



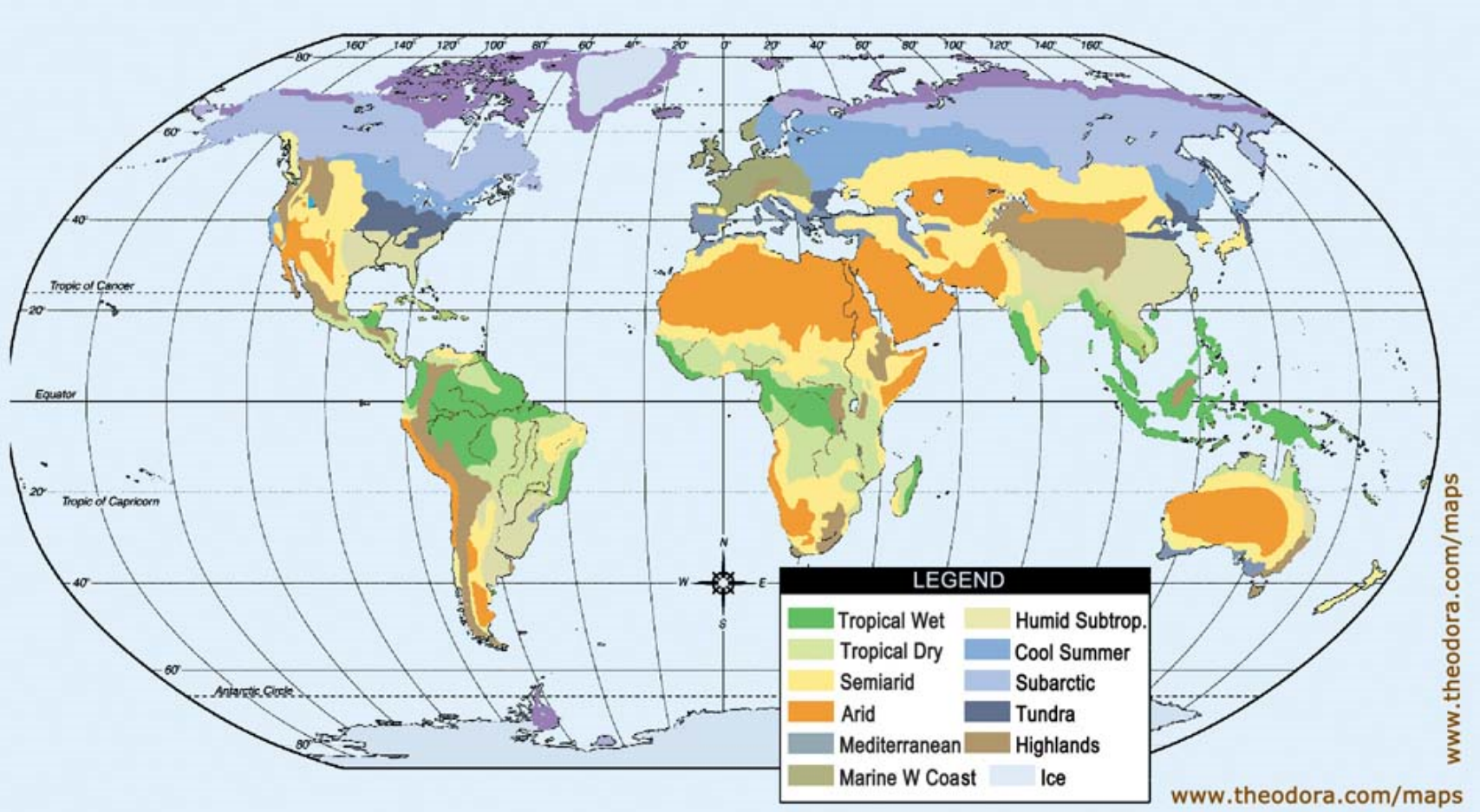
# Earth and Space Science Review

2016-2017

# Weather/Meteorology

1. Climate – pattern of weather in a large area over a long period of time
2. Weather – condition of the atmosphere in a smaller area over a shorter period of time

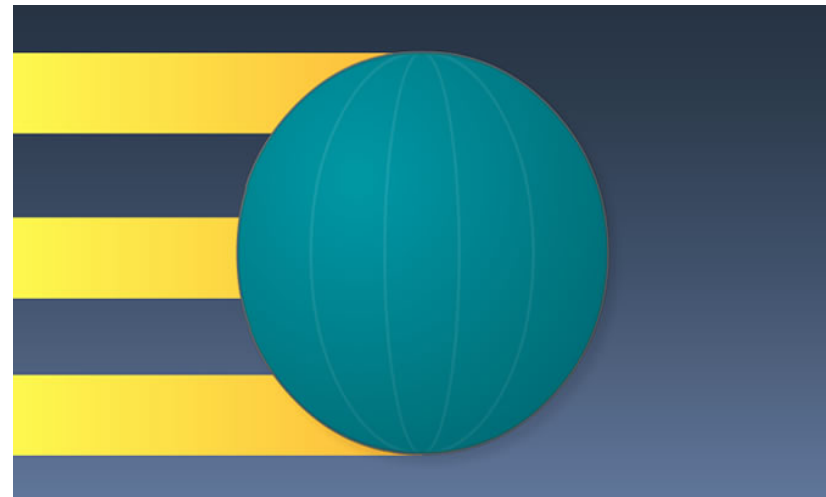
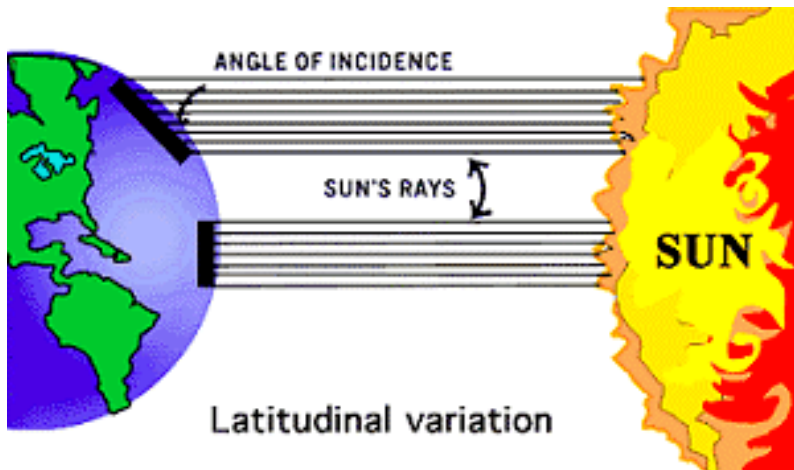
# Climate patterns



### 3. Types of heat:

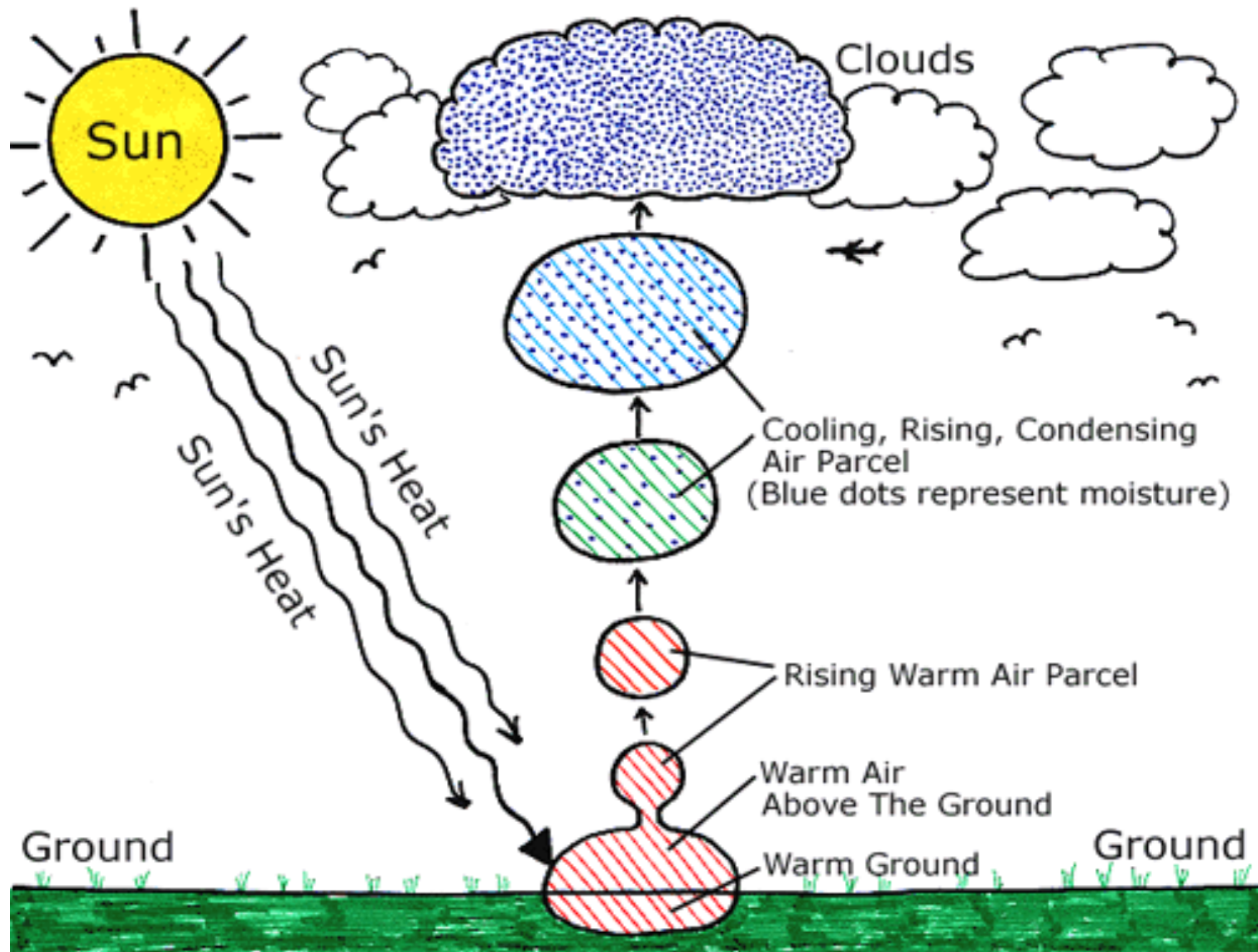
- Radiation = how sun's heat travels to us through space
- Conduction = heat is transferred by contact (soil in beaker warms from outside in)
- Convection = heat rises in one area and sinks in another; the air masses replace each other. (hot air rises, cold air sinks)

4. Equatorial zones that receive most direct sunlight = hottest.

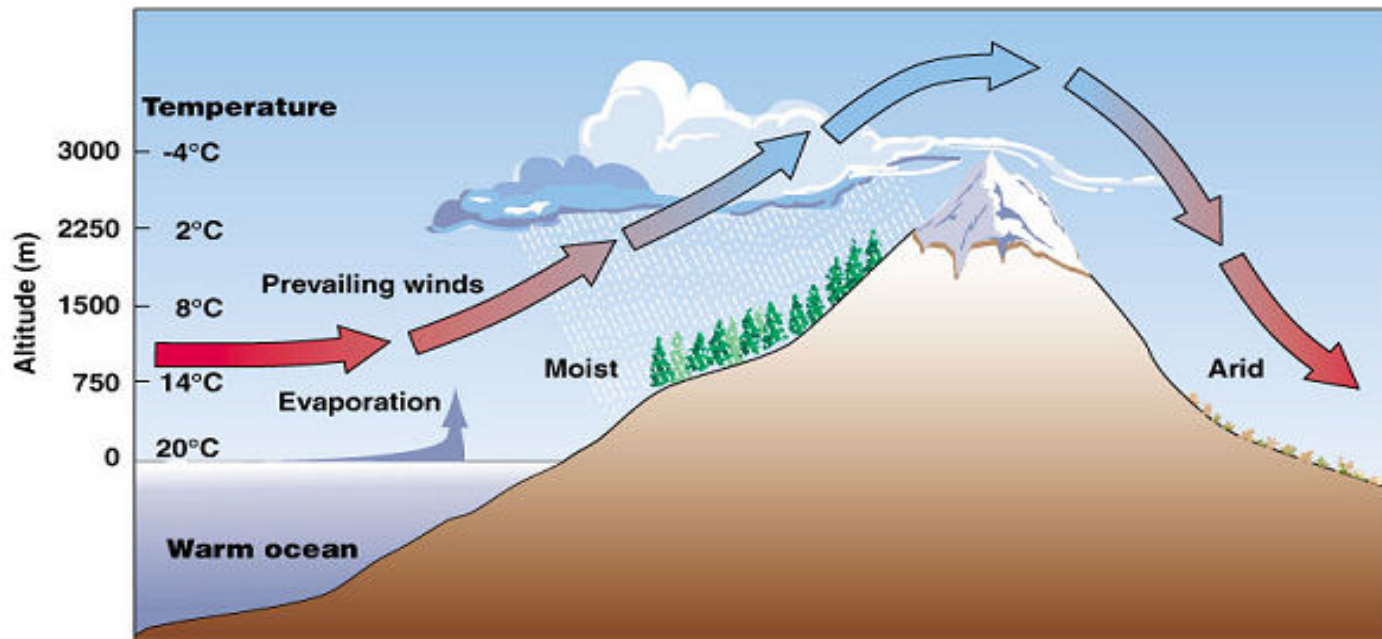


5. Cloud formation – Water evaporates into the air (water vapor) then rises, cools, and condenses onto dust particles in the upper atmosphere.

Clouds are millions of tiny water droplets combined together.



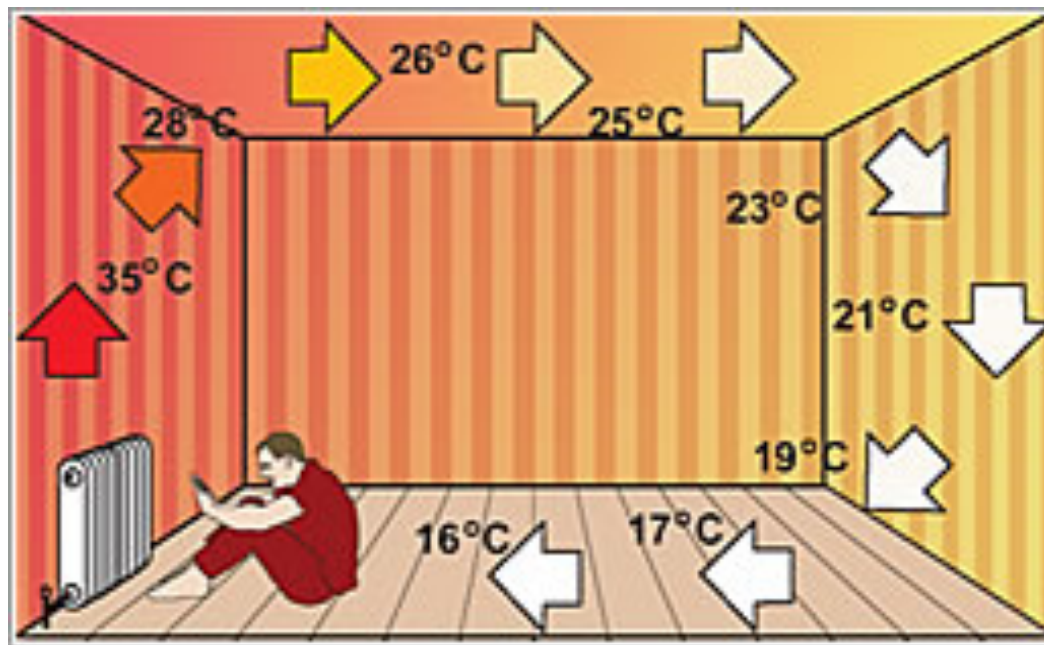
6. Rain Shadow - More precipitation on mtns b/c it is colder, so more condensation.



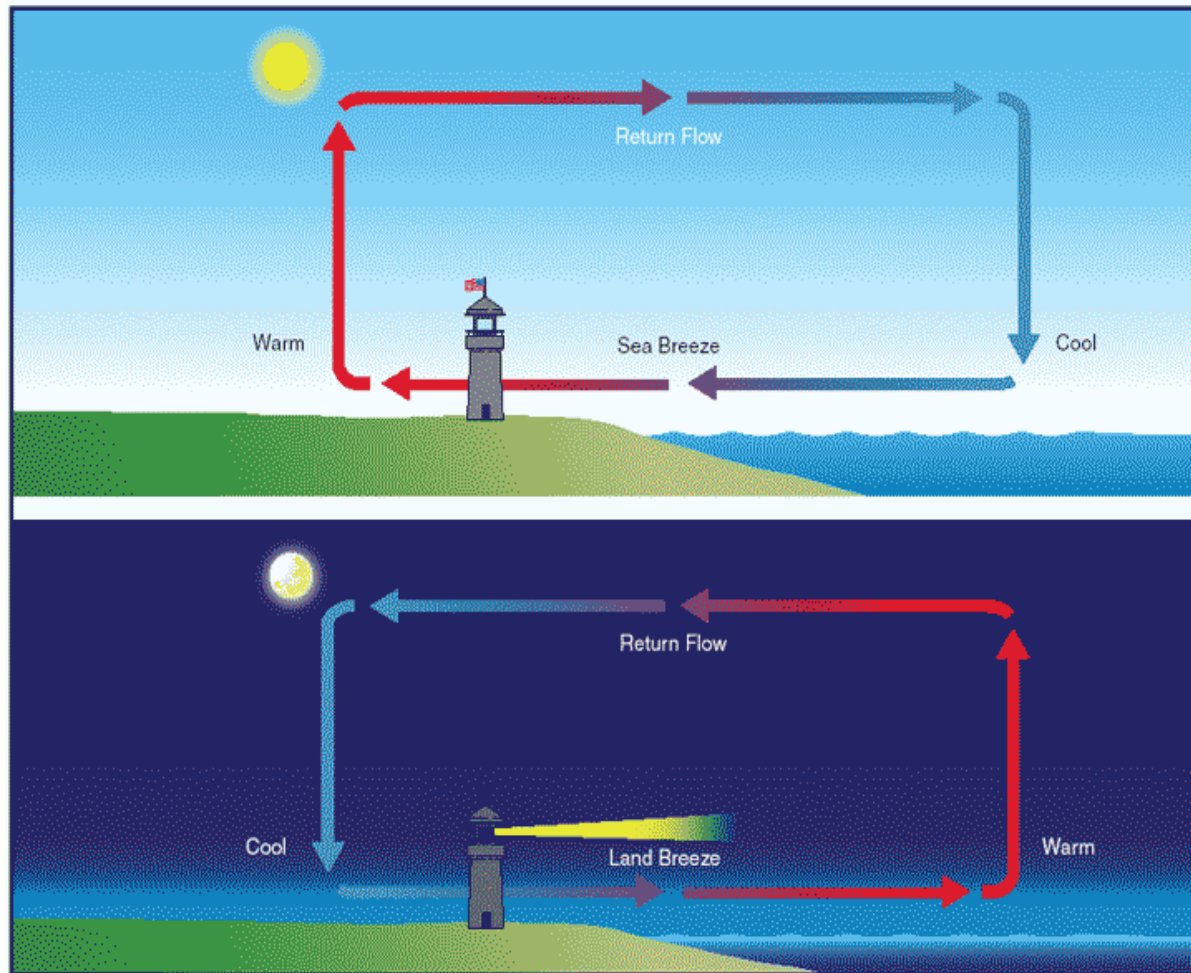
Copyright © 2003 Pearson Education, Inc., publishing as Benjamin Cummings.



7. Convection current – air moving in a circular pattern caused by uneven heating of Earth.



# Remember these?!



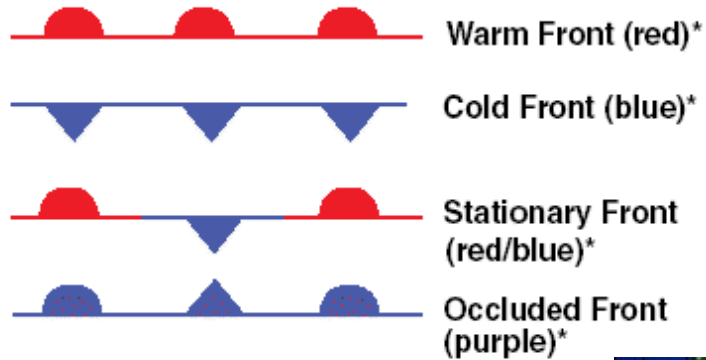
8. Weather front – boundary between two air masses (where changes in weather occur)

Types: stationary, cold, warm, etc.

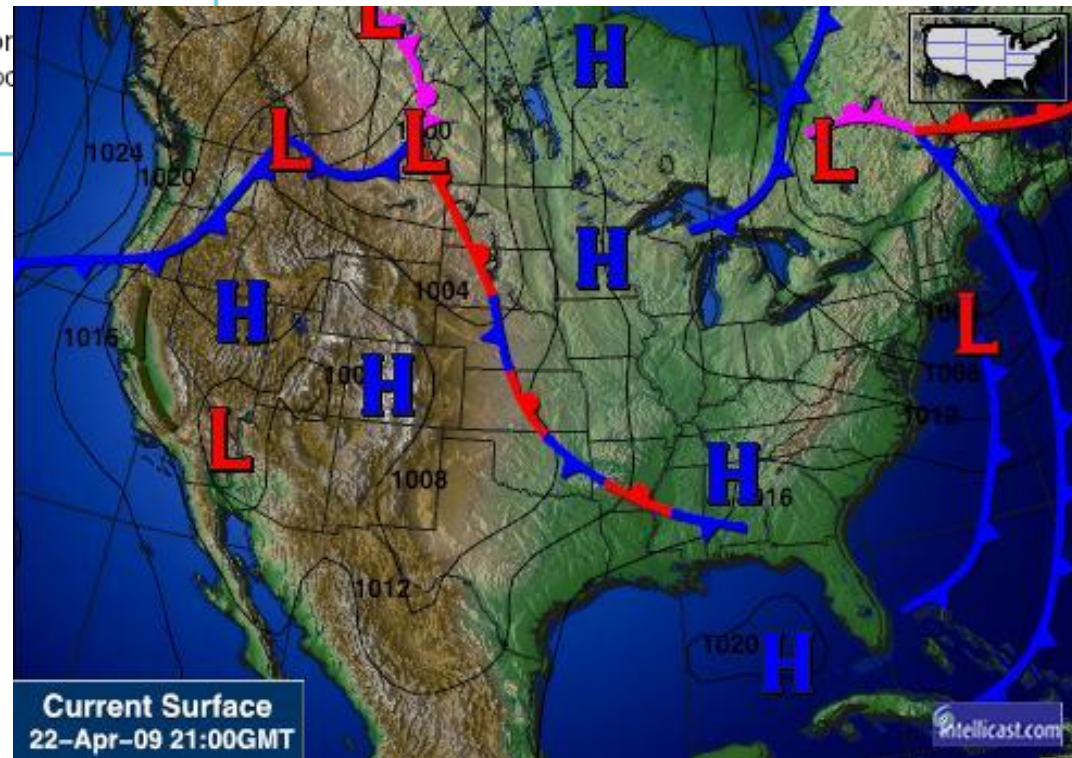
[http://www.classzone.com/books/earth\\_science/terc/content/visualizations/](http://www.classzone.com/books/earth_science/terc/content/visualizations/)

## Table A

Symbols for Surface Fronts and Other Significant Lines Shown on the Surface Analysis Chart



\* Note : Fronts may be black and white or color on their source. Also, fronts shown in color code necessarily show frontal symbols.



# 9. Water cycle:

<http://earthguide.ucsd.edu/earthguide/diagrams/watercycle/index.html>

<http://www.enchantedlearning.com/subjects/astronomy/planets/earth/Watercycle.shtml>

Evaporation

Transpiration

Condensation

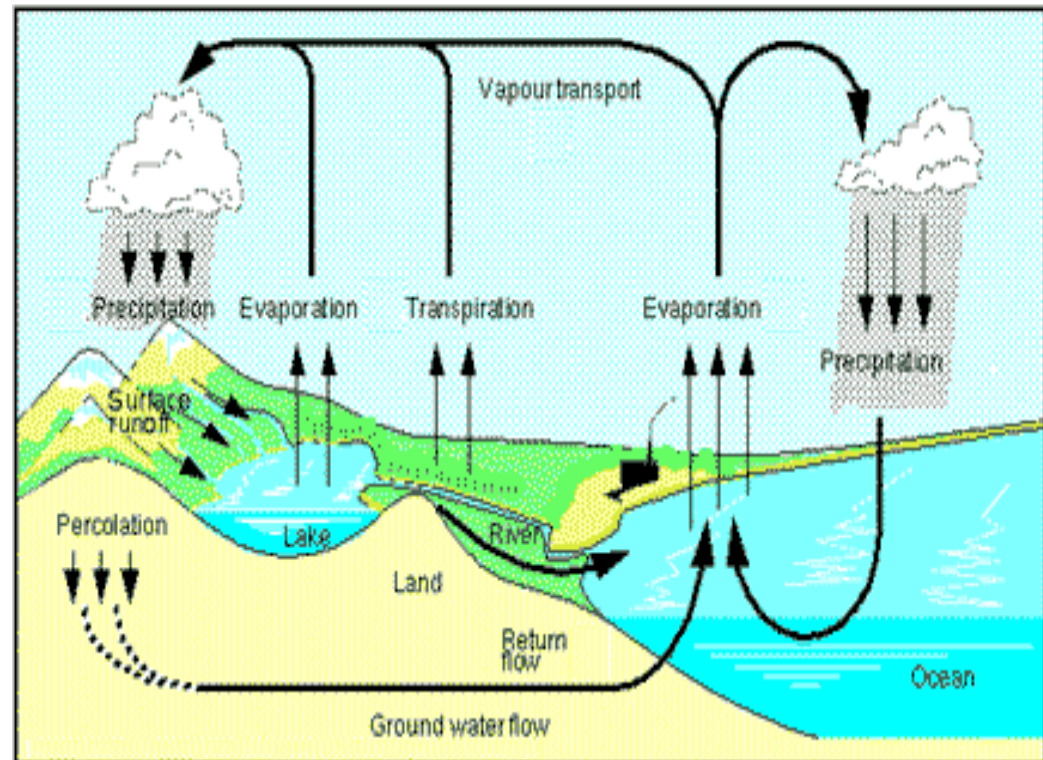
Precipitation

Run-Off

Filtration

Accumulation

Sublimation



Courtesy Erich Roeckner, Max Planck Institute for Meteorology

<http://earthguide.ucsd.edu/earthguide/diagrams/watercycle/index.html>

<http://www.enchantedlearning.com/subjects/astronomy/planets/earth/Watercycle.shtml>

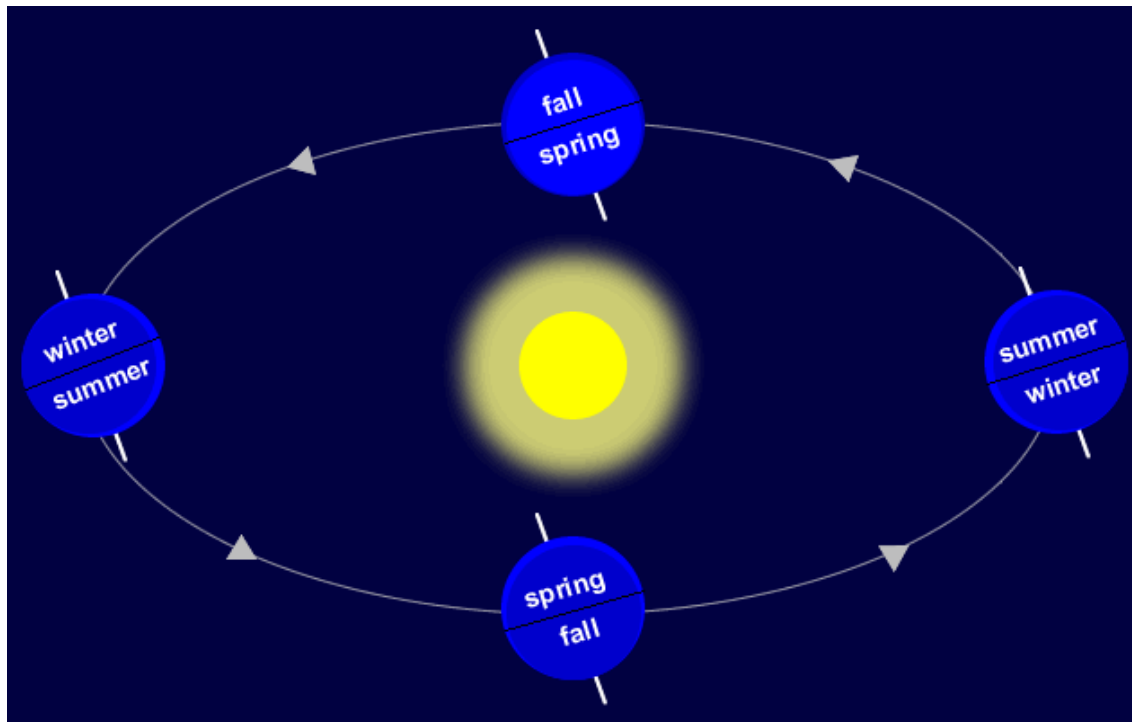
9a. Evaporation = water moves from liquid to gas state; heat gained

b. Condensation = water moves from gas to liquid state; heat lost

c. Sublimation = water moves from solid to gas state; heat gained

# Astronomy/Space Science – Earth-Moon-Sun System

1. Seasons – summer = axis tilts toward sun,  
winter = axis tilted away from sun.



## 2. Moon Phases –

new/can't see

full/see whole side

waxing = getting bigger

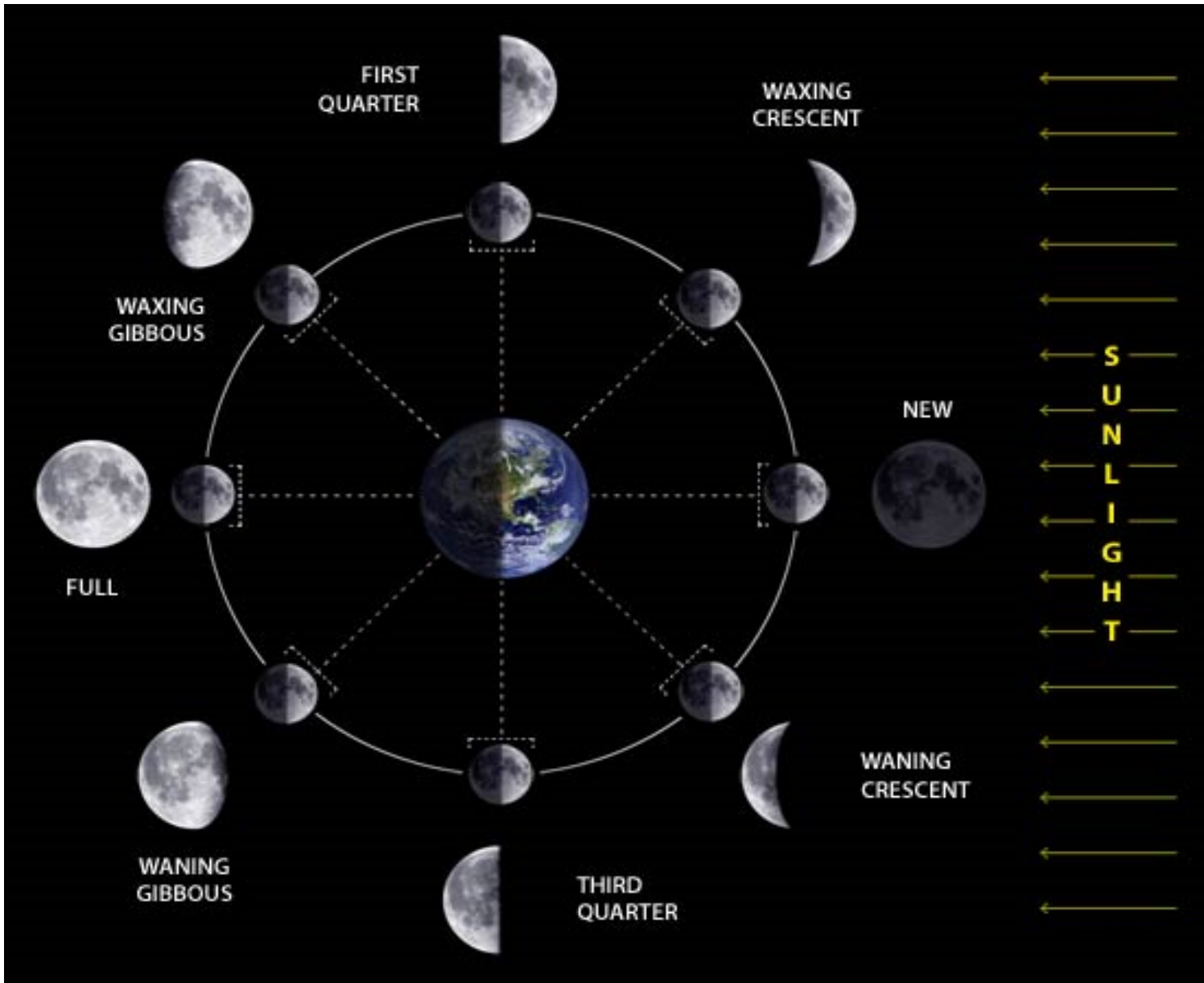
waning = getting smaller

gibbous

crescent

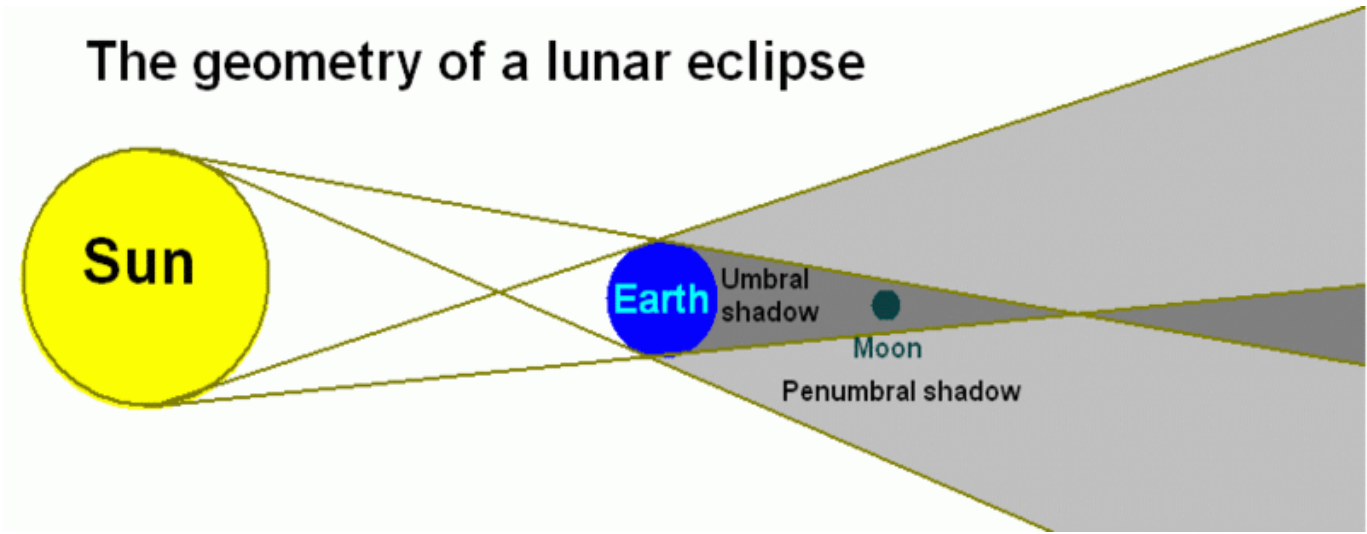
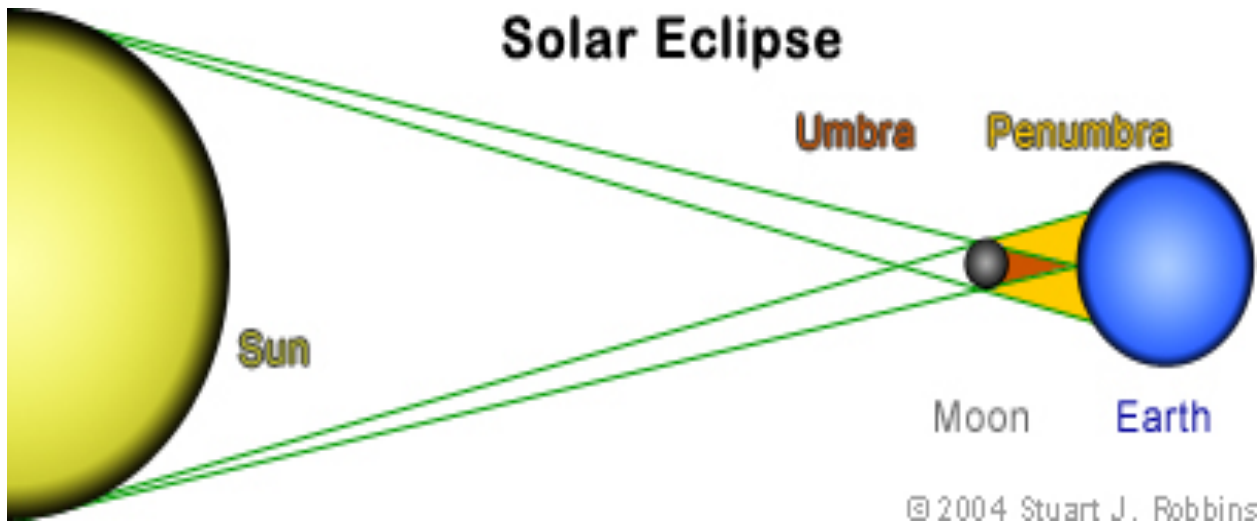
[http://www.moonconnection.com/moon\\_phases.phtml](http://www.moonconnection.com/moon_phases.phtml)





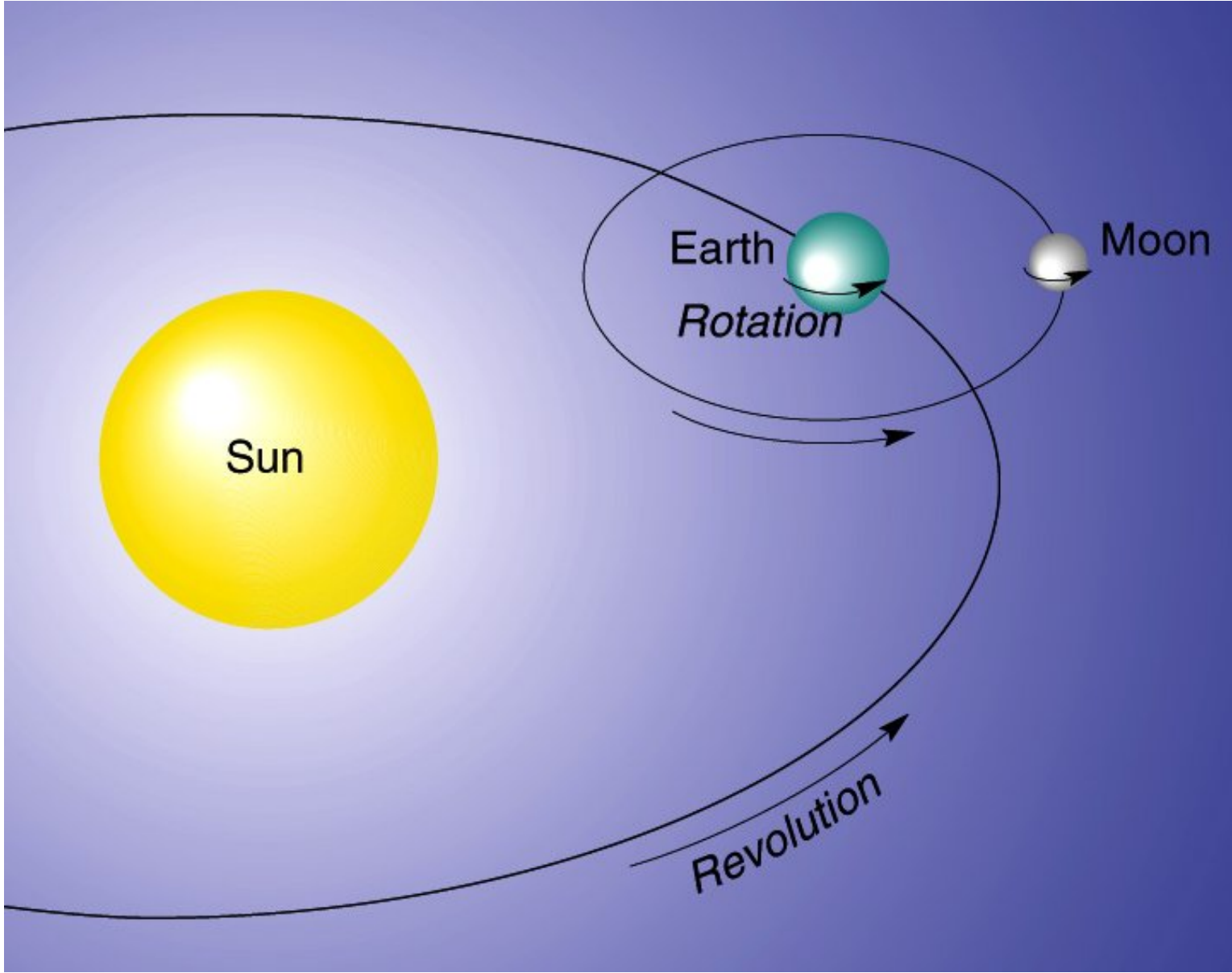
# 3. Eclipses

- a. Solar = Sun blocked out (caused by shadow of moon on Earth), only seen from certain places on Earth <http://www.mreclipse.com/Special/SEprimer.html>
- b. Lunar = moon blocked out (caused by shadow of Earth on moon) Seen from everywhere on Earth <http://www.mreclipse.com/Special/LEprimer.html>



4. Rotation – Planet spins on its axis = 1 day (24 hrs), same length all over the world

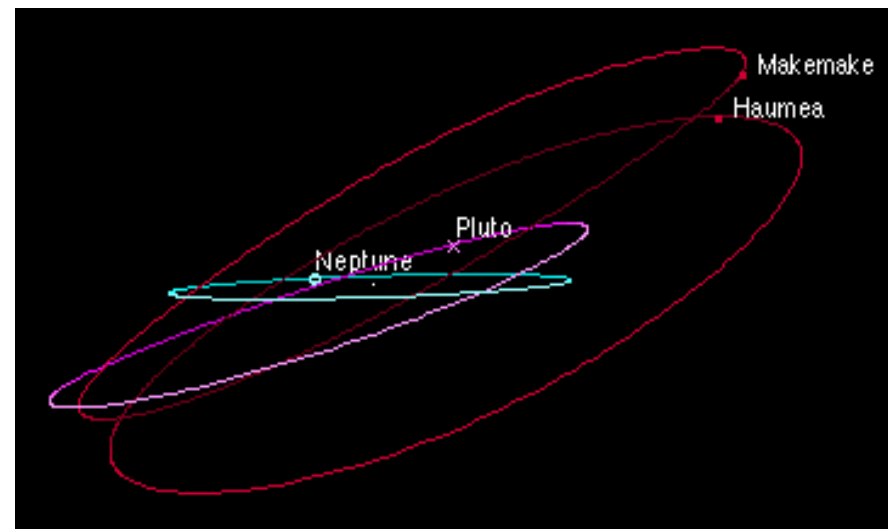
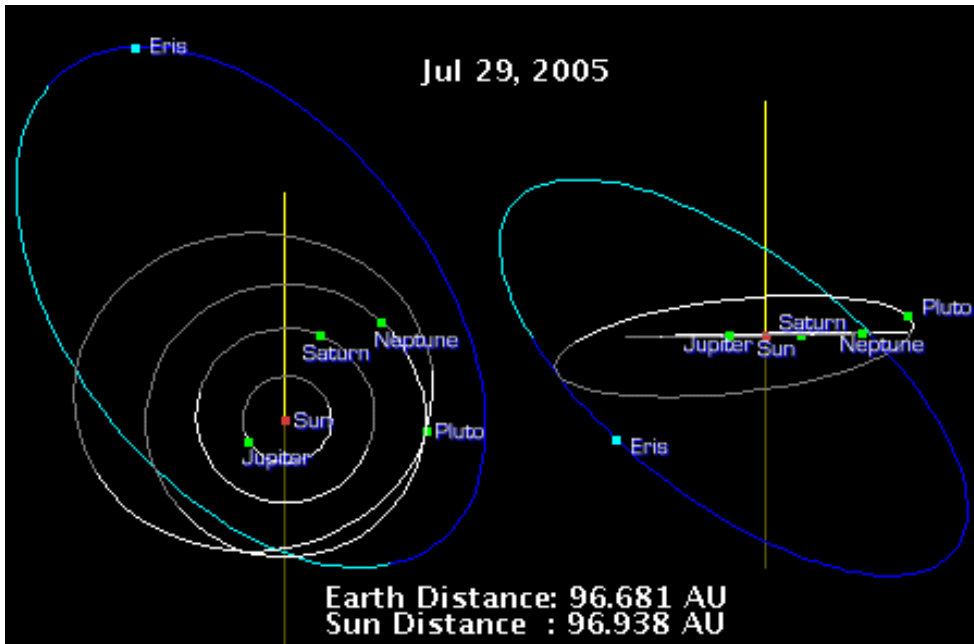
Revolution – one complete orbit of planet = 1 year, same length all over the world, 365 days



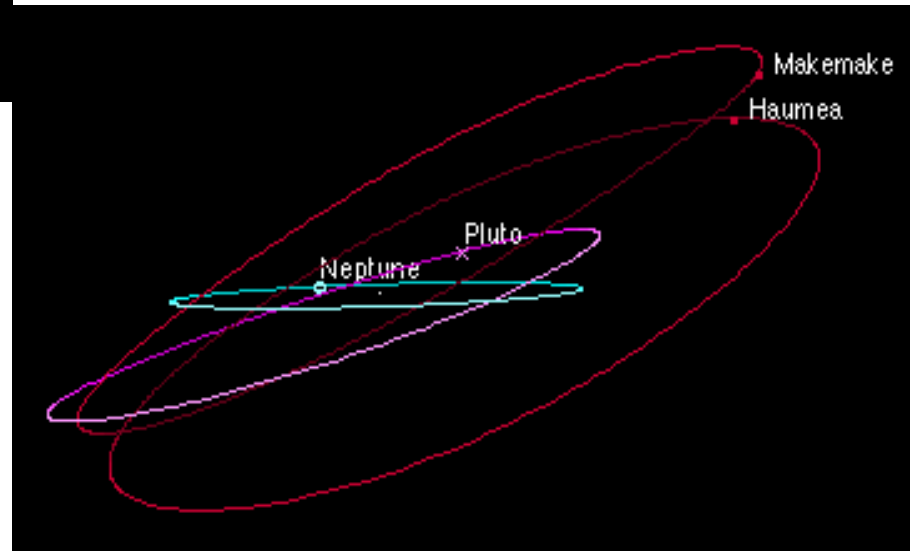
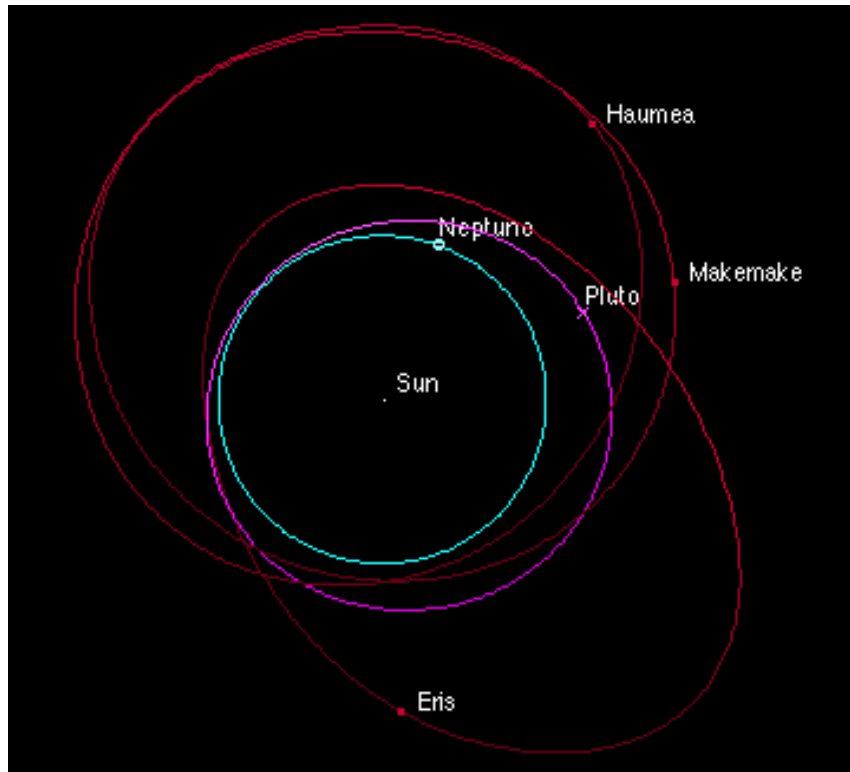
# Universe, Galaxy, Solar System

1. Planet – orbits a star  
Moon – orbits a planet (also called a satellite)
2. Star – gaseous ball of fire. How many in our solar system? ONE: the sun!

3. Dwarf planets = Ceres, Pluto, Haumea,  
Makemake, Eris

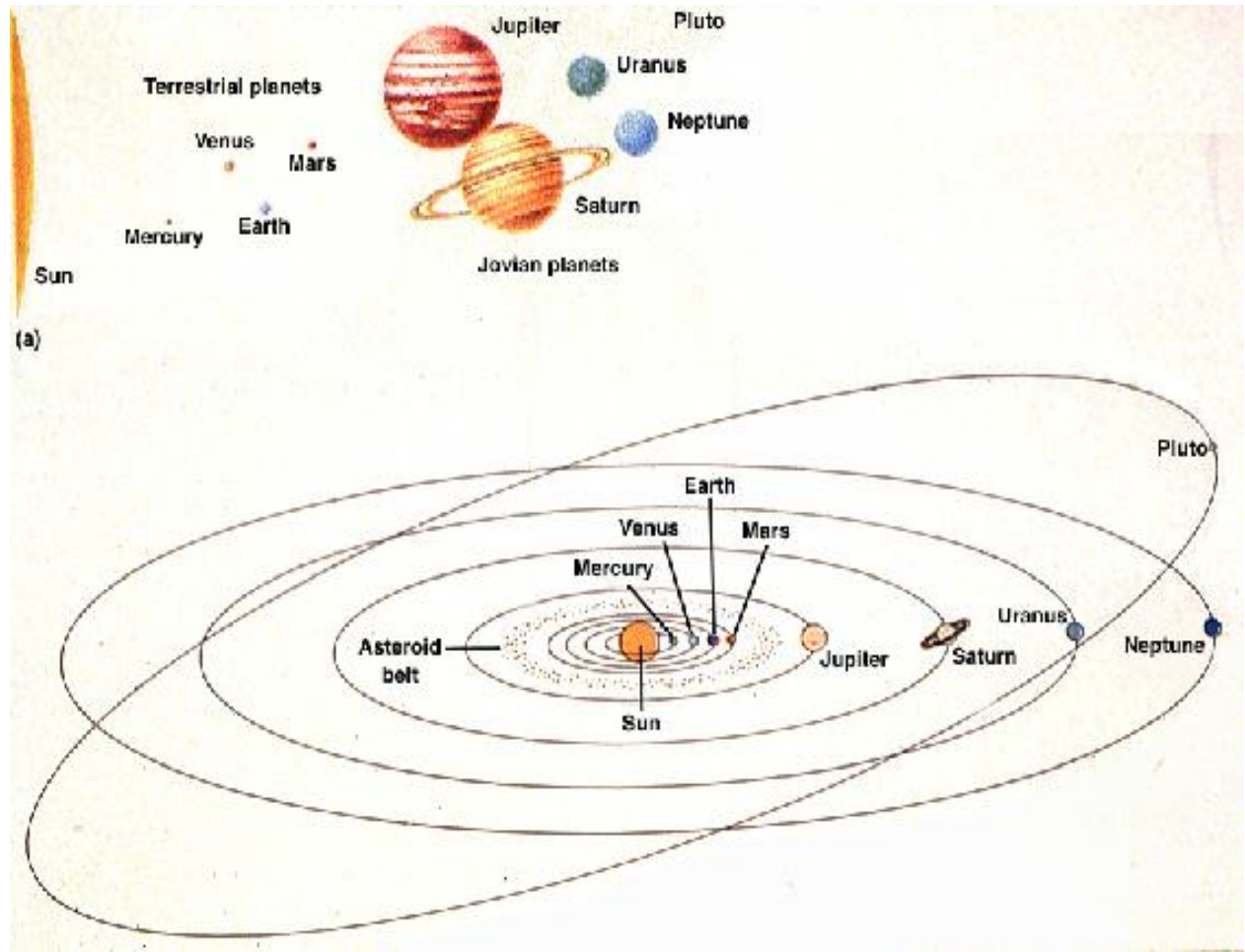


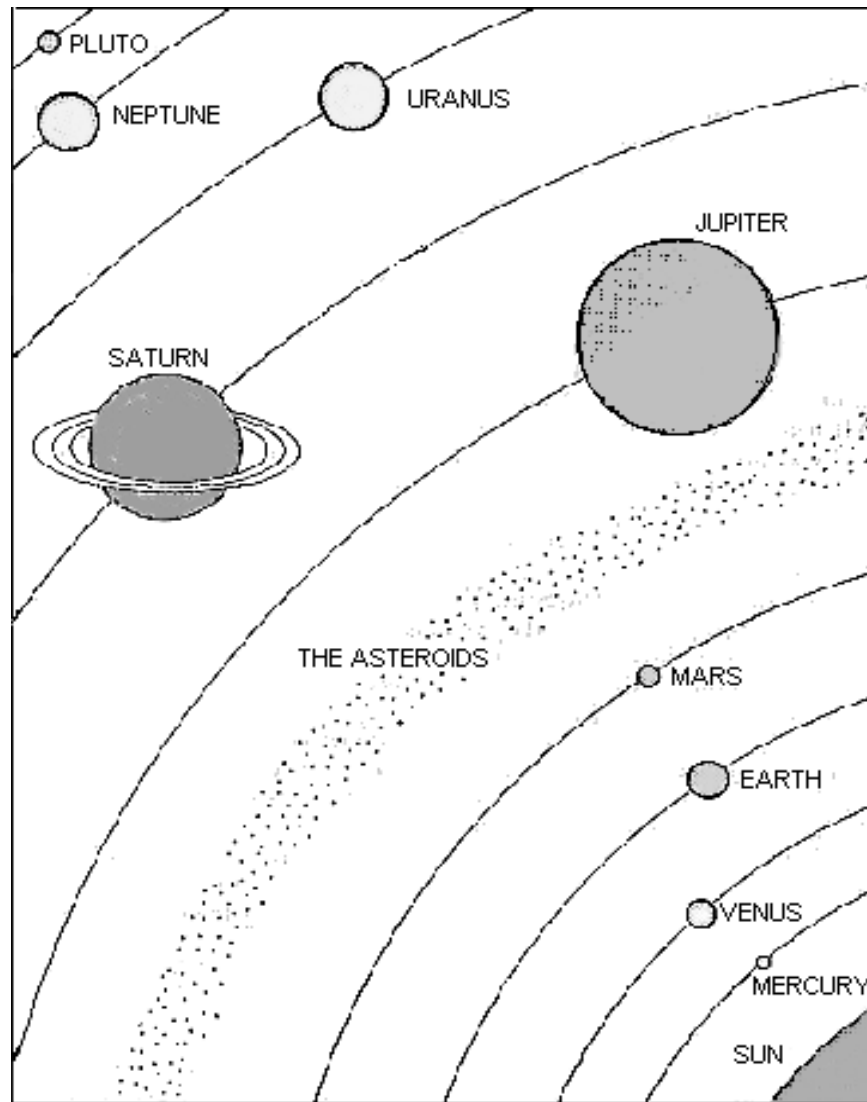




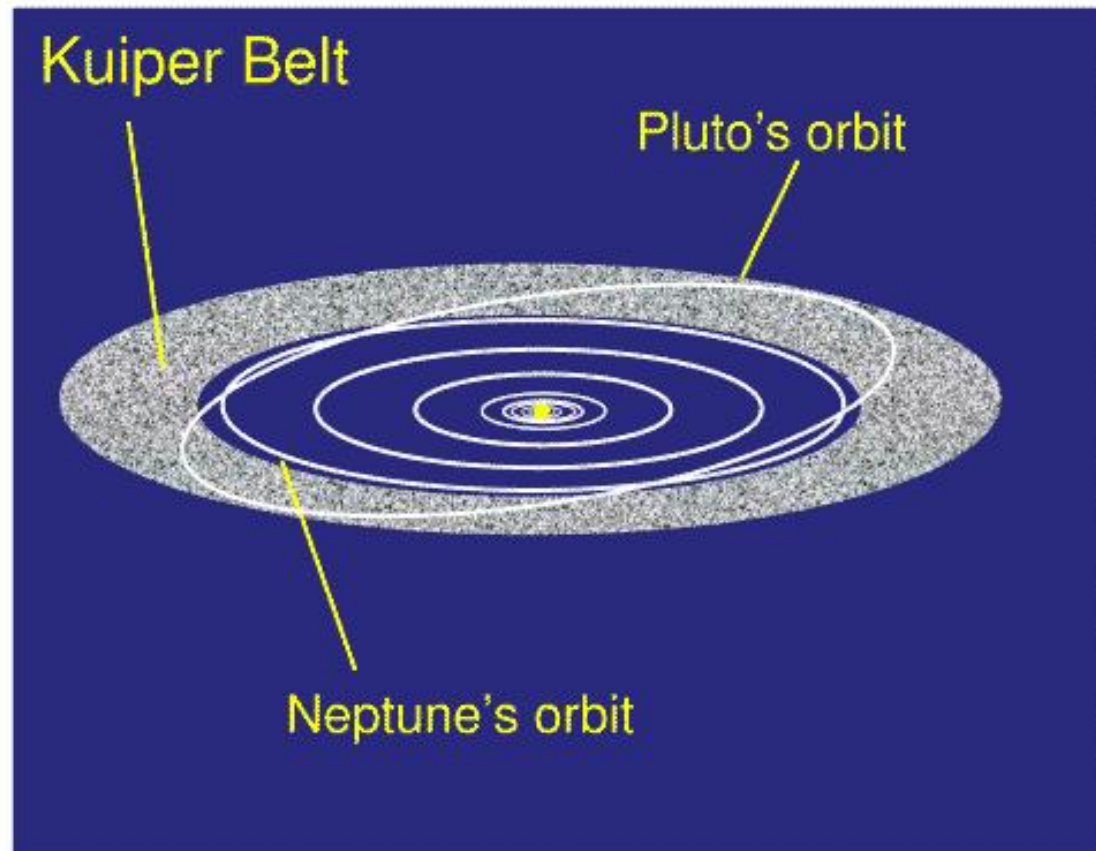
4. Inner planets – Mercury, Venus, Earth, Mars  
Outer planets - Jupiter, Saturn, Uranus,  
Neptune

	<b>Relative size</b>	<b>State of Matter</b>	<b>Spacing pattern</b>
Inner Planets	Smaller	Solid	Closer together
Outer Planets	Larger	Gaseous	Farther apart



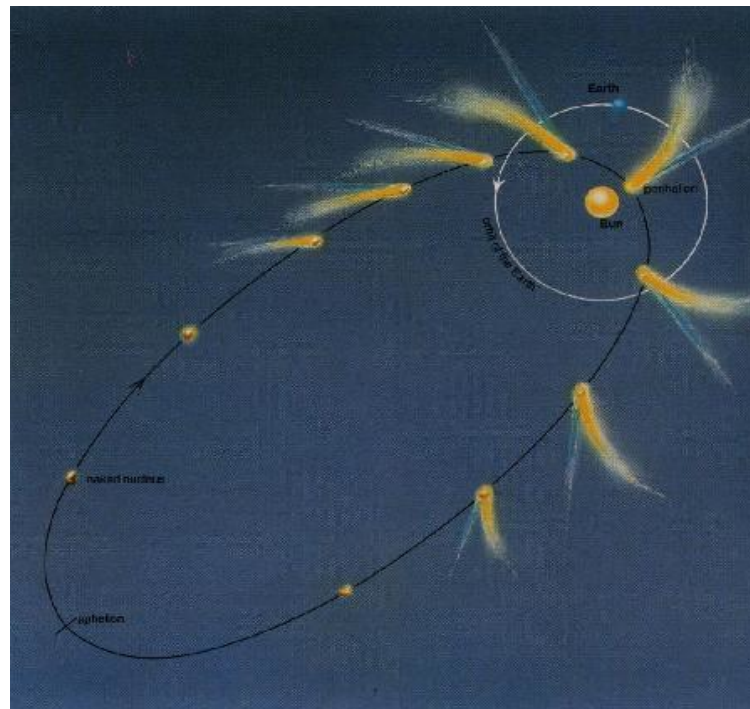


5. Asteroid Belt – big space rocks between Mars and Jupiter
6. Kuiper Belt – region beyond Neptune that is full of comets, asteroids and other debris.



# 7. Comets – have a tail, made of ice, orbit the Sun

<http://www.kidsastronomy.com/comets.htm>



8. Meteor - when space rock enters atmosphere

Meteorite - space rock

Meteoroid - when it hits E's surface



*Biggest item*

Universe

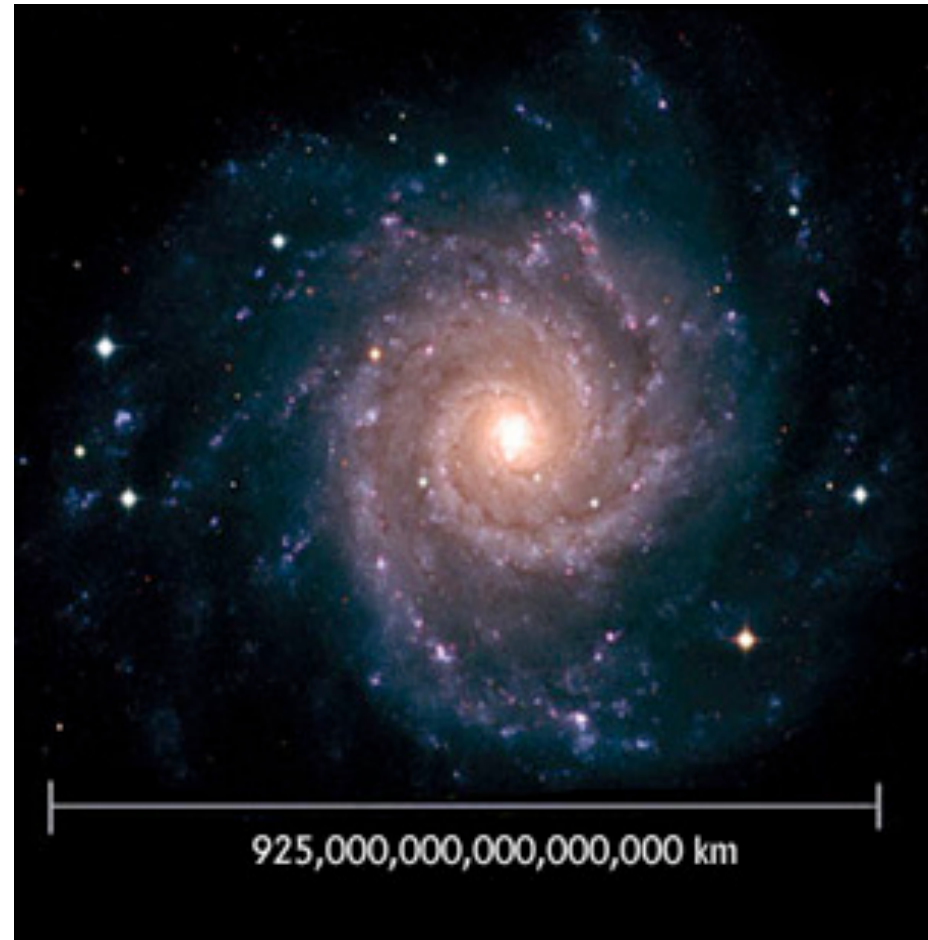
Galaxy (Milky Way)

Solar System

Planet

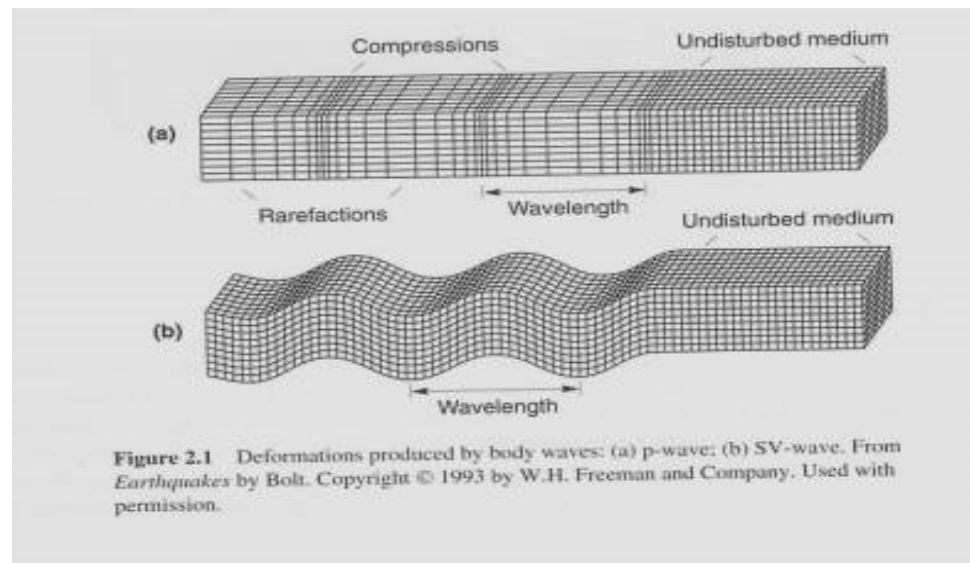
Satellite

*Smallest item*



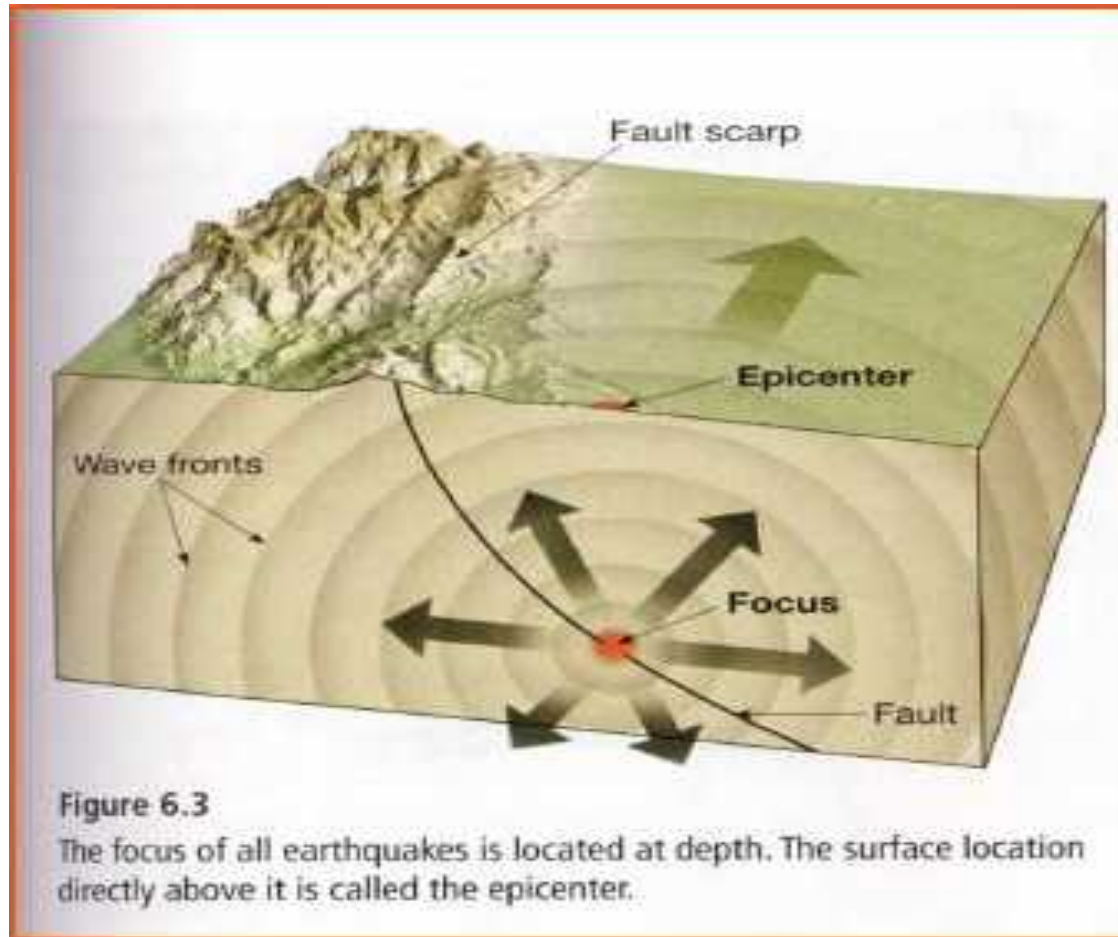
# Earth Science – Plate Tectonics

1. Earthquakes – seismic waves (P and S) are the energy released from the earthquake's focus. P-waves travel faster than S-waves.

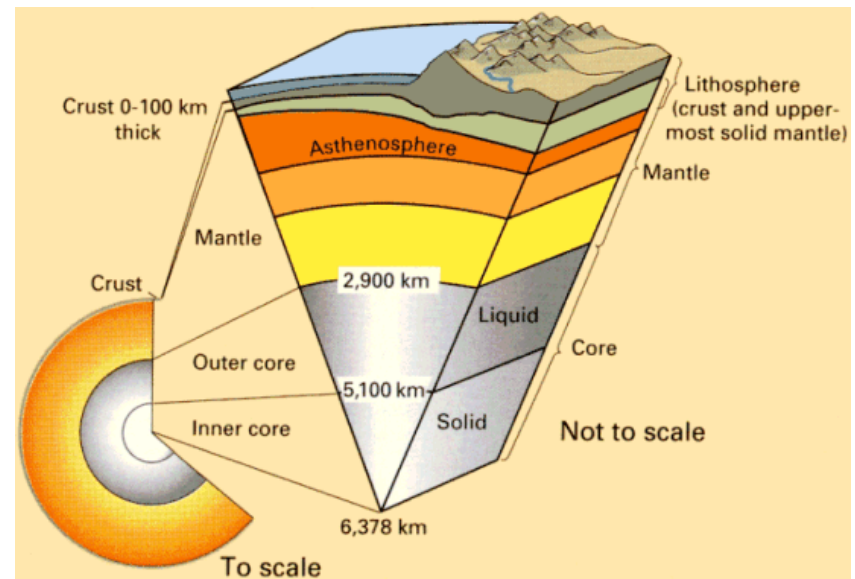
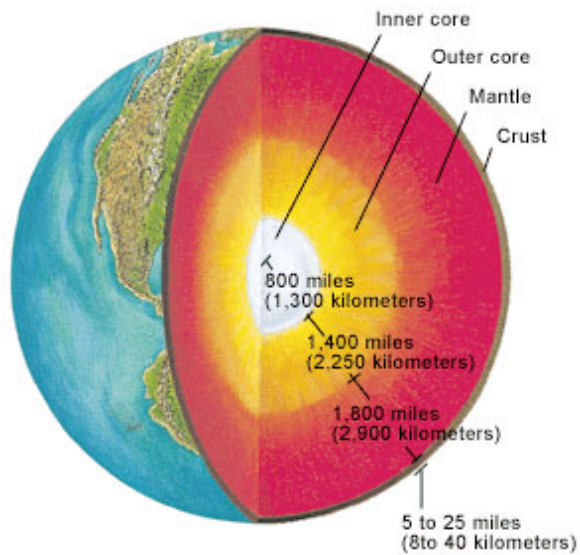


- a. Seismographs are the instruments that record the seismic waves.
- b. Richter Scale – measures the energy release of a moderate earthquake (magnitude 3.0-7.0)
- c. Moment magnitude - measures the energy release of large scale earthquakes
- d. Mercalli Intensity scale – measures the damage done by an earthquake.

# Focus vs. epicenter



## 2. Inner Earth– crust, mantle (plastic,) outer core (liquid,) inner core (solid)



### 3. Volcanoes – shield, composite/stratovolcano, cinder cone



*Shield*



*Cinder Cone*



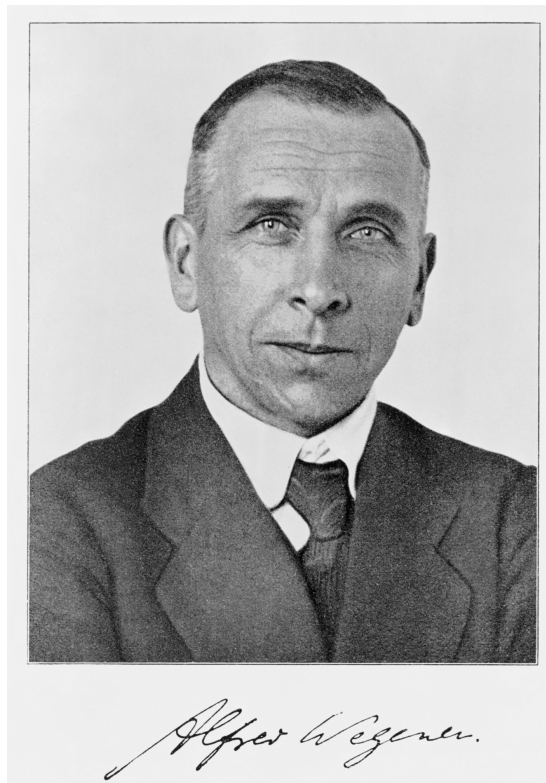
*Composite Volcano*

## 4. Mountain formation

- a. Coast range – plates collide, not volcanic, folded mountains
- b. Cascade Range – Pacific plate subducts under the North American. plate, volcanic.
- c. Himalayan Range – Indian plate colliding with the Eurasian plate, NOT volcanic

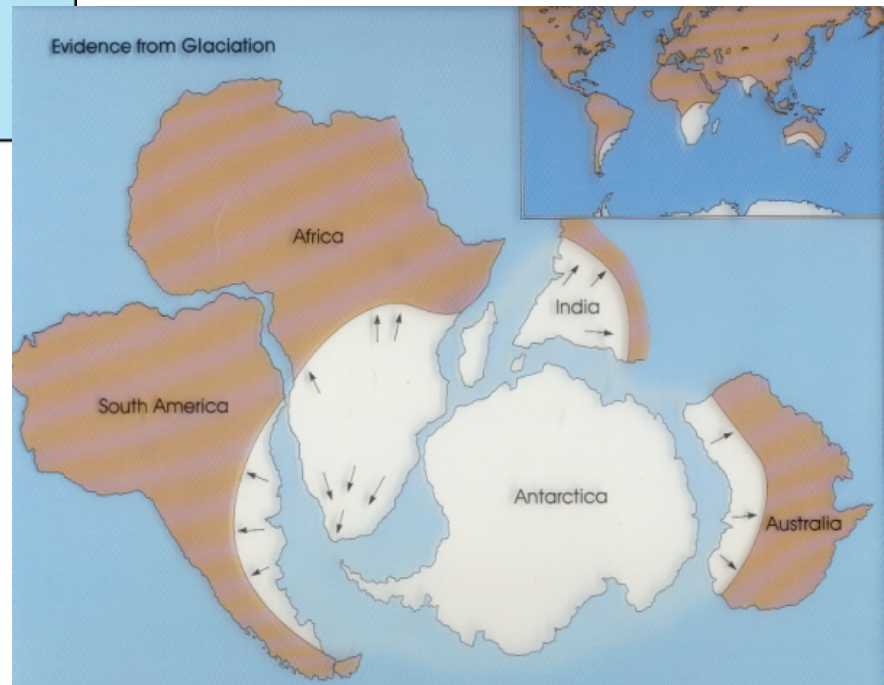
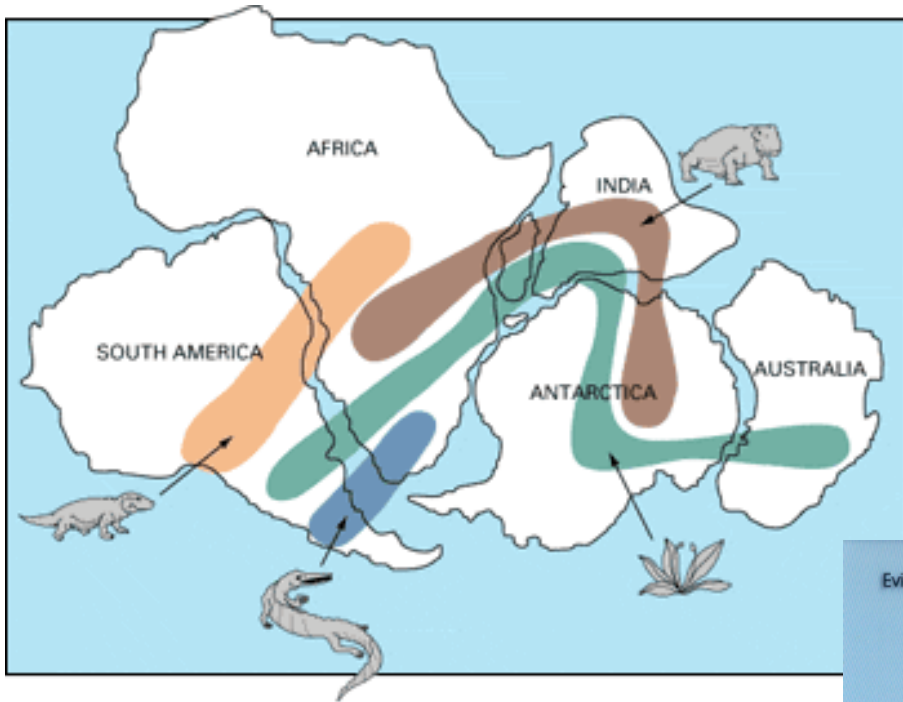
<http://www.pbs.org/wgbh/nova/everest/earth/shock.html>

## 5. Alfred Wegener = Theory of Continental Drift



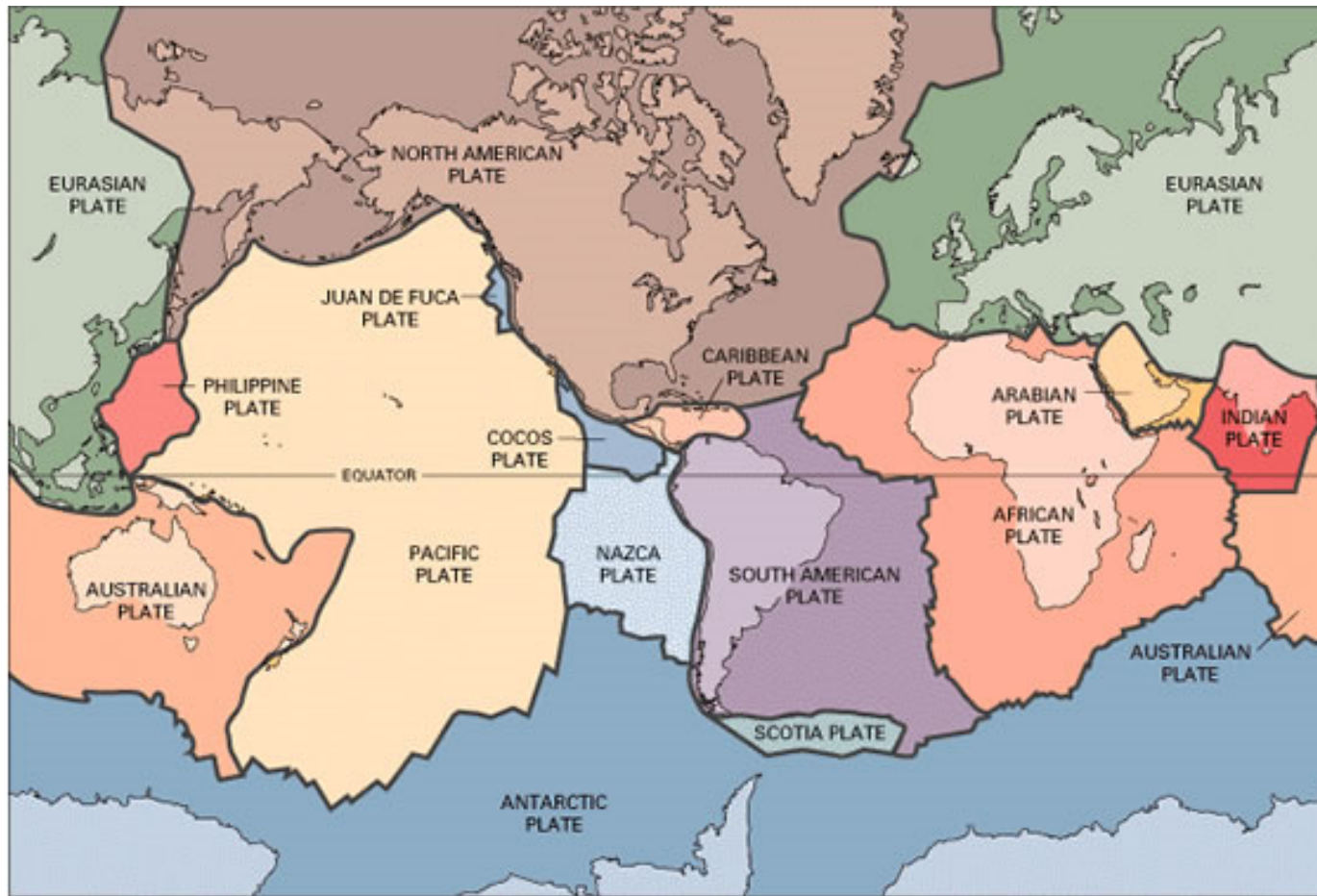


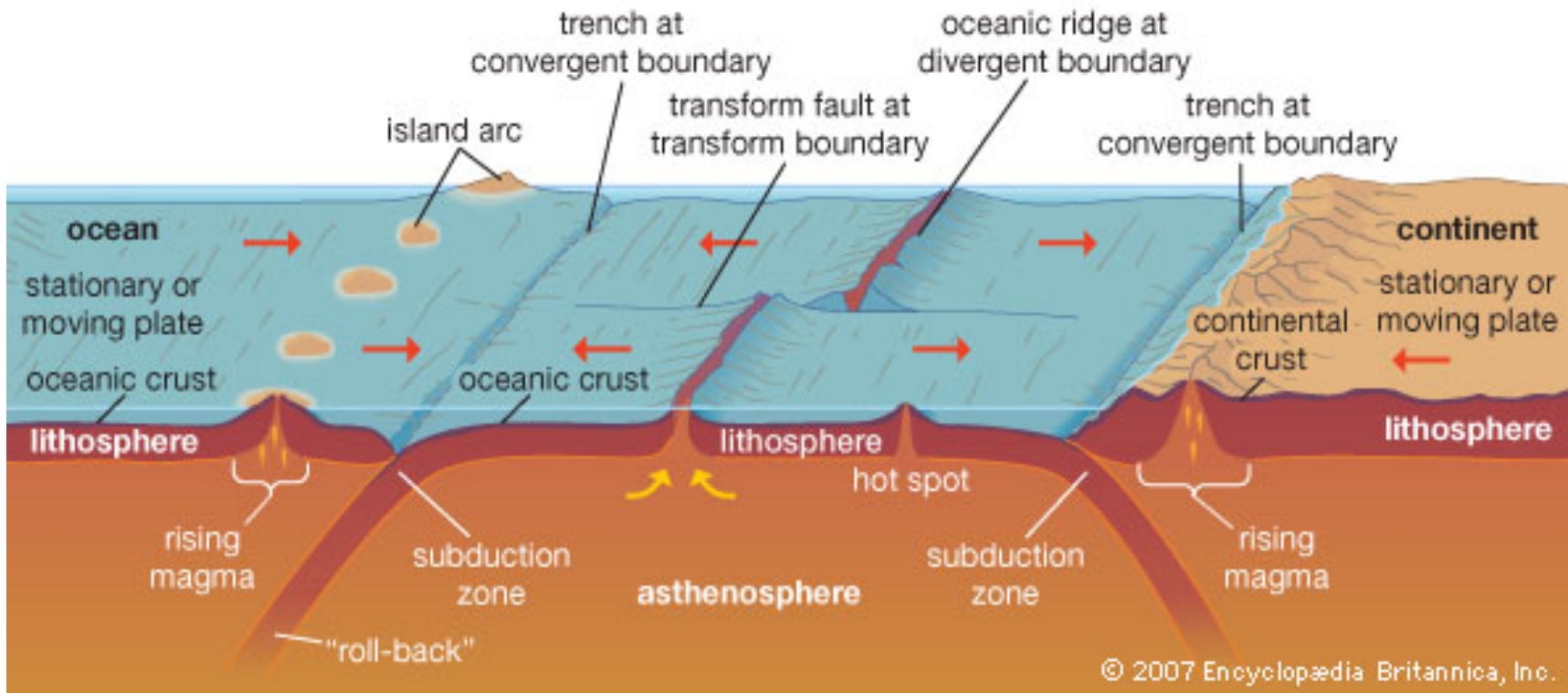
6. Evidence of Pangaea – Fossils, Mountain Ranges, glacial striations, & continental shapes all match

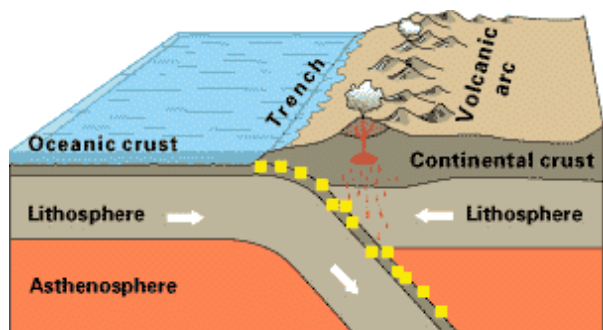


# 7. Theory of Plate Tectonics –

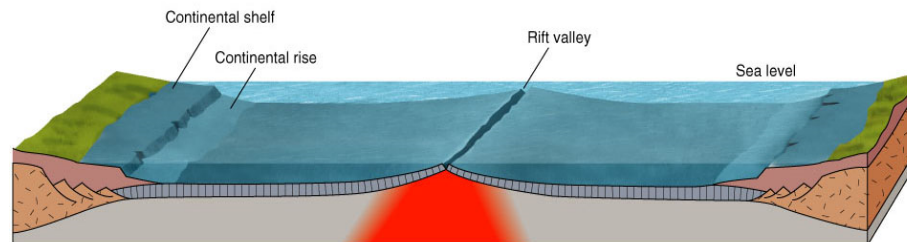
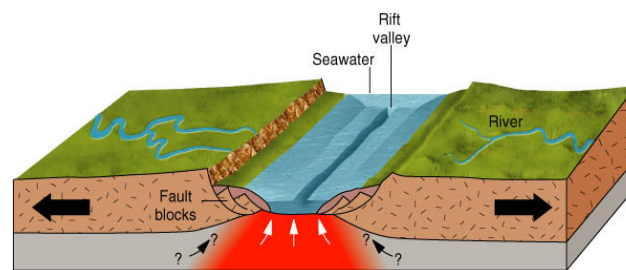
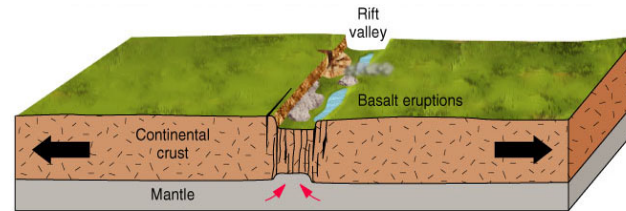
- a. Convergent – found along coastlines, plates move toward one another
- b. Divergent – mid-ocean ridges, plates move away from each other
- c. Transform boundaries – San Andreas Fault, plates move side by side each other
- d. Subduction zones - Area where oceanic crust plunges under continental crust



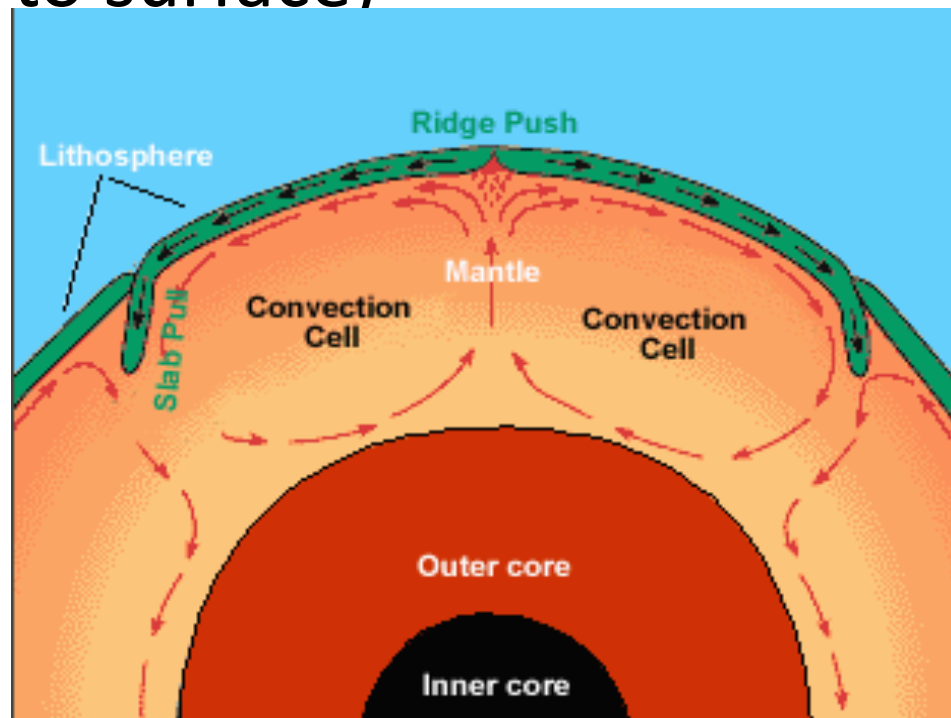




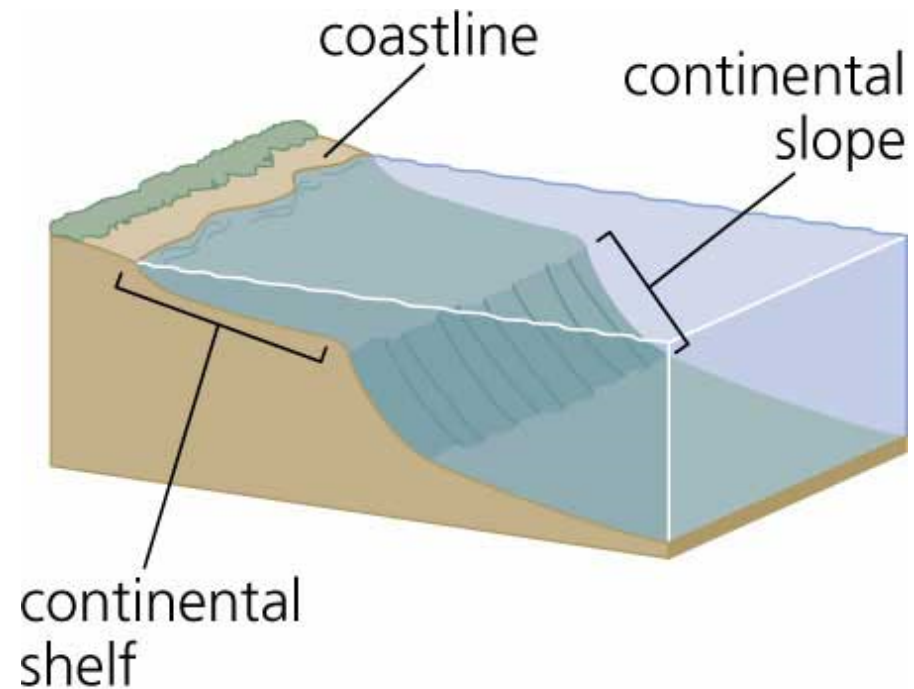
Oceanic-continental convergence



8. Why the plates move: basal drag (convection in mantle), slab pull (gravity), ridge push (magma forces to surface)



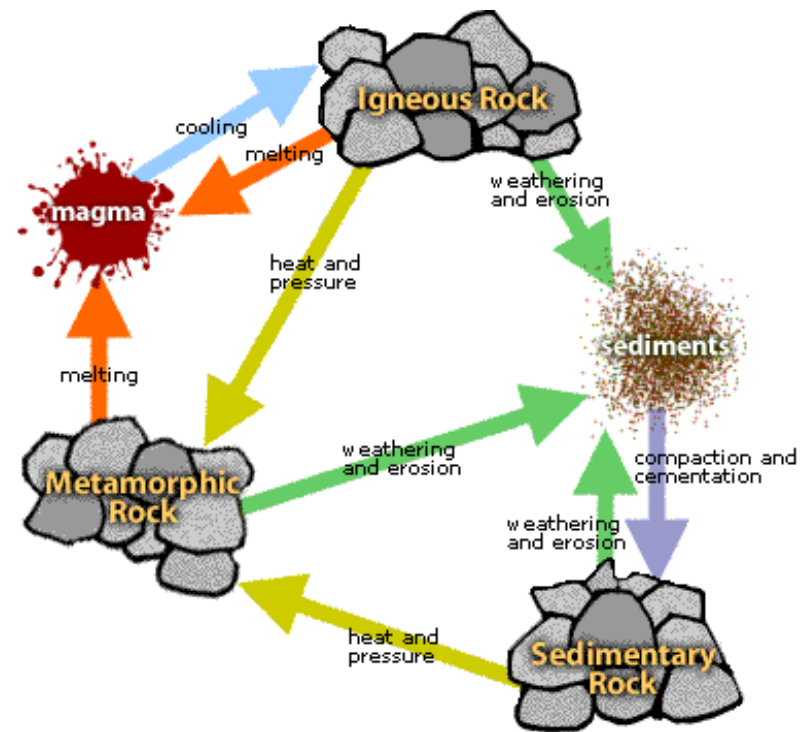
## 9. Continental Shelf – “edge” of continent, under ocean





# Geology

## 1. Rock Cycle – melting/cooling, heat/pressure, compaction/cementation



Weathering – breaks down the rock

Erosion – movement of rock particles

*Go to Barb's website and click "geology links"*

# Three Types of Rocks

**Igneous** = Volcanic

intrusive or plutonic: from magma, ex. granite,  
large crystals

extrusive or volcanic: from lava, ex. obsidian,  
basalt



## **Sedimentary**

clastic: layered, deposition ex. Sandstone

chemical: crystals from evaporation of water,  
stalactite, stalagmite ex. thunderegg

organic: fossils buried in layers of sediment



**Metamorphic** – (gumdrops/gummi bears) ex.  
gneiss, slate

Foliated: flattened crystals

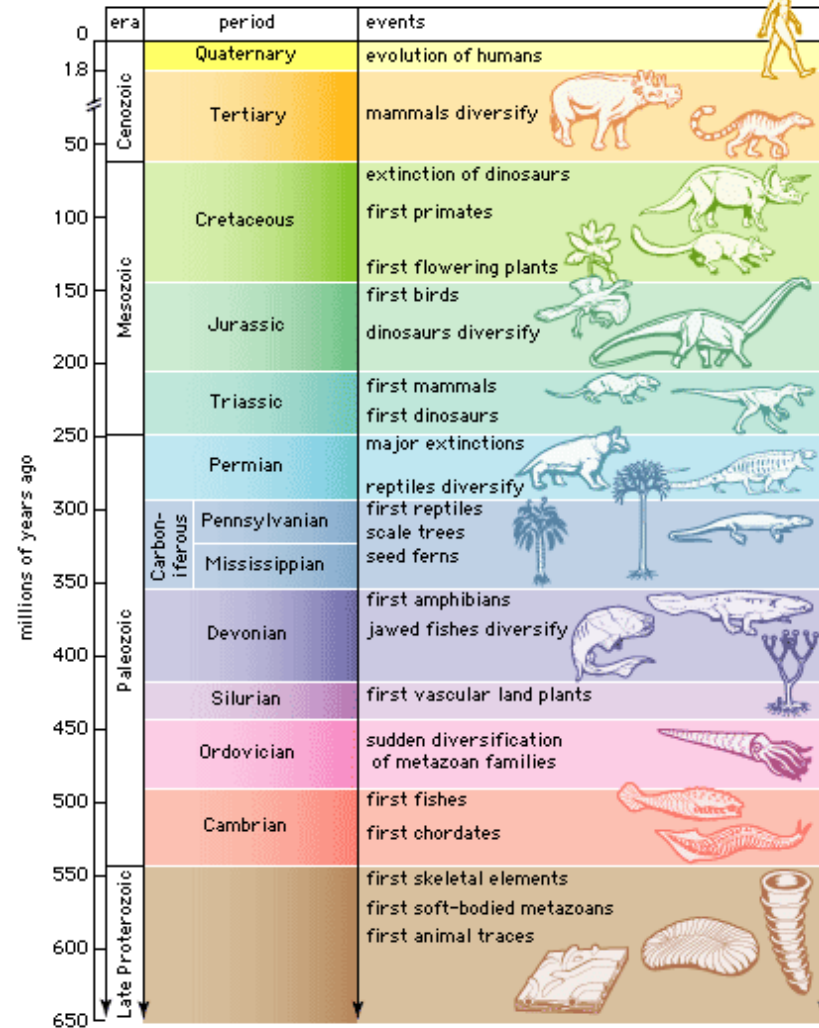
Non-foliated: mangled/folded, or just a  
completely different rock altogether





# Geologic Time Scale

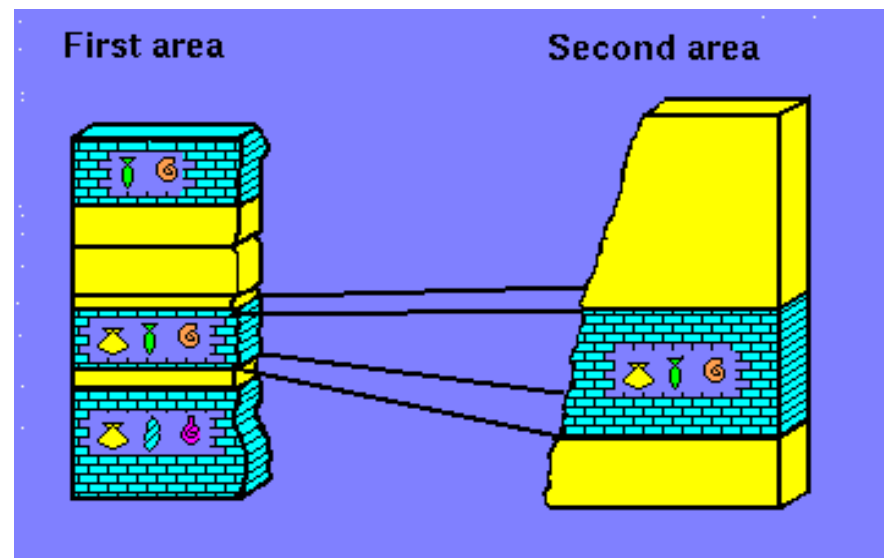
Geologic time scale, 650 million years ago to the present

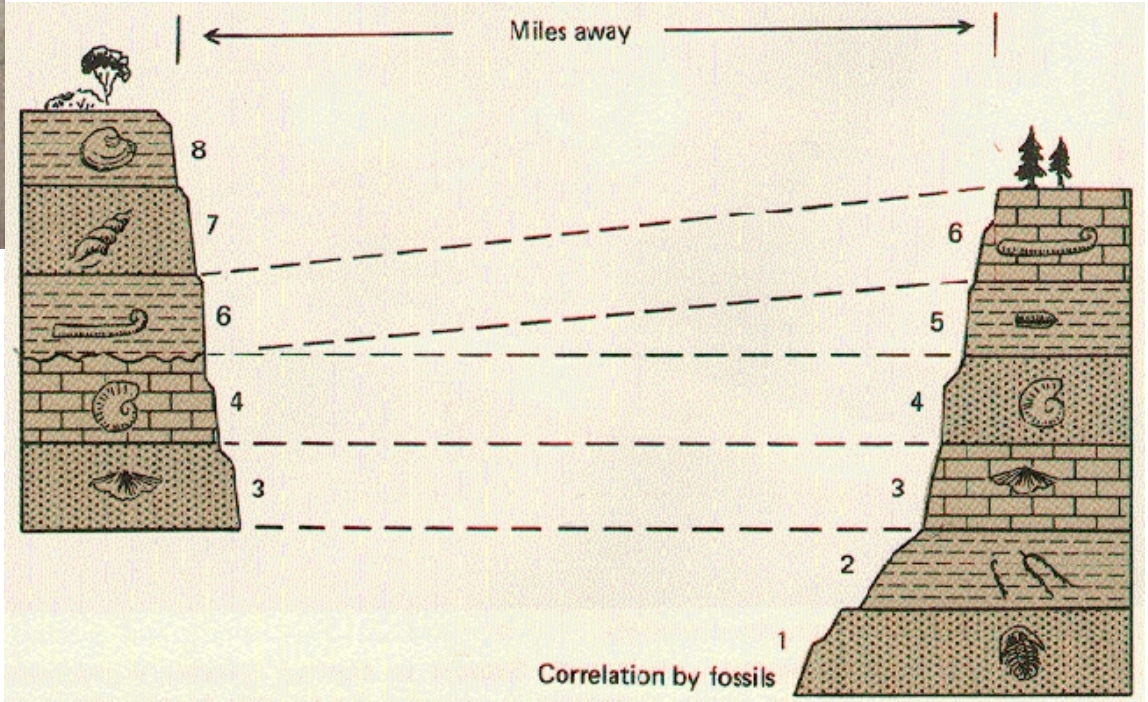


# Finding relative ages of rocks = comparing which one is older

- a. Law of Superposition - helps determine relative ages of rocks
- b. Index fossils – organisms that lived for a relatively short time and are common in the fossil record.
- c. Carbon dating (C-14) – helps determine age of organic remains

THE GROWING PILE OF SEDIMENT LAYERS			TIME
Location A	Location B	Location C	
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We DID it! 😊

**GOOD LUCK!**