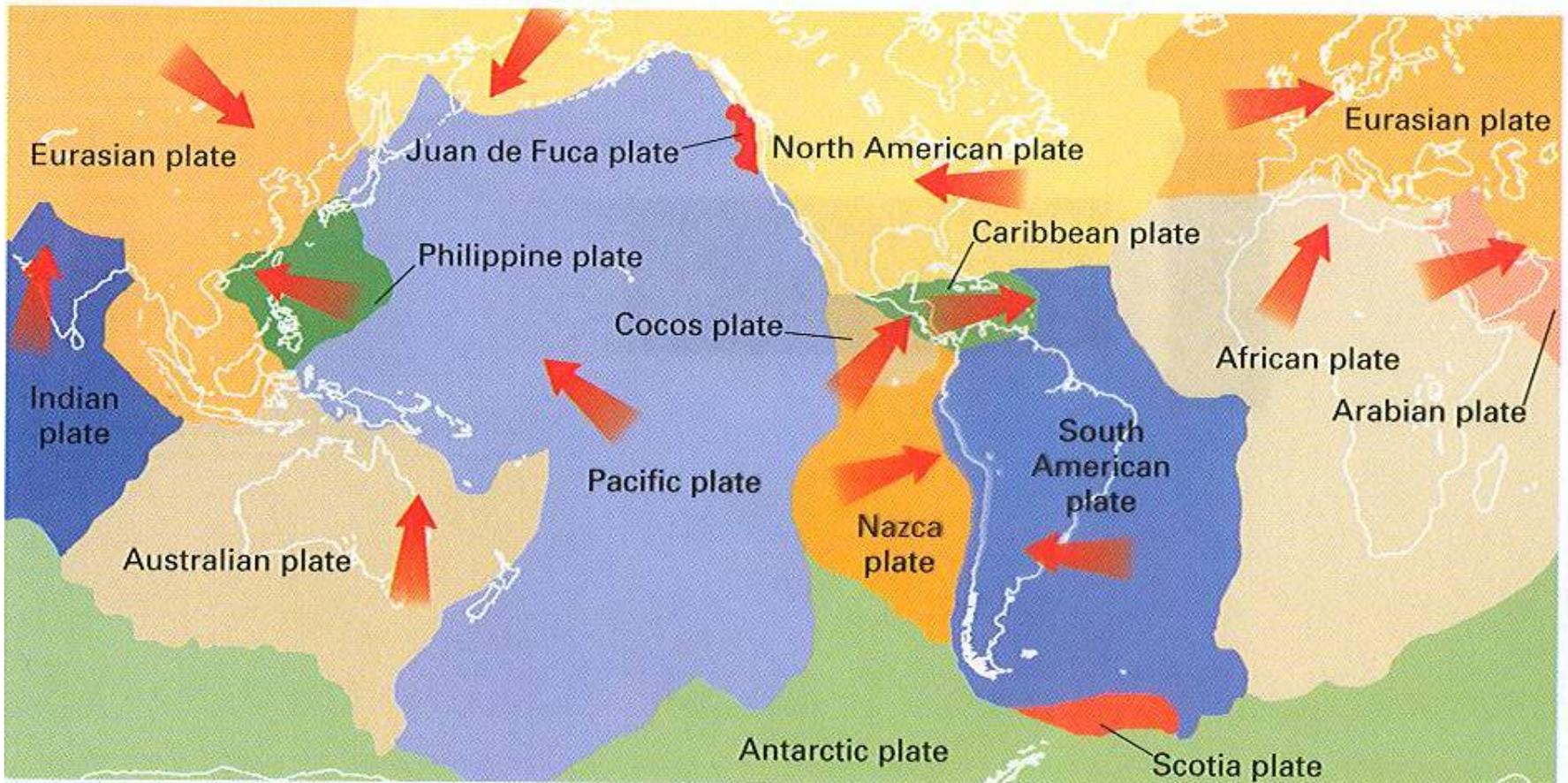
- The oceanic and continental crust make up the lithosphere.
  - Thin outer shell of the earth
- Below the lithosphere lies the asthenosphere, a layer of plastic rock, that is solid, solid rock that flows (like putty) under pressure.

# The Theory of Plate Tectonics

- According to the theory, the lithosphere is broken into plates that ride on the denser asthenosphere.
  - Like blocks of wood floating on water.
- Most plates are composed of both continental and oceanic crust.

# The Theory of Plate Tectonics

- There are about 30 Lithospheric Plates

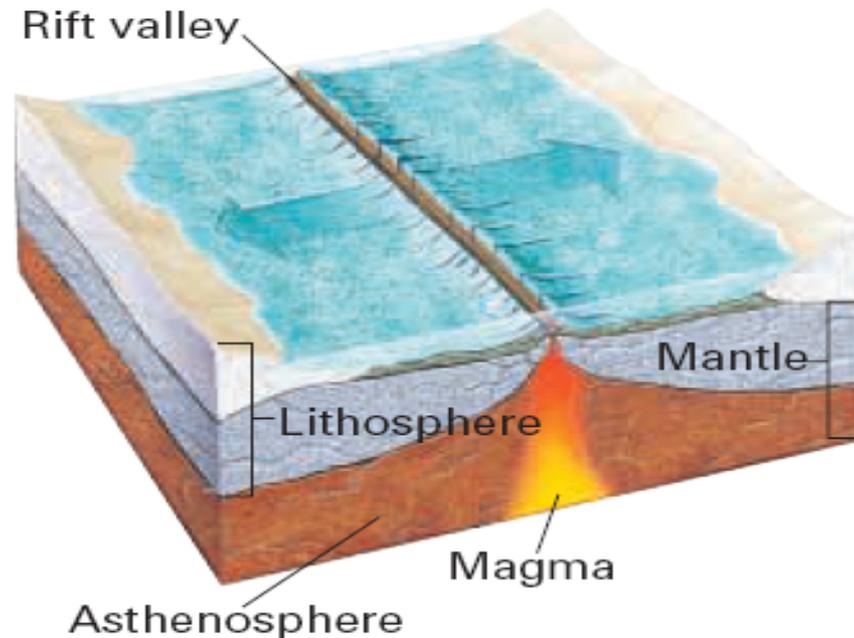


# Lithospheric Plate Boundaries

- Some plates move toward each other others are moving apart.
- This constant movement is what has created our earth's major surface.
  - Mountain Ranges
  - Deep-ocean Trenches

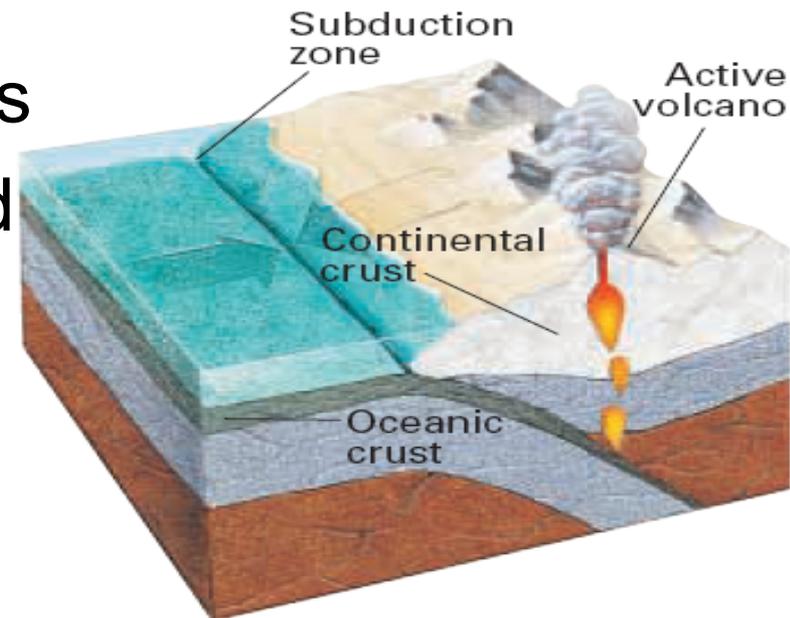
# Divergent Boundaries

- Plates are moving apart from each other
- Form what is known as a rift valley.



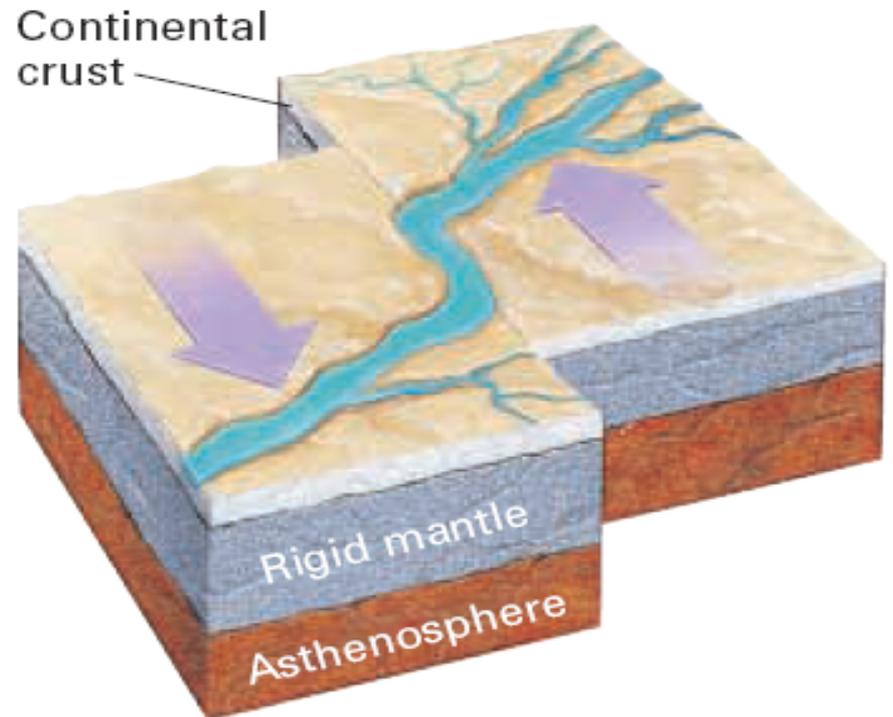
# Convergent Boundaries

- Plates are pushing into neighboring plates.
- 3 things can be created:
  - Subduction zone
  - Uplifting/ mountain ranges
  - Island arc/ volcanic island



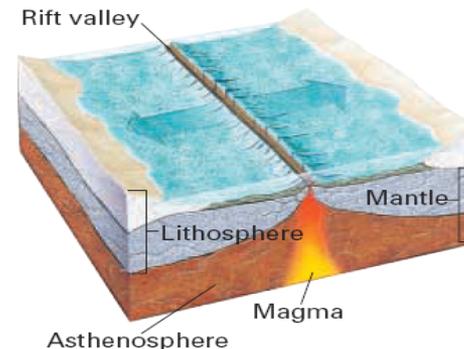
# Transform Boundaries

- Formed when two plates grind past each other.
- Example:
  - San Andreas Fault



# Causes of Plate Motion

- Many scientist believe that the movement of plates is do to convection, the transfer of through the movement of metal.
- A cycle of warm water rising and cool water sinking is known as convection current.



# Microplate Terrains Theory

- Alfred Wegener's hypothesized on how the plates ended up where they are today.
- His theory is the continents are actually like patchworks of terrains.
  - **Each terrain has 3 characteristics**
    - Rocks and fossils unique to it's terrain
    - Major fault at every boundary
    - Different magnetic properties