**Geography**

TIDE/MOON/TIME

- Review
  - Ebb Tide → Tide goes out
  - Flood Tide → Tide goes in
  - Slack Tide → still 

**WEATHER & CLIMATE**

3 major things that hold up the BIOSPHERE

- Bio GEOGRAPHY
  - atmosphere
  - hydrosphere
  - lithosphere

**Atmosphere:**

Gaseous Combination of gases that surround Earth.

Refer to Air =

- ↑ Hot increase temp = makes gas molecules travel faster,
- Kinetic Energy = molecules in motion.
Escape Velocity = is the speed you have to go in order to leave the planet.

* If molecules reach Escape Velocity, it can leave the atmosphere of the planet.

Whether or not a planet has an atmosphere depends upon (2) things:

1. Temperature
2. Gravitational pull

* Terminal Velocity is how fast an object is going when it hits the ground.

* Travel 32 ft/sec.

* When forcing material together, the molecules heat up and the temperature increases.

13% Nitrogen
68% H₂O Vapor
19% CO₂

Gases coming out of a volcano:
- H₂O vapor
- 68% CO₂
- 13% Nitrogen

H₂O liquid cannot exist above boiling point.

Earth when started was around 14,000°F but over time cooled down to a temperature where H₂O was able to stay as a liquid.
What is Air made up of?

- Air
- N₂ (78%)
- O₂ (21%)
- Ar (0.93%)
- Other gases (0.04%)

Plants produce CO₂ and O₂

What is CO₂ used for?

- Plant growth
- Respiration

To make an ozone layer: you need 3 O₃

O₃ will absorb UV

O₂ will not absorb

Chemistry of atmosphere, changed up change of

3O₂ + O₂ → 2O₃

Ozone

O₃

[3 O₂ + O₂ → 2O₃]

[O₃]

[O₂]

Ozone is formed in the stratosphere.

Ozone protects Earth from UV rays.

Ozone is formed by the reaction of O₂ with O:

O₂ + O → O₃

O₂ + O₃ → O₂ + O₂

O₂ is produced by photosynthesis.

O₂ is also produced by volcanic activity.

O₂ is also produced by lightning.
Atmospheric Pressure = measurement of the weight of air above you

$212^\circ F = H_2O$ boils (sea level)

As you go up into elevation, you decrease the temp of boiling pt.

Air is LESS DENSE than water.

Water is LESS DENSE than dirt.

Above 45 miles, gases begin to layer.

THREE things that could happen to temp of air as you go up:

1. Increase
2. Decrease
3. Stay same

Increase height in elevation $\Rightarrow$ Decrease in temp.

Normal lapse rate.

Isothermals: No change in temp up.

Inversion.
Pollution will rise in a normal lapse rate.

![Graph showing pollution rising with height and temperature]

Pollution Box of Dirty Air

By smoking 1 cigarette you increase particle pollution by 300%.

Inversion Air Sinks

High Pressure

Inversion Layer

Dirty Air

Air gets warmer as you go up in an inversion layer.

2 kinds of pollution:
- Oxides of Nitrogen = very hard to get rid of
- Oxide of Sulfurs
- Particle pollution = you just use a filter mask

*Smoke made up of gaseous pollution.
ATMOSPHERE

THERMOSPHERE
(absorbed ultraviolet light)

MESOPAUSE

(No escape)

MESOSPHERE
(midrange ultraviolet light absorbed)

STRATOPAUSE

STRATOSPHERE

TROPOPAUSE

TROPOSPHERE

(x) = Weather occurs here

Height changes with season and pressure.

Top of Volcanic Eruptions can lead to Climate Change.

Cl⁻ takes O₃ → ozone and converts it to O₂.

*Very BAD* because O₃ is what absorbs UV light.

Cl⁻ acts as a catalyst thus, it takes out hundreds of O₃ molecules.

Pressure & Density Decrease as you go up into the Atmosphere.

Density over Equator is higher than @ poles.

Ozone - Caused by Charged Particles from Sun.
O₂ = Green
Argon = Orange
Radon = Pink

END
EXAM I on Feb 29th

2:24:00  NOT ON FIRST TEST ↓

Go back over - changing time? What time is it in ?

Triple pt. of WATER

Boiling pt. of H₂O drops as you go up the mt.

Freezing pt. goes up as you go up the mt.

Hot Air Rises / Cold Air Sinks

Electro Magnetic Spectrum

3 States of Matter - < solid / liquid / gas>

Main Cancer → H₂O → ICE, WATER, VAPOR

Q: Which has more Energy?
A: Vapor.

f: Phase Change = going from ICE → WATER → VAPOR

f: Sublimation = you can go from SOLID STATE straight to VAPOR i.e. → 🛋️ SNOW

Dry Ice - 🛋️
Method of transferring energy = (4 ways)

1. Conduction
2. Convection
3. Radiation
4. Phase Change

1. Only method of transferring energy in a solid is through Conduction. Think of kids in line, kid at end of line punches kid in front, and says pass it forward.

2. Convection = Transfers energy better than Conduction. It occurs in Liquid & Gases.

3. Radiation = Speed of light = Line of sight (186,000 miles/sec). (Doesn't go around corners)

* Far more efficient than Conduction or Convection.
* Sun transfers its energy to Earth - thru Radiation.
The way a thermometer works is it reads the **Convection Energy** → **People Read temp then Radiation**

**Energy received from Sun** → **By Radiation**

Energy moves from Equator at hottest pt. by Convection/Conduction out to poles.  

*This is the whole idea of weather.*

![Diagram of radiation and wavelength](image)

- **wavelength**
- **Speed of light = c × λ**
- Frequency is directly proportional to wavelength

Radio is a form of Radiation

**Electromagnetic Spectrum:**

- μm = micrometers = $10^{-6}$ meters = 0.000001
Electromagnetic Spectrum

Visible Light

- Blue
- Indigo
- Green
- Yellow
- Red

White is all these visible colors put together

Black - is the absence of light

41% of energy from sun is sent in the form of visible light

Shorter wave length -> Ionizing Radiation

Longer wave length -> Non-Ionizing Radiation

Infrared
- Microwave
- Radio
- X-ray
- Power

Near Infrared

Very healthy vegetation

Plants = Infrared lights are bounced back to camera - is light Red to Film.

Different veggies/plants = will bounce off/reflect the Infrared light as different shades of color.

Far Infrared

Heat

- You can photograph Earth News Channel
- Use this system to give weather information

Remote Sensing Device

- Is where device senses something

Micro-waves

- Used for
  - Radar
  - Communication
  - Microwave (oven)

Cooking

Radiation that's absorbed by food.

Food then heats up by conduction.

Usually weight 5min. for food to finish cooking.

Because conduction is a slower process than
Convection Oven

Whole outside surface this to Heat up
In order to Heat meat

Convection & Conduction

MicroWave

Heads H2O to Spread Heat thru.

Uses Radiation to Cook Food

Limiting Resolution = Sensor cannot see anything Bigger than it is Calibrated (In wave lengths) for.

110 - 120 V AC 60 Hz Nominative is energy power out of wall.

\[
\lambda = \frac{\text{speed of light}}{\text{frequency}} \quad \Rightarrow \quad \lambda = \frac{186,000 \text{ miles/sec}}{60 \text{ Hz/sec}}
\]

\[
\lambda = \frac{c}{f} \quad \Rightarrow \quad \lambda = 3.100 \text{ miles/sec}
\]
wave lengths are so short
they can go thru. Body.

Gamma Radiation = most Deadly form of
Radiation

(used for Killing things)

Soon Gov't will be Radiating Meat to get Rid of
Bacteria

11 = Test Day