HEATING THE ATMOSPHERE

Unit 7 - Chapter 17.2

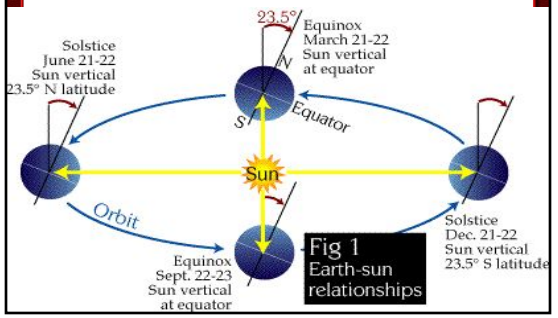
SOLSTICE

SUMMER SOLSTICE	WINTER SOLSTICE
• Marks first day of **Summer**	• Marks first day of **Winter**
• **June 21-22** each year	• **Dec 21-22** each year
• **Northern** Hemi. leans 23.5 degrees **towards** Sun	• **Northern** Hemi. leans 23.5 degrees **away** from Sun

EQUINOX

AUTUMNAL EQUINOX	SPRING EQUINOX
• **Sept 22-23** each year	• **March 21-22** each year
• In **Northern** Hemi.	• In **Northern** Hemi.
• Vertical rays of Sun strike **Equator**	• Vertical rays of Sun strike **Equator**

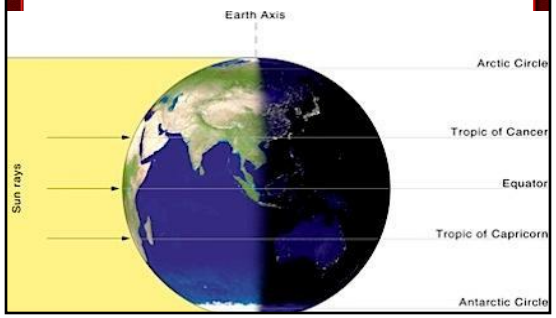
Solstices & Equinoxes



Length of Daylight

- **Daylight** on **summer** solstice in **Northern** Hemi. is **greater** than length of **darkness**
- Farther **north** of **Equator** on **summer** solstice, **longer** period of daylight
- **Arctic Circle**: 66.5°N, daylight is **24 hours**

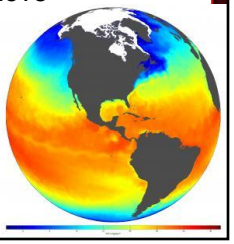
Length of Daylight



State of the Atmosphere

Temperature vs Heat

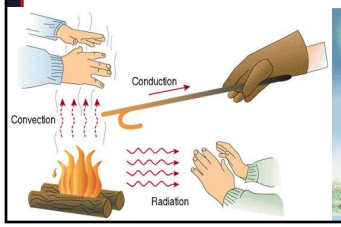
- **Temperature** – Measures how **rapidly** or **slowly** molecules move
  - Measures energy **movement**

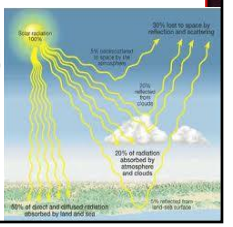


State of the Atmosphere

Temperature vs Heat

- **Heat** – Energy **transfer** due to **difference** in temperature



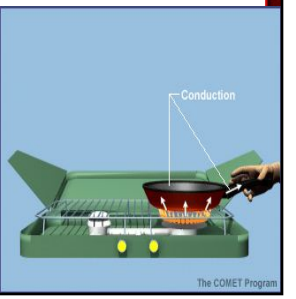


State of the Atmosphere

CONDUCTION

– Heat ***transfer*** through **physical contact**

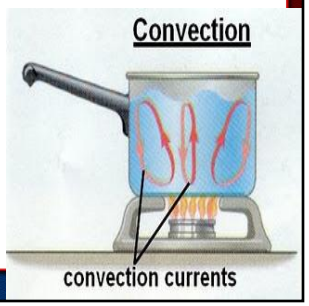
– Flows from **higher** to **lower** temp



State of the Atmosphere

CONVECTION

– Heat transfer by **circulation** of heat **currents**

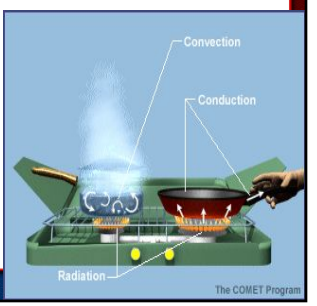


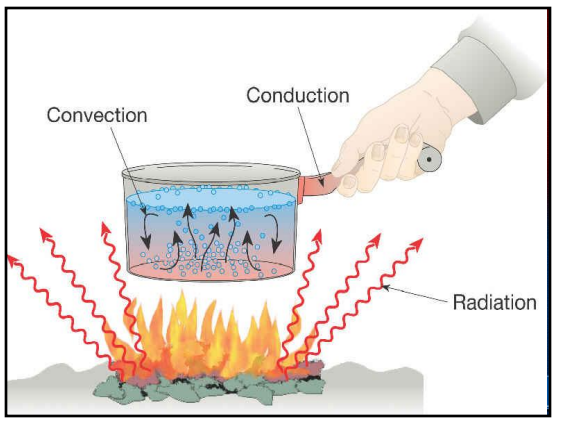
State of the Atmosphere

RADIATION

– Heat transfer that travels in **all directions**

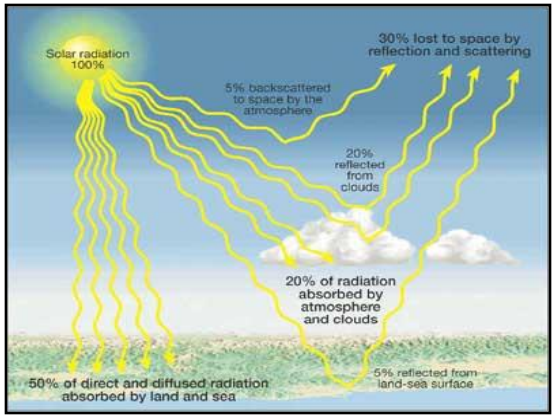
– Can travel through **space**





Solar Radiation

- **Three(3)** scenarios:
- 1. Energy is **absorbed** by object
- 2. **Water** and **air** are **transparent** to certain **wavelengths** of radiation
- 3. May **bounce** off objects without being **absorbed**



Temperature vs Pressure

- **Temperature** is **directly** proportional to **pressure**
- **Increase** temp = **increase** pressure

Table 11-2 Atmospheric Relationships

As T ↑, P ↑
As T ↓, P ↓
As T ↓, D ↑
As T ↑, D ↓

T = Temperature
P = Pressure
D = Density
↑ = Increases

Temperature vs Density

- **Temperature** is **inversely** proportional to **density**
- **Increase** temp = **decrease** density

Table 11-2 Atmospheric Relationships

As T ↑, P ↑
As T ↓, P ↓
As T ↓, D ↑
As T ↑, D ↓

T = Temperature
P = Pressure
D = Density
↑ = Increases

Air Pressure vs Density

Table 11-1 Density Changes With Altitude

Altitude km	Density g/L	Altitude km	Density g/L
0	1.23	30	0.018
2	1.01	40	0.004
4	0.82	50	0.001
6	0.66	60	0.0003
8	0.53	70	0.00009
10	0.41	80	0.00002
15	0.19	90	0.000003