NOTES FOR GEOLOGOFE

Name:_____

(DO NOT LOSE!)

- Continental Drift: The gradual movement of the continents across the earth.

- Plate tectonics - The earth's crust and upper mantle are broken into sections called plates. These plates float on the mantle like rafts (moving very slowly)

Evidence For Continental Drift

-The Shapes Match

-Same fossils found on different continents

- These are the pictures on the puzzle pieces.

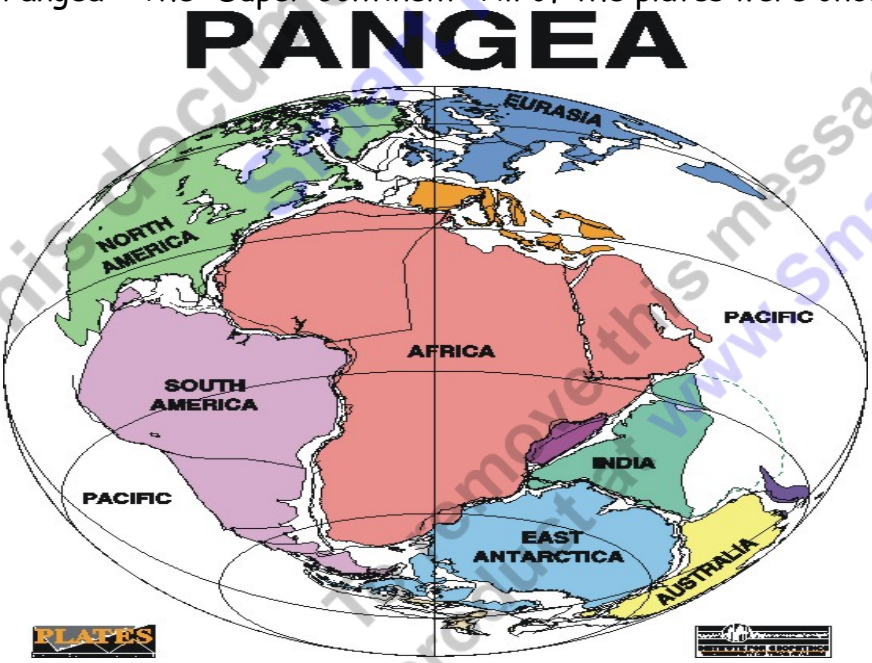
-The Same rock structures on different continents

-Fossils of Trees and Animals in Antarctica

-Magnetic layers in sea floor spreading

Gondwondaland and Laurasia were two mega continents before Pangea.

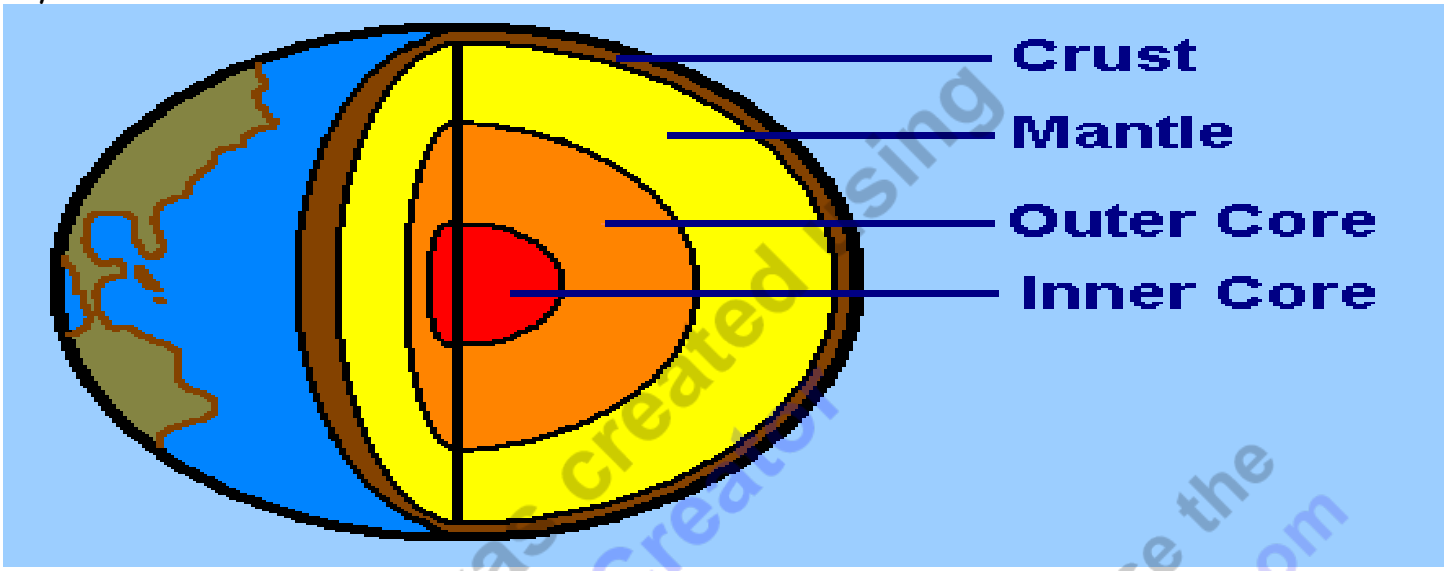
Pangea – The "Super Continent" All of the plates were once together



We know the material of the interior of the earth based on how P and S waves move through planet.

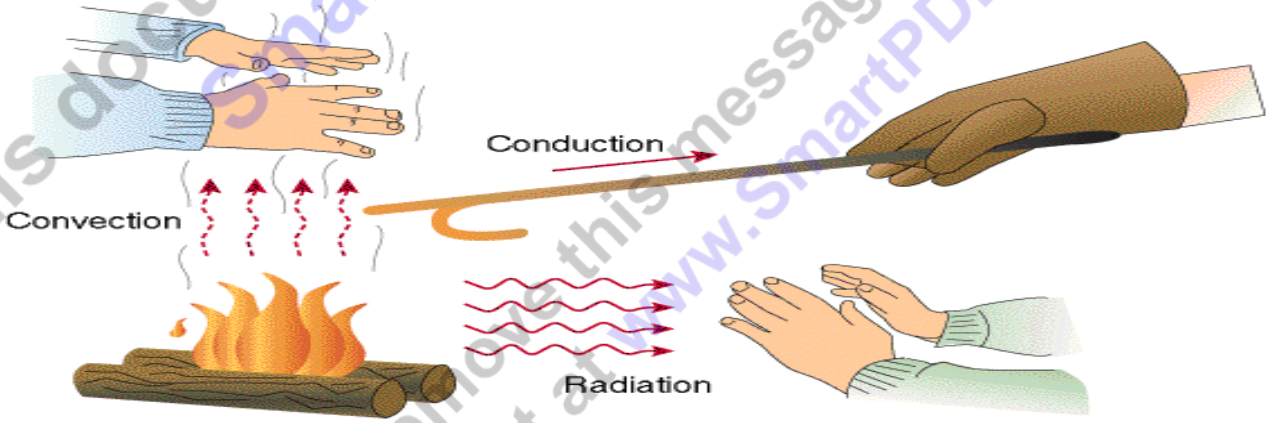
- P Wave: Primary wave. Moves lateral
- S Wave: Secondary waves. Stronger and move back and fourth.

Layers of the Earth



- Layers formed early in Earth System History (Archean Eon) Gravity pulled heavy elements toward the middle.

Pictures for heat transfer



Convection - Vertical circulation in which warm rises and cool sinks. Flow of heat by this circulation.

Conduction - The movement of heat from one molecule to another.

Radiation - Energy that is radiated or transmitted in the form of rays or waves or particles.

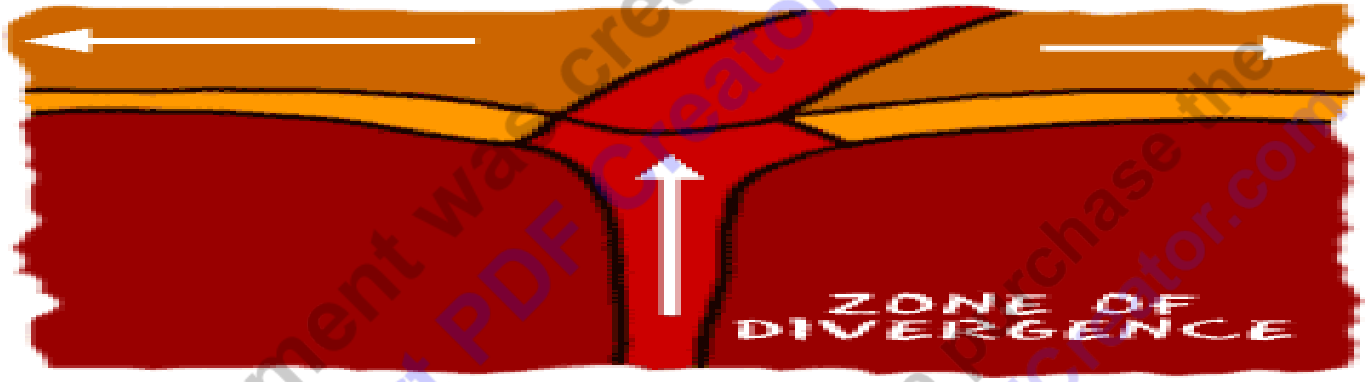
The two types of Crust

Ocean Crust (Basalt)

Continental Crust (Granite)

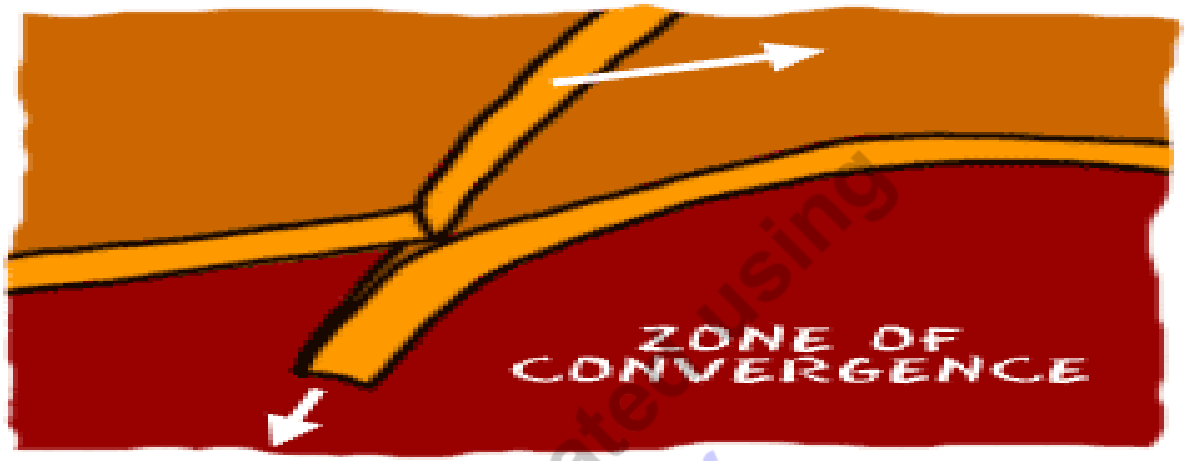
PLATE BOUNDARIES

Divergent Boundaries: At divergent boundaries new crust is created as two or more plates pull away from each other

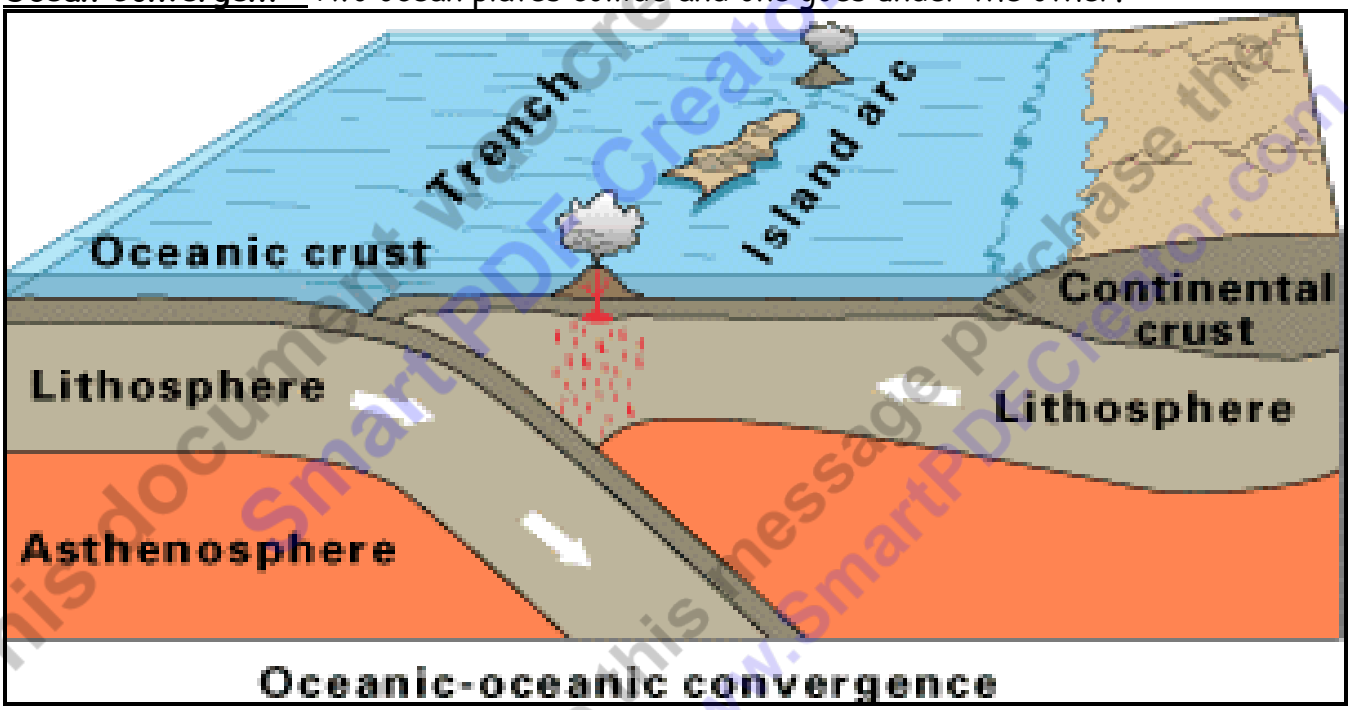


Mid-Atlantic Ridge is like a baseball because it encircles the earth, showing the places where new earth is formed.

- **Convergent Boundaries**: Here crust is destroyed and recycled back into the interior of the Earth as one plate dives under another.

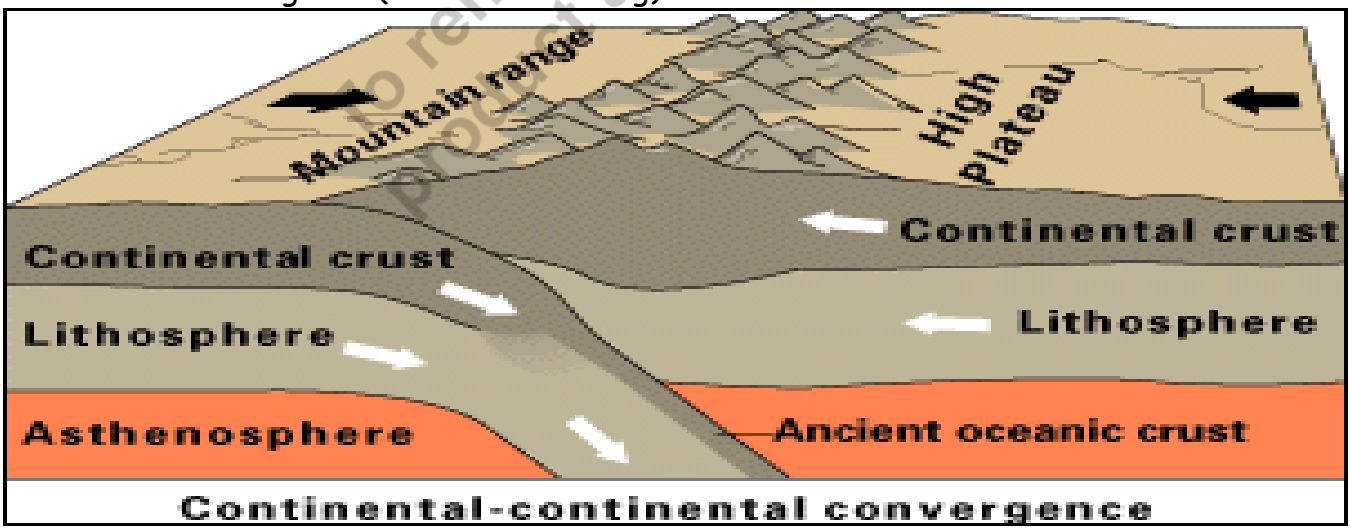


- **Ocean Convergent:** Two ocean plates collide and one goes under the other.

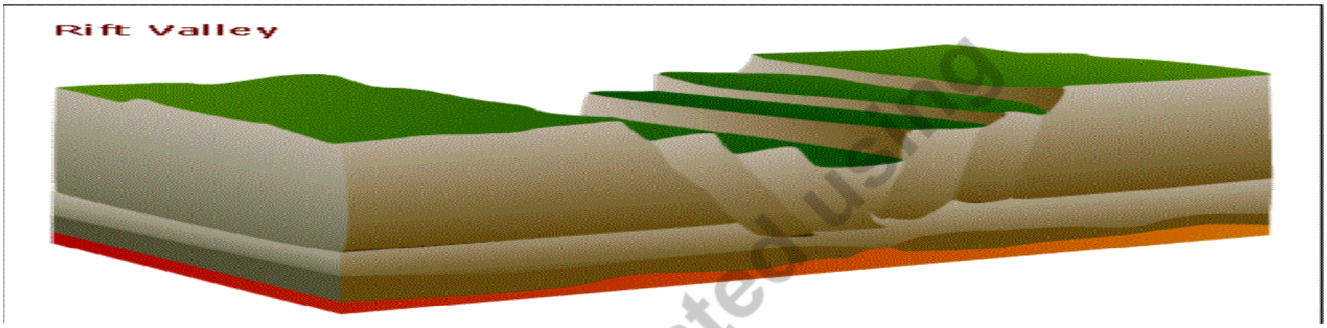


Archipelago (Island Arc) – Group of volcanic islands formed from ocean curst convergence.

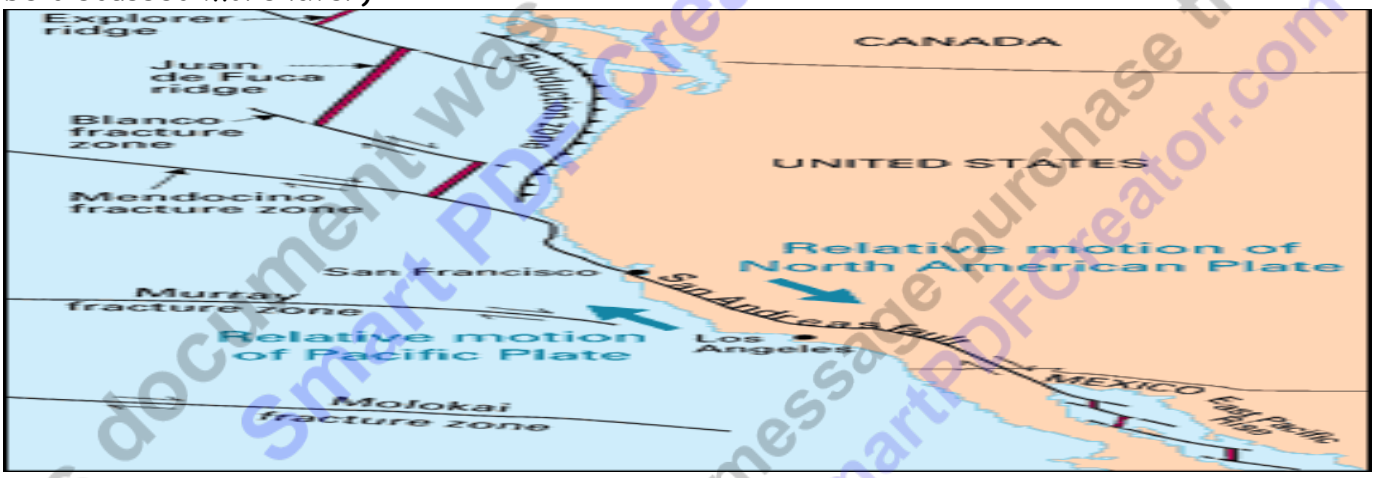
Continental Convergence (Mountain Building)



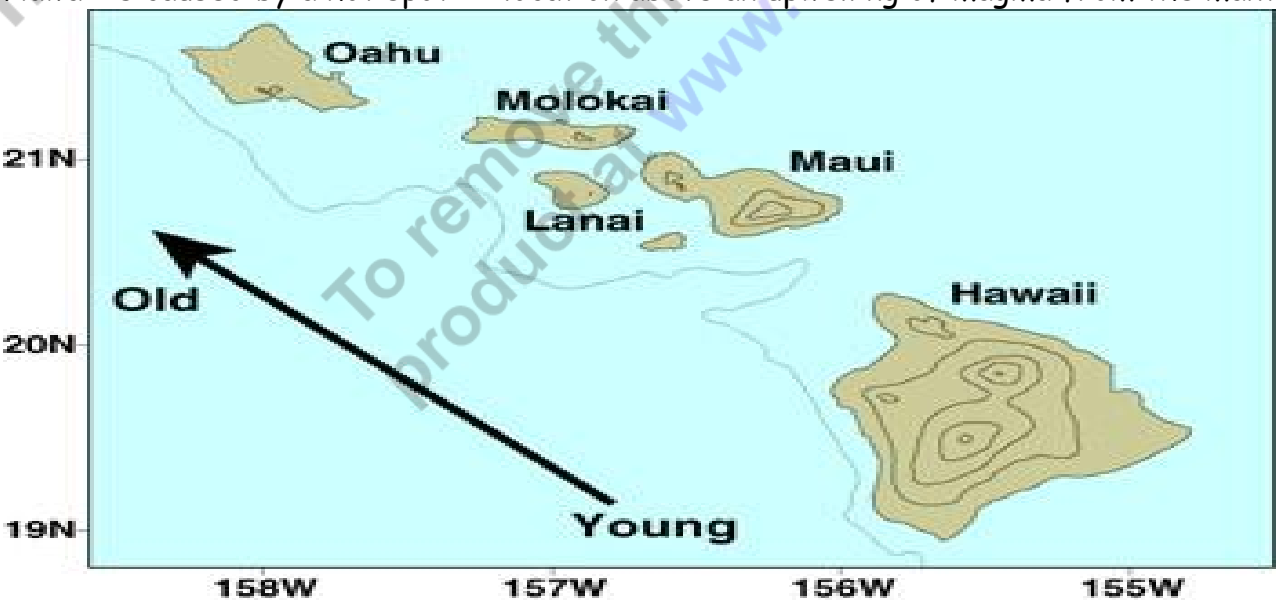
Continent Divergence (Moving apart)



Transform-Fault Boundaries: Where two plates are sliding horizontally past one another. (To be discussed more later)



Hawaii is caused by a hot spot: A location above an upwelling of magma from the mantle.



VOLCANOES

- Volcano - An opening in the Earth's crust through which molten magma and gases erupt.

- The positives of volcanoes
  - -New Land is formed
  - -Release of healthy gases
  - -Many gems and ores worth $
  - -Hominids used obsidian (cutting tools) to advance
  - -Volcanic ash fertilizes land
  - -Volcanic eruptions formed oceans and early atmosphere.

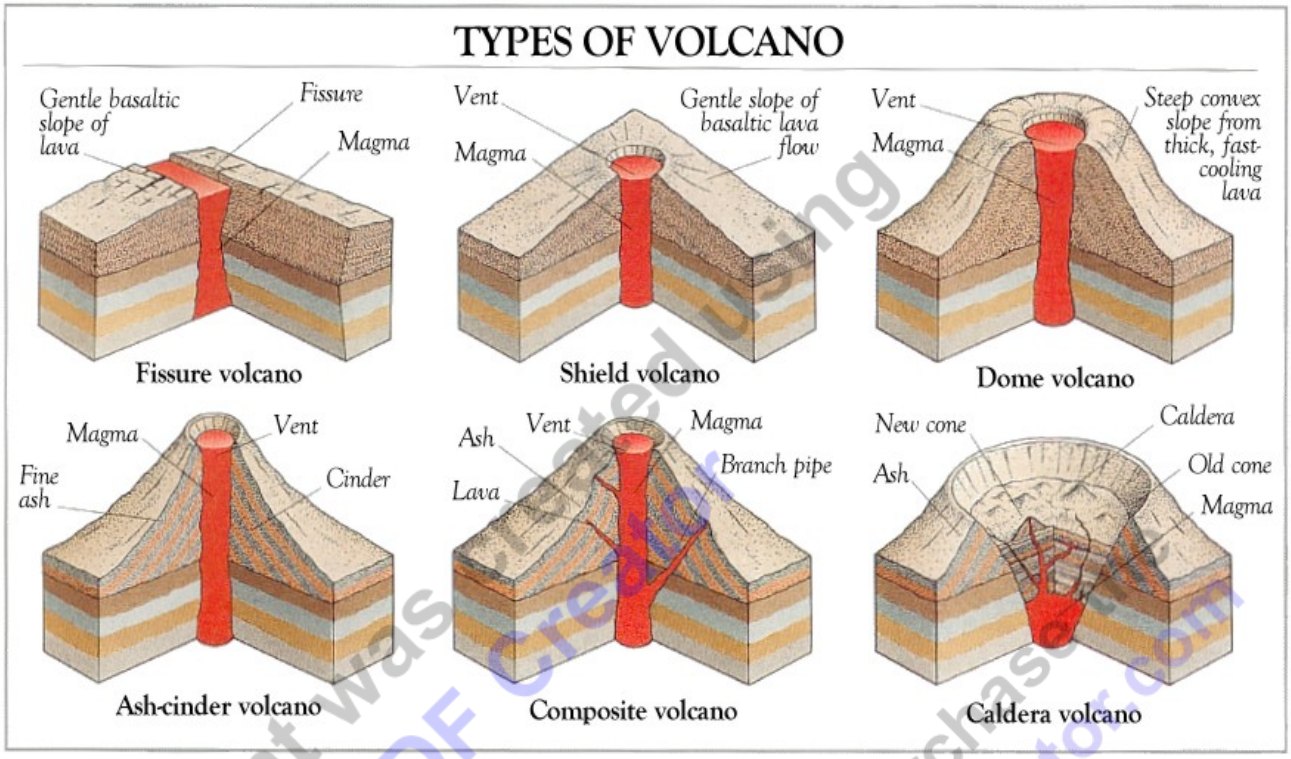
The Negatives of Volcanoes

- Death and Destruction
- Loss of land until…?, Permanent loss of structures.
- Release of poisonous and greenhouse gases.
- Eruptions can have a tremendous impact on global climate.
- Mass extinction events

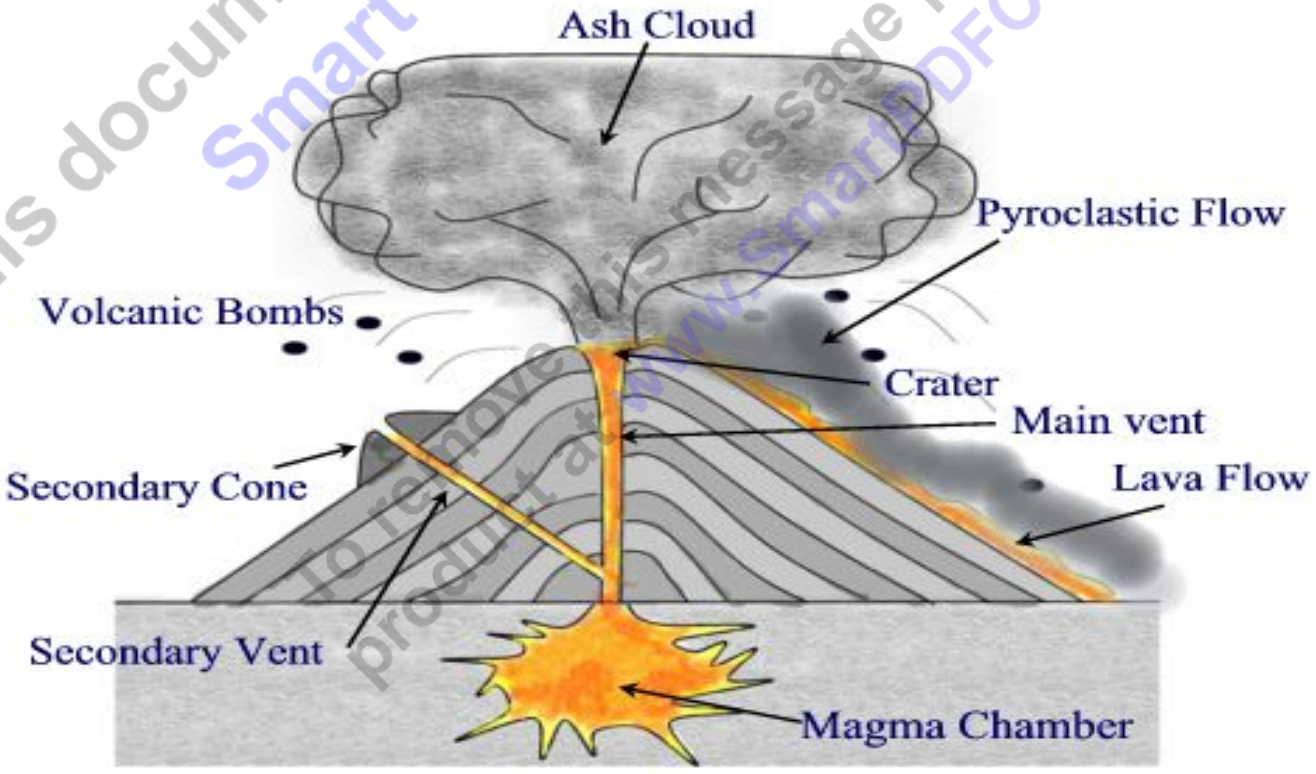
Types of Volcanoes

Fissure
Shield – Olympus Mons
Dome
Ash Cinder
Composite

Caldera: Large crater caused by the violent explosion of a volcano that collapses into a depression.



PARTS OF A VOLCANO



Main Features of a Volcano

Pyroclastic rock: Rock ejected from volcano
Lahar - A flow of volcanic ash and water.

Magma is beneath the earths surface
Lava is above the surface

3 Types of Lava
Felsic lava – High in silica. (sticky and chunky) Highly explosive.
Mafic lava – Flows more, high in basalt.
Intermediate – Has a higher amount of silica (Silica = liquid quartz or sand)

Viscosity: Resistance of liquid to flow.
High viscosity = Travels slow because of high resistance
Low viscosity = travels fast because low resistance

Types of lava when cooled
'A'ā - Rough lava, older and has crystalized, Pronounced "ahh ahh"
Pāhoehoe – Fresh lava, (Pa hoy hoy) Basaltic lava that is smooth and flowing.

EARTHQUAKES

Earthquake – Shaking of the earth's crust from a sudden release of energy.
Movement of tectonic plates against each other cause the plates to fault and fold.

- Fault – Break / crack where movement occurs.
- Fold – Collision of crust bends rock layers "stress"

Normal Fault – Pulling apart tension causes crust to drop down.

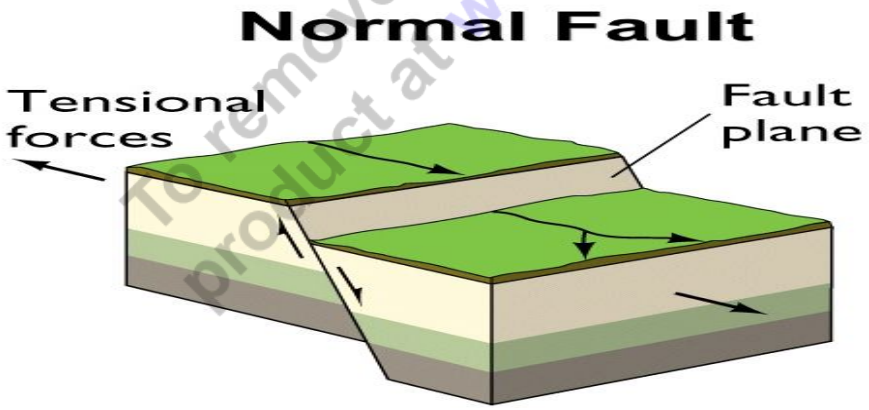


Fig. 18.12b

Reverse / Thrust Fualt – Compression forces cause crust to move up.

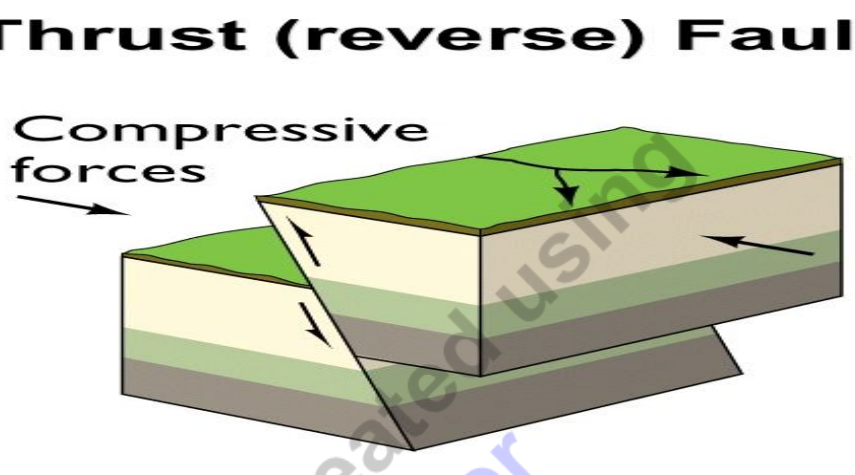


Fig. 18.12c

Lateral or Strike Slip Fualt – Crust moves alongside each other in opposite directions.

Types of Folds
- Compression
- Tension
- Shearing

Seismograph - An instrument used to measure the shaking caused by an earthquake

Ritchter Scale - Scale for measuring earthquake magnitude. A magnitude 7.0 earthquake generates 10 times larger amplitude waves than those of a magnitude 6.0.

Epicenter: The point on the Earth's surface that is directly above the hypocenter or focus.
- Just above the earthquake.

Tsunami - An ocean wave generated by a submarine earthquake, volcano or landslide.
- Can travel across whole oceans.

ROCKS AND MINERALS

Rock – Mass or grouping of minerals
They can be big

They can be small
Used in buildings
Inorganic (non-living)

Minerals are natural inorganic (non-living) solids that join together (crystals) to make unique compositions.

A crystal is a solid in which the atoms arranged in a repeating pattern.

Uses of minerals
Gems $
Ores, Mined for $

Six types of crystals.

- Hexagonal. (Four axes, three are equal in length and lie at an angle of 120° from each other).
- Triclinic: (3 axis, all unequal and none at 90° angles).
- Orthorhombic: (All axis unequal in length, and 90° degrees from each other).
- Monoclinic:All axis unequal in length. Two of them are at right angles to each other, while the third is lies at an angle other than 90°.
- Tetragonal. (Three axes, two are equal in length, one is unequal.)
- Isometric: (All three axes are equal in length an at 90° degrees from each other.)

Two main type of minerals
Silicate Minerals – Contain silica and oxygen. 75% of all minerals.
Non-silicate minerals

Physical Property of Minerals- a characteristic that can be observed or measured without changing the identity of the substance.
Luster – How light is reflected from a mineral.

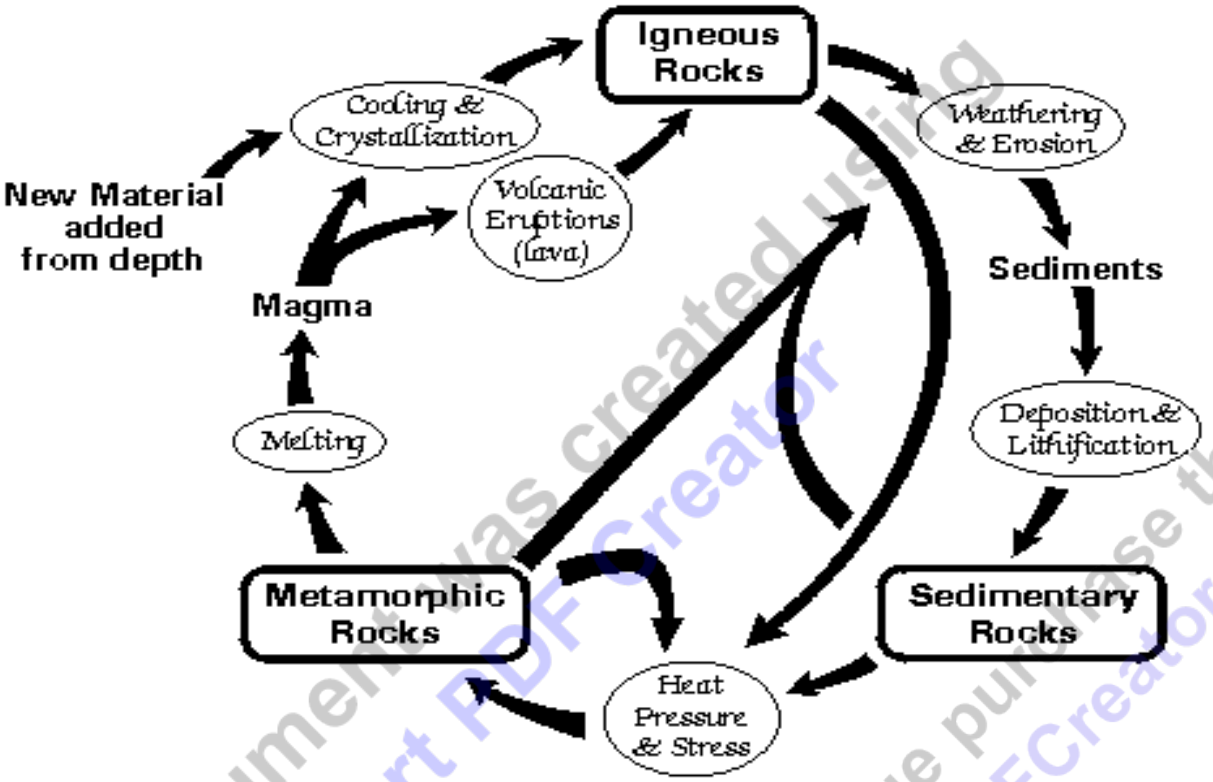
- Metallic (shiny)
- or non-metallic (dull)

Hardness – How easily a mineral can be scratched.
Color – Tells what atoms make up the mineral.
Streak – The color of the mineral when it is broken up and powdered
Specific Gravity – How dense the mineral is?

The rock cycle – How one rocks changes into another.

- Driven by continental drift (plate tectonics)

The Rock Cycle



- Igneous Rocks – Molten earth cooled
  - Intrusive – cooled below crust
  - Extrusive – cooled or earth surface (faster)

Classification of Igneous Rocks

Basaltic – Dark, heavy (dense), Iron
Granitic – Light colored, less heavy, filled with oxygen
Andesitic – Between the two

Common Igneous Rocks

Granite is Igneous Rock types include Quartz and feldspar
Basalt
Obsidian – Glassy
Gabbro
Rhyolite

Metamorphic – Rock that changed forms due to extreme temperature and pressure

Common Metamorphic Rocks

Slate

Gniess
Marble
Schist

Sedimentary Rocks
Sediments are compacted and cemented together
Caused by weathering, erosion, and deposition
Usually layered
Layers can be from old living materials (fossils).

Common Sedimentary Rocks
Limestone
Sandstone
Shale
Conglomerate

HOLD NOTES FOR THE GEOLOGOFE - DUE NOT LOSE