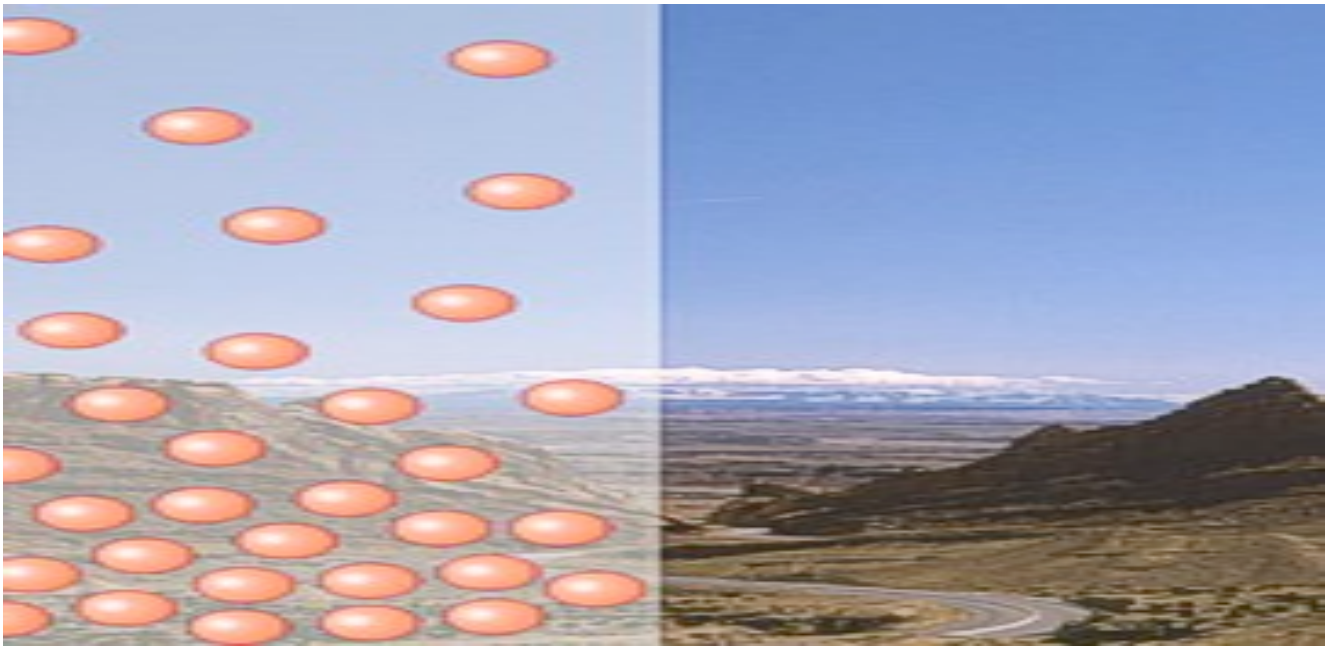
Weather and Climate Unit Notes

Name:_____

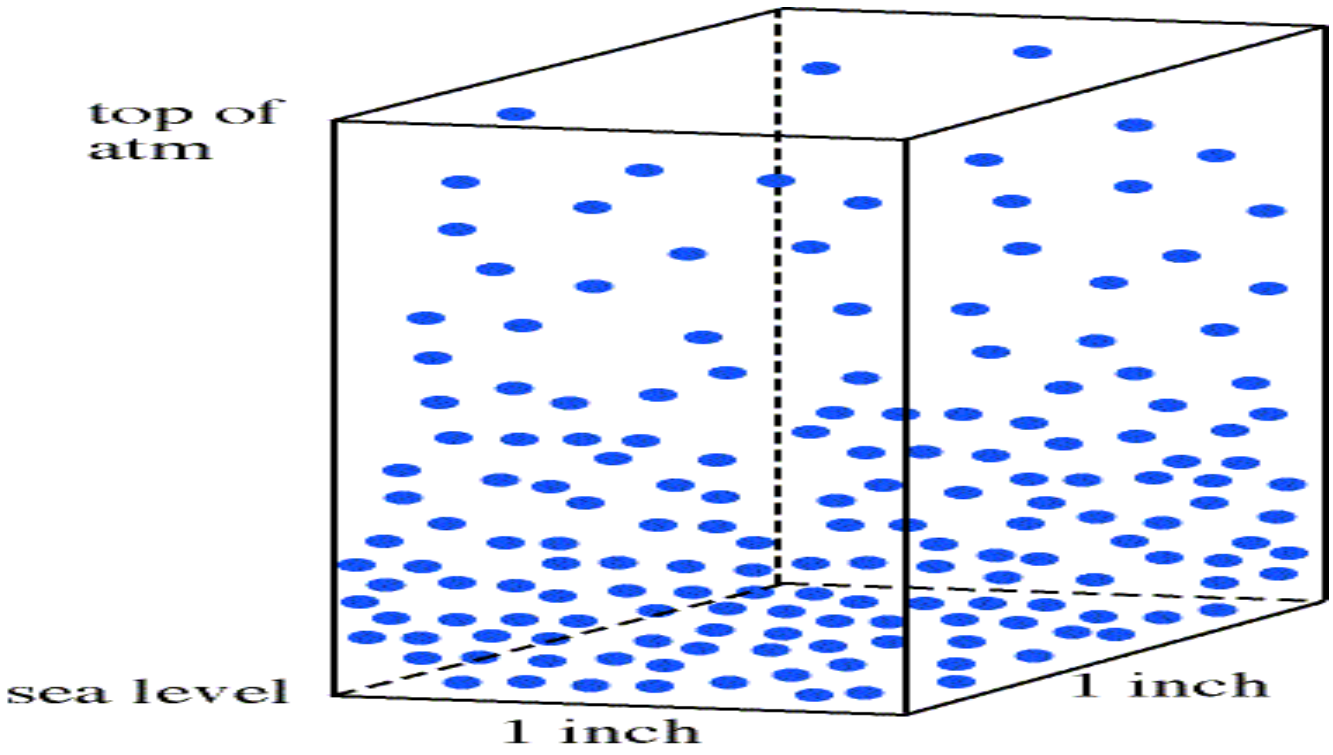
(DO NOT LO

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

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

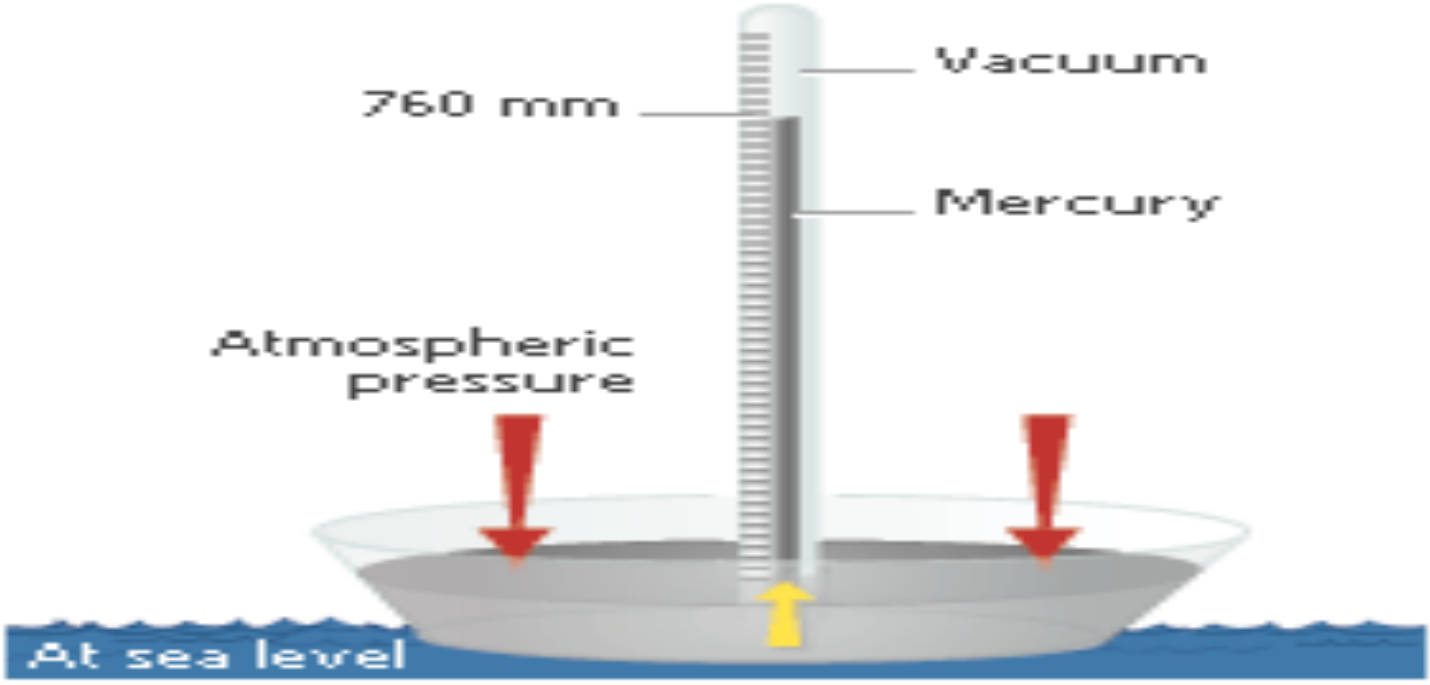


As elevation_____, air pressure_____.



As you increase in elevation, pressure decreases. Inverse relationship

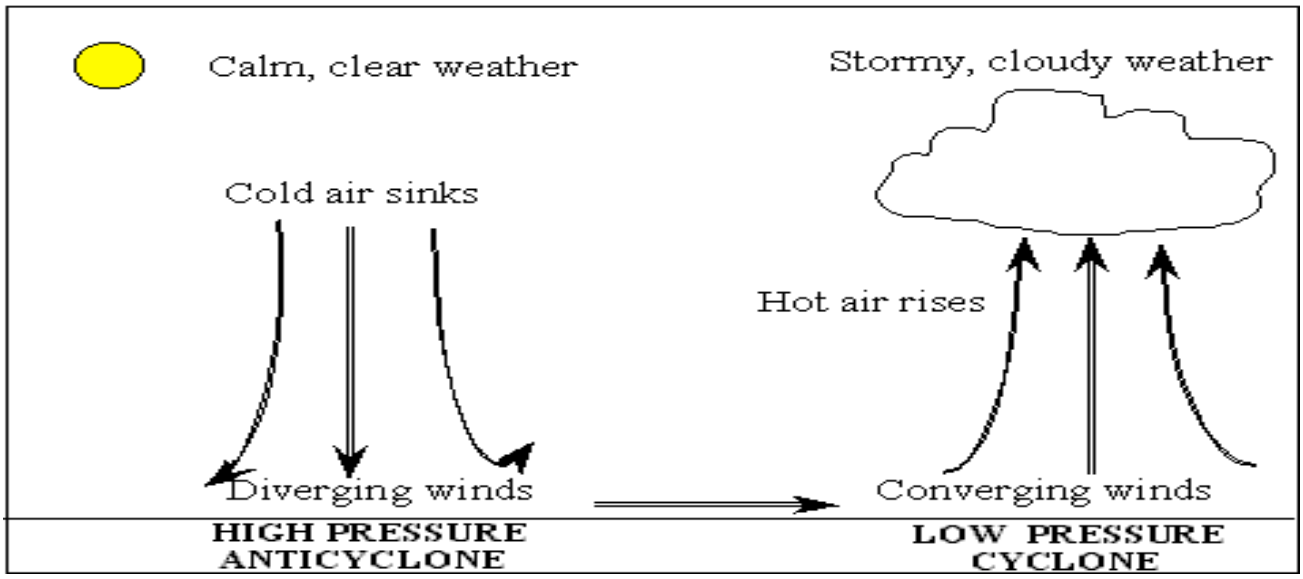
Barometer – Instrument that measures _____.



_____ drives the wind and creates the weather.

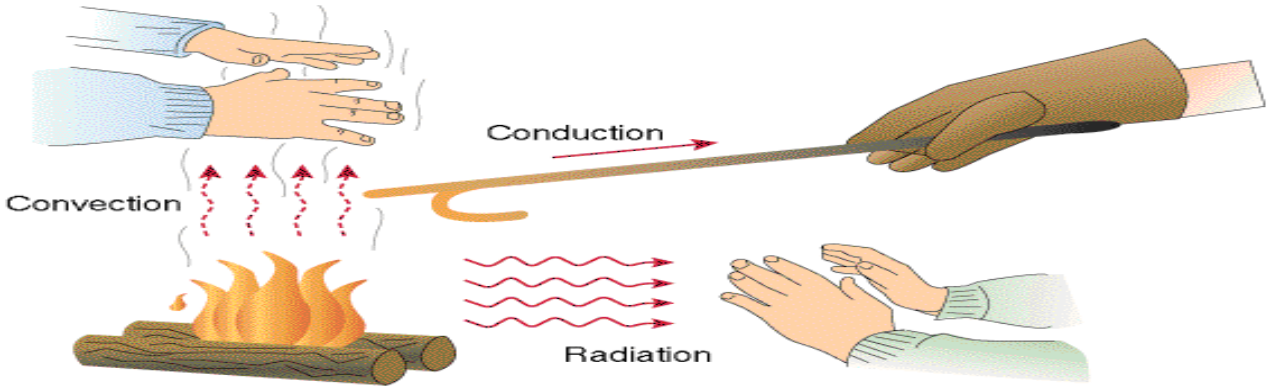
Warm air _____, cool air_____.

Warm is _____pressure, Cold is _____Pressure.



- **Most importantly, wind travels from areas of _____pressure to areas of _____pressure!**

Pictures for heat transfer



_____: Vertical circulation in which warm rises and cool sinks.

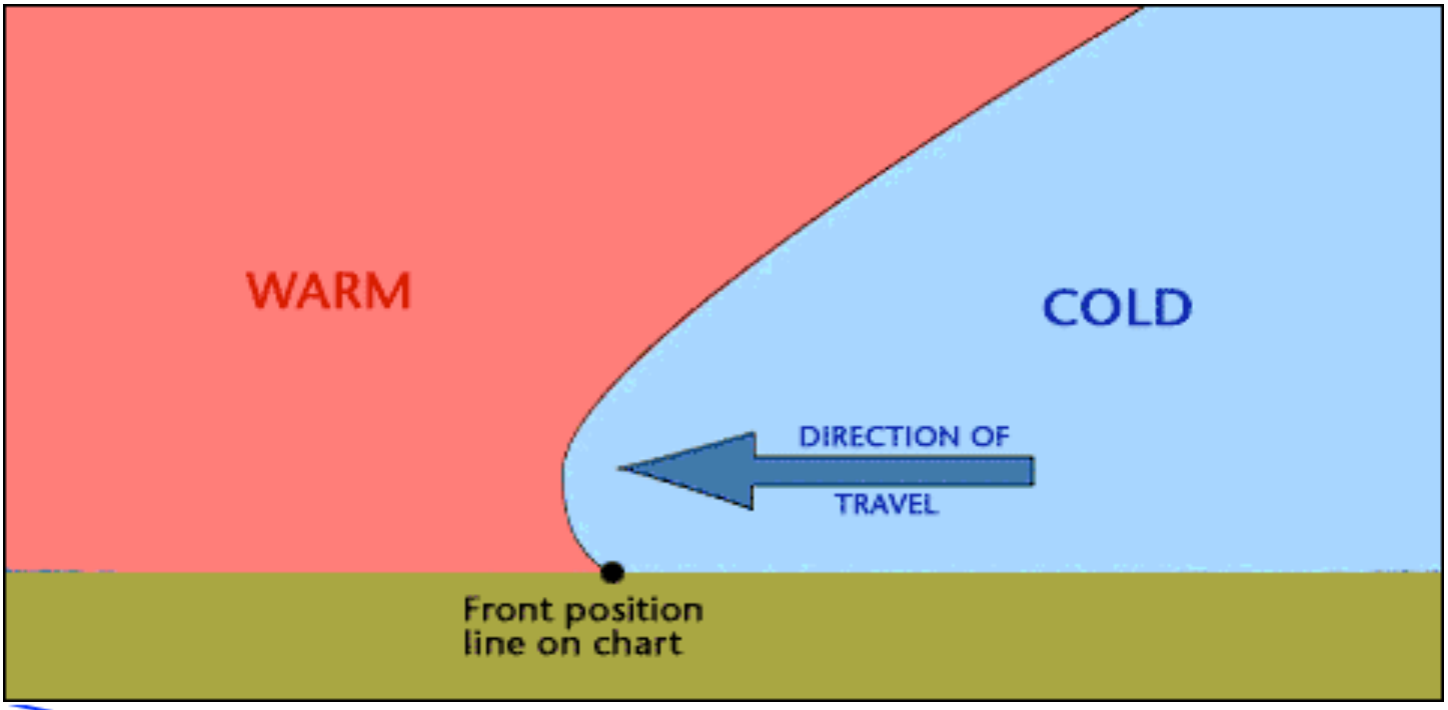
--Flow of heat by this circulation.

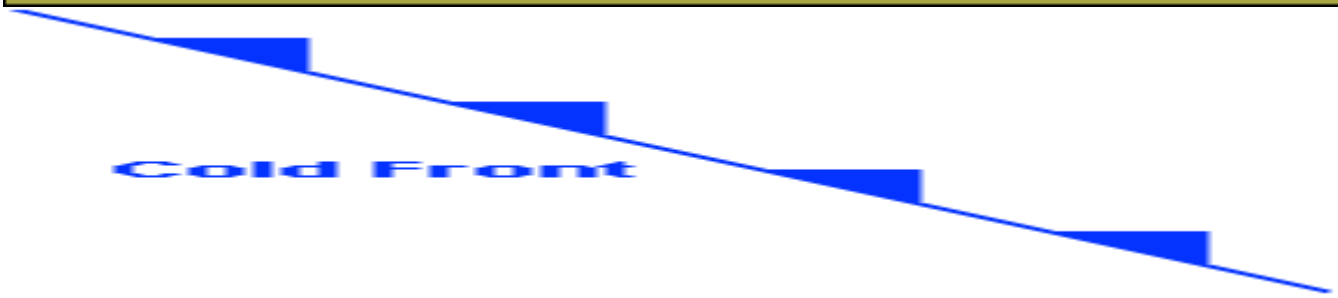
_____: The movement of heat from one molecule to another.

_____: Energy that is radiated or transmitted in the form of rays or waves or

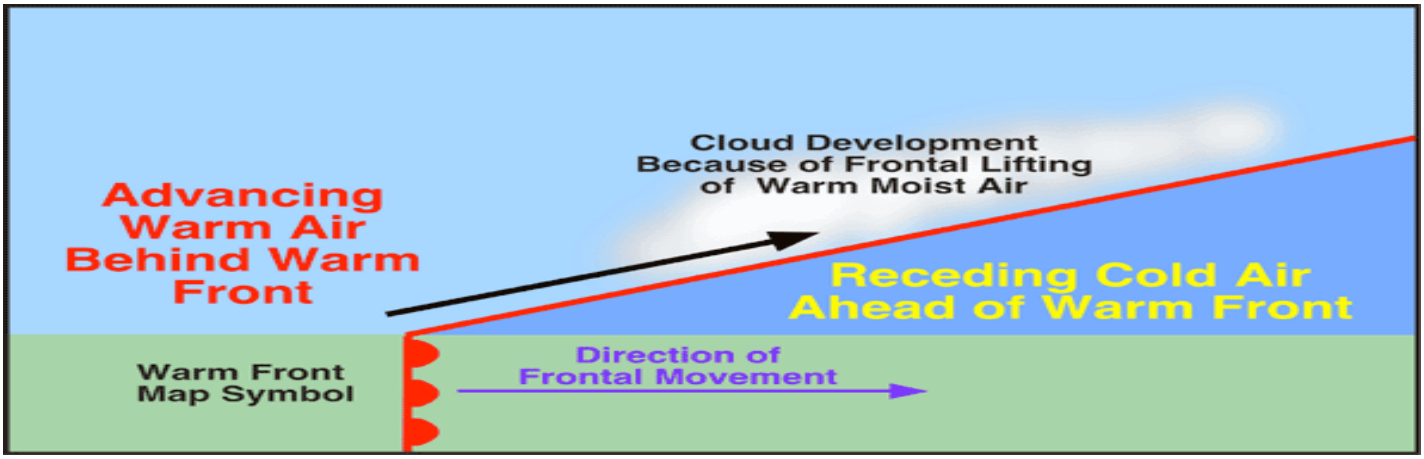
Warm Fronts and Cold Fronts, caused by_____.

_____Front: Form where cold air moves towards warm air. Creates rain storms.

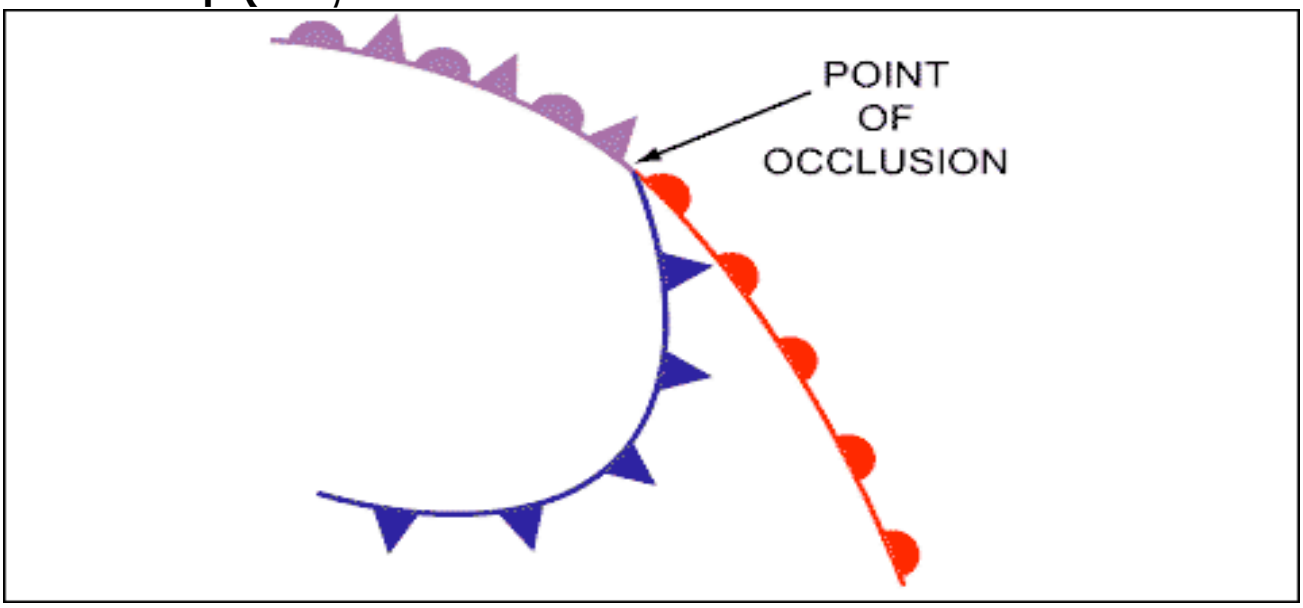




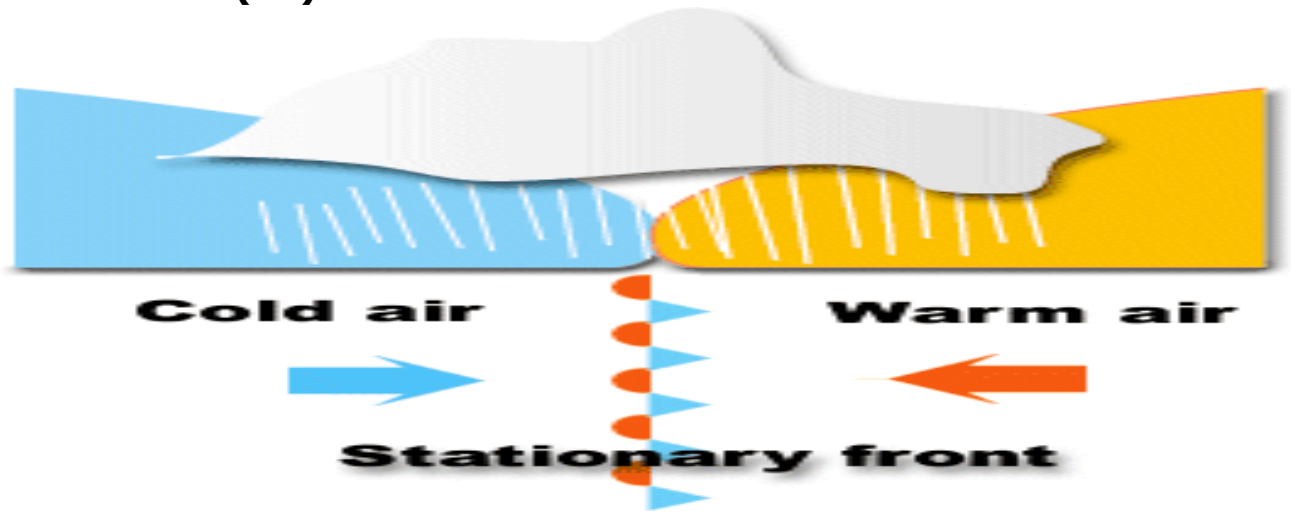
_____Front: Form where warm air moves towards cold air.



_____front: When a cold overtakes a warm and forces it up (Mix)



_____Front: When cold and warm cannot overtake each other (tie)

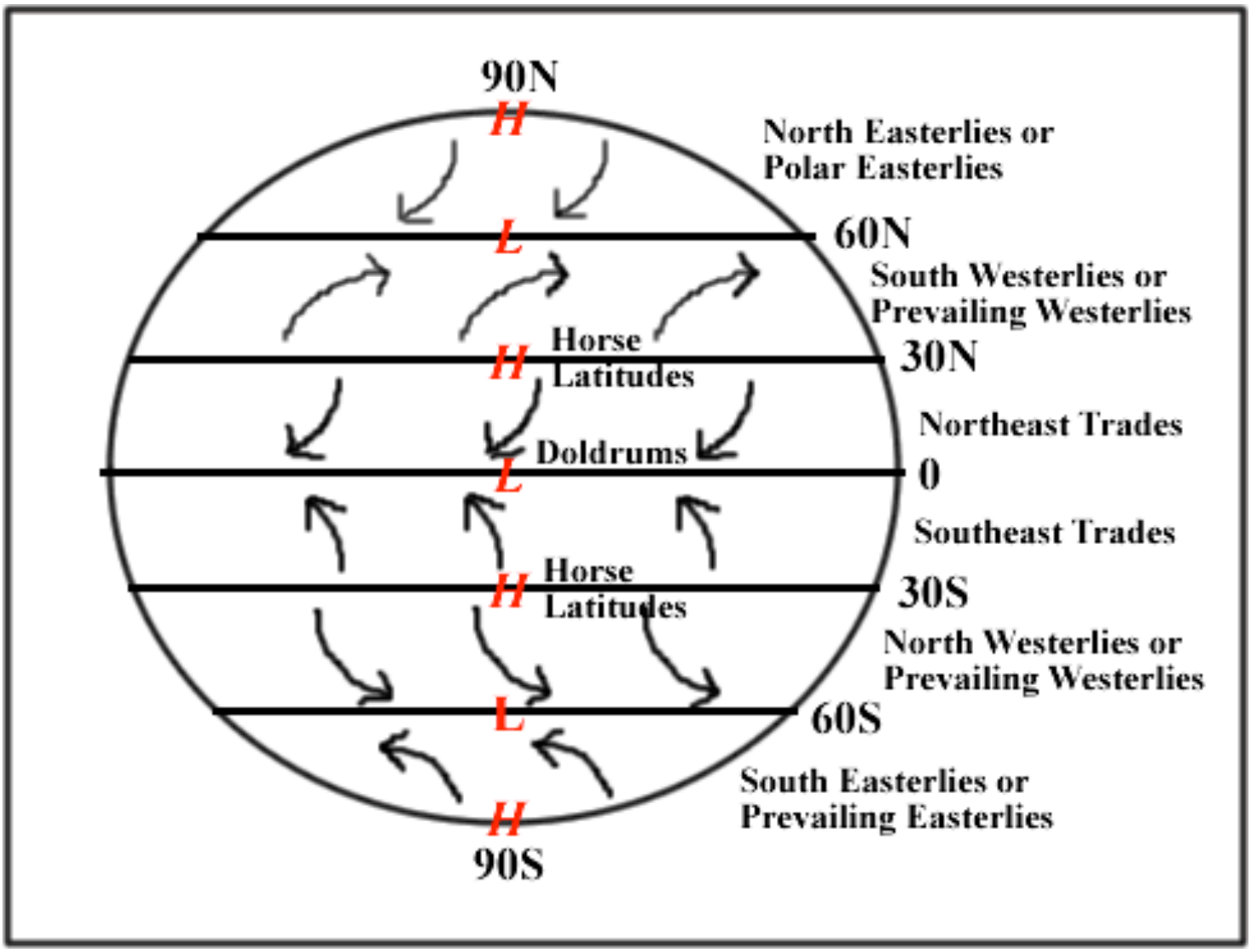


Wind

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

Global Winds

- **- Doldrums**
- **- Horse latitudes**
- **- _____**
- **- Prevailing Westerlies**
- **- Polar Easterlies**

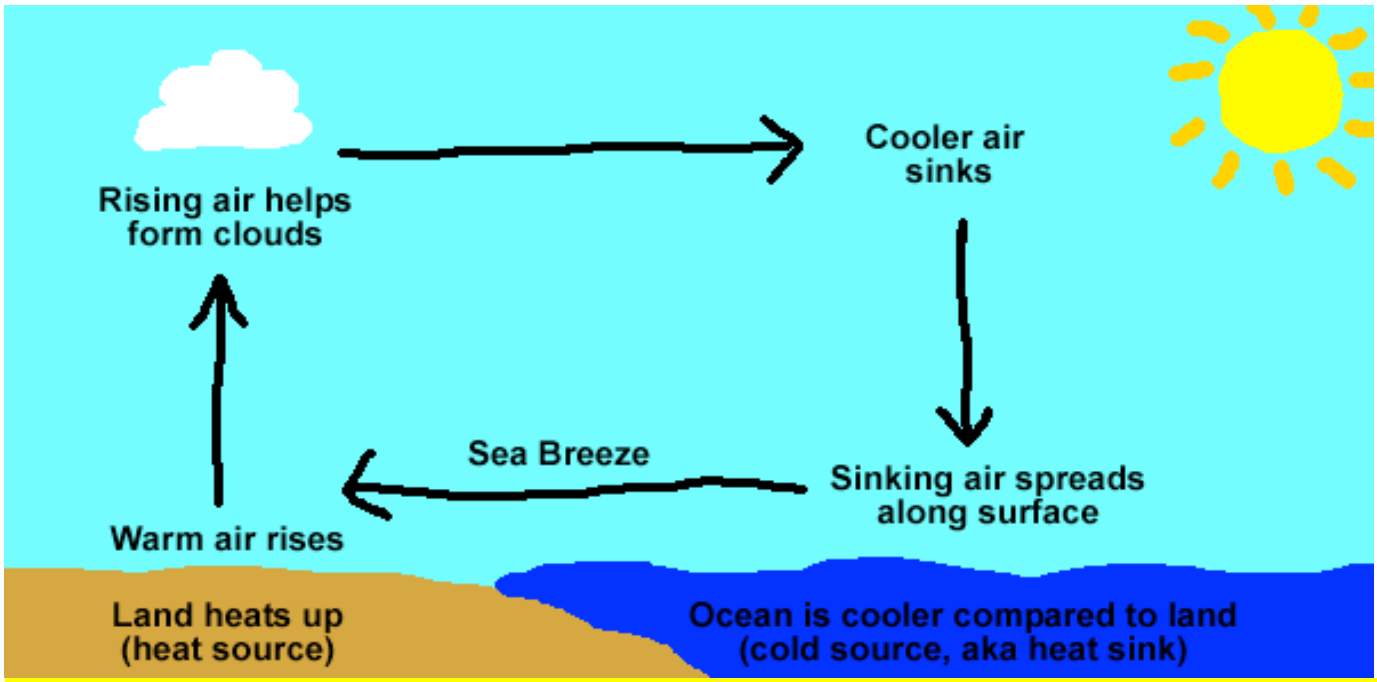


The rotation of the Earth (which causes the Coriolis force).

- **Coriolis Force – Rotating body deflects.**

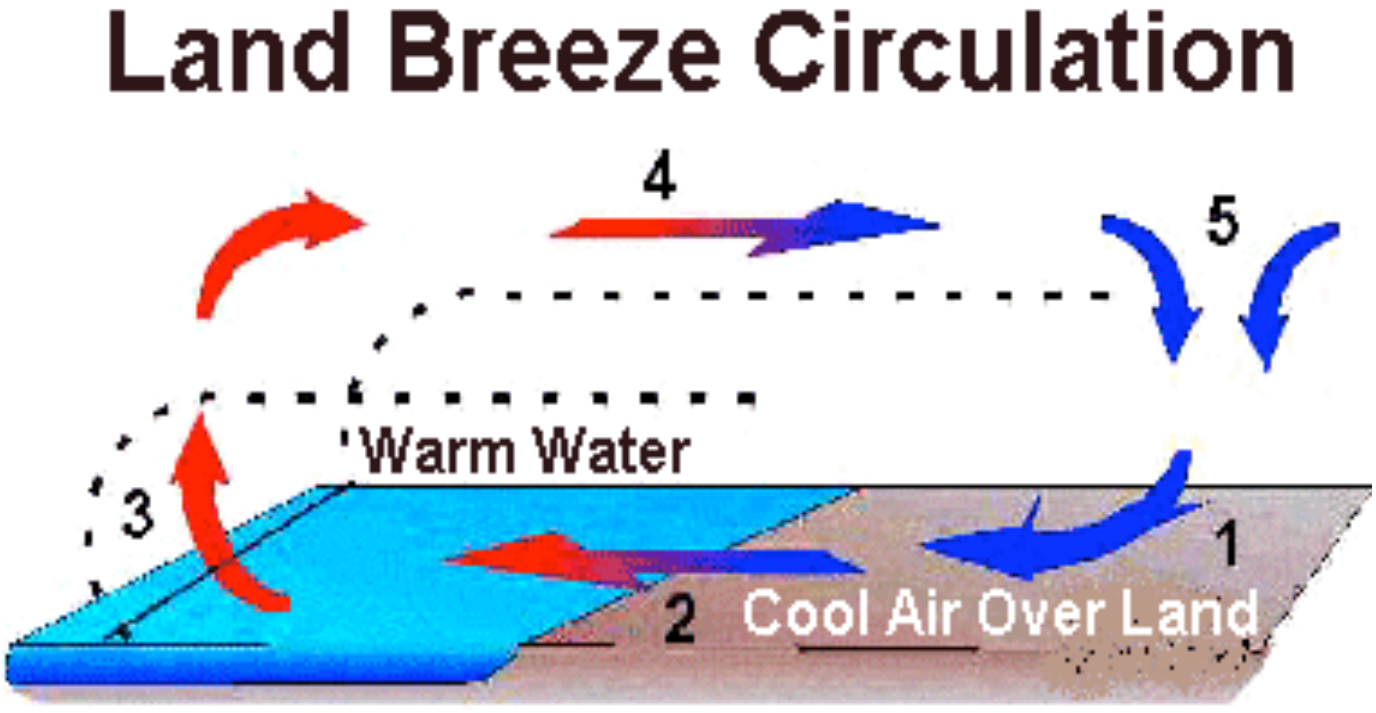
The _____ Stream: Any of the high-speed, high-altitude air currents that circle the Earth in a westerly direction.

_____Breeze (Day)- The breeze that blows from the sea toward the land during the day,

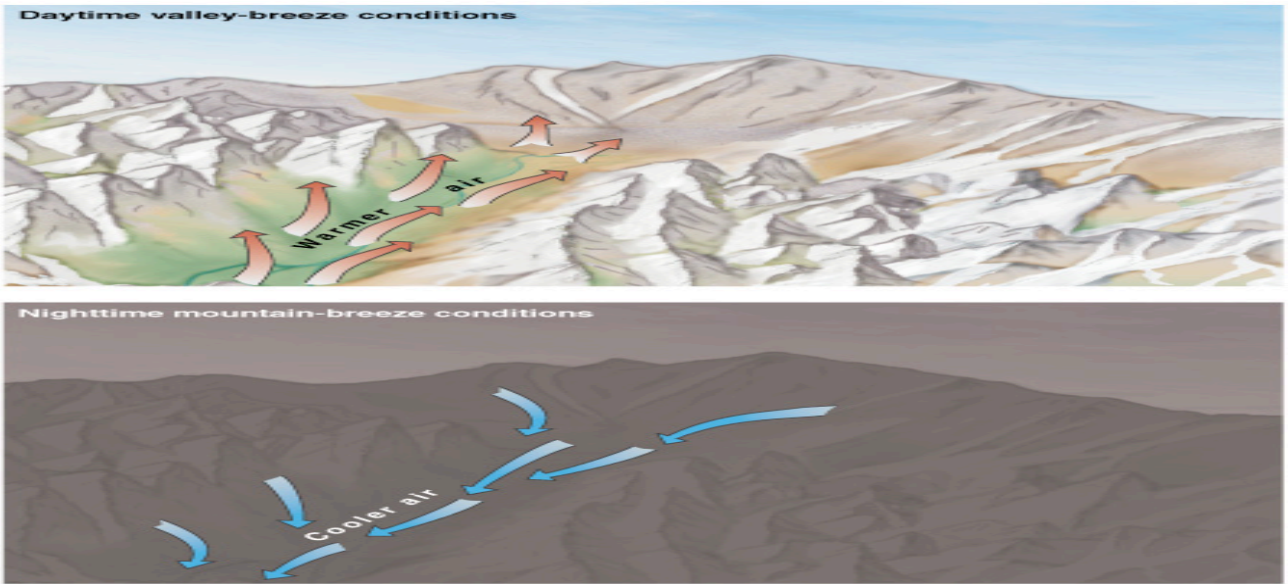


Caused by air rising over the warmer land (day) and is replaced by cooler air from above the sea.

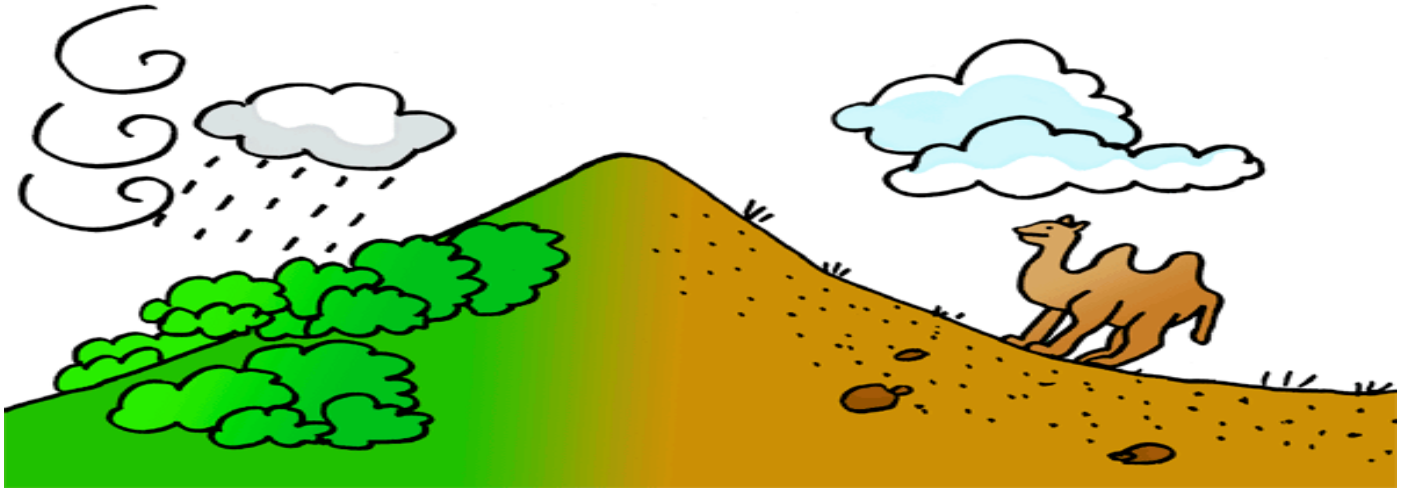
_____Breeze (Night): The breeze that blows from the land toward the sea.



_____Winds: Mountains can create strong winds. Warm air rises up Mtn. (day), Cool air sink down Mtn. (Night)



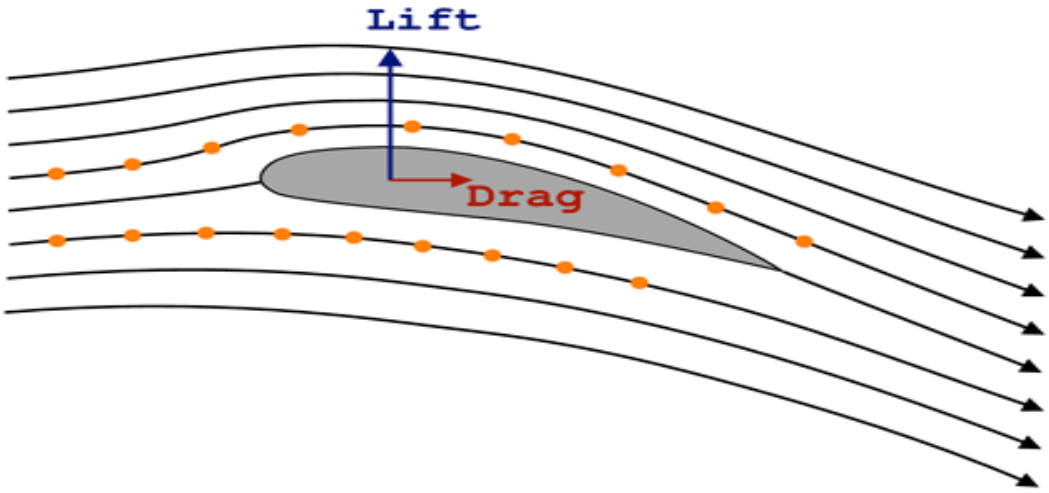
Mountain Rain Shadow Effect:



_____Chill - The cooling effect of wind and temperature combined. The higher the wind, the cooler it gets.

Flight.

- Simple combination of Bernoulli's Principle and Newtons 1st law of motion.
- Air flows faster over the top of the wing than the bottom making less pressure, higher pressure underneath pushes the wing up.



Dangerous Weather Systems

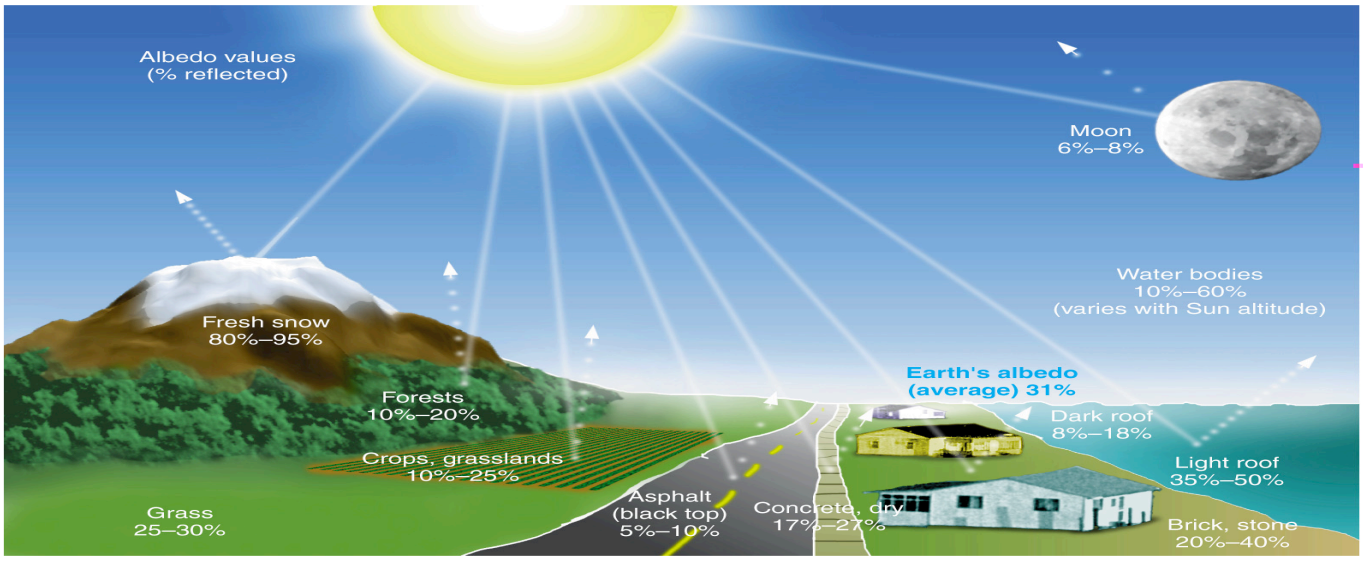
_____: Rapid changes in air pressure cause a disturbance.

- **Hurricanes**
- **Tornados**
- **Blizzard**
- **Microburst**
- **Thunderstorm**
- **Ice Storm**

New Area of Focus: Light and Temperature

Light: An energy wave.
Black absorbs all colors of the spectrum while white reflects.

Albedo: The reflectiveness of a surface.



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

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

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

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

WHAT CAUSES THE SEAONS?

- The tilt of the earth's axis 23.5 degrees
    - Summer = Northern Hemisphere is tilted into more direct light.

- Winter = Northern Hemisphere tilts away from the direct light.

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

Part III: Earth the water planet

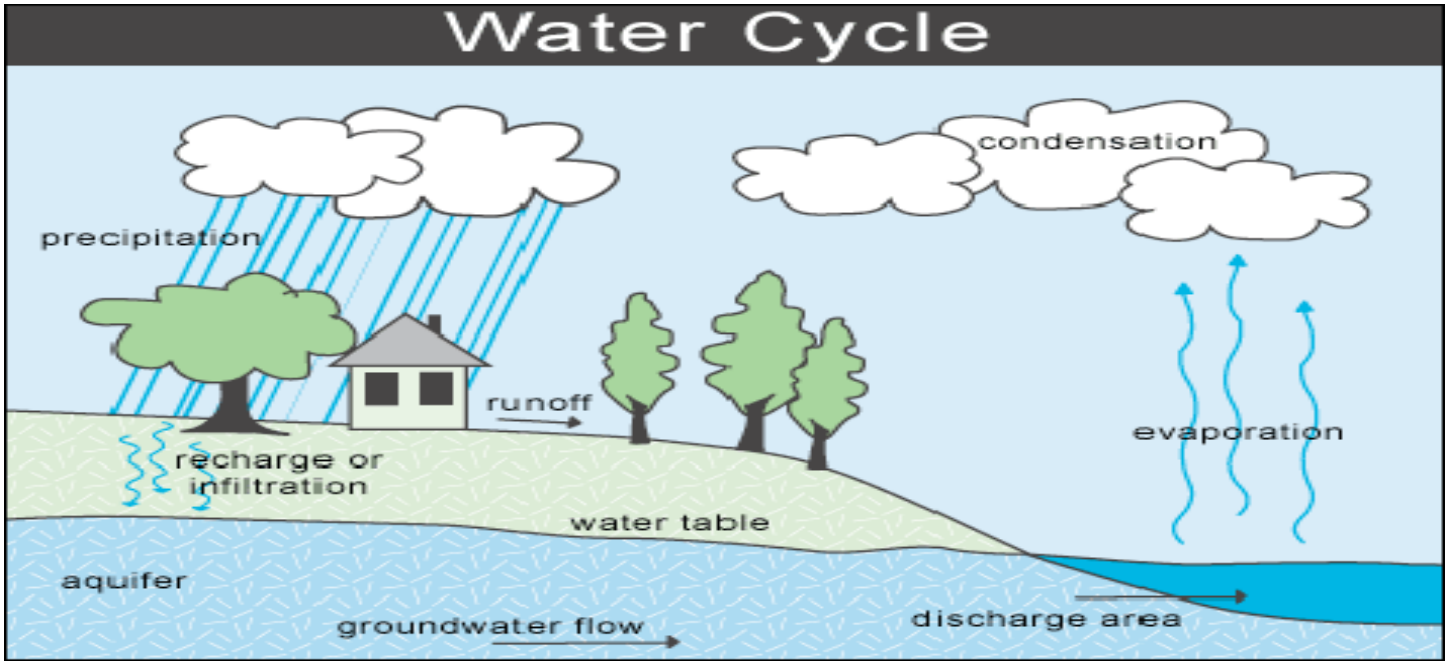
- High Specific Heat: Hydrogen bonds absorb heat when they break, and release heat when they form.

The Oceans
-Heat and cool the earth.
-The oceans influence climate by absorbing solar radiation and slowly releasing heat needed to drive the atmospheric circulation. (High Specific Heat).
-Warm seas and wind are moved to the icy poles
-Humidify and dry the planet.
-Control the wind speed and direction.
-Part of the water and carbon cycle
-Phytoplankton in ocean produces half the oxygen

-Releases aerosols (small particles) that influence cloud cover, fall as rain, and absorbing carbon.

- _____: **A warming of the surface water of the eastern and central Pacific Ocean**, occurring every 4 to 12 years and causing unusual global weather patterns.
  - Generally occurs in winter.
  - Winds get weaker, thus ocean gets warmer.
  - Thunderstorms that normally occur on the equator move eastward.
    - Southwest U.S. gets more water, Australia and Indonesia gets less (maybe).
- _____ : **Unusually cold temperatures in Pacific**. Brings the opposite of El Nino.

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



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

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

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

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

Evapotranspiration – Water released by plants into air.

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

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

Percolation: The slow movement of water through the soil.

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

_____: **Wetness in the atmosphere**
Evaporation: Water turns from liquid to gas.

Condensation: Water turns from gas to liquid

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

_____: **The temperature to which air must be cooled for saturation to occur**.

Sling psychrometer: Device used to measure humidity.

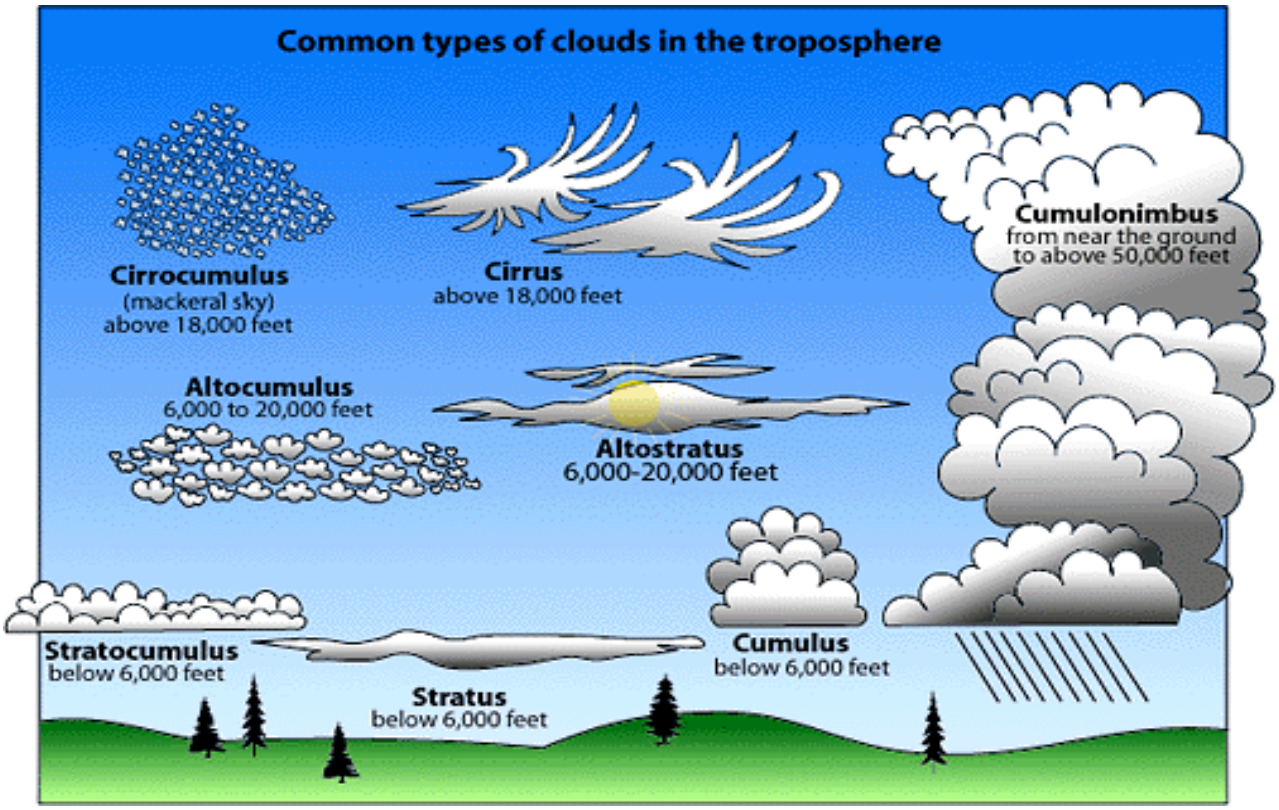
_____: **A visible body of very fine water droplets or ice particles suspended in the atmosphere at different altitudes.**

Clouds

- Water molecules attach to a condensation nuclei.

Fog: A cloud 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
  - _____(Wispy)
  - _____ (Puffy)
  - _____(Layered)



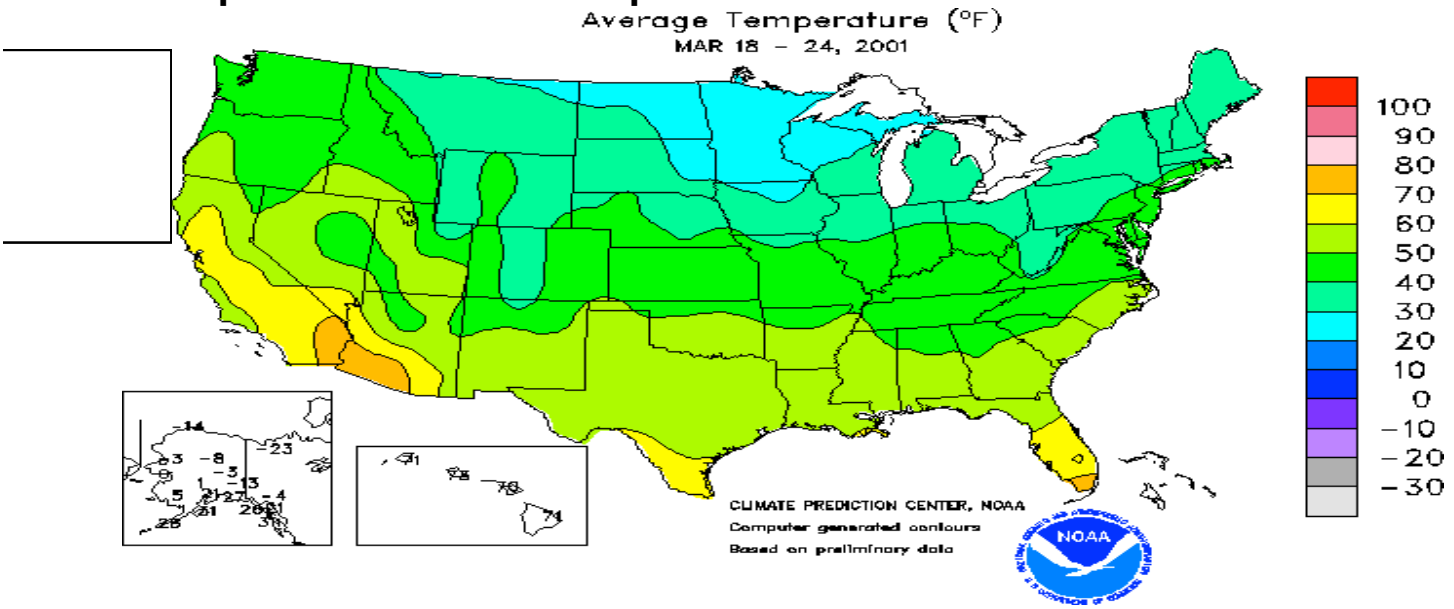
- _____
  - Very tall
  - Dense, heavy, dark massive thunderstorms
  - hard showers, explosive top, great vertical development

_____The study of atmosphere that focuses on weather process and forecasting.

- **Most common weather tools**
  - **- Thermometer**
  - **-_____ – Wind direction**
  - **- _____– Wind speed**
  - **- _____– Measures air pressure**
  - **- Rain Gauge: Measures rainfall.**

- **- Snow / rain equivalent = One inch of rain is about 10 inches of snow and vice versa.**
- **- Satellites: Provide larger view of weather.**

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



Ocean currents from tropics keep Arctic from growing too large.

Ocean currents from poles keep tropics from becoming to warm.