

**17.1 ATMOSPHERE CHARACTERISTICS**

\_\_\_\_\_ - the state of the atmosphere at a specific time \_\_\_\_\_  
 \_\_\_\_\_ - the average weather conditions in a region

I. Atmosphere \_\_\_\_\_ (what it's \_\_\_\_\_ of):

a. gases

1. 76.5% \_\_\_\_\_
2. 20.5% \_\_\_\_\_
3. 2% \_\_\_\_\_ vapor (average-lower over deserts, higher in tropics)
4. 1% trace gases (CO<sub>2</sub>, argon, etc.)

b. Solids

1. Fine \_\_\_\_\_ dust, sea \_\_\_\_\_, \_\_\_\_\_, soot, \_\_\_\_\_, microorganisms, dust from \_\_\_\_\_, \_\_\_\_\_ and dust from volcanoes
2. Used as \_\_\_\_\_ **nuclei** (the \_\_\_\_\_ of every raindrop)

II. Layers of the atmosphere

a. \_\_\_\_\_ - lowest layer of the atmosphere

1. from 0 to 12 km
2. All \_\_\_\_\_ occurs here
3. Those are most \_\_\_\_\_
4. Greatest \_\_\_\_\_
5. Temperature \_\_\_\_\_ as you go up

b. \_\_\_\_\_

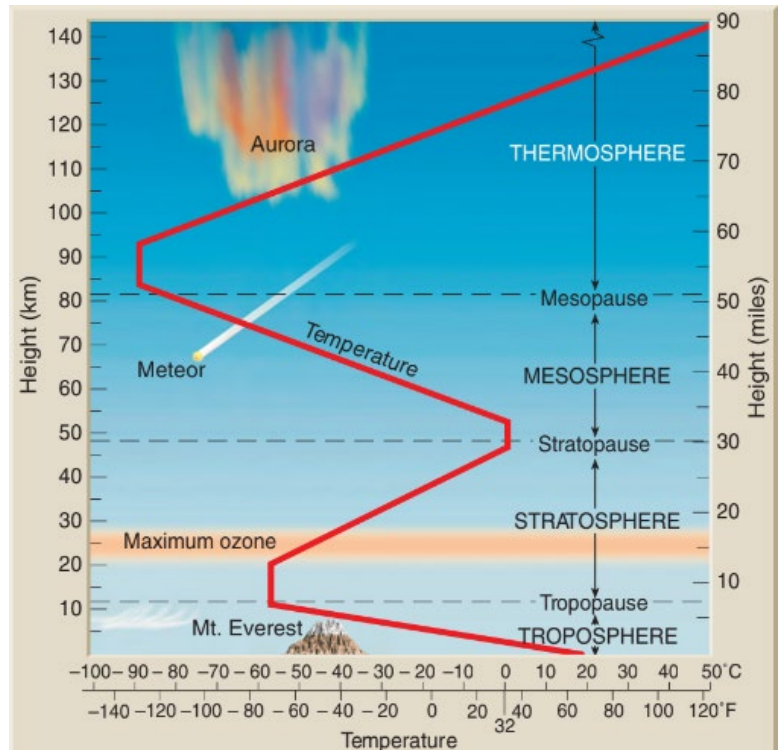
1. From 12 to 50 km
2. Temperature \_\_\_\_\_ as you go up
3. Contains the \_\_\_\_\_ **layer** which blocks harmful \_\_\_\_\_ rays from the Sun (This is why the stratosphere gets warmer)

c. \_\_\_\_\_

1. from 50 to 80 km
2. Gets \_\_\_\_\_ as you go up
3. Coldest of all the layers
4. burns up \_\_\_\_\_

d. \_\_\_\_\_

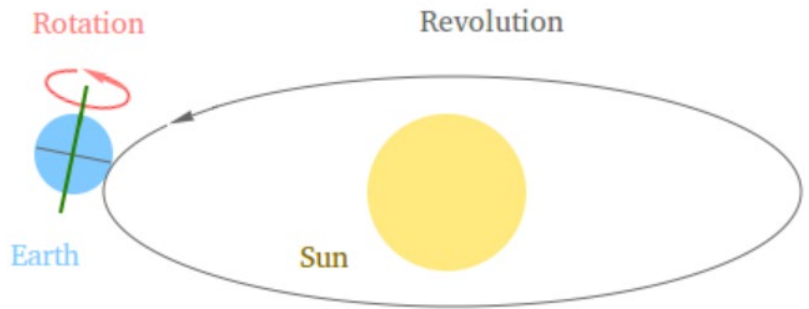
1. From 80 to 140 km
2. Gets \_\_\_\_\_ as you go up
3. Least \_\_\_\_\_ layer
4. Least amount of \_\_\_\_\_
5. Temperature very high (molecules moving very \_\_\_\_\_)
6. There is not a lot of heat transfer because molecules are too \_\_\_\_\_ apart



III. Earth Sun relationships

a. Earth's motions

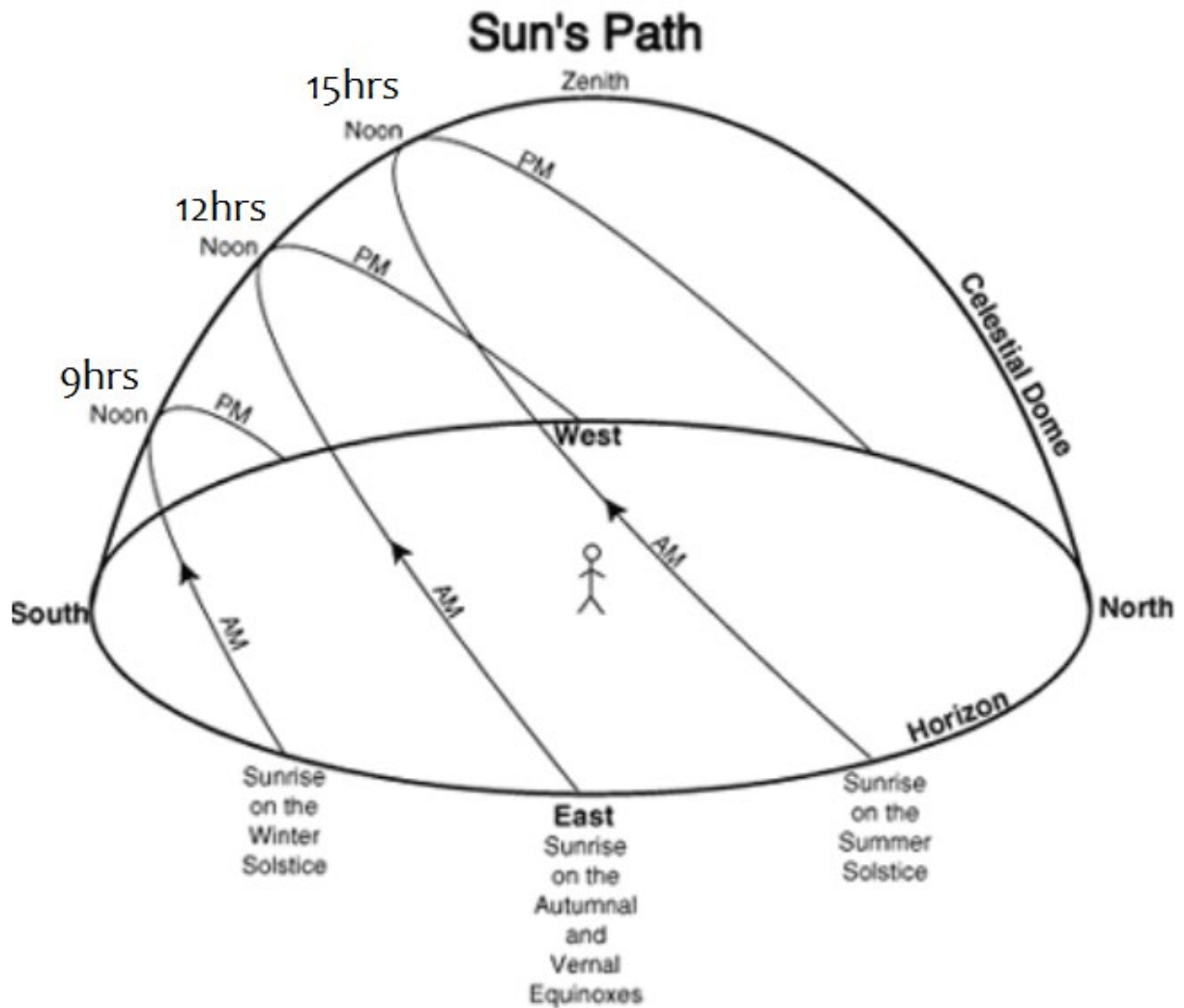
1. \_\_\_\_\_ -  
Spinning in place, One  
time per 24 \_\_\_\_\_
2. \_\_\_\_\_ -  
Orbiting around the Sun,  
1 Time per \_\_\_\_\_ and  
1/4 days



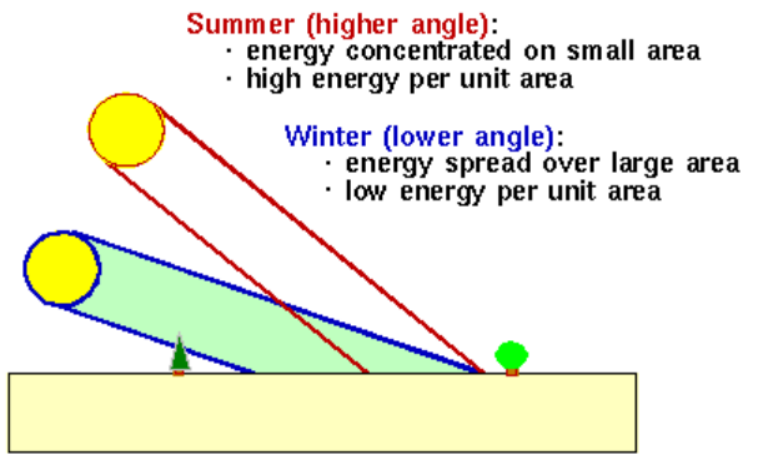
b. Earth's Seasons-

1. Earth has Seasons because it is \_\_\_\_\_  $23.5^\circ$
2. If the tilt was \_\_\_\_\_ than  $23.5$  our seasons would become too \_\_\_\_\_ and  
too \_\_\_\_\_
3. If there was \_\_\_\_\_ tilt we would have a \_\_\_\_\_ equator and giant  
\_\_\_\_\_ at both poles leaving only a tiny portion of Earth habitable

IV. Sun's apparent path

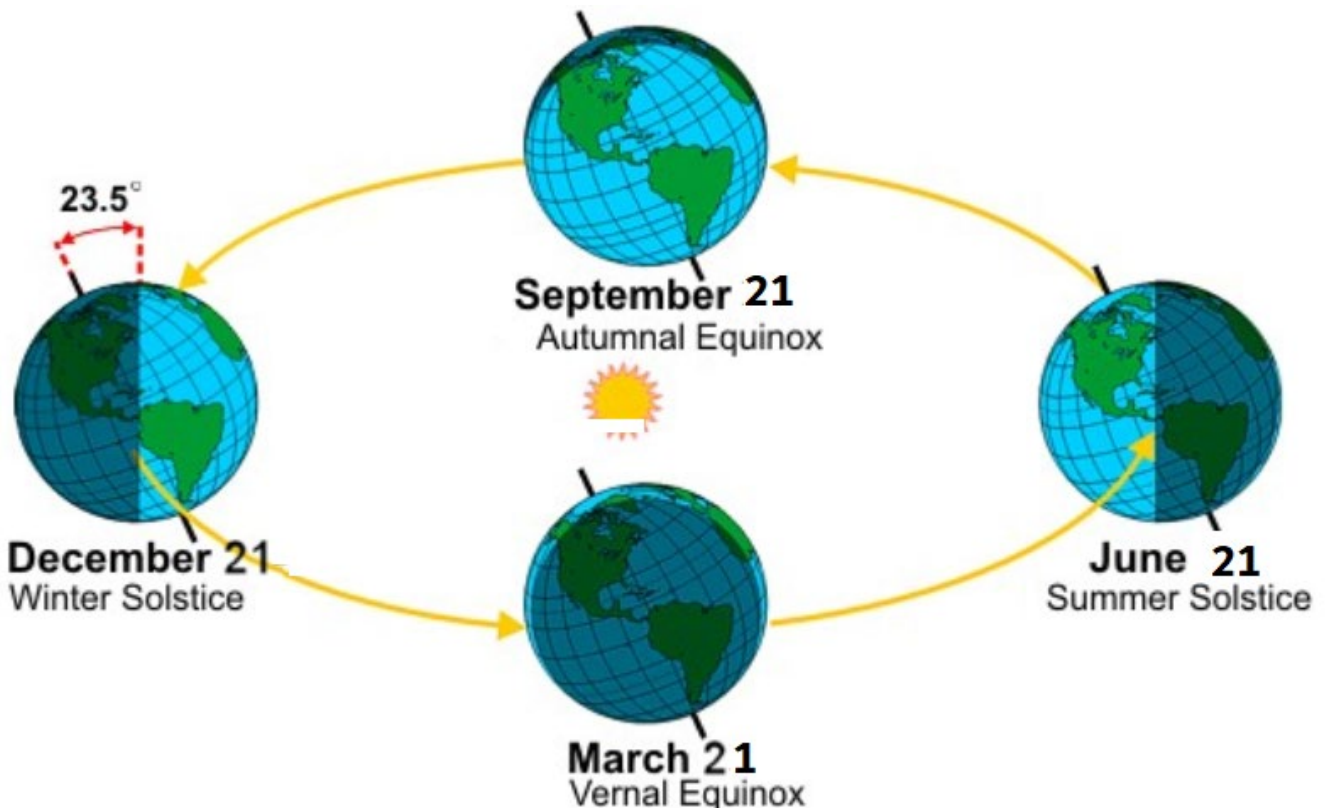


- a. Earth's \_\_\_\_\_ causes the Sun to beam down at different \_\_\_\_\_ during different times of the year
1. During \_\_\_\_\_ it is  $73.5^\circ$  (More \_\_\_\_\_ down on our heads)
    - i. Causes the sunlight to be more \_\_\_\_\_
    - ii. Each square unit gets \_\_\_\_\_ sunlight
  2. Winter it is  $40^\circ$  (Coming down at a more extreme \_\_\_\_\_)
    - i. Causes the sunlight to be more \_\_\_\_\_ out
    - ii. Each square unit gets \_\_\_\_\_ sunlight



V. Solstices and equinoxes

- a. \_\_\_\_\_ **solstice**, June 21st, \_\_\_\_\_ Hours of daylight, Northern \_\_\_\_\_ pointed directly at Sun
- b. \_\_\_\_\_ **equinox**, \_\_\_\_\_ 21st, 12 hours Of daylight, \_\_\_\_\_ hemisphere pointed directly at Sun
- c. **Winter** \_\_\_\_\_, December \_\_\_\_\_, 9 \_\_\_\_\_ of daylight, southern hemisphere pointed \_\_\_\_\_ at Sun
- d. **Spring** \_\_\_\_\_, \_\_\_\_\_ 21st, 12 hours of \_\_\_\_\_, neither hemisphere pointed directly at Sun
- e. The combination of \_\_\_\_\_ **days** and \_\_\_\_\_ **sunlight** creates warmer temperatures in summer
- f. The combination of **shorter** \_\_\_\_\_ and **indirect** \_\_\_\_\_ creates colder temperatures of winter



## 17.2 HEATING THE ATMOSPHERE

\_\_\_\_\_ -The measure of how \_\_\_\_\_ molecules are moving

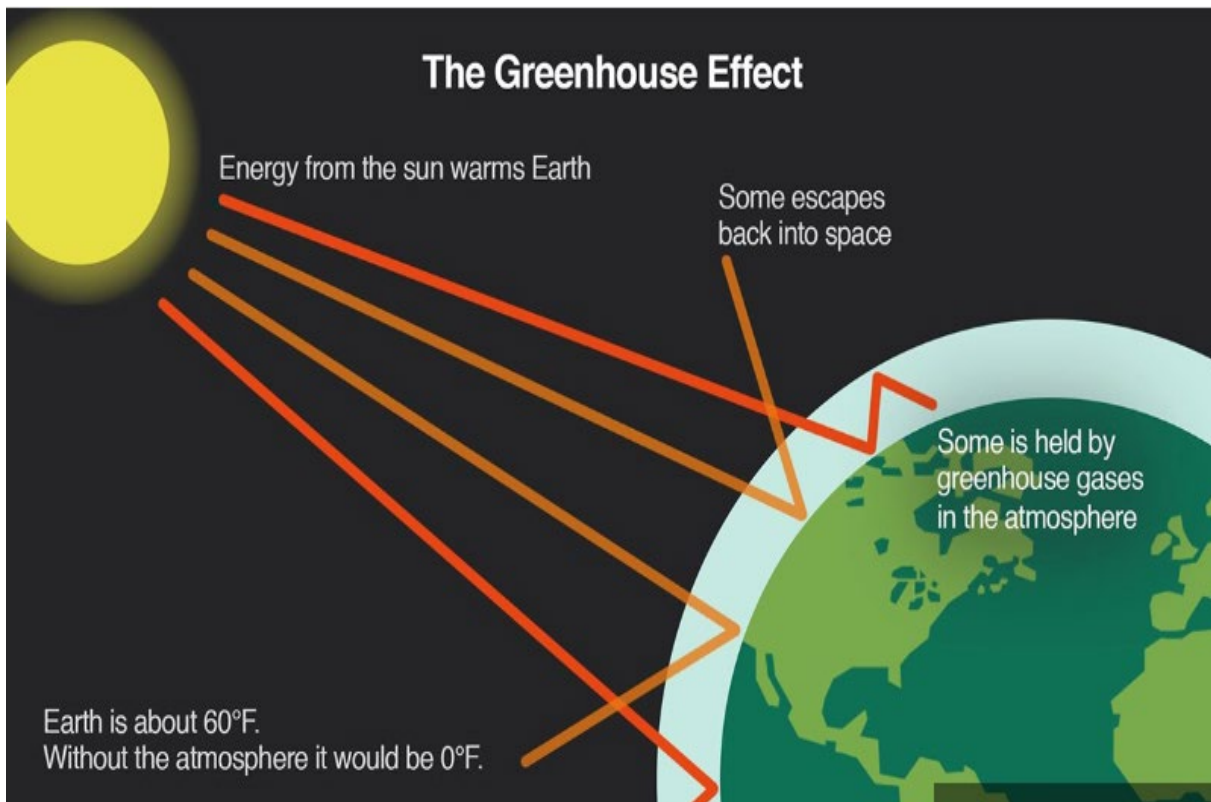
\_\_\_\_\_ -The measure of how much energy \_\_\_\_\_ from one object to another

### I. The ways heat energy moves:

- a. \_\_\_\_\_ -transfer of heat by matter \_\_\_\_\_ (Individual molecules collide, Sending their kinetic energy into others Like balls on a pool table) Must have a \_\_\_\_\_
- b. \_\_\_\_\_ -transfer of heat when Liquids or gases \_\_\_\_\_ and take their heat with them (Heat rises and cold sinks) Must have a \_\_\_\_\_
- c. \_\_\_\_\_ -Transfer of heat by electromagnetic \_\_\_\_\_. Does \_\_\_\_\_ need a medium (Can travel through emptiness)
  1. Solar Radiation can be \_\_\_\_\_ (soak in to atmospheric gases, clouds, land)
  2. solar Radiation can be \_\_\_\_\_ (Bounce off substances)
  3. Solar radiation can be \_\_\_\_\_ (pass Through substances)
  4. Solar radiation can be \_\_\_\_\_ (Turn into a large number of weaker \_\_\_\_\_ traveling in different directions) as they hit dust particles and gas molecules. This is why the sky is \_\_\_\_\_.
  5. Solar radiation can be \_\_\_\_\_ in \_\_\_\_\_ (Radiant energy is transformed into \_\_\_\_\_ energy making all life possible)

II. \_\_\_\_\_ effect- Greenhouse gases can \_\_\_\_\_ radiation from the Sun and become \_\_\_\_\_

- a. Makes it so all life is \_\_\_\_\_
- b. Too much may create \_\_\_\_\_ change too \_\_\_\_\_ for organisms to adapt



## 17.3 TEMPERATURE CONTROLS

Why temperatures vary on Earth

- I. \_\_\_\_\_
  - a. The closer you are to the \_\_\_\_\_ the \_\_\_\_\_ it is due to **direct** (Straight \_\_\_\_\_) sunlight
  - b. The farther you are from the equator the \_\_\_\_\_ it is due to \_\_\_\_\_ (Diagonal) sunlight
- II. **Land and** \_\_\_\_\_
  - a. Land Heats \_\_\_\_\_ and cools down faster
  - b. Cities surrounded by land have \_\_\_\_\_ Summers and \_\_\_\_\_ Winters (More harsh)
  - c. Water takes \_\_\_\_\_ to heat up and longer to cool \_\_\_\_\_ due to its high heat capacity
  - d. Cities near water have cooler Summers and warmer Winters (\_\_\_\_\_)

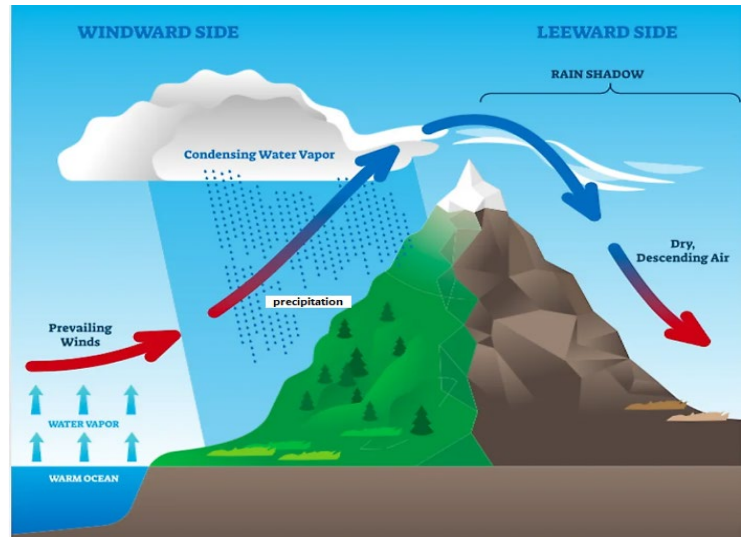
### III. **Coast versus Coast**

- a. Windward Coast-Where the wind blows from the \_\_\_\_\_ onto the \_\_\_\_\_
  1. Cities get \_\_\_\_\_ climates
- b. Leeward Coast-Air above the ocean is \_\_\_\_\_ blowing toward land
  1. Cities get \_\_\_\_\_ climates



### IV. **Geographical Position (Mountains as a \_\_\_\_\_)**

- a. \_\_\_\_\_ side of mountain- air goes up mountain, cools, condenses out all water
  1. Gets more \_\_\_\_\_
  2. Temperatures more \_\_\_\_\_ due to water in air
- b. \_\_\_\_\_ side of mountain- air goes down other side, but now has moisture
  1. Gets \_\_\_\_\_ to no rain
  2. Temperatures more \_\_\_\_\_ due to less water in air



### V. \_\_\_\_\_ (how high up the mountain you are)

- a. The higher you are in the troposphere, the \_\_\_\_\_ the temperature
- b. The lower you are in the troposphere, the \_\_\_\_\_ the temperature

### VI. **Cloud cover**

- \_\_\_\_\_ the fraction of total radiation that is \_\_\_\_\_ by a surface
- a. High Albedo is \_\_\_\_\_ reflective (Light surfaces like clouds and Icy glaciers)
  - b. low albedo is \_\_\_\_\_ reflective (Dark surfaces like land)
  - c. Lots of clouds during the day \_\_\_\_\_ sunlight and makes days \_\_\_\_\_ (high albedo)
  - d. Lots of clouds during the night \_\_\_\_\_ heat like an insulating blanket, and makes night time \_\_\_\_\_
  - e. Overall, cloud cover creates \_\_\_\_\_ temperatures