

EARTH'S INTERIOR AND PLATE TECTONICS

**What evidence do we have that
continents moved?**

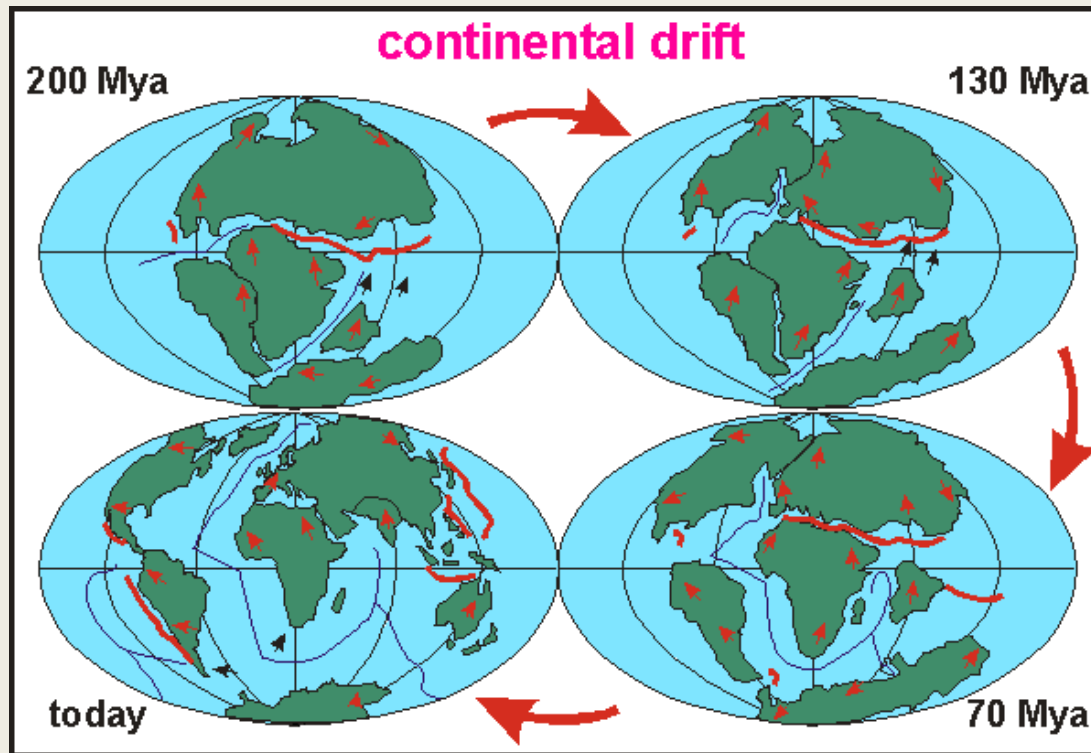
*In order for a scientific explanation to be accepted, we need
evidence and we need to explain the evidence.*

Today's Task

- Read Wegener's Rejected Hypothesis
- Pangea Fossil and Mountain Chain Evidence Worksheet and Questions

What is Continental Drift?

(2min)



We just explored some pieces of evidence that would support Wegener's Hypothesis

- Alfred Wegener thought that the jigsaw puzzle appearance of continents, as well as identical fossils and geographic formations, could be explained by the existence of a supercontinent in the ancient past that split apart over time
- His theory, continental drift, was widely rejected and ridiculed because he could not explain what immense force(s) could have caused the movement of continents
- We will look at additional pieces of evidence of Earth's movement, such as volcanoes and earthquakes, to better understand how continents could have moved.

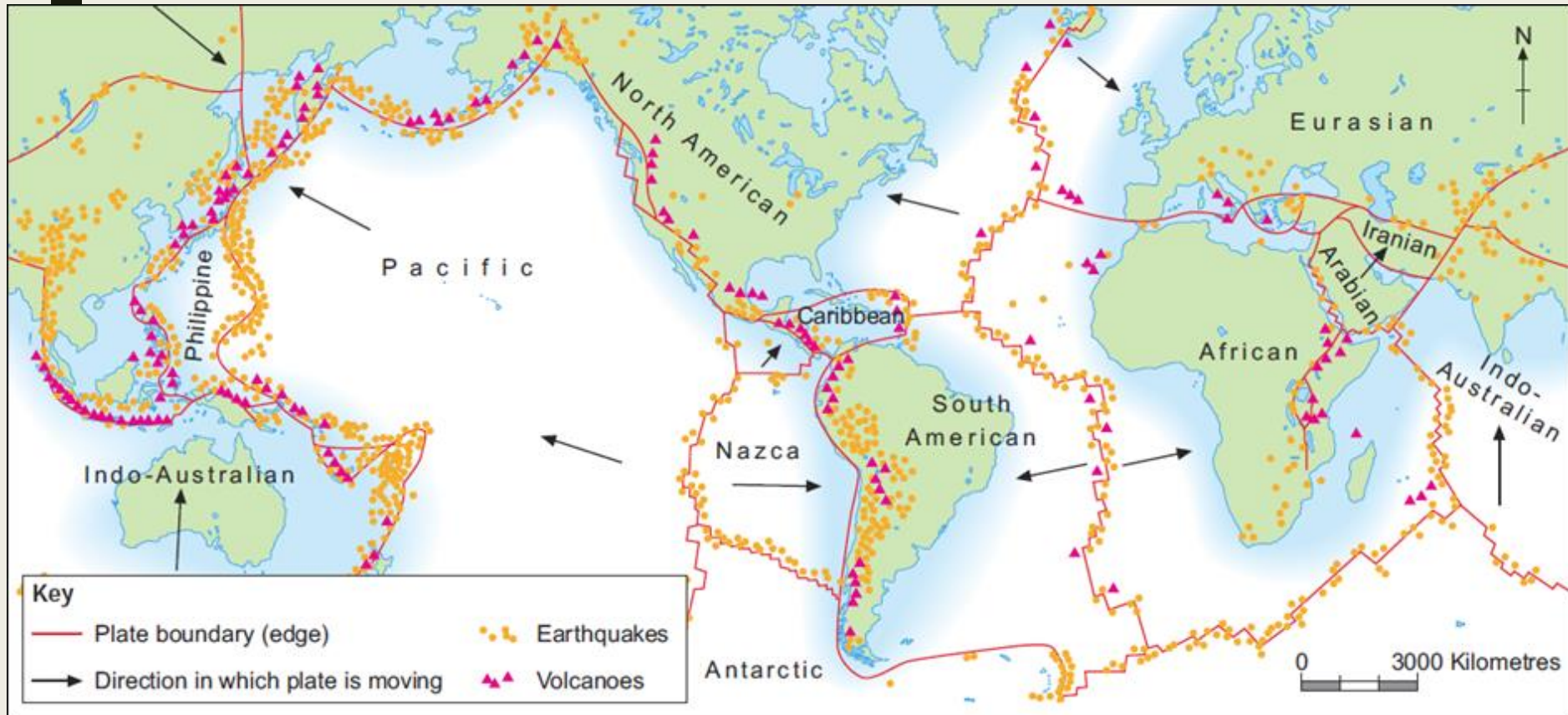
Where do Earthquakes and Volcanoes occur most often?

- Worksheet: Mapping out where do Earthquakes and Volcanoes occur?

Where do earthquakes and volcanoes occur most often?

- Did you notice a pattern of where earthquakes and volcanoes occur?
- What is going on at these locations that might explain their occurrence?
- How does what we learn about earthquakes and volcanoes help us explain how the continents could have moved over time?

Most earthquake epicenters and volcanoes are located in the same geographic areas on earth's surface, plate boundaries



HW: Dynamic Earth: Plate Tectonics

Part 1 and 2

(you will need internet access to
complete)

Dynamic Earth Link

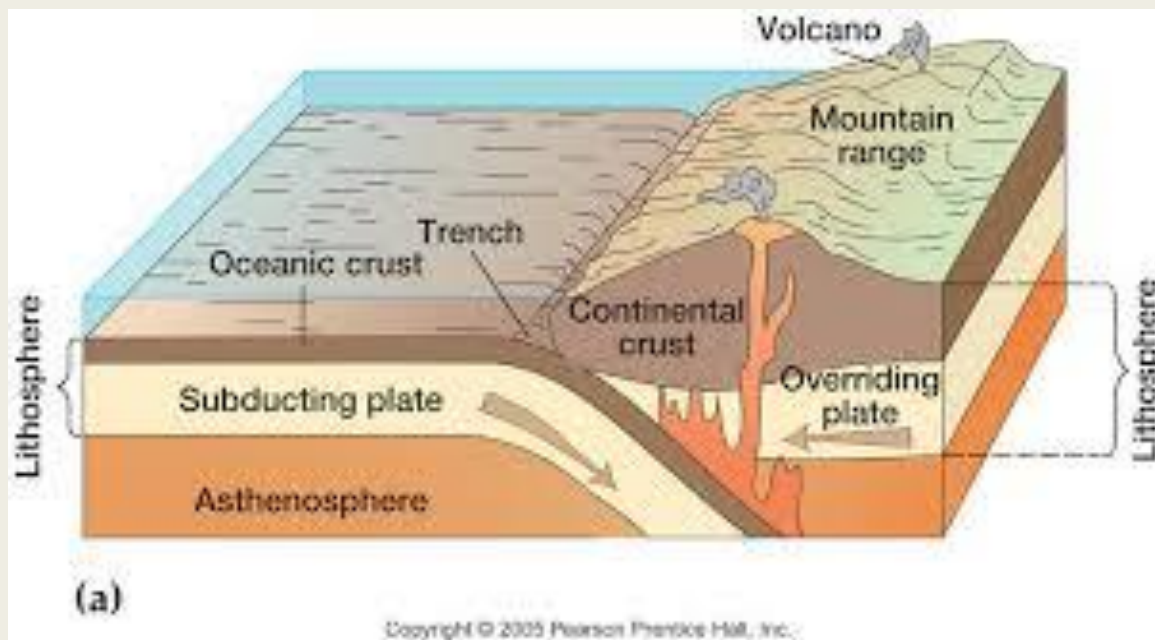
<https://www.learner.org/interactives/dynamicearth/index.html>

Phet simulation- Use a model to make observations of plate interactions

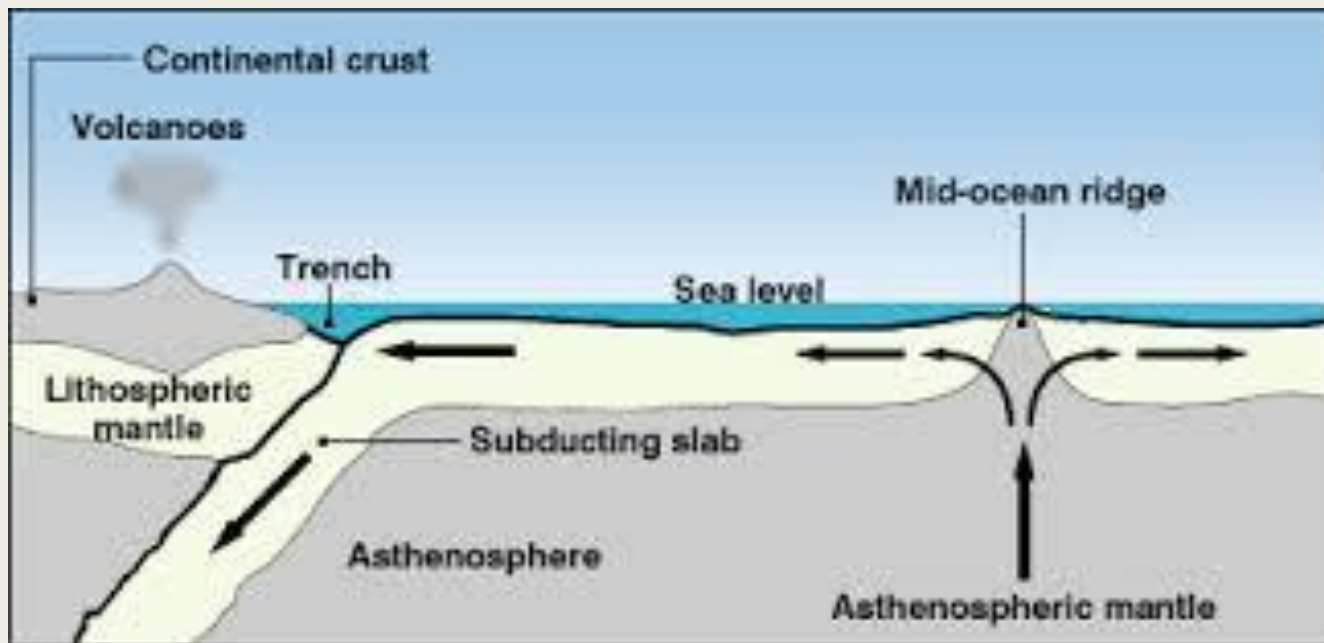
Link <https://phet.colorado.edu/en/simulation/plate-tectonics>

The type of interaction between plates and the **relative density** seems to determine what kind of geographic features are found at those boundaries.

Ocean plates are denser than continental plates, so sink (subduct) under the continental plates. We will explore this more.

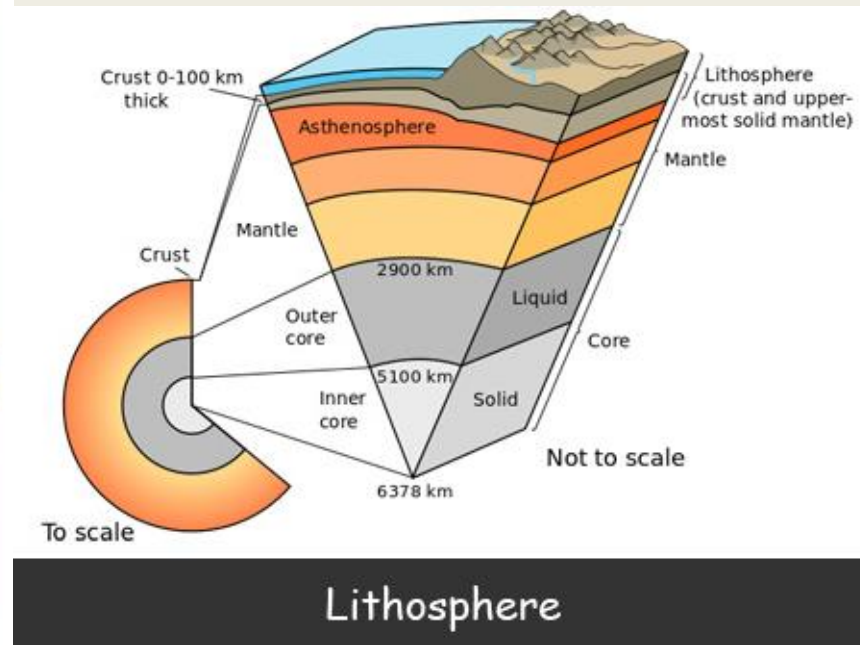
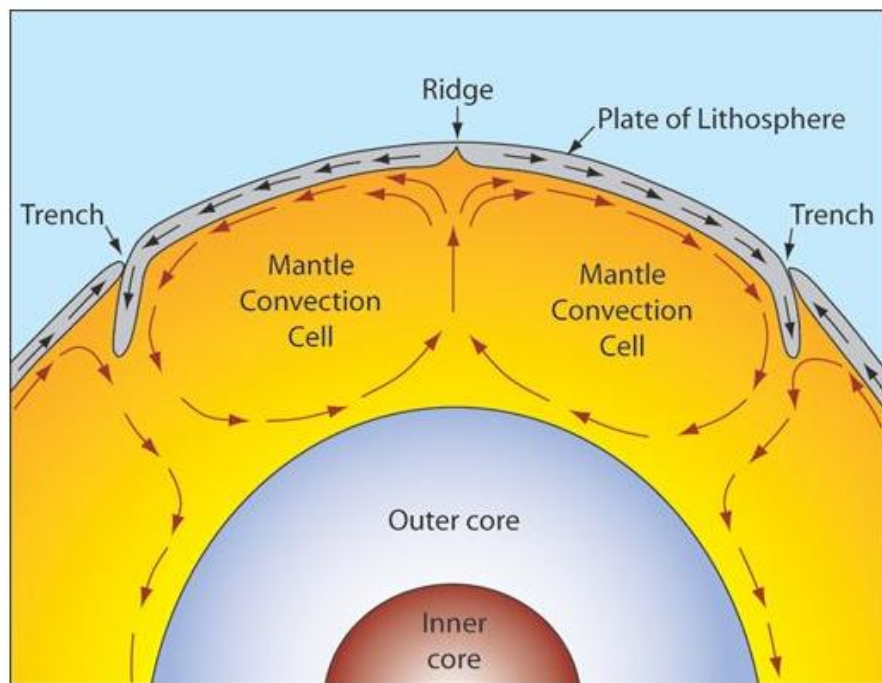


New crust is being formed at mid-ocean ridges, and the oldest crust is found at trenches (subduction zones), where it sinks back into the Earth. This supports the idea that the plates, which continents are a part of, must be moving.



What makes the plates move?

Lithospheric Plate motion is thought to be caused by **convection currents** in the **asthenosphere** (upper mantle). Since hotter material deep in the asthenosphere is less dense it will rise slowly, as it reaches the base of the lithosphere it begins to cool, become more dense, and will sink.



Part 2 Plate Motion

Use an interactive simulation to make observations of different types of plate boundary interactions and resulting landforms, as well as the scale of time.

Link:

https://sepuplhs.org/middle/iaes/students/simulations/sepup_plate_motion.html

HW: Dynamic Earth's Interactive: Part 3+4

How do plate boundaries move?

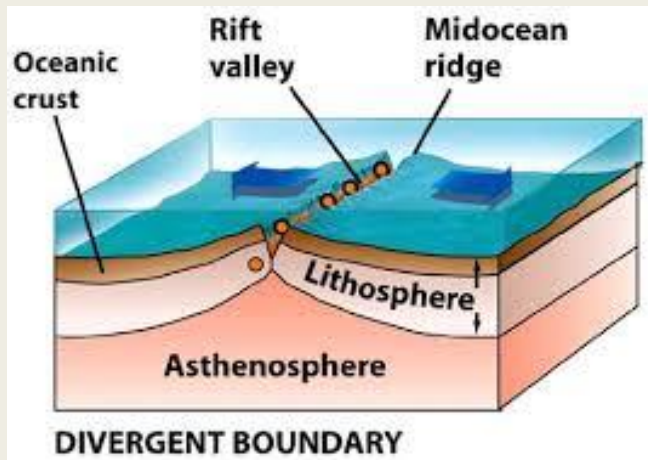
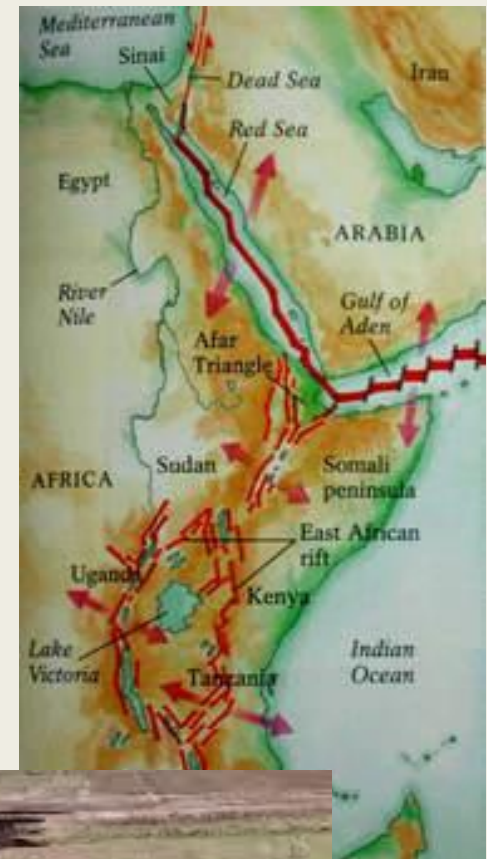
3 Types Plate Boundaries

1. Divergent Plate Boundaries
2. Convergent Plate Boundaries
3. Transform Plate Boundaries

Plate Boundaries

1. Divergent Plate Boundaries:

When the two plates move away from each other at mid-ocean ridges and new seafloor forms (Rift Valleys and volcanoes are formed).



Africa has
sometimes

MID OCEAN RIDGE

UNDERWATER LANDSCAPE FORMED BY A DIVERGENT PLATE BOUNDARY



MID OCEAN RIDGE

UNDERWATER LANDFORM FORMED BY A DIVERGENT PLATE BOUNDARY

Plate Boundaries Continued...

- **2. Convergent plate boundaries:** when the two plates move towards each other, the result depends on the type of lithosphere the plates are made of.

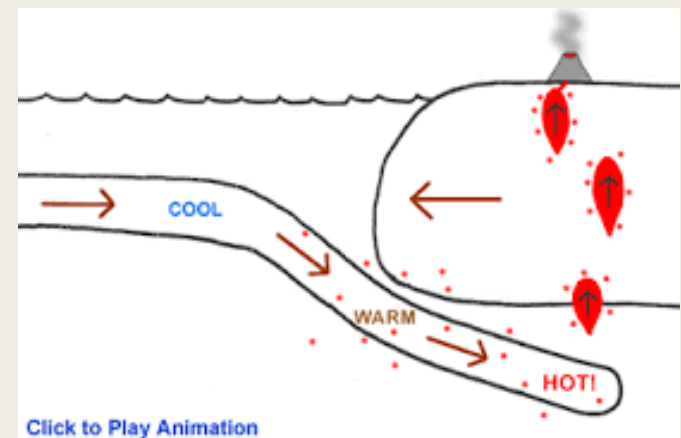
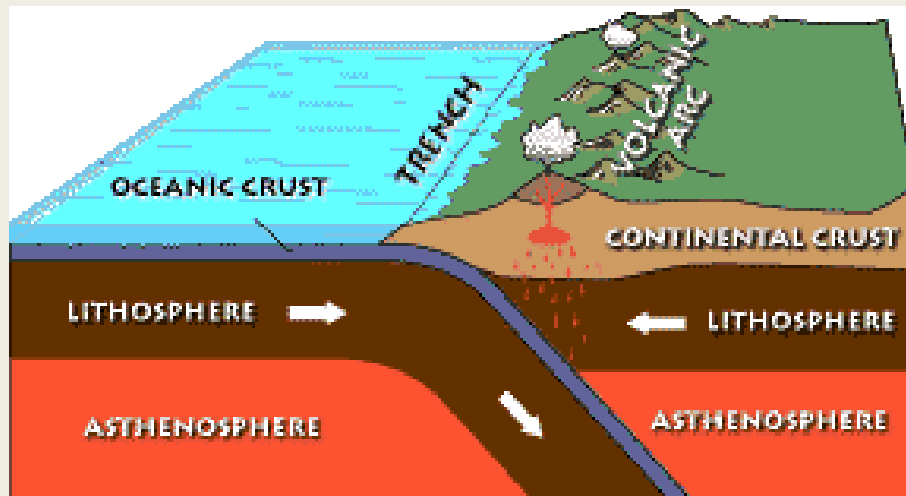
Three types of convergent plate boundaries.

- *Ocean to Continent*
- *Continent to Continent*
- *Ocean to Ocean*

Convergent Plate Boundaries

- A. **Ocean-Continent**-when oceanic crust converges with continental crust, the denser oceanic plate plunges beneath the continental plate. This is called **subduction**. (Location of volcanos and Earthquakes)

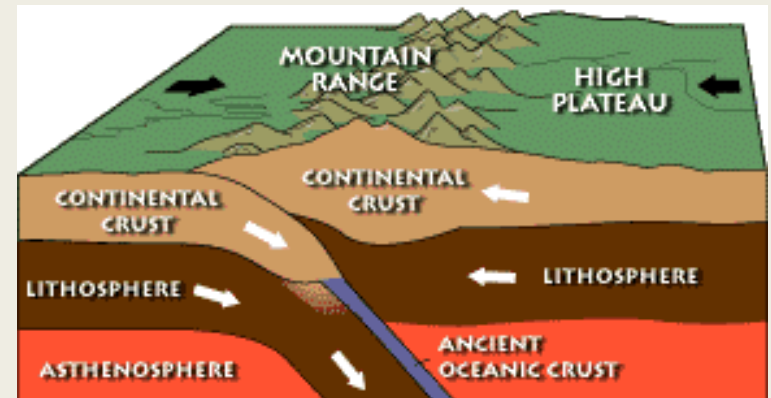
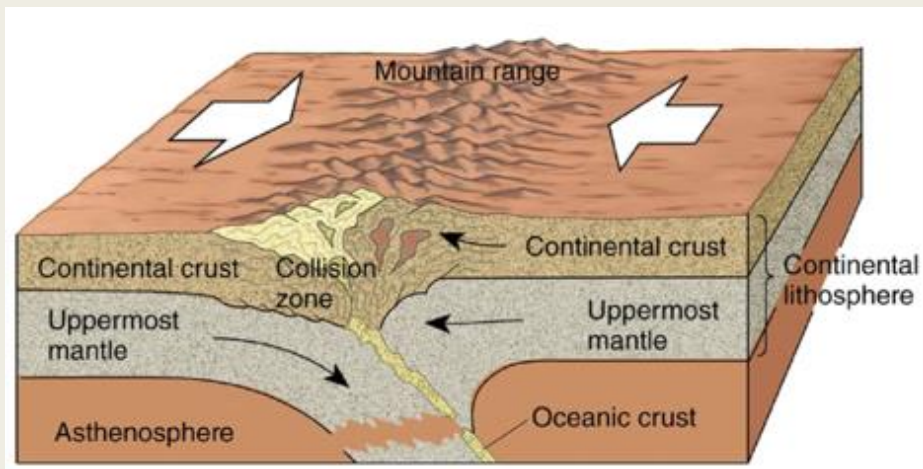
Link: <https://www.geolsoc.org.uk/Plate-Tectonics/Chap3-Plate-Margins/Convergent/Oceanic-continental>



Convergent Plate Boundaries Continued...

B. Continent-Continent- Continental plates are too buoyant to subduct. So they create some of the largest mountain ranges. These collisions bring on numerous and large earthquakes (Creates Mountains)

- [Link: https://www.geolsoc.org.uk/Plate-Tectonics/Chap3-Plate-Margins/Convergent/Continental-Collision](https://www.geolsoc.org.uk/Plate-Tectonics/Chap3-Plate-Margins/Convergent/Continental-Collision)



Convergent Plate Boundaries Continued...

C. **Ocean-Ocean**- when two oceanic plates converge, the older, denser plate will subduct into the mantle. An **ocean trench** marked the location where the plate is pushed down into the crust. The line of **volcanoes** that grows on the upper oceanic plate is an **island arc**.(Islands)

Link: <https://www.geolsoc.org.uk/Plate-Tectonics/Chap3-Plate-Margins/Convergent/Oceanic-oceanic-collision>

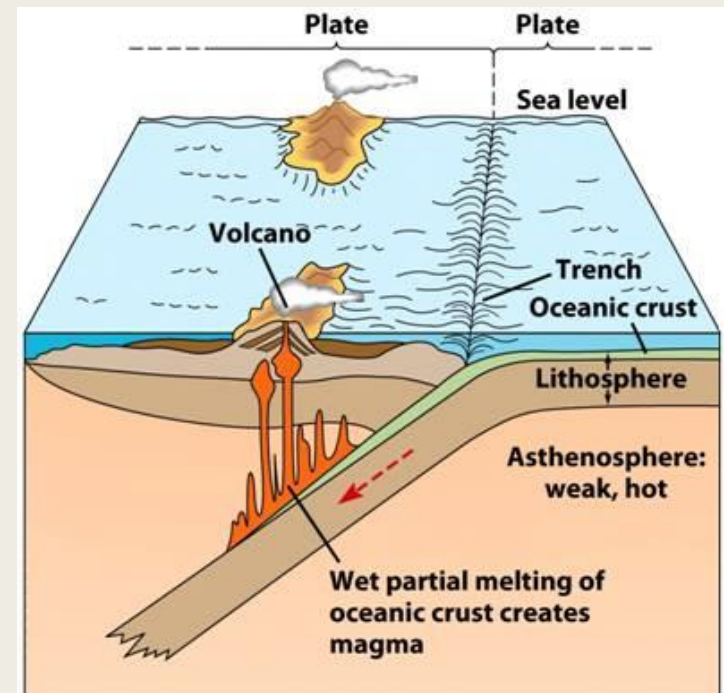
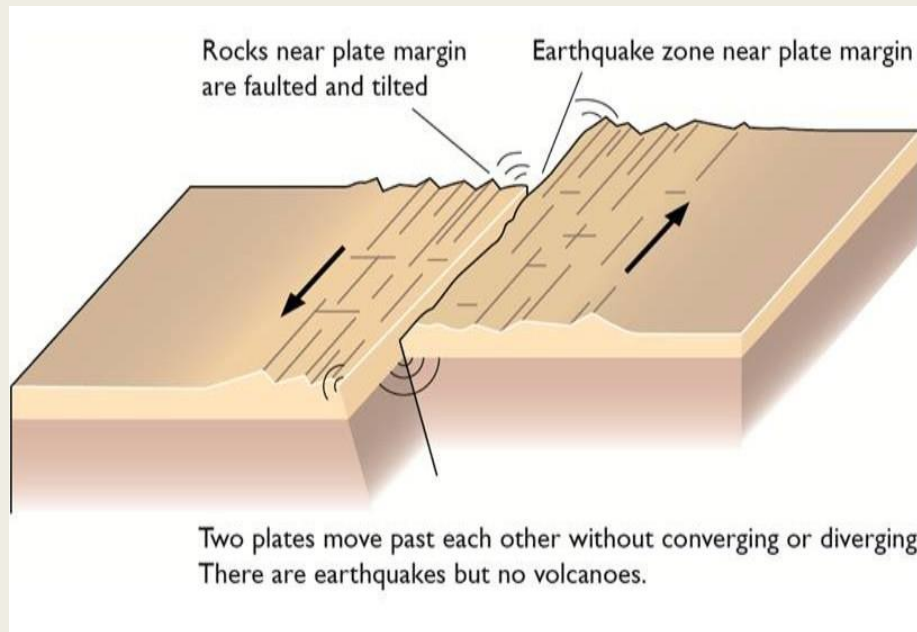


Plate Boundaries Continued...

- **3. Transform Plate Boundaries-** are seen as transform faults, where two plates move past each other in opposite directions. Transform faults on continents bring massive earthquakes.





Watch video 4:50min

<https://www.youtube.com/watch?v=ifke1GsjN>

NO

HW: Dynamic Earth's
Interactive: Part 3+4

Do now: Color Plates Activity and Review for Quiz

- Review for Quiz on Monday

Additional Resources

- Ring of Fire: 45 minutes
<https://www.youtube.com/watch?v=wJS7hGMr0Ws>
- Tectonics of Planet Earth (15 minutes)
https://www.youtube.com/watch?v=Kg_UBLFUpYQ