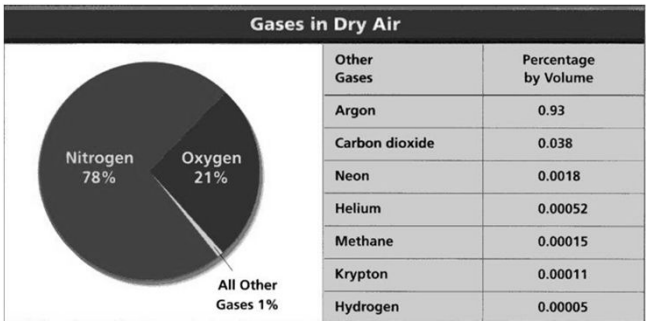
Earth Science

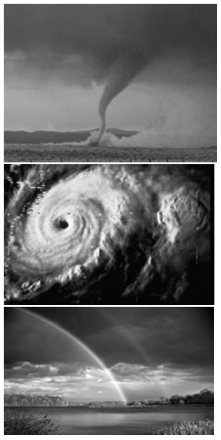
Chapter 7 Atmosphere

The Air Around You

- **Earth's atmosphere is the envelope of gases that surrounds the planet.**
  - **made up of nitrogen, oxygen, carbon dioxide, water vapor, and many other gases, as well as particles of liquids and solids**
- **Weather is the condition of Earth's atmosphere**

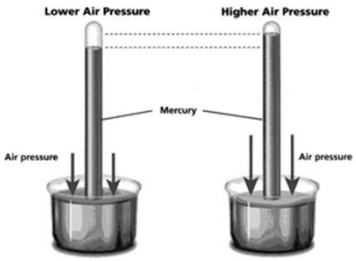


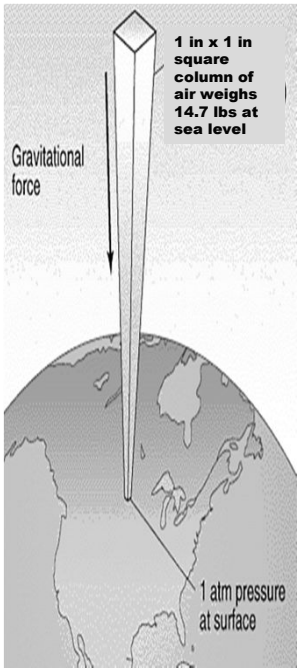
Other Gases	Percentage by Volume
Argon	0.93
Carbon dioxide	0.038
Neon	0.0018
Helium	0.00052
Methane	0.00015
Krypton	0.00011
Hydrogen	0.00005



Air Pressure

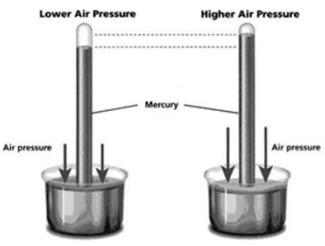
- **Air pressure is the result of the** weight of a column of air pushing down on an area.
  - 14.7 **lbs/inch²**
  - 1013.25 **millibars**
  - 1013.25 **hPa (hecto Pascals)**
  - 29.92 **inches of Hg**

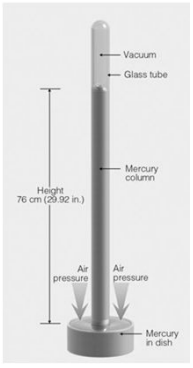




Measuring Air Pressure

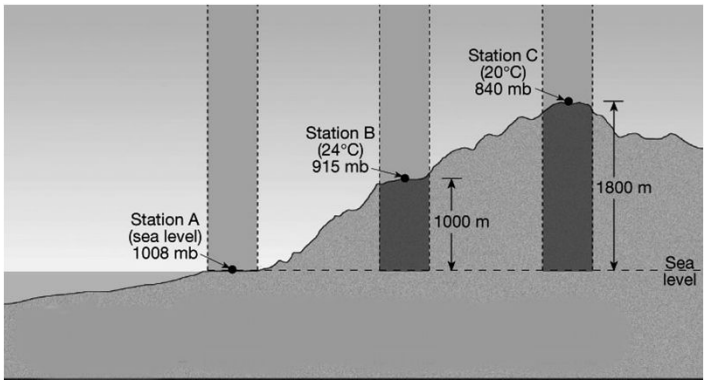
- **barometer** is an instrument that is used to measure air pressure.
  - **mercury barometer** consists of a glass tube open at the bottom end and partially filled with mercury
  - **aneroid barometer** has an airtight metal chamber





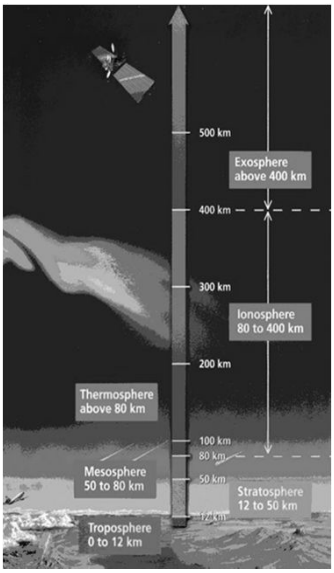
Air Pressure & Altitude

- Elevation – the distance above sea level.
- As altitude increases → Air pressure decreases
- As air pressure decreases, so does density.



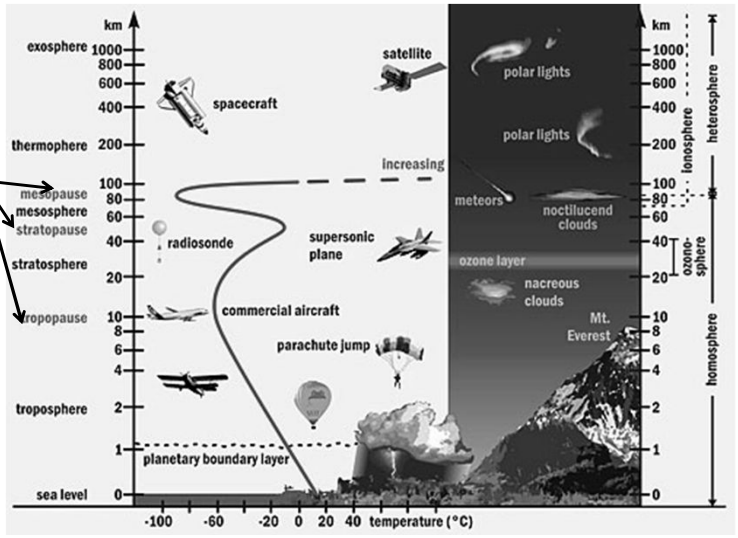
Layers of the Atmosphere

- **Scientists divide Earth's atmosphere into four main layers classified according to changes in temperature.**
  - **Troposphere – sea level to 12 km**
    - **All weather occurs here**
  - **Stratosphere – from 12 to 50 km**
    - **Ozone layer, protects from UV, jets fly here**
  - **Mesosphere – from 50 to 80 km**
    - **Dense enough to burn meteoroids**
  - **Thermosphere – above 80 km, made up of 2 layers**
    - **Ionosphere – 80 km to 400 km**
      - **Gas particles electrically charged**
      - **Radio waves reflect back to Earth from here**
      - **Aurora borealis occur here**
    - **Exosphere – above 400 km**
      - **Satellites orbit here**



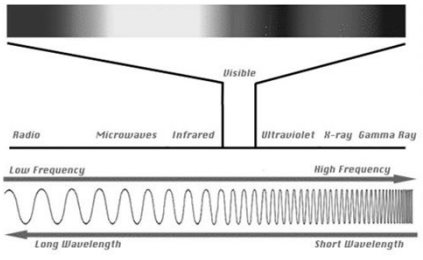
Layers of the Atmosphere

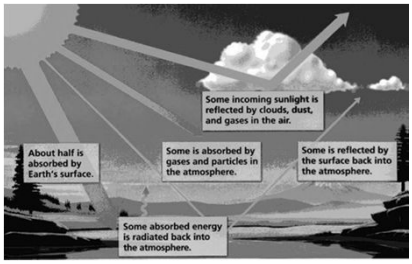
The term "pause" refers to "between" layers.



Energy in Earth's Atmosphere

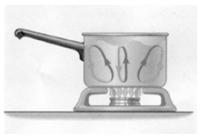
- Energy travels to Earth as electromagnetic radiation from the Sun
- EMR travels through the atmosphere & heats the surface of the Earth
- When Earth's surface is heated, it radiates most of the energy back into the atmosphere as infrared radiation.

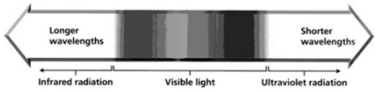


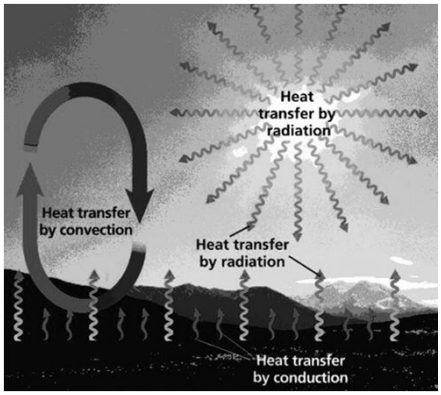


Heat Transfer in the Atmosphere

- **Thermal energy** - total energy of motion in the particles of a substance
- **Temperature** – the average thermal energy of the substance particles
- Heat - transfer of thermal energy from a hotter object to a cooler one
  - Transferred in 1 of 3 ways:
    - Radiation
    - Conduction
    - Convection

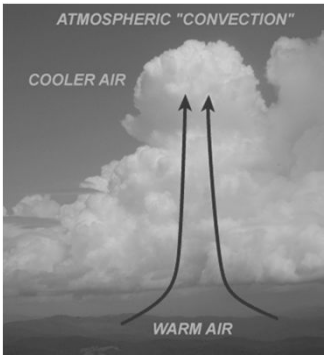


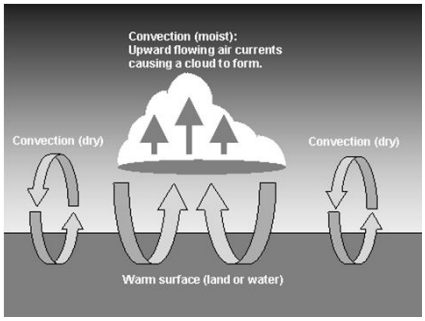




Winds

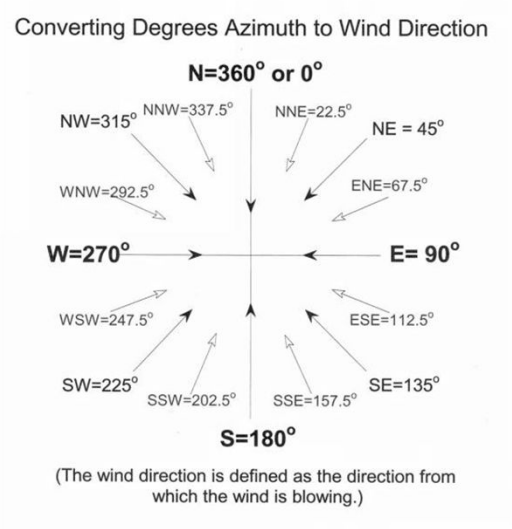
- Wind is the movement of air from an area of high pressure to an area of lower pressure.
- Winds are caused by differences in air pressure caused by unequal heating of the atmosphere



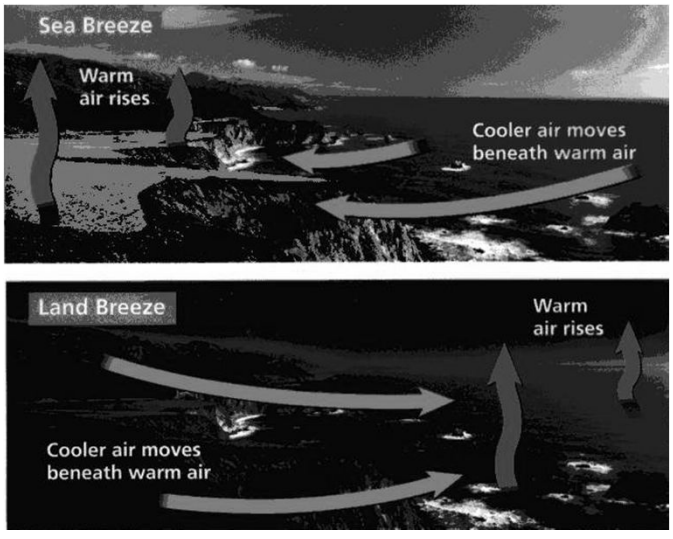


Wind Direction / Wind Speed

- Wind speed is measured with an **anemometer.**
- The name of a wind tells you the direction the wind is coming from.

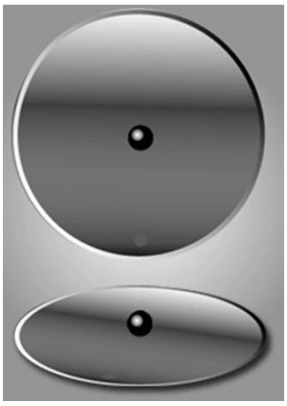


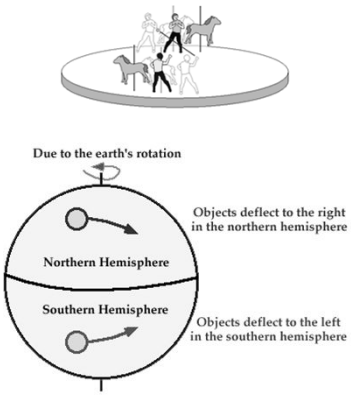
Sea breezes & Sand breezes are Local Winds caused by the unequal heating of Earth's surface



Coriolis Effect

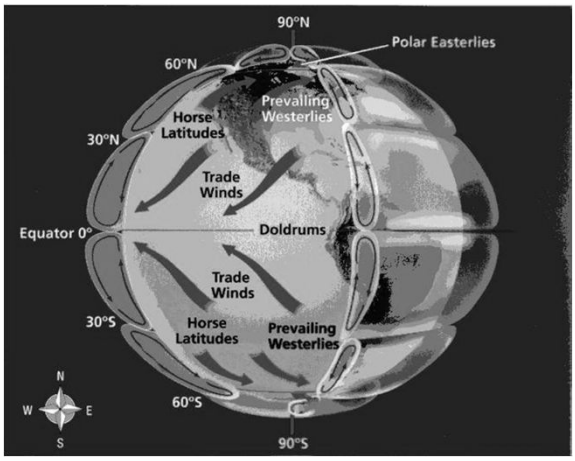
- Because Earth is rotating, global winds do not follow a straight path. The way Earth's rotation makes winds curve is called the Coriolis effect. In the Northern Hemisphere, global winds curve to the right. In the Southern Hemisphere, global winds curve to the left.





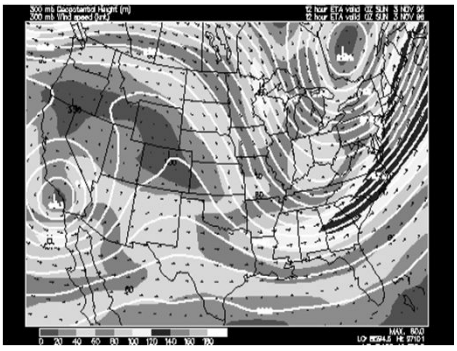
Global Winds occur over a large area & are affected by the Coriolis Effect (caused by the rotation of the Earth)

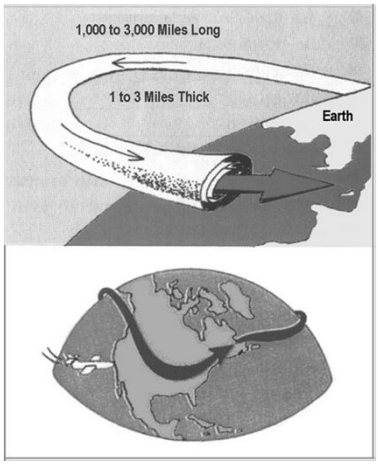
- The Winds
  - Trade winds blow from the NE between Equator & 30N
  - Prevailing Westerlies blow from the SW between 30N & 60 N
  - Polar Easterlies 60 N to 90
- Calm areas:
  - Doldrums along the equator
  - The Horse Latitudes around 30 N & S



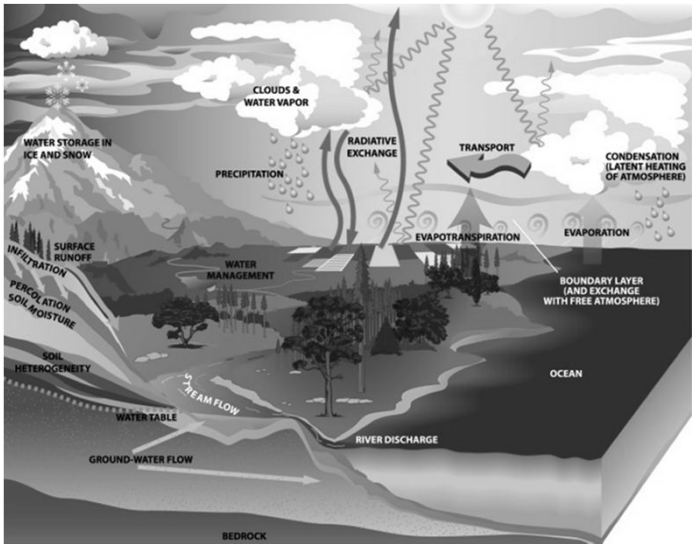
Jet Stream

- High speed wind currents about 150 mph that are 10-15 km above the surface





The Water Cycle



Evaporation
Condensation
Precipitation
Runoff

No mas!!
Fini !!