Progress Can Not Be Made Without Change

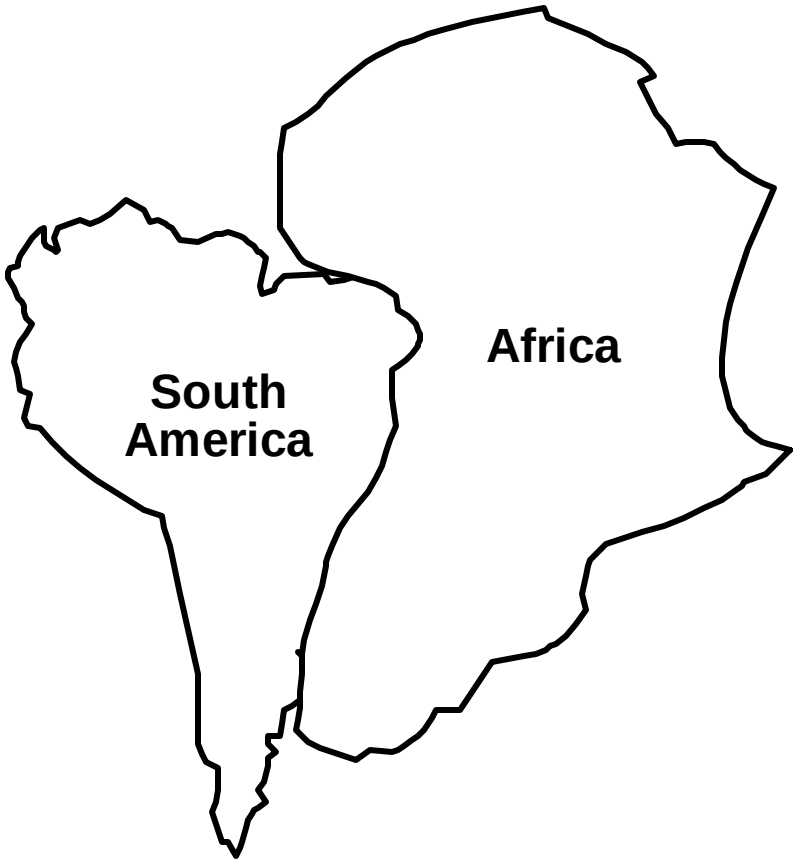
Everyone is entitled to change their opinion. It's a good and healthy process. Without change, we can never move on to a level of improvement.

Geologists change their opinions too. As recently as the 1950s most geologists believed that the continents were fixed and unmoving masses. Since then, many exciting discoveries have led them to question their beliefs. Today, they have many lines of strong and convincing evidence that lithospheric plates actually move and transport continents across the surface of our planet.

Thirty years ago, you would have had difficulty finding a geologist who believed that continents are capable of movement. Today you would have difficulty finding one who doesn't.

Science, then, is tentative in nature. We should never forget to present it this way to our students.

Alfred Wegener (early 1900s)



Alfred Wegener (early 1900s)

PANGAEA — "All Lands"

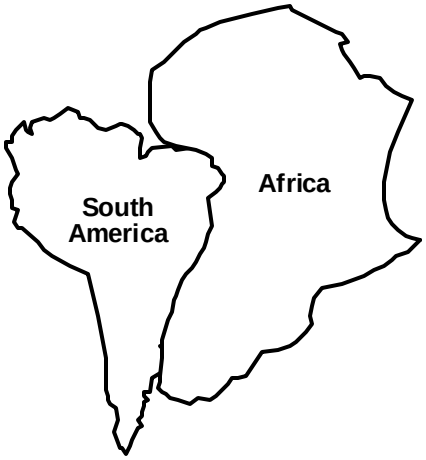
Hypothesis of Continental Drift:

- The continents were once connected as a single landmass.

- Landmasses "plowed" through ocean floor to move to their current location.

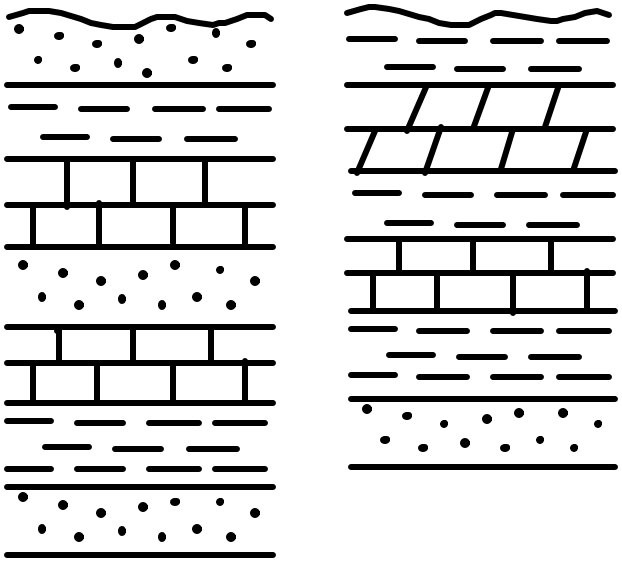
Evidence for Continent Connection:

1) Jigsaw Puzzle Fit



2) Similar Structures at Connection Points

3) Similar Ancient Rock Sequences

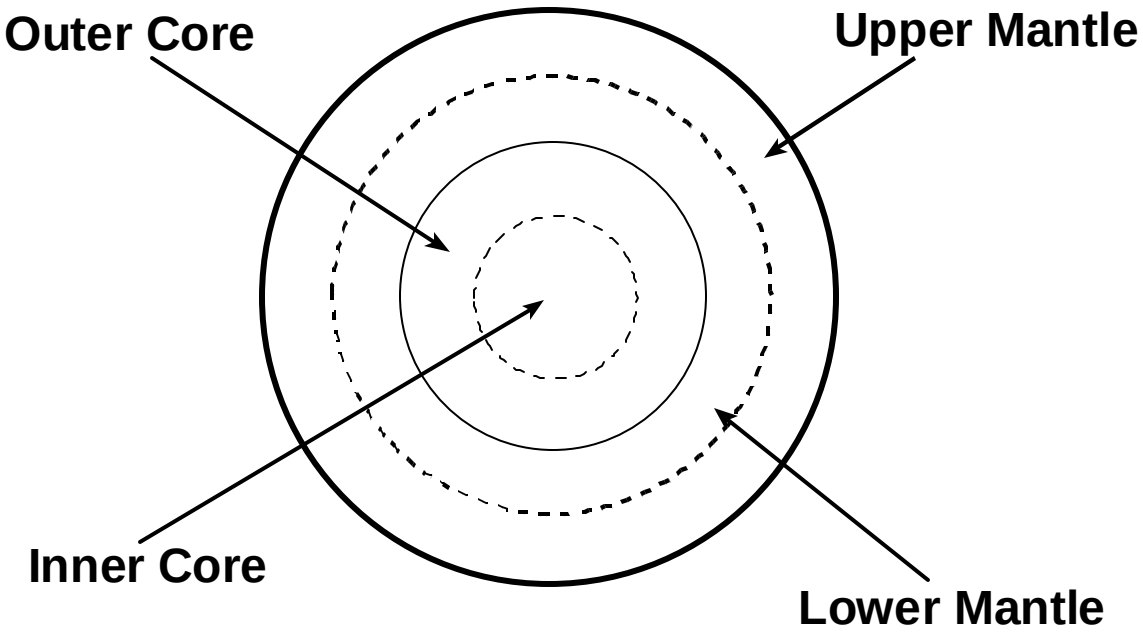


4) Different Living Species Similar Fossil Species

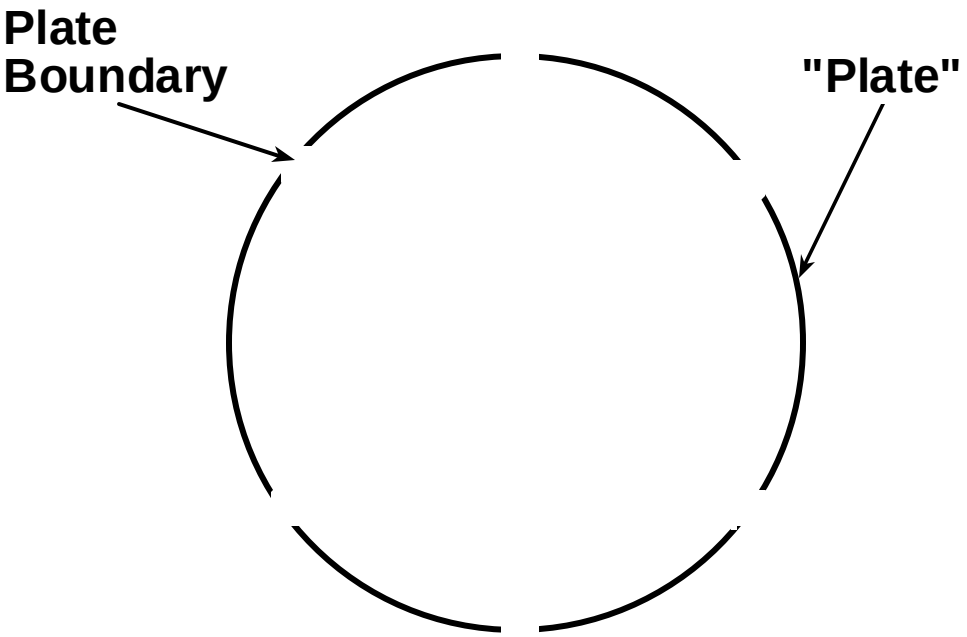
The Hypothesis Did Not Become a Theory.

- Too incredible!
- How could continents move?
- What force could possibly more them?
- Scientific snobbery?

Lithospheric "Plates"



Lithospheric "Plates"



The Crust: Two Types

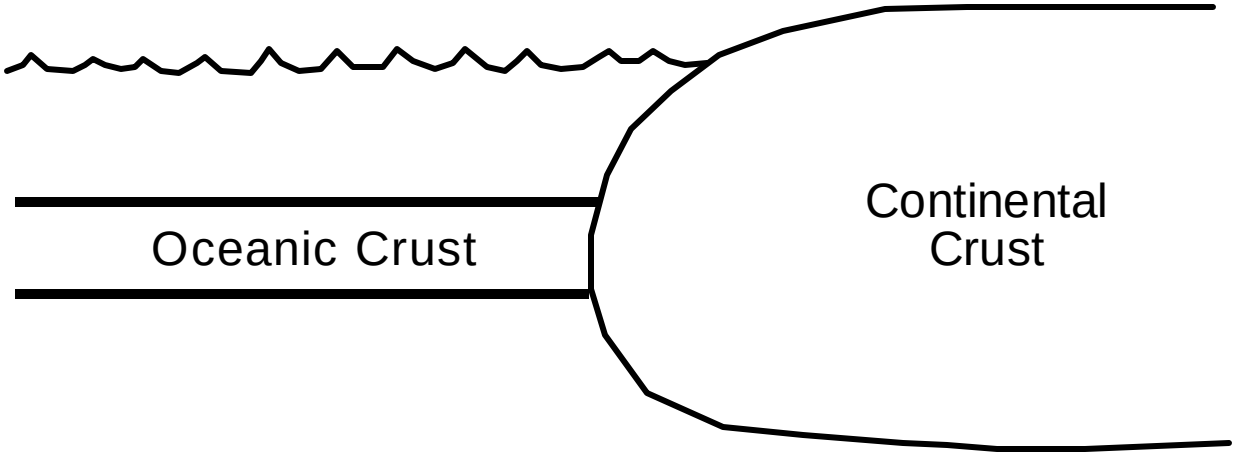


Plate Boundaries Are Important!

- Volcanoes
- Earthquakes
- Mountain Ranges

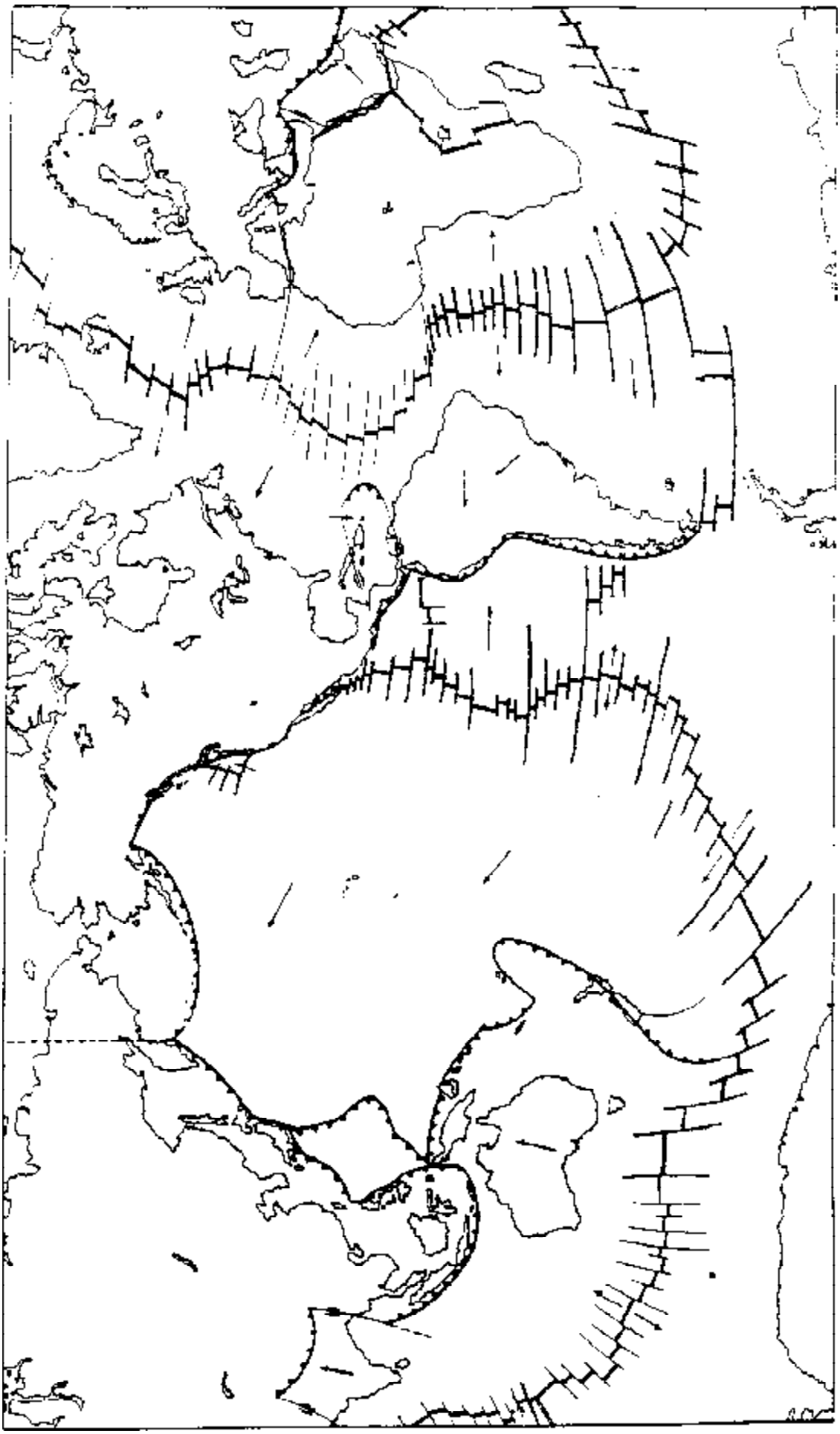


Plate Tectonics

The lithosphere is divided into a series of plates which move and interact with each other to cause earthquakes, volcanoes, mountain building, and the creation of new lithosphere.

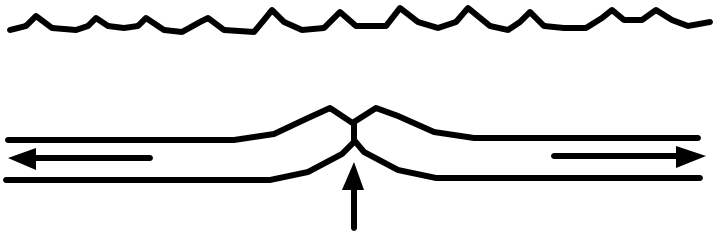
Types of Plate Interactions

1) Divergent (Pull-Apart)

2) Convergent (Collision)

3) Transform Fault (Slide-Past)

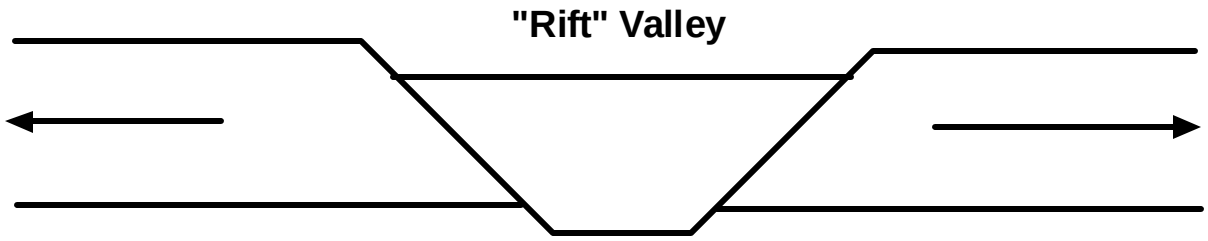
Divergent Boundary: (Ocean Plates)



EXAMPLE:

EFFECTS:

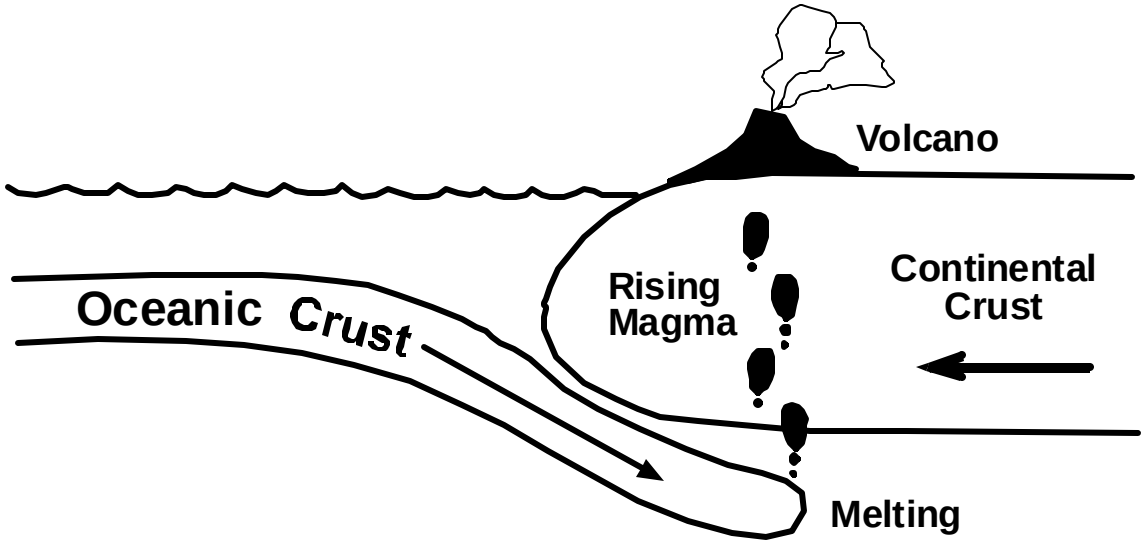
Divergent Boundary: (continent)



EXAMPLE:

EFFECT:

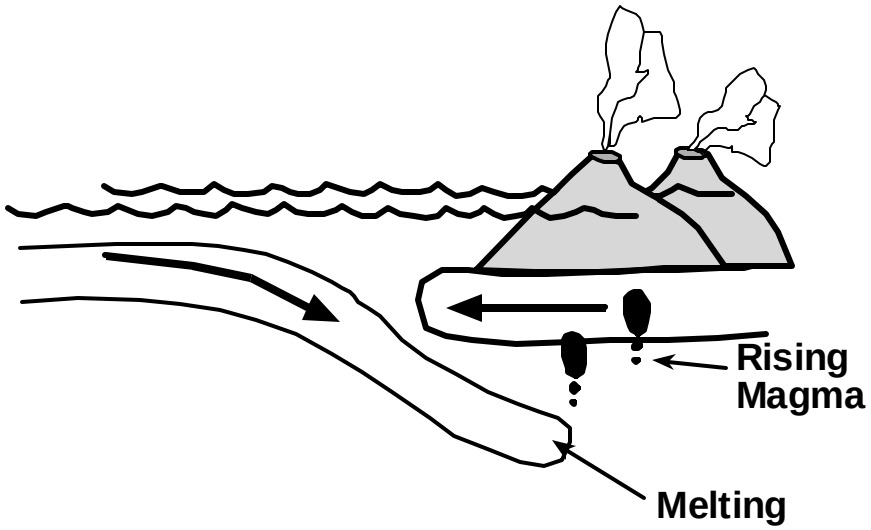
Convergent Boundary: (continent—ocean)



EXAMPLE:

EFFECTS:

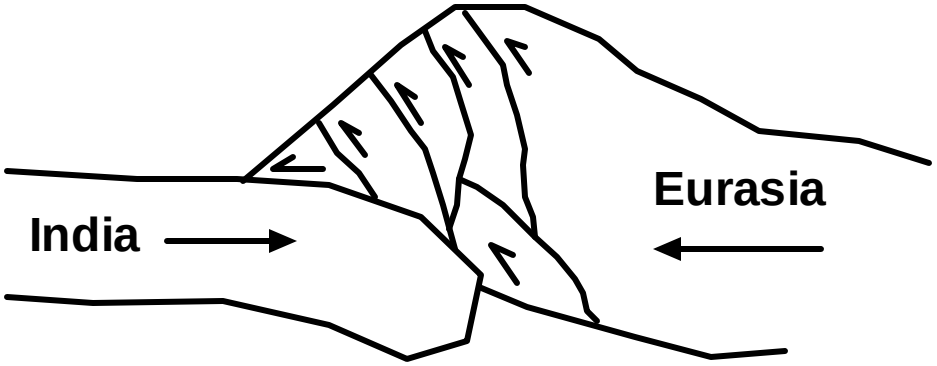
Convergent Boundary (ocean-ocean)



EXAMPLE:

EFFECTS:

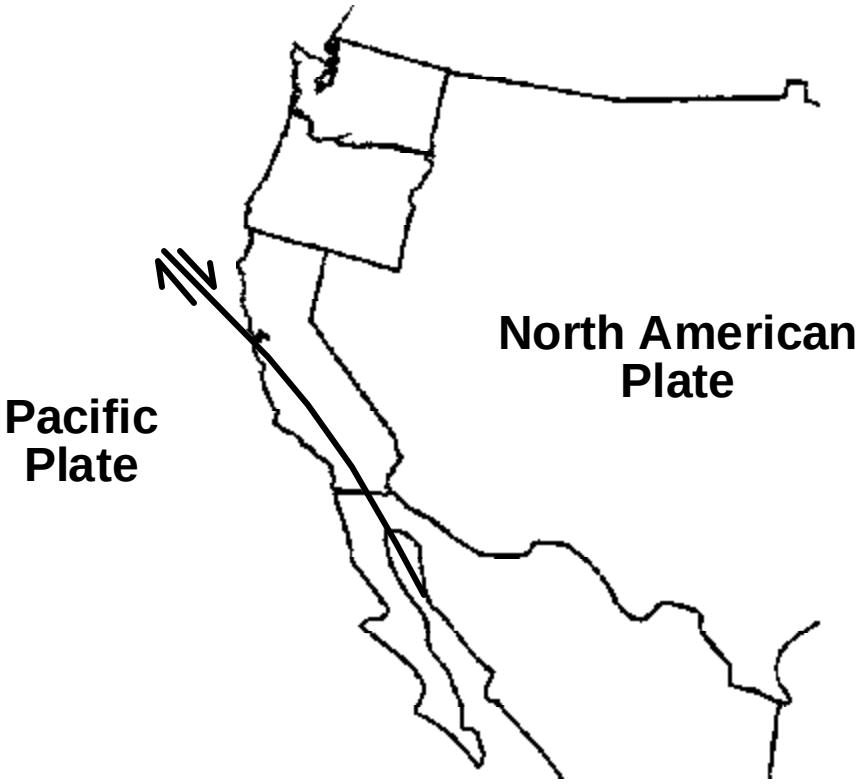
Convergent Boundary (two continents)



EXAMPLE:

EFFECTS:

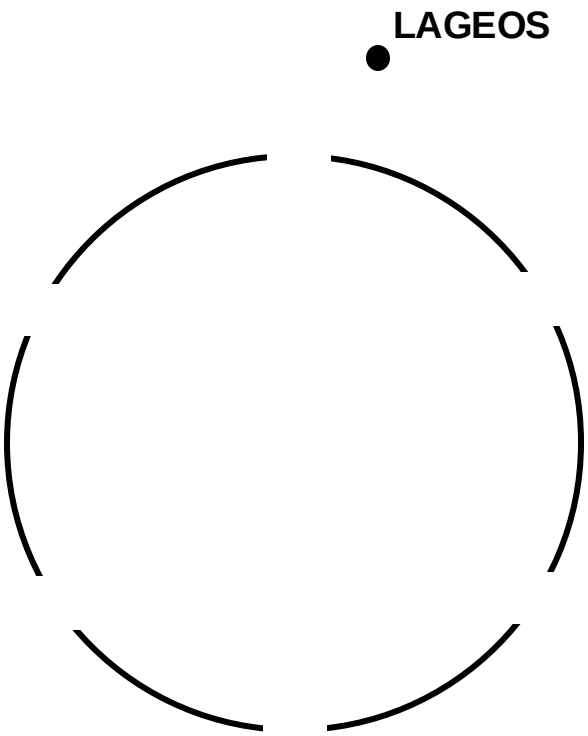
Transform Boundary: Plates Slide Past One Another



EXAMPLE:

EFFECTS:

Testing the Plate Movement Theory



Understanding Plate Tectonics

1) The lithosphere is divided into several plates.

2) The plates move by mantle convection.

3) There is significant evidence for plate movement.

4) There are different types of plate boundaries.

5) Earthquakes, volcanoes, and mountain ranges are created by plate interactions.