

Weather and Climate Unit Notes

Name: _____

(DO NOT LOSE!)

FOCUS: WEATHER AND THE ATMOSPHERE

Weather: The state of the _____ at a given time and place, with respect to variables such as...

- - T _____
- - Moisture
- - W _____
- - Air Pressure

Climate: The average _____ of a particular part of the world at different times of the year.

Atmosphere: The layer of _____ surrounding Earth; composed mainly of _____ and oxygen.

Importance of the Atmosphere

- Keeps planet _____ (Greenhouse effect)
- Provides _____ to breathe (makes respiration possible)
- Protects us from small _____.
- Has _____ that protects us from _____.
(UV)

Without atmosphere, _____, _____, _____, and _____ are not possible.

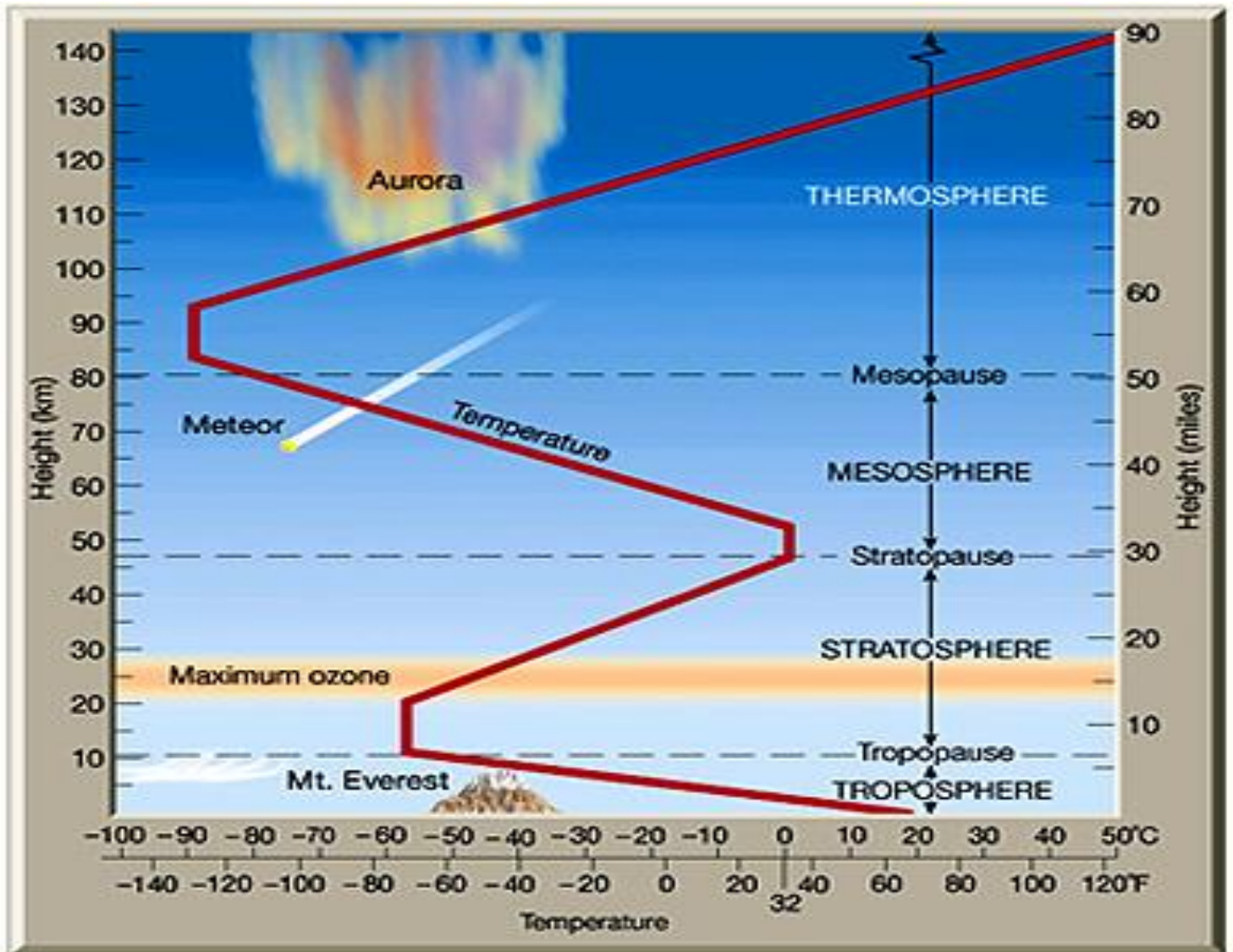
The atmosphere is made of

- - 78% N_____ Gas
- - 21 % Oxygen
- - All other gases 1%
 - Argon .7%
 - Carbon Dioxide .2%
 - N_____
 - Helium
 - M_____
 - Krypton
 - Hydrogen
 - X_____

● Title: Layers Of Atmosphere

● Spread these 5 bullets out over a page. Draw relevant things after titling layer.-

- - Troposphere – W_____ occurs here, life, air travel.
- - Stratosphere – O_____ found here.
- - _____sphere – Meteors burn up here
- - Thermosphere – Space shuttle orbits here, Aurora borealis
- - _____sphere – Merges with _____, some satellites here.



New Area of Focus: Air Quality and Pollution

Air Pollution can be

- G _____ (Global Warming)
- R _____ (Acid Rain)
- L _____ (Smog)

To avoid carbon monoxide poisoning, Do not...

- Run a car in a _____ garage
- Burn charcoal indoors or in a tent

- Run a generator _____.
- Burn anything without ventilation

Ozone Layer

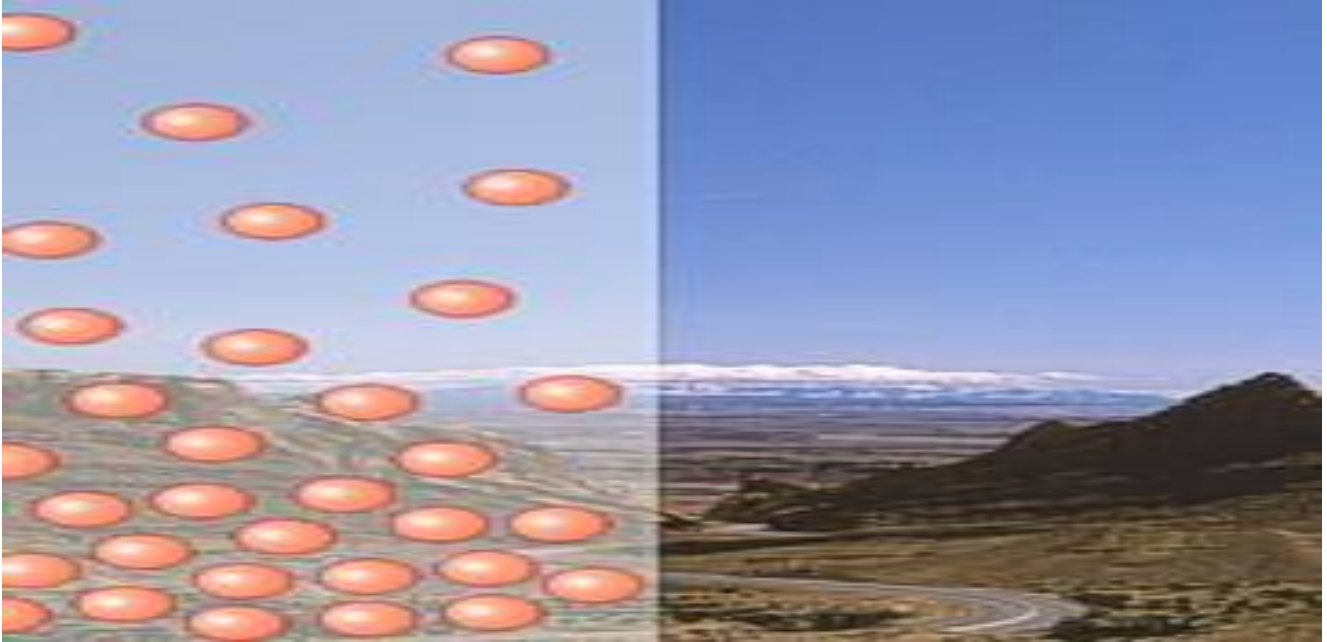
- - Layers of _____
- - Gas made of 3 _____ atoms (O₃)
- - Absorbs 99% of sun's harmful _____ rays
- - Chlorofluorocarbons, (_____) made by humans in aerosols destroy Ozone
- - Humans have created a _____ in the ozone layer.

Ways to avoid skin cancer

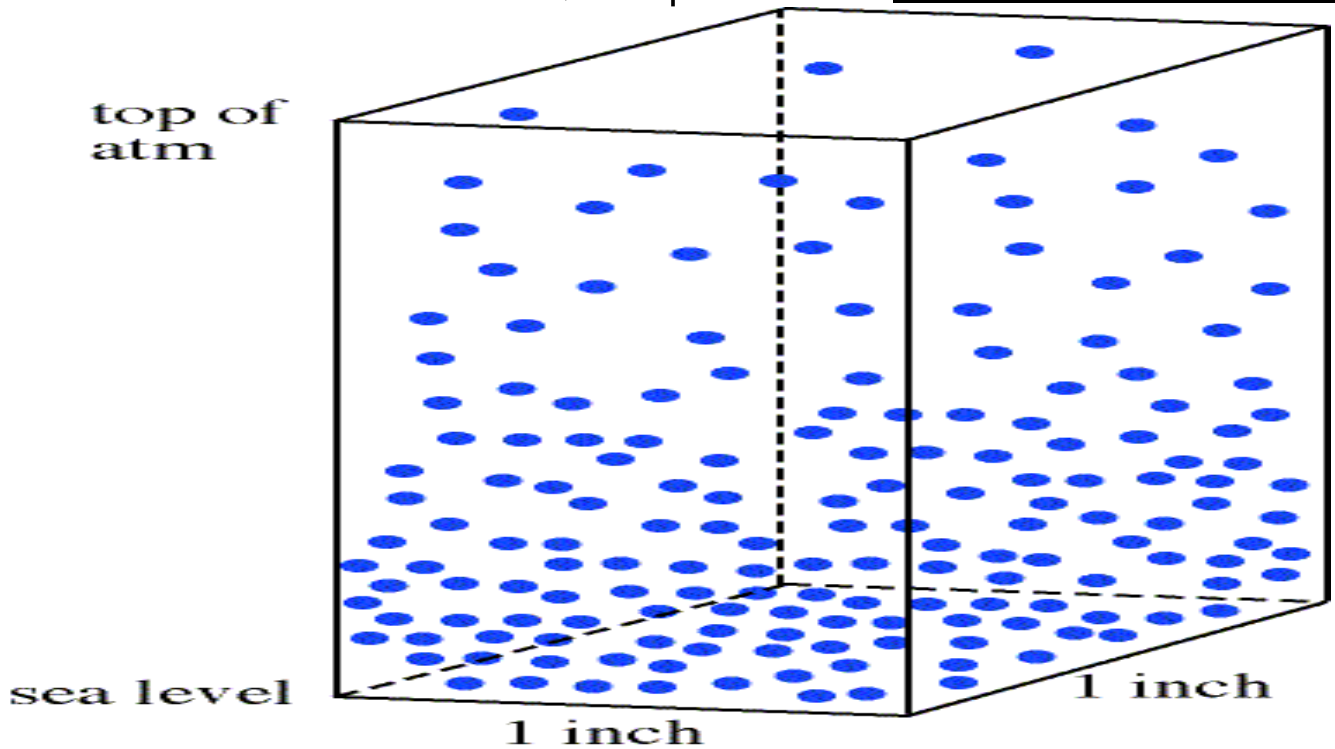
- Don't _____. The sun is radiation
- T_____ also increases your risk
- Avoid the sun, especially between 10-4PM
- Seek _____
- Wear a shirt (thicker and darker)
- Wear _____
- Be especially wary fair skinned people

New Area of Focus: Air Pressure, The factor that controls the weather.

Air Pressure: The pressure caused by the _____ of the atmosphere.

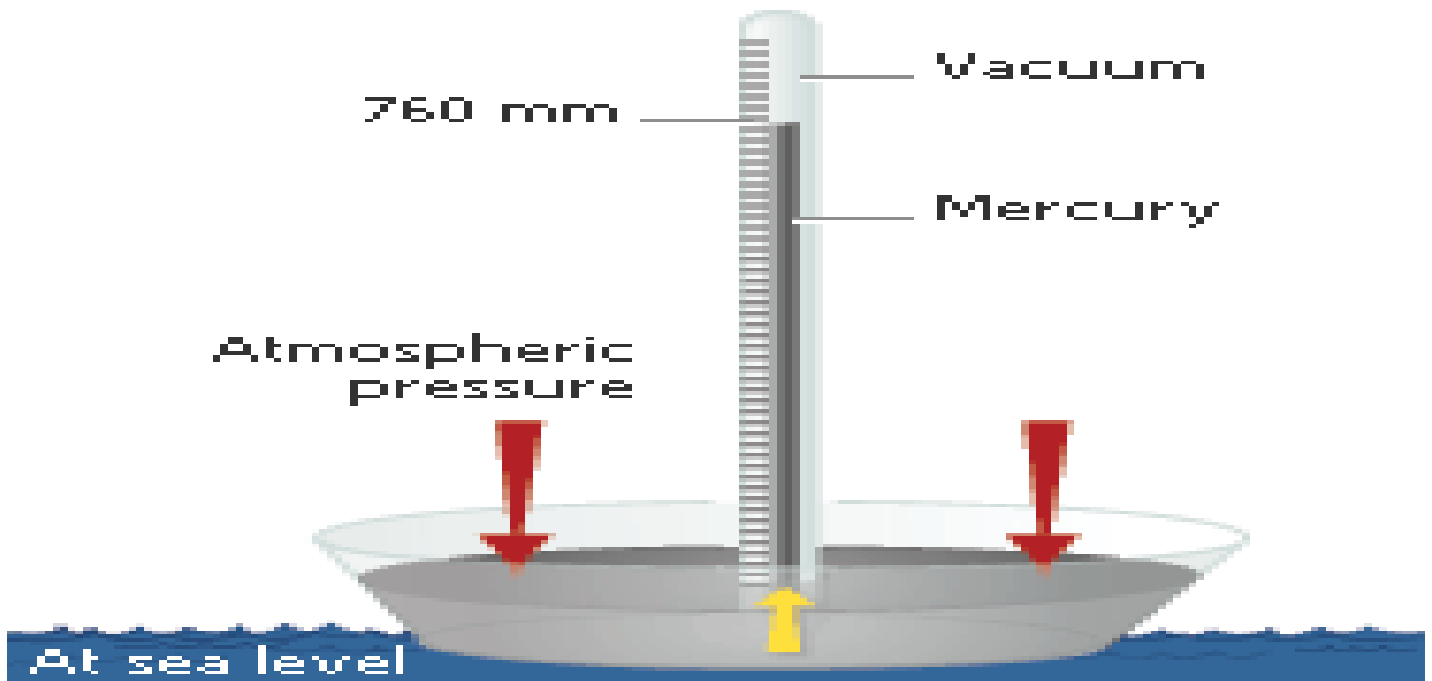


As elevation increases, air pressure _____.



As you increase in elevation, _____
decreases. Inverse relationship

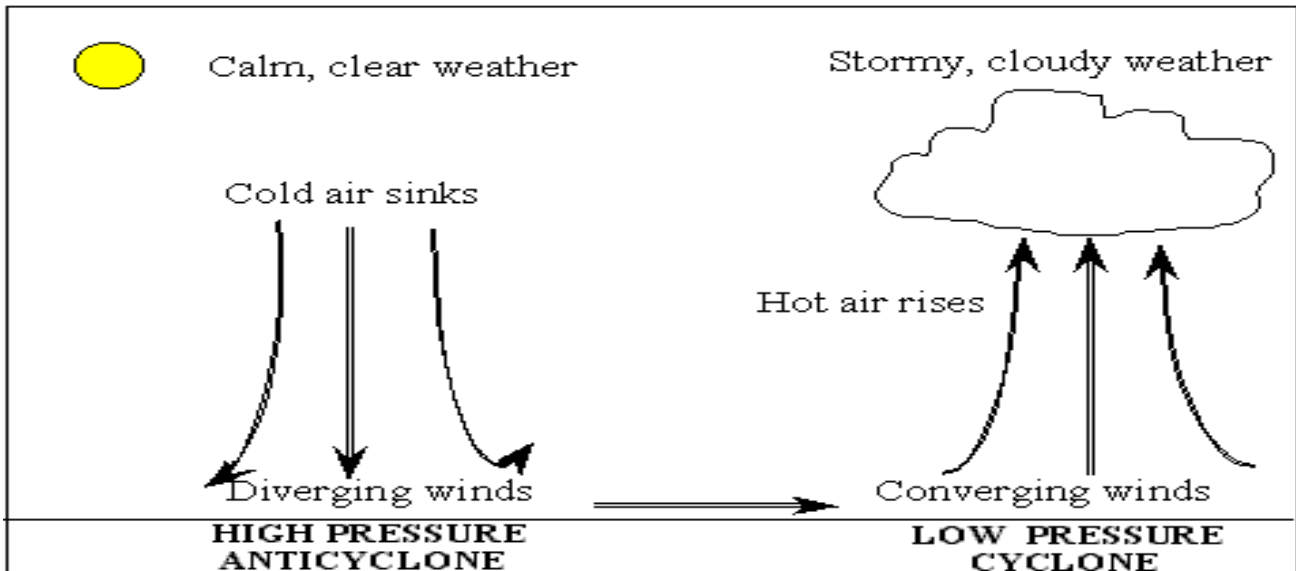
Barometer – Instrument that measures air _____.



Air Pressure drives the _____ and creates the weather.

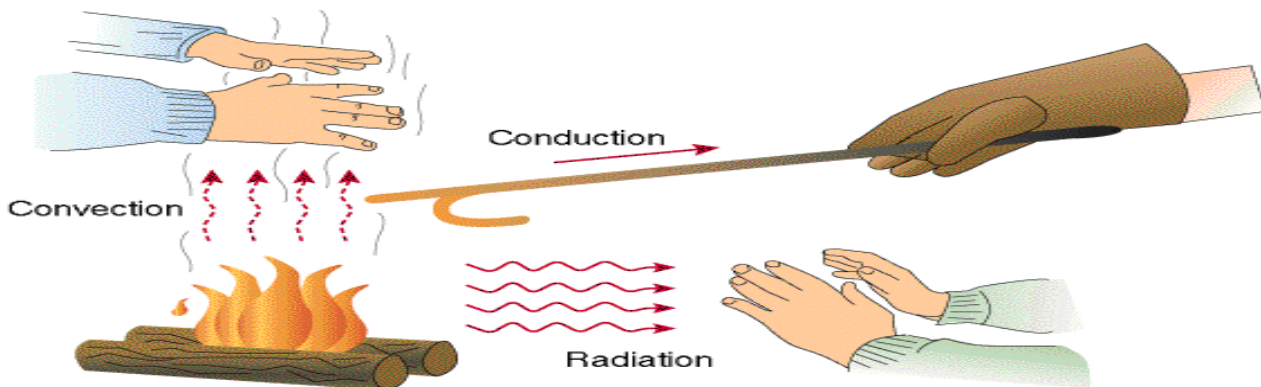
Warm air _____, cool air _____.

Warm is low pressure, C _____ is High Pressure.



- Most importantly, wind travels from areas of high pressure to areas of low pressure!

Pictures for heat transfer



Convection: Vertical circulation in which warm r_____ and cool _____.

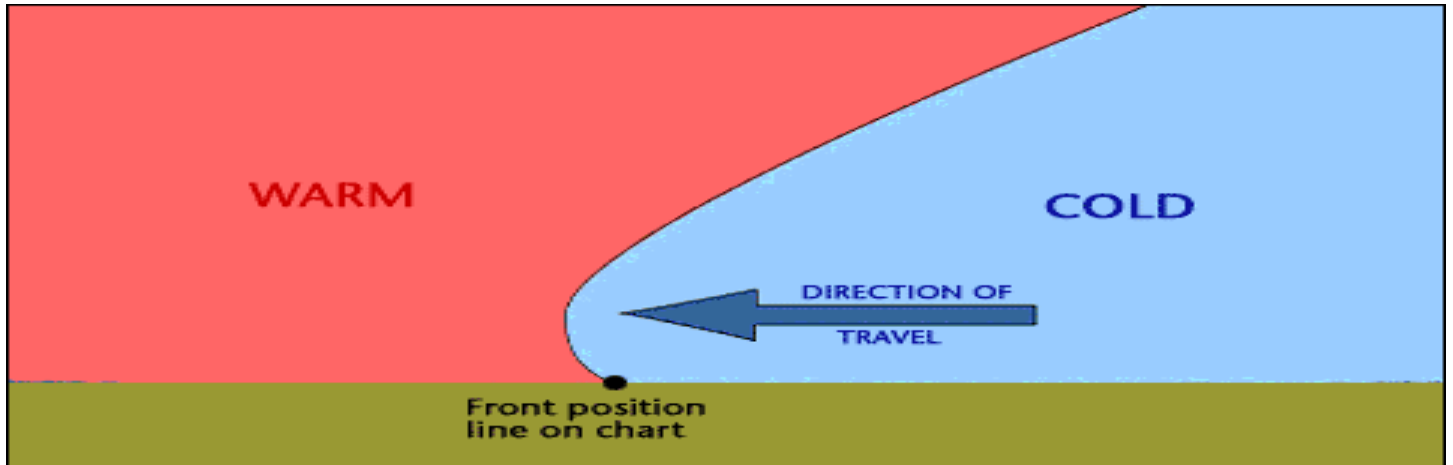
--Flow of heat by this circulation.

Conduction: The movement of _____ from one molecule to another.

Radiation: _____ that is radiated or transmitted in the form of rays or waves or particles.

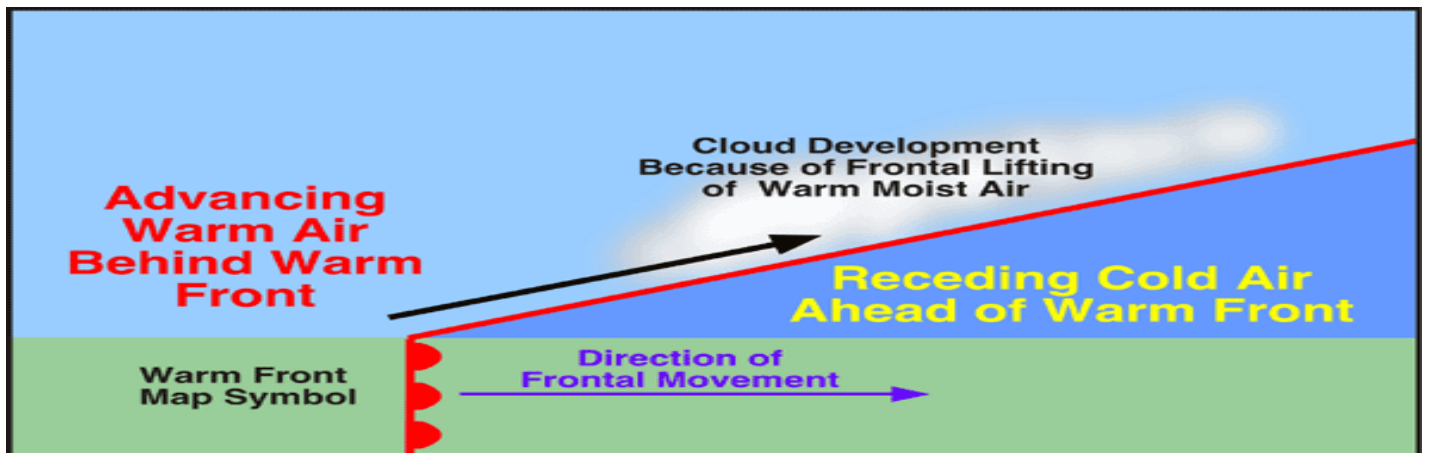
Warm Fronts and Cold Fronts, caused by air pressure.

Cold Front: Form where cold air moves _____ warm air. Creates _____ storms.



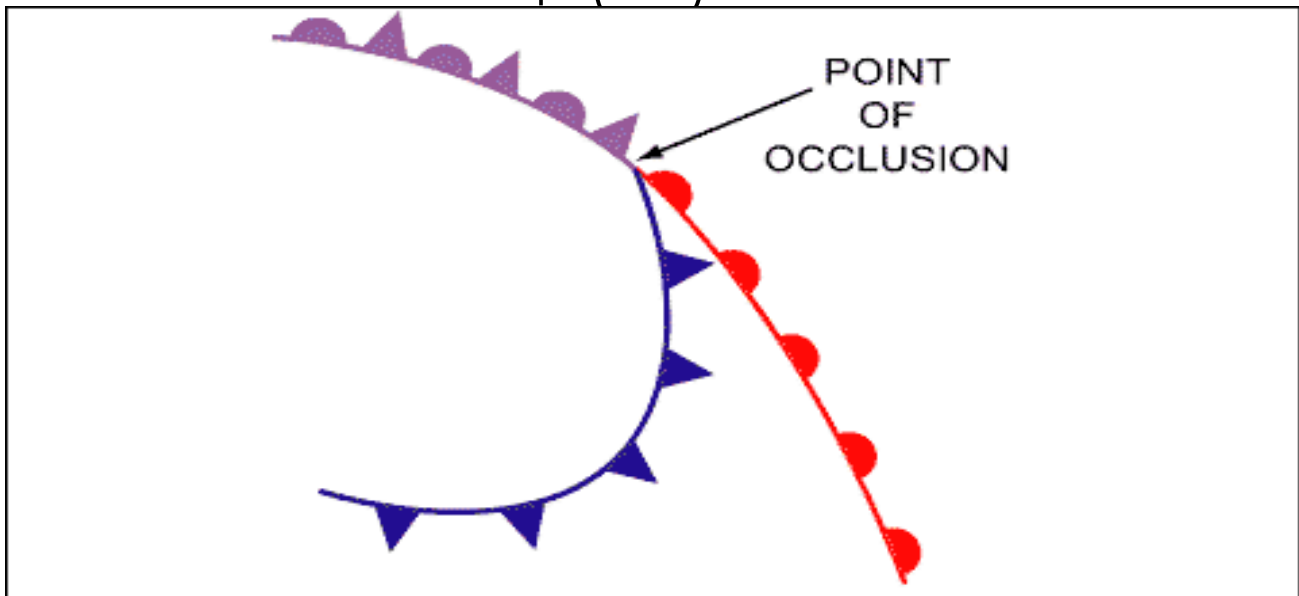
Cold Front

Warm Front: Form where _____ air moves towards cold air.

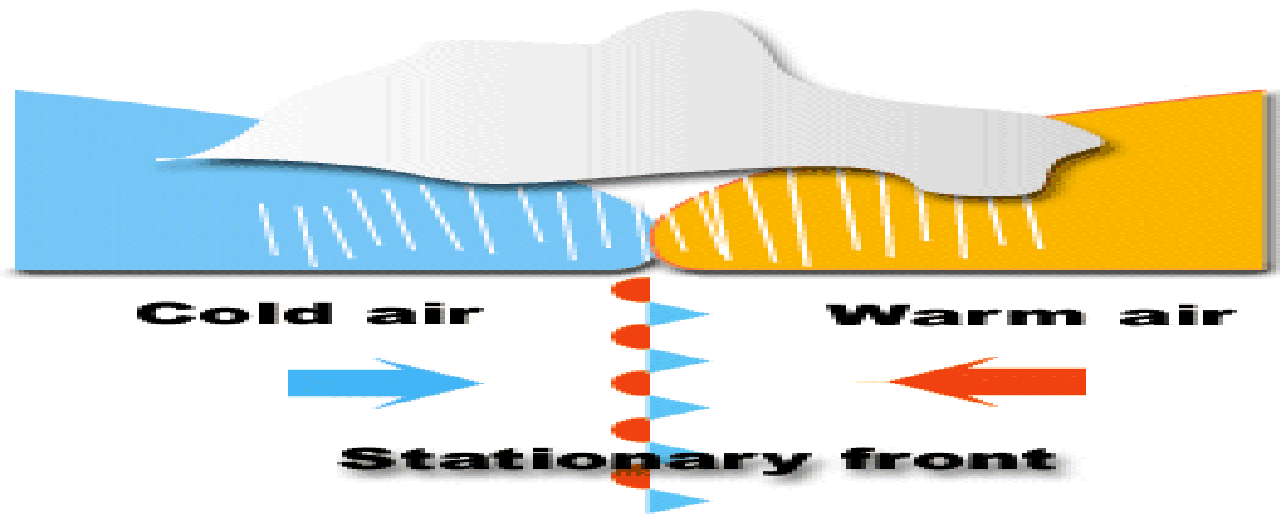




Occluded front: When a cold front _____ a warm and forces it up (Mix)



Stationary Front: When cold and warm _____ overtake each other (tie)

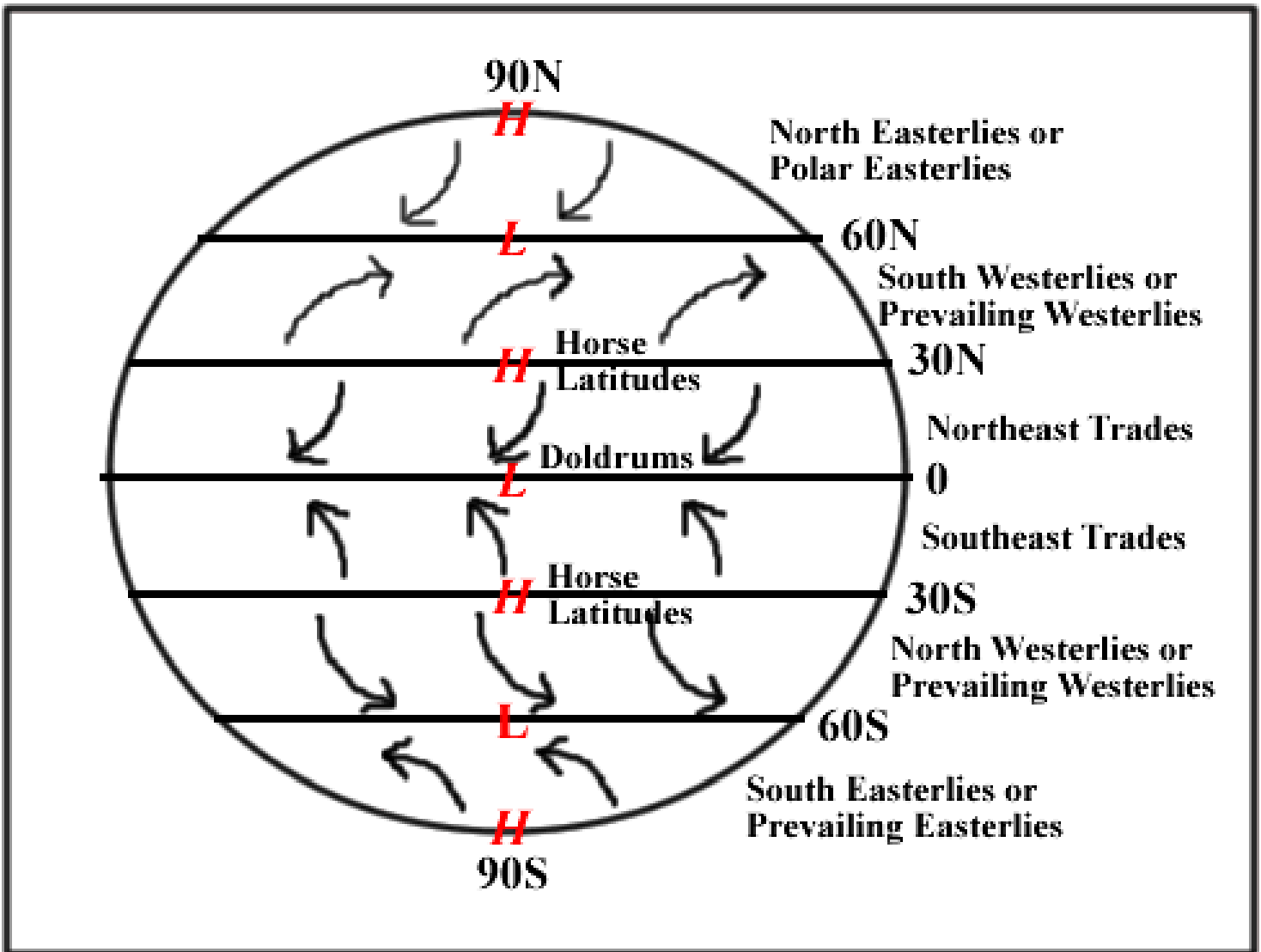


Wind

- - The movement of air, from _____ pressure to _____ pressure.
- - The wind is caused by the different _____ (and therefore air pressure differences) around a planet - this is caused by the Sun.
- - Temperature _____ over the land and over seas.
- - The _____ of the land (Mountain Effect)

Global Winds

- - D _____
- - Horse latitudes
- - T _____ Winds
- - Prevailing Westerlies
- - P _____ Easterlies

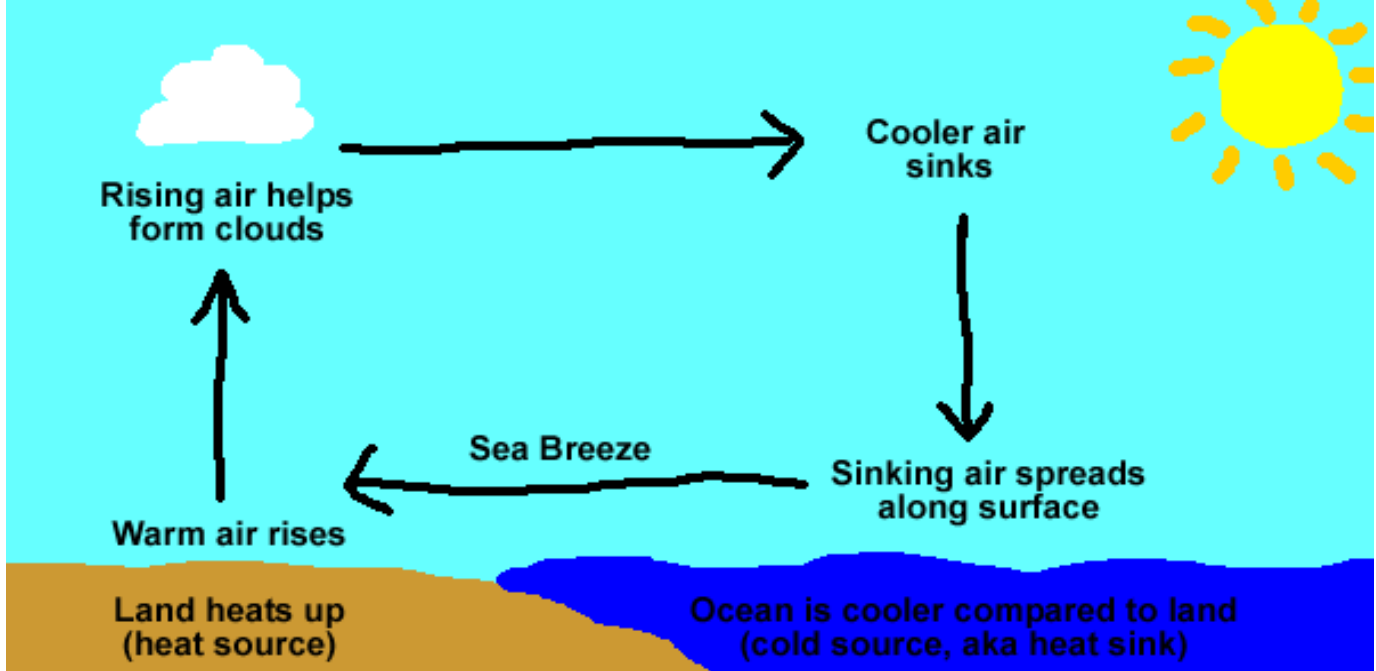


The _____ of the Earth (which causes the Coriolis force).

- Coriolis Force – Rotating body _____.

The Jet Stream: Any of the high-speed, high-
 _____ air currents that circle the Earth in a
 w_____ direction.

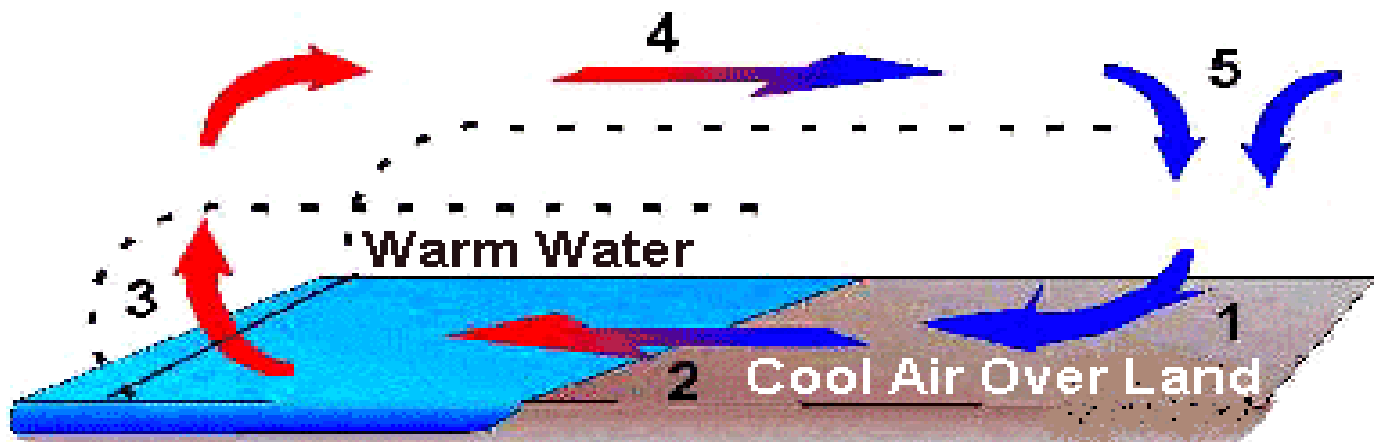
Sea Breeze (Day)- The breeze that blows from the _____ toward the _____ during the _____,



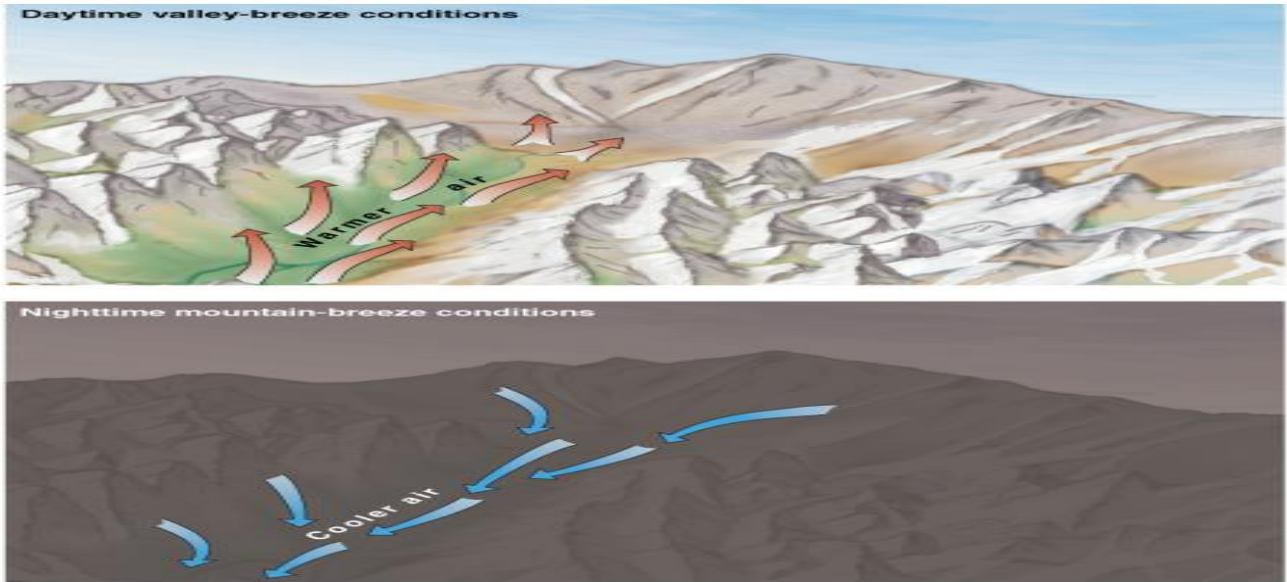
Caused by air rising over the warmer _____ (day) and is replaced by cooler air from above the _____.

Land Breeze (Night): The breeze that blows from the _____ toward the _____.

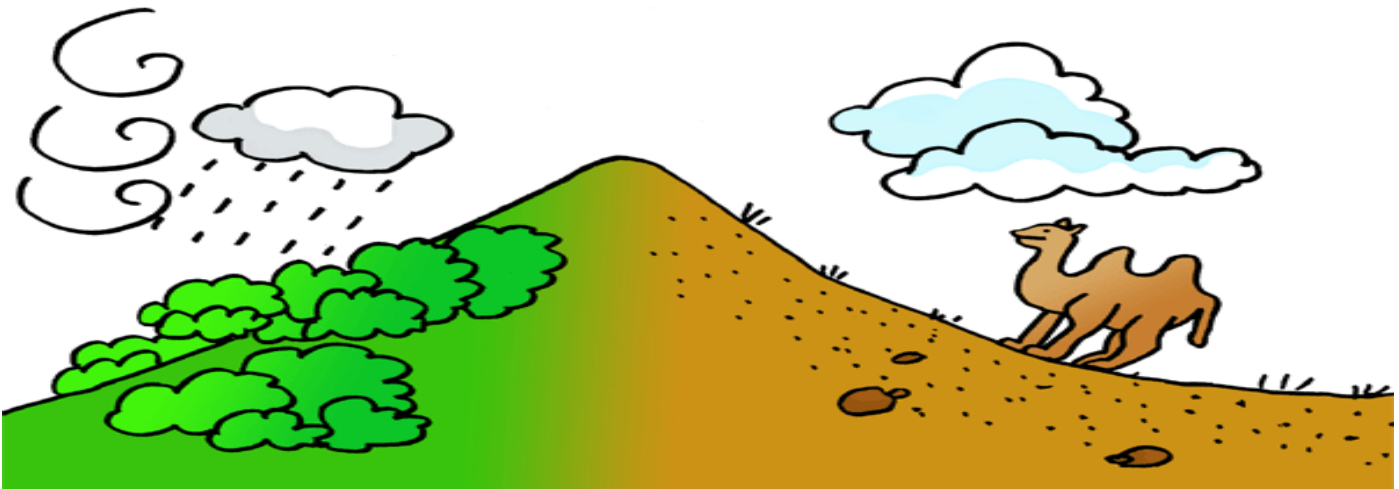
Land Breeze Circulation



Mountain Winds: Mountains can create strong winds.
 Warm air _____ up Mtn. (day), Cool air _____
 down Mtn. (Night)



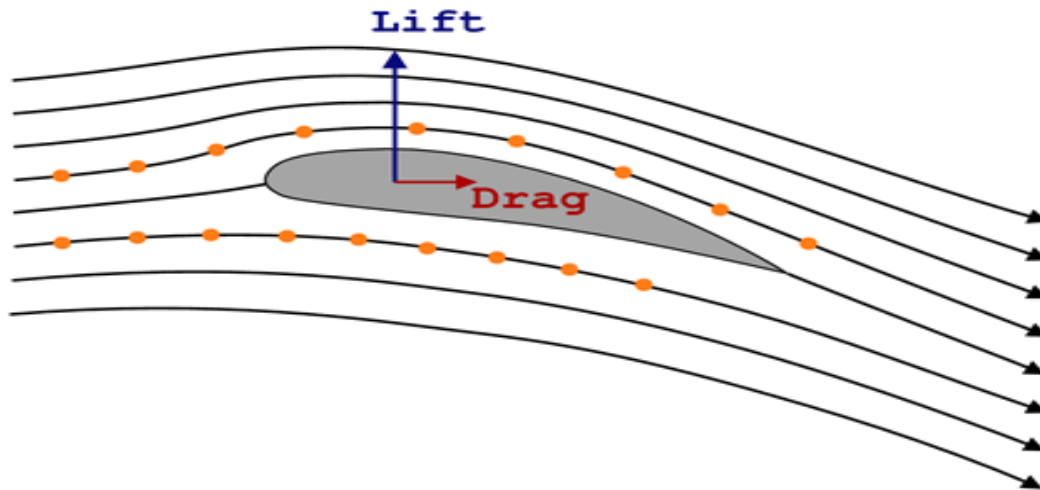
Mountain Rain S_____ Effect:



Wind Chill - The cooling effect of _____ and
 temperature combined. The higher the wind, the
 _____ it gets.

Flight.

- Simple combination of Bernoulli's Principle and Newton's _____ law of motion.
- Air flows _____ over the top of the wing than the bottom making less pressure, higher pressure underneath _____ the wing up.



Dangerous Weather Systems

Storms: Rapid changes in _____ pressure cause a disturbance.

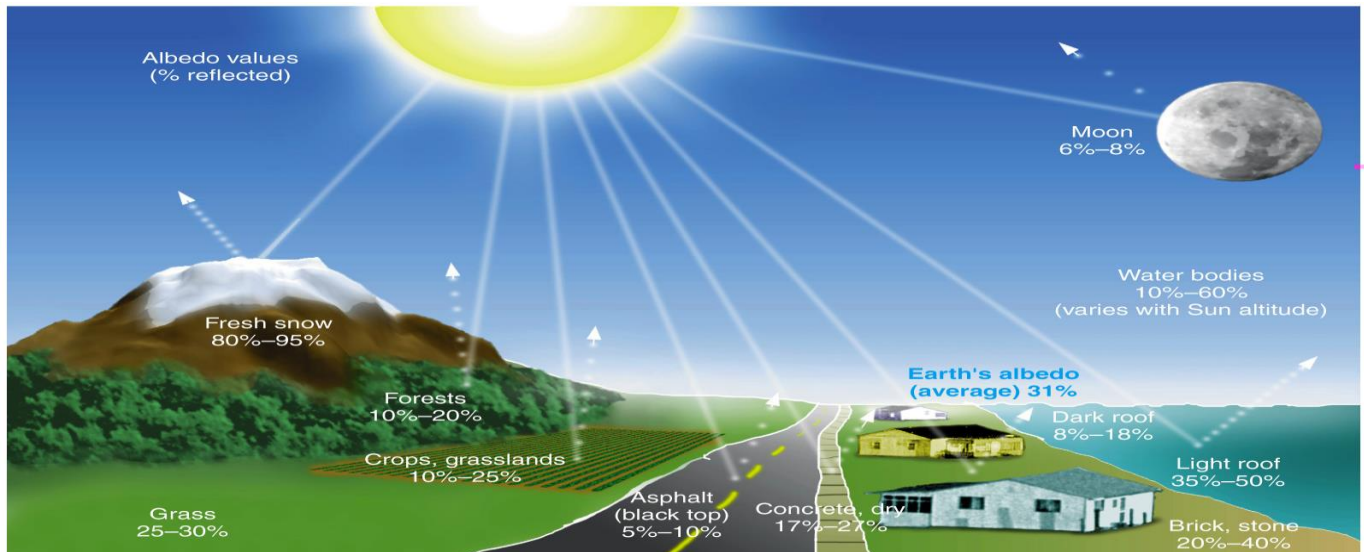
- H _____
- Tornadoes
- B _____
- Microburst
- T _____
- Ice Storm

New Area of Focus: Light and Temperature

Light: An energy _____.

Black absorbs _____ colors of the spectrum while white _____.

Albedo: The _____ of a surface.



Dark colored materials _____ up quicker than _____ colored materials. Air above dark colored surfaces heats up quicker.

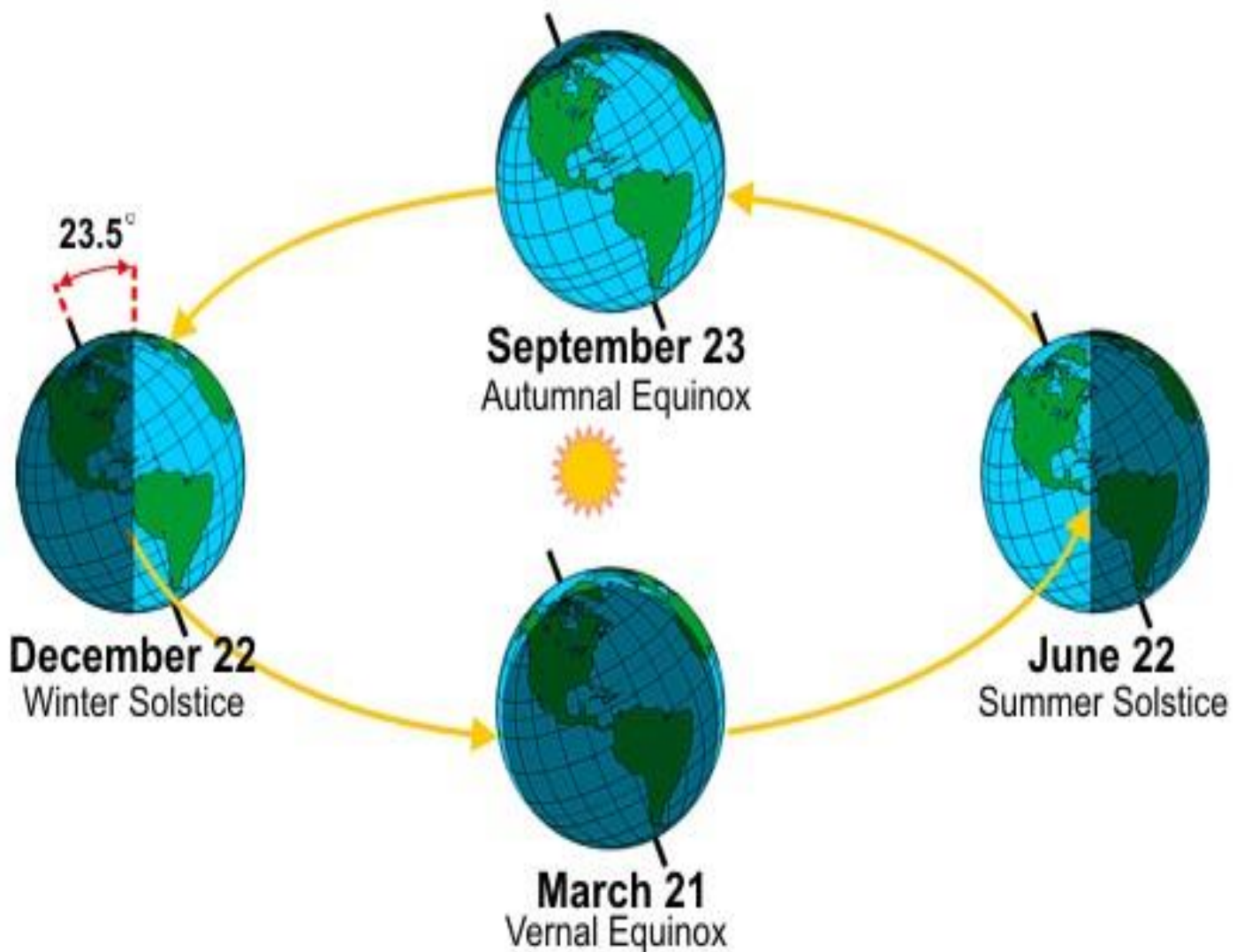
Temperature: A measure of the average kinetic energy (_____) of individual molecules in matter.

- 100 degrees Celsius = Water _____
- 0 degrees Celsius = Water _____

Thermometer: A measure of the heat from _____ and _____ liquids or coils.

WHAT CAUSES THE SEASONS?

- The tilt of the earth's axis _____ degrees
 - Summer = Northern Hemisphere is _____ into more direct light.
 - Winter = Northern Hemisphere tilts away from the _____ light.



Different parts of the world have _____ at different months of the year.

Part III: Earth the water planet

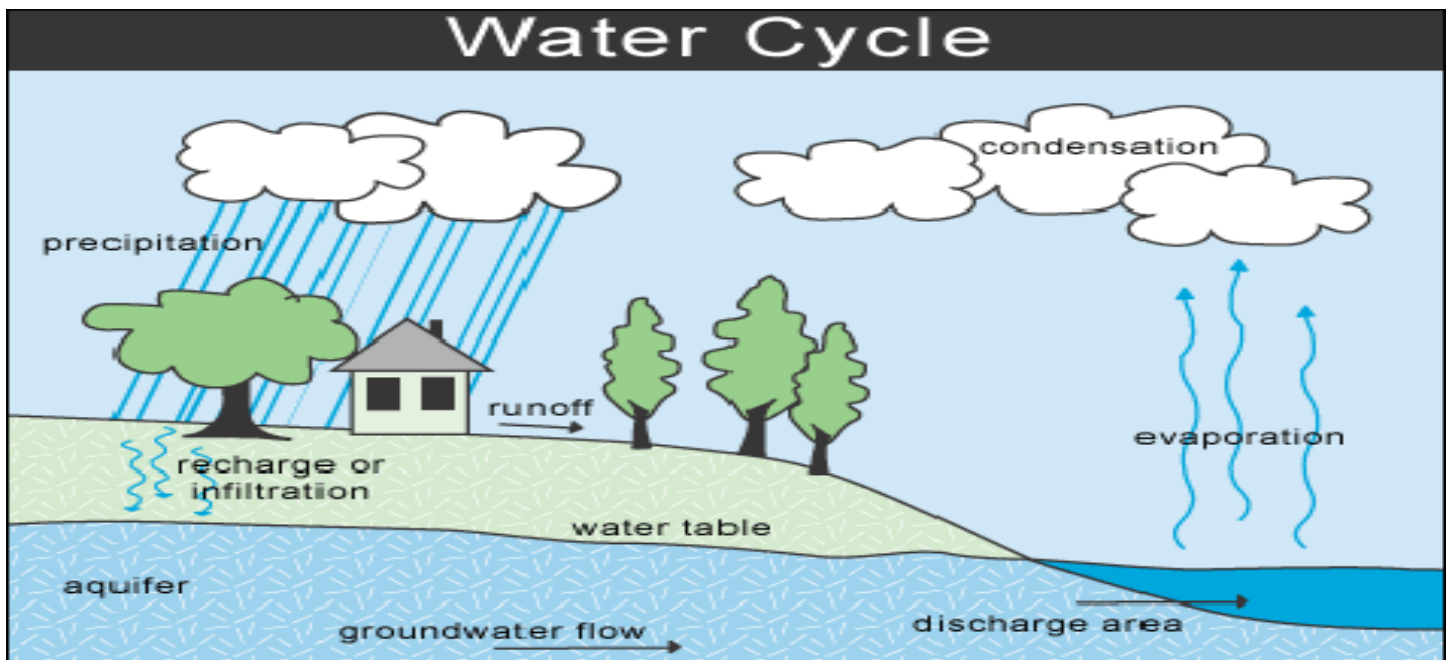
- High Specific Heat: Hydrogen bonds absorb _____ when they break, and release _____ when they form.

The Oceans

- Heat and _____ the earth.
- The oceans influence _____ by absorbing solar radiation and slowly releasing _____ needed to drive the atmospheric circulation. (High Specific Heat).
- Warm seas and _____ are moved to the icy poles
- H_____ and dry the planet.
- Control the wind _____ and direction.
- Part of the _____ and carbon cycle
- Phytoplankton in ocean produces half the _____
- Releases aerosols (small particles) that influence _____ cover, fall as rain, and absorbing carbon.
- El Nino: A _____ of the surface water of the eastern and central _____ Ocean, occurring every 4 to 12 years and causing unusual global weather patterns.
 - Generally occurs in _____.

- Winds get weaker, thus ocean gets _____.
- Thunderstorms that normally occur on the equator move _____.
- Southwest U.S. gets more _____, Australia and Indonesia gets less (maybe).
- La Nina: Unusually _____ temperatures in Pacific. Brings the opposite of El Nino.

The hydrologic cycle: The continuous movement of _____ on, above, and _____ the surface of the Earth.



Evaporation – Substance changes from a _____ state to a _____ state (requires energy).

Condensation – Water vapor (gas) turns back to a _____ . (energy required / cold) -cloud formation.

Precipitation – Water that is so heavy it _____ as liquid / solid.

Sublimation – Solid state turns directly to a _____ state skipping liquid phase.

Evapotranspiration – Water released by _____ into air.

- Non-living to the _____, and back again.

Surface run-off: The water _____ which occurs when soil is full to capacity and excess water travels over the land.

Percolation: The slow movement of water through the _____.

G_____ discharge: Water that has been underground seeps back into the oceans, or into rivers or lakes.

Humidity: Wetness in the a _____

Evaporation: Water turns from liquid to _____

Condensation: Water turns from _____ to liquid

Dew: moisture _____ from the atmosphere, esp. at night, and deposited in the form of small drops upon any cool surface.

Dew Point: The _____ to which air must be cooled for saturation to occur.

Sling psychrometer: Device used to measure _____.

Cloud: A visible body of very fine water _____ or ice particles suspended in the atmosphere at different a _____.

Clouds

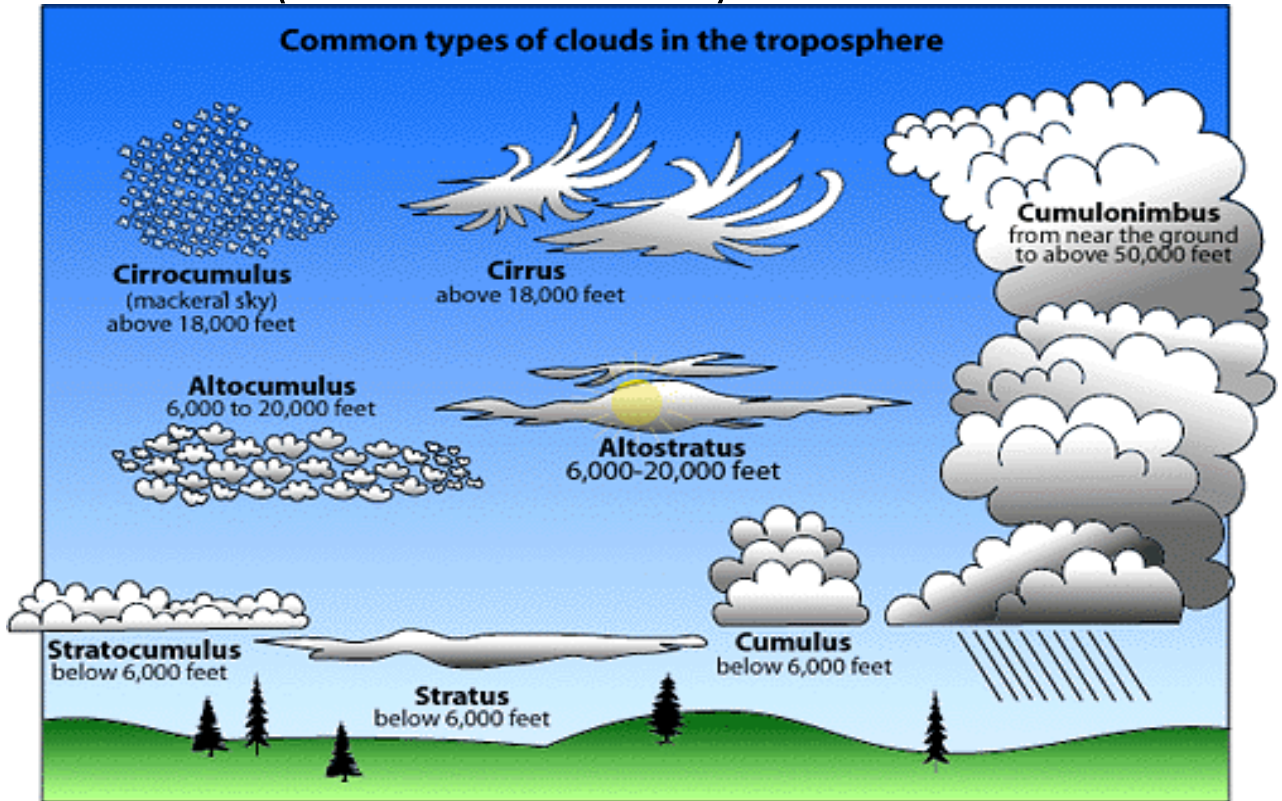
- W _____ molecules attach to a condensation nuclei.

Fog: A _____ bank that is in contact with the ground.

In really dry places, morning fog can be collected. Desert animals take advantage of dew.

- The three main types are
 - - Cirrus (W _____)
 - - Cumulus (P _____)

- - Stratus (L_____)



● Cumulonimbus

- Very _____
- Dense, heavy, dark massive _____
- hard showers, explosive top, great vertical development

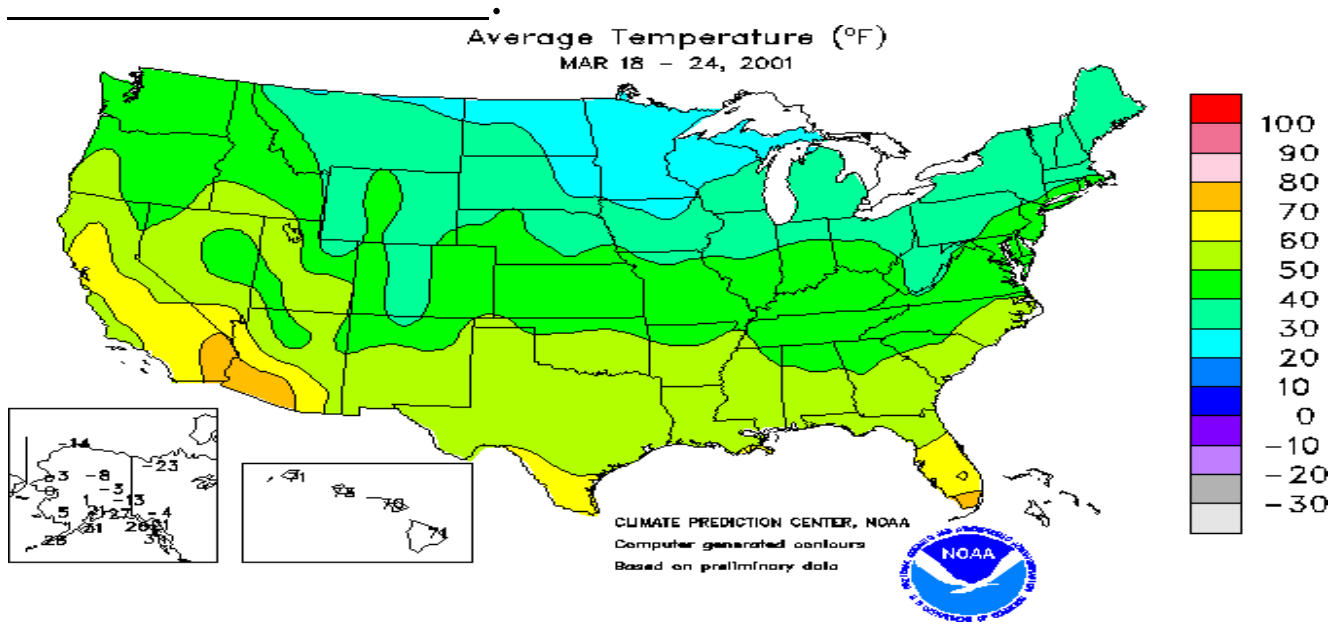
Meteorology: The study of _____ that focuses on weather process and _____.

● Most common weather tools

- - T _____
- - Wind Vane – Wind direction
- - Anem _____ – Wind speed
- - Barometer – Measures air pressure

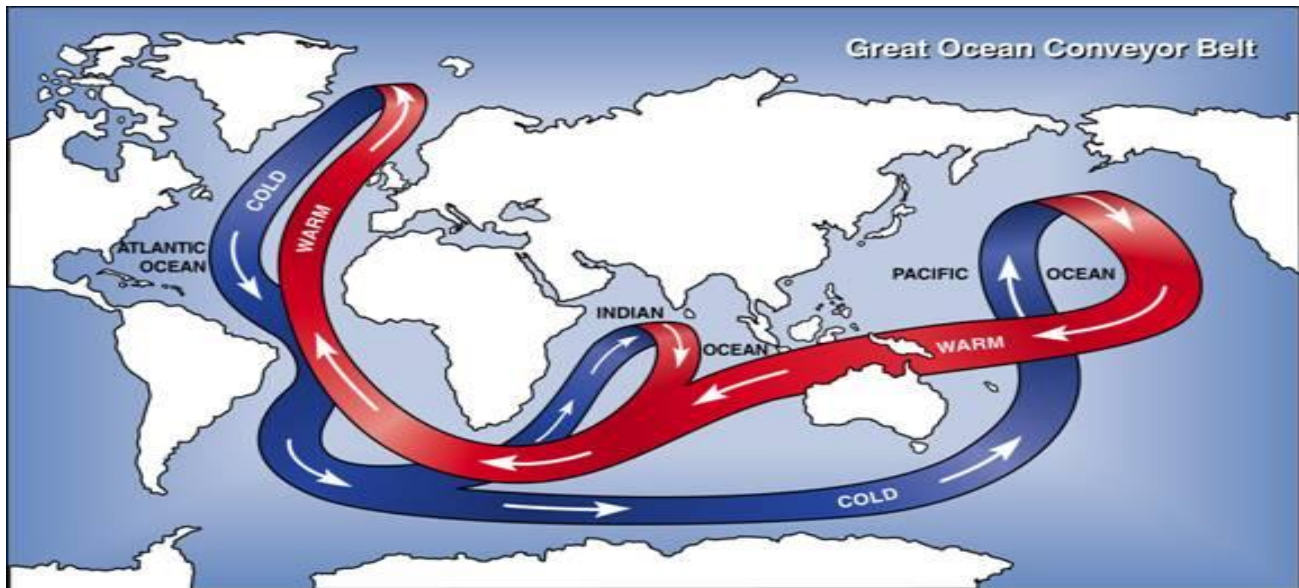
- - Rain _____: Measures rainfall.
- - Snow / rain equivalent = One inch of rain is about 10 inches of snow and vice versa.
- - S _____: Provide larger view of weather.

Isotherm- A line drawn on a weather map or chart linking all points of equal or constant



Ocean c_____ from tropics keep Arctic from growing too large.

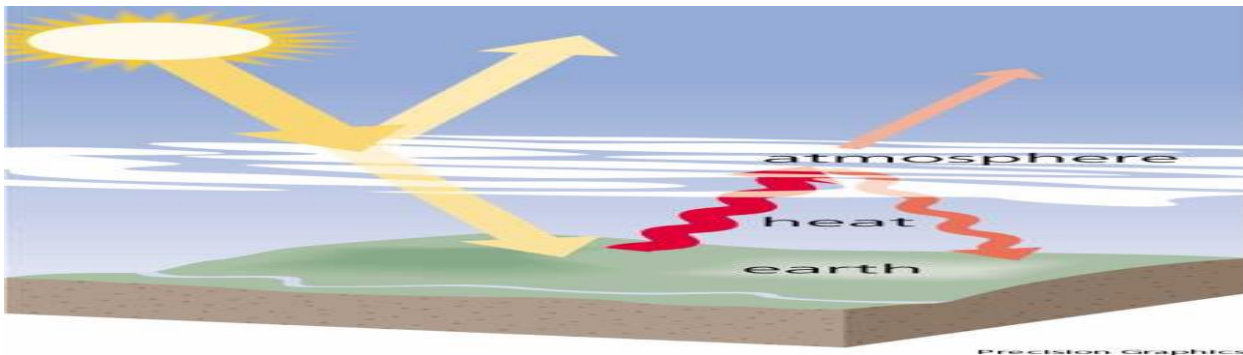
Ocean currents from _____ keep tropics from becoming too warm.



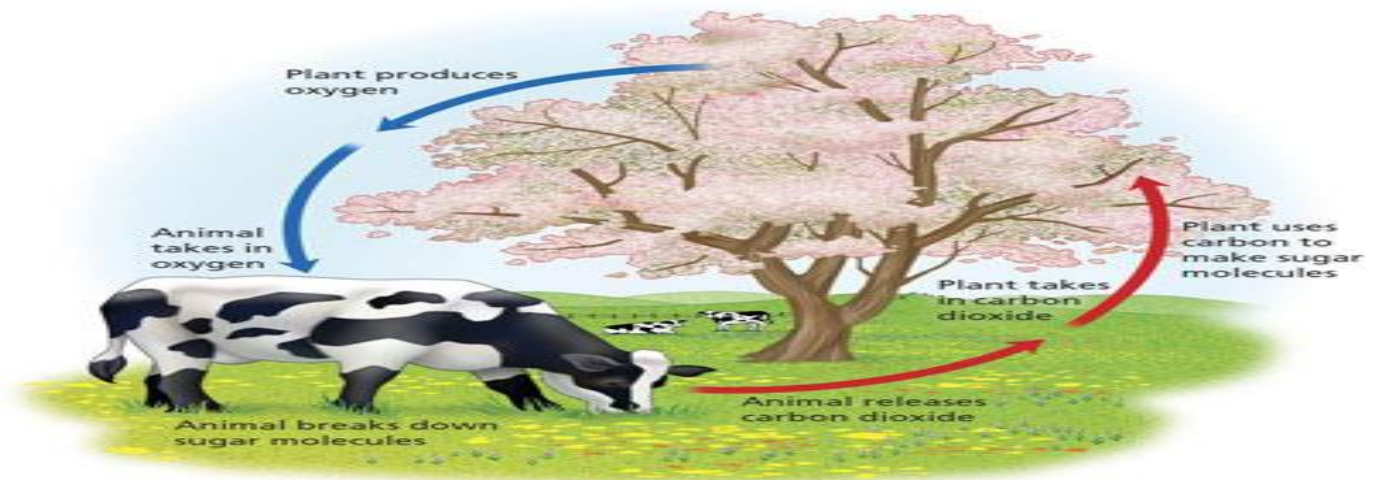
NEW AREA OF FOCUS:
ENHANCED GLOBAL WARMING / Climate Change

Specifically: Enhanced global warming or
Anthropogenic G_____ Warming.

- Global Climate Change: The gradual _____ of the Earth caused by the greenhouse effect.
 - The result of _____-made emissions of greenhouse gases such as carbon _____.
- Greenhouse Effect: _____ of Earth's heat at or near the surface



The natural _____ oxygen balance on our planet.



These _____ fuels when burned release carbon dioxide that has been locked away under the Earth for _____ of years into the system.

Increases in carbon dioxide levels in the atmosphere traps in more of the Earth's radiant _____ causing planet to warm.

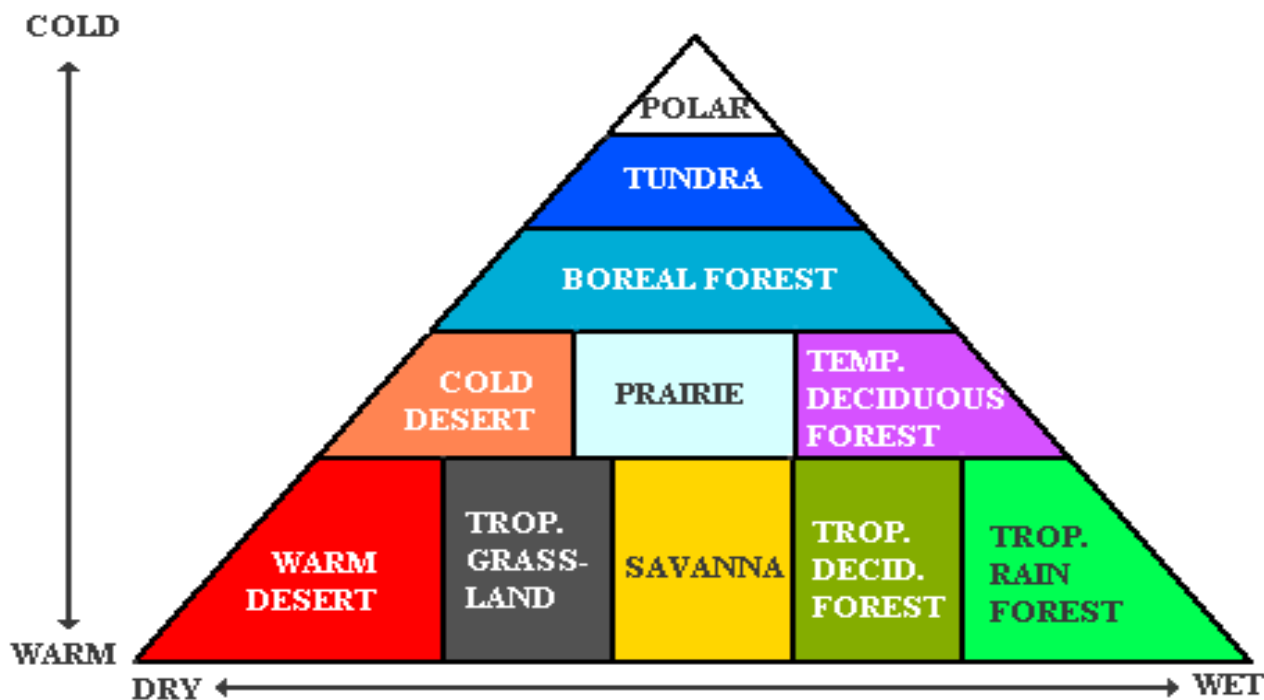
- The Effects of global warming – The big 6
 - - Spread of _____
 - - More _____ (warmer water)
 - - Long _____ and intense heat waves

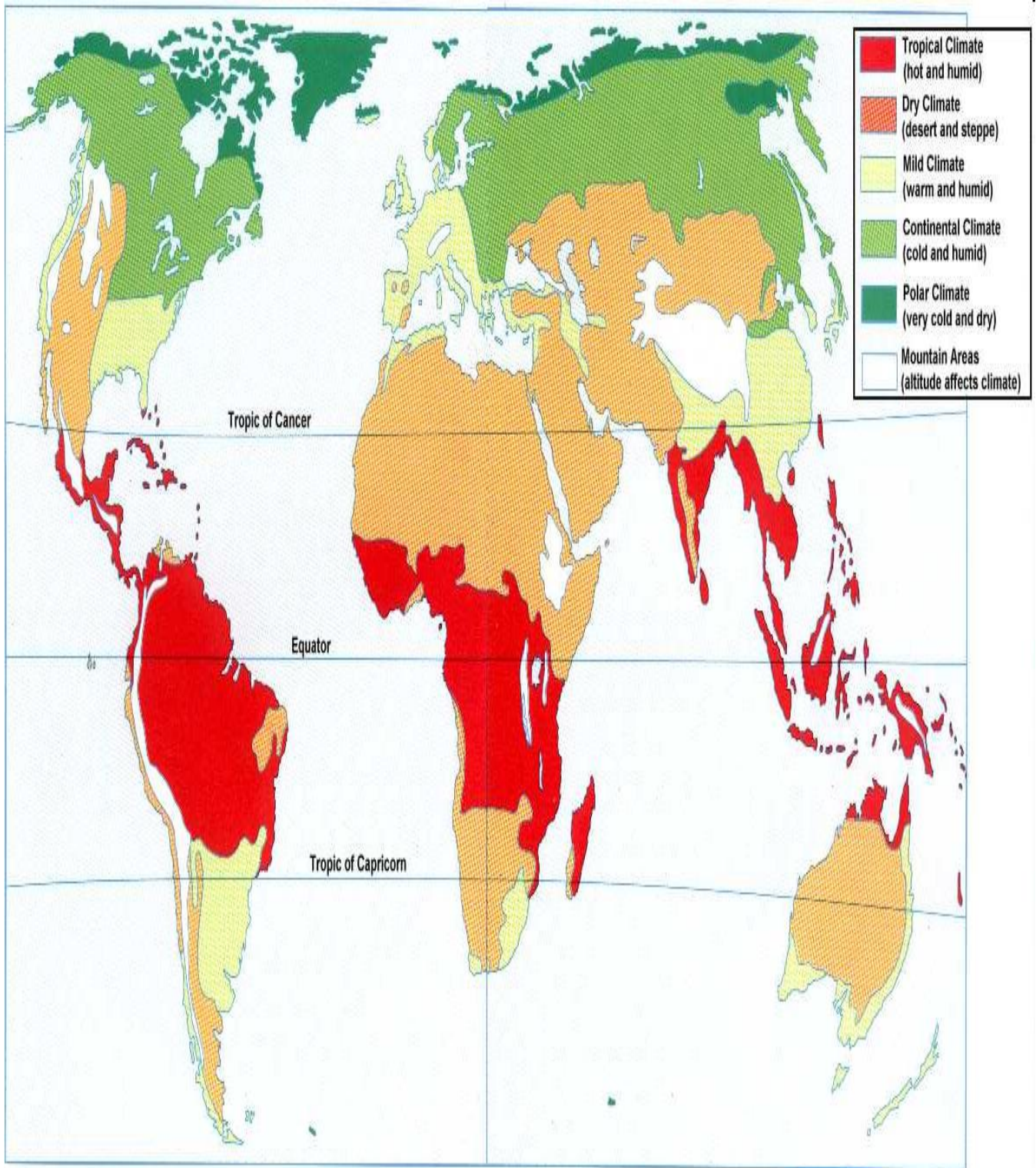
- - Rapid _____ Changes
- - Economic consequences
- - Polar Ice Caps _____ and Sea Level Rise
- - Arctic species will lose habitat / become _____.

NEW AREA OF FOCUS: BIOMES

A biome is a large, distinctive complex of _____ communities created and maintained by _____.

Rainfall and _____ determine the type of biome.





Marine Biome: Covers _____ of globe, oceans, coral reefs, estuaries.

SAVE THIS FOR THE UNIT ASSESSMENT

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