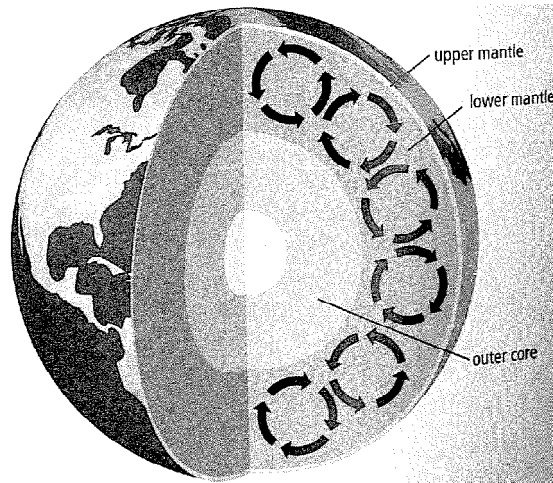


Continental Drift and Tectonic Plates - Notes

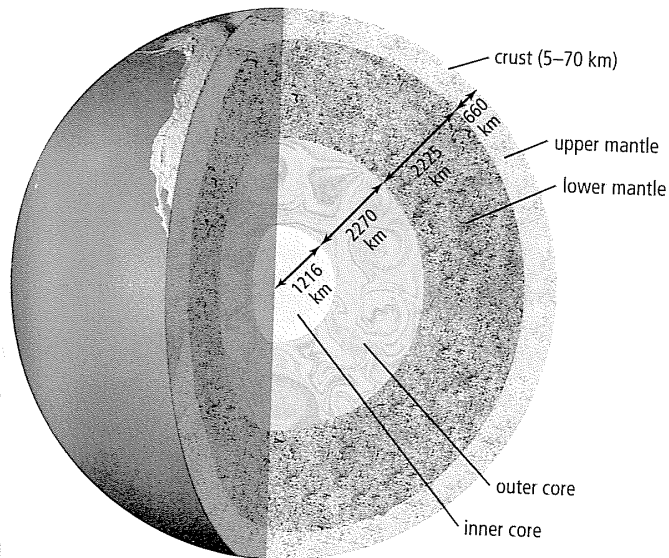
- Continental Drift - is a theory that the continents of the world are moving. This theory came about as the east coast of South America fits so nicely with the west coast of Africa. The idea was proposed by a scientist named Wegner. He used 3 pieces of evidence like fossils and mountain ranges that matched from different continents he gathered proof of this theory.
 - 1.) Certain fossils of plants and animals were appearing on different continents. Because these continents are too far apart for the animals to travel between, Wegner guessed that the different continents were once attached.
 - 2.) Some mountain ranges start on one continent, go right to the coast, and then start again on the other continent across the ocean. He also found one more key piece of evidence.
 - 3.) Glaciers from millions of years ago carved up the ground as they expanded outward. The tracks they left are consistent across different continents. From these pieces of evidence Wegner called the one large mass of land that existed millions of years ago PANGEA.
- So, how do continents move? The earth's crust is broken into large plates of rock that are floating on a sea of magma. These slabs of rock are called tectonic plates. The movement of these plates is what is thought to cause volcanoes, earthquakes and mountains.
- Scientists proposed the idea of plate tectonics from a series of proofs.
 - o Scientists found that the sea floor was spreading out and the youngest rock was in the middle of the ocean. They found this was occurring because magma was coming up (new rock) and pushing the older rock to the side causing the sea floor to spread.
 - o Scientists found a magnetic striping in this new rock over periods millions of years. This striping was caused by the magnetic field of the earth reversing polarity!
- The earth is broken into 5 main layers just like an onion has layers.
 - 1.) Crust - the outermost layer that we live on. Largely composed of oxygen and silicon.
 - 2.) Upper Mantle - semi liquid layer of mostly iron and magnesium that the plates move on. The upper mantle is broken into 2 layers.
 - a.) Lithosphere - bottom of crust and top of mantle together that is filled by the tectonic plates.
 - b.) Asthenosphere - layer under the tectonic plates, that is, moving the plates in part from hot convection currents.




3.) Lower Mantle - still partly liquid layer or rock composed of magnesium and iron.

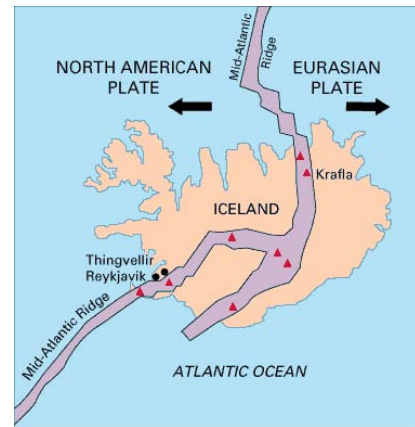
4.) Outer Core - Only fully liquid layer composed of iron and nickel.

5.) Inner Core - solid core of iron and nickel.








- The convection currents of rock from the mantle are one cause of the plate movement apart from each other or into each other.
- The ridge-push (rising magma coming up through the crust pushing older rock on each side apart) along with a slab-pull, when one plate is pushed under another the mass of the plate pulls the remaining exposed plate slowly under.
- These 3 movements cause 3 different types of plate boundaries. Plate boundaries are a region where two plates are in contact with each other.

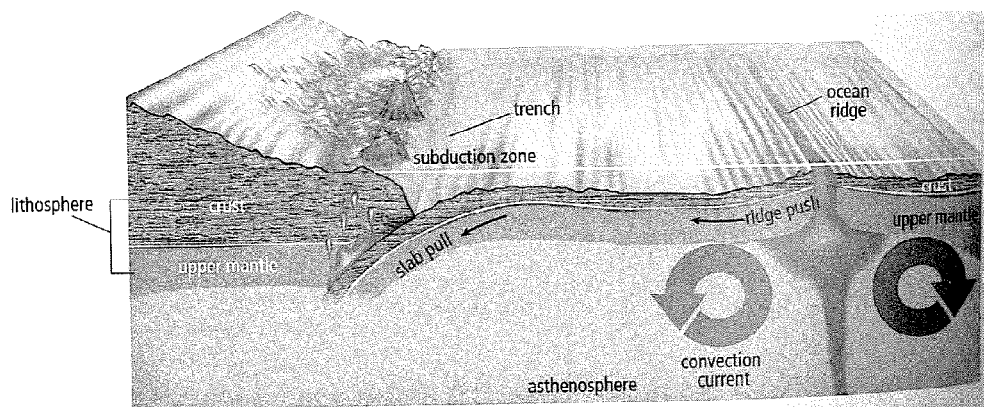
1.) Divergent plates () - plates that are pulling apart from each other. This pulling apart allows hot magma to come up from the mantle causing volcanoes and pushing the older rock on either side further apart. This pushing action is called a ridge push. When the plates are diverging under water we call it a ridge. The Atlantic ridge is in the middle of the Atlantic ocean and the plates are pulling apart there. This is causing the largest mountain range on earth. When the plates diverge on land we call it a rift valley.



- Plate boundaries are shown using symbols on maps. You should become familiar with the following symbols which are used to represent the indicated information on a plate tectonics map.

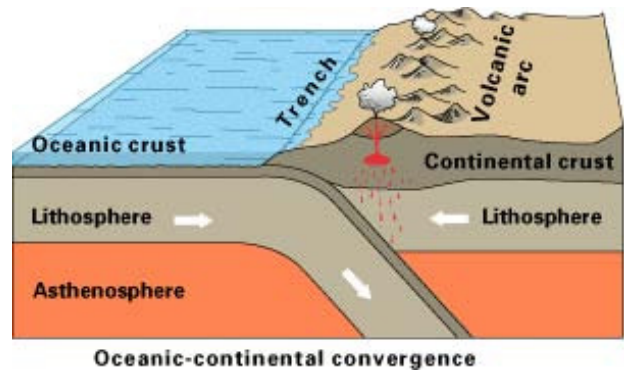
-  transform fault
-  convergent
-  divergent
-  plate movement
-  volcanoes

2.) Converging plates () plates that are colliding into each other. This collision causes a subduction zone. A subduction zone is when one plate is pushed under the other.

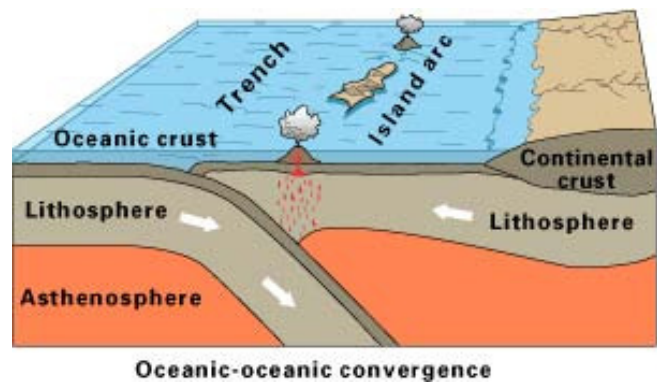


- Subduction zones could cause earthquakes, volcanoes, and mountain formation. Which of these occurs depends on what types of plates are colliding.

- 1.) Oceanic-continental - when these collide the dense oceanic plate is pushed under the continental plate. This makes a large trench where the plates meet. Volcanic mountain ranges often occur inland of this boundary. The west coast of BC is this kind of boundary and that is how the Rocky Mountains formed.

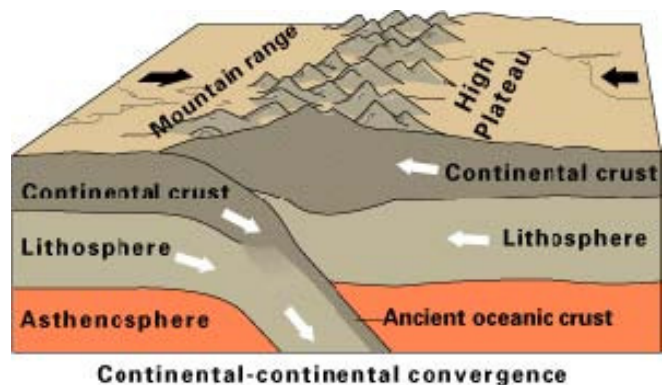



- 2.) Oceanic-oceanic - when these two plates collide one plate will be cooler and as such more dense, causing it to be pushed under. The results are volcanic islands known as volcanic island arc. This is how Japan and Hawaiian islands were created and are being created to this day.



- 3.) Continental-continental - when these two plates collide neither can be pushed under as they have similar densities. This causes the plates to crumple like cars in an accident. This crumpling causes huge mountain ranges (not volcanic mountains like in BC).

This is how the Himalayas are being formed even today.



3.) Transform plates () - plates that are sliding past each other. These boundaries don't cause volcanoes or mountains but earthquakes. This occurs in the US as the San Andreas Fault.

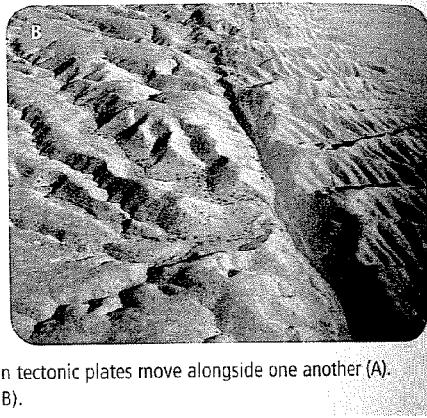
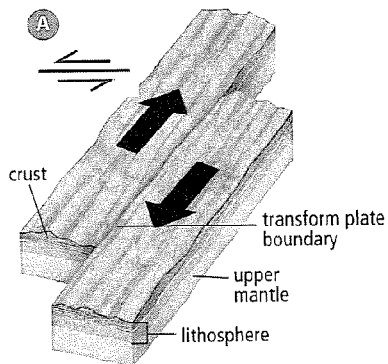


Figure 12.20 Transform faults can occur when tectonic plates move alongside one another (A). The San Andreas Fault is in the United States (B).

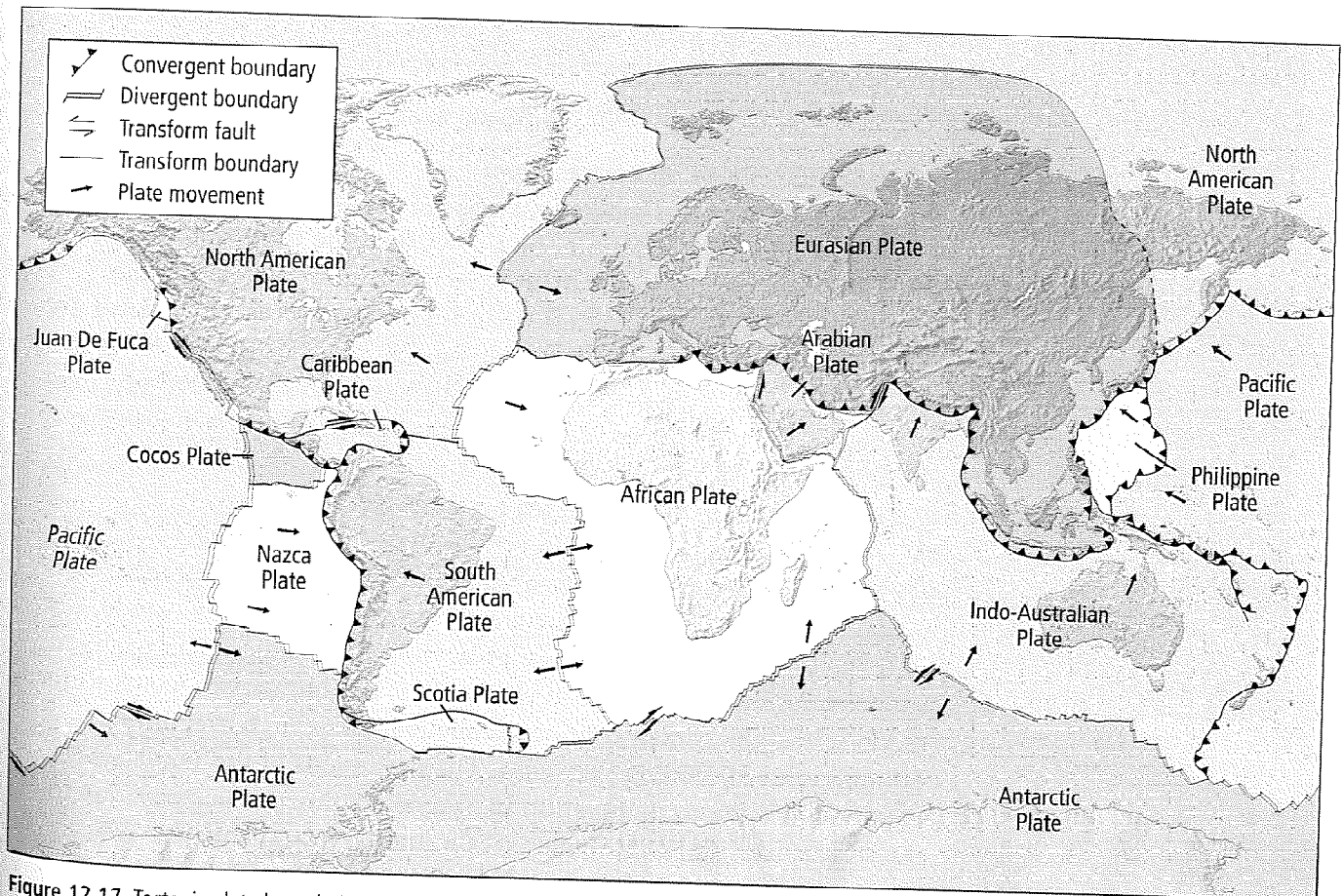
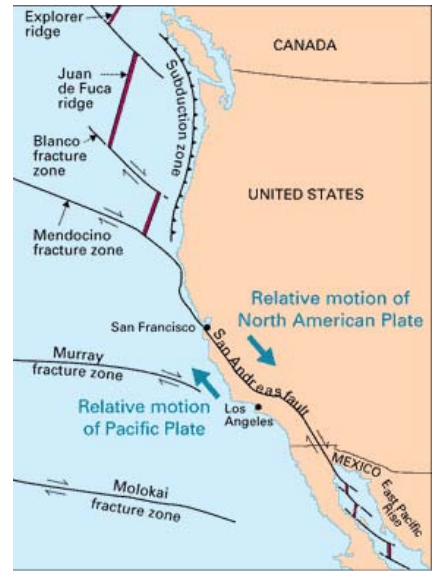


Figure 12.17 Tectonic plate boundaries