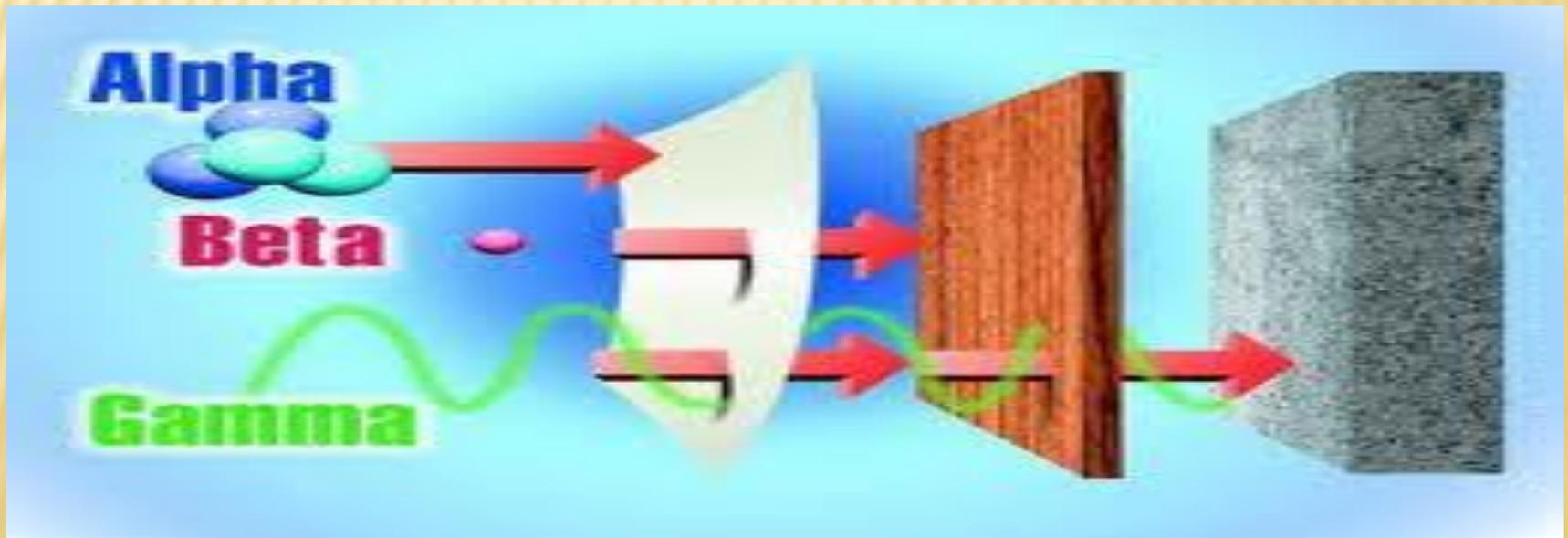


RADIATION

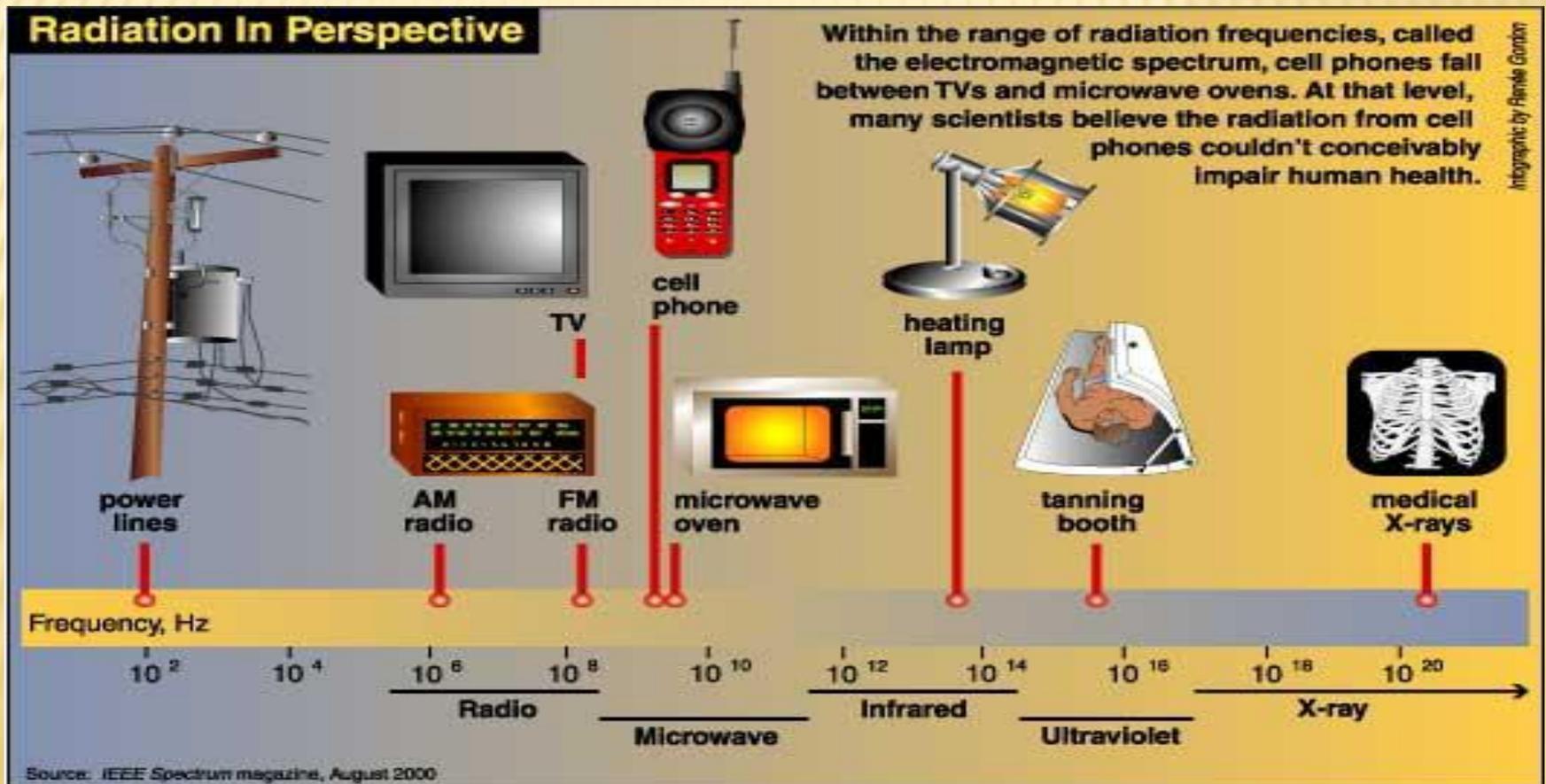
- ✘ Radiation –
- ✘ Radiation is the movement of energized particles, or waves.



RADIATION

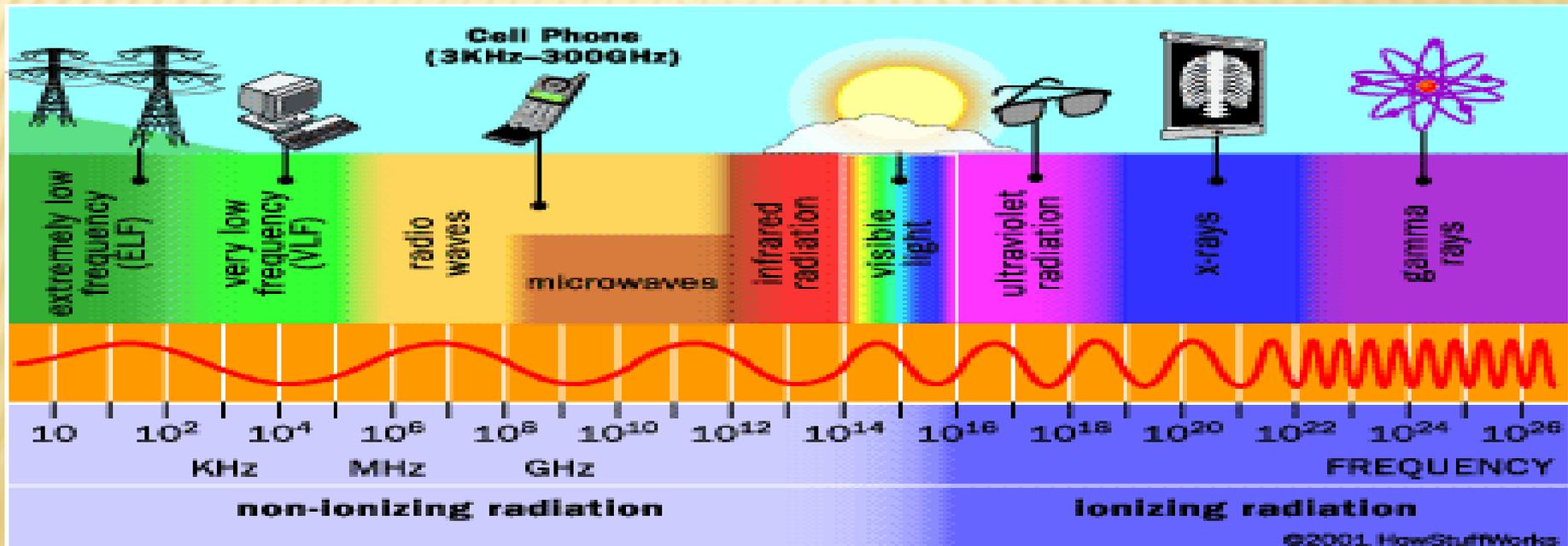
What are some types of Radiation

Types of Radiation ex. Solar, TV, X-rays

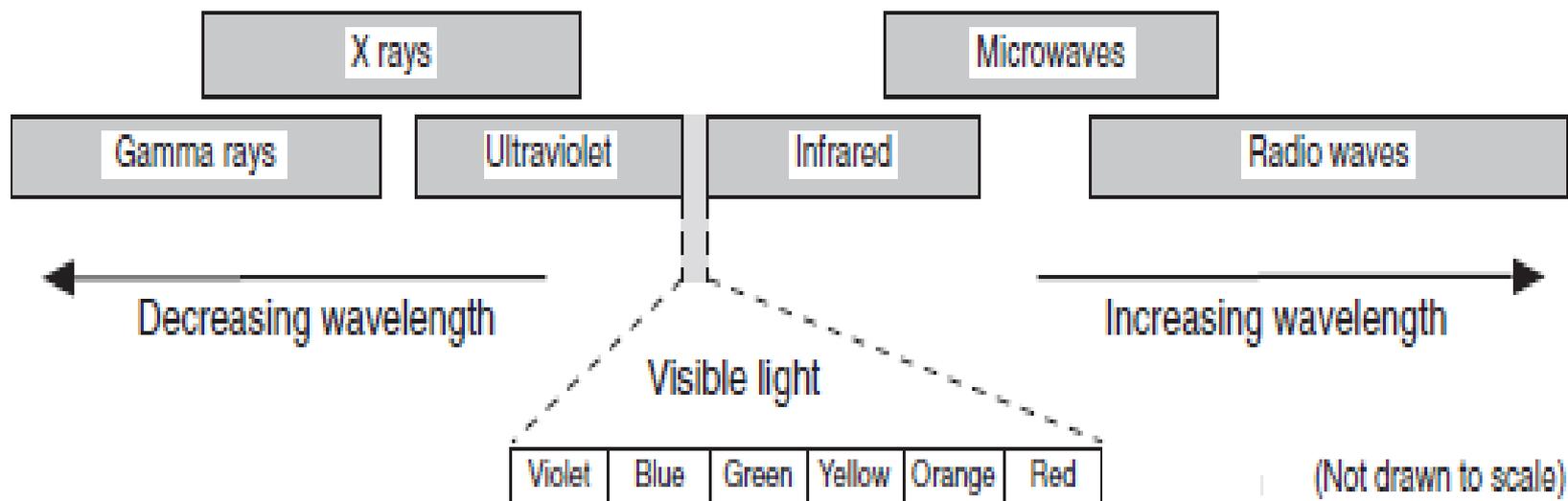


RADIATION

- ✗ Which waves have more energy: shorter or longer?
- ✗ Shorter waves have more energy, longer waves have less.
(think: shaking a rope, wave pool)



Electromagnetic Spectrum





ELECTROMAGNETIC SPECTRUM

FREQUENCY (Hz)

10^{18}

10^{15}

10^{12}

10^9

RANGE OF
HUMAN HEARING

RANGE OF
HUMAN VISION

ALL YOU HEAR
AND ALL YOU SEE
ALL HAPPENS IN HERE

10^{-6}

10^{-3}

1

10^3

10^6

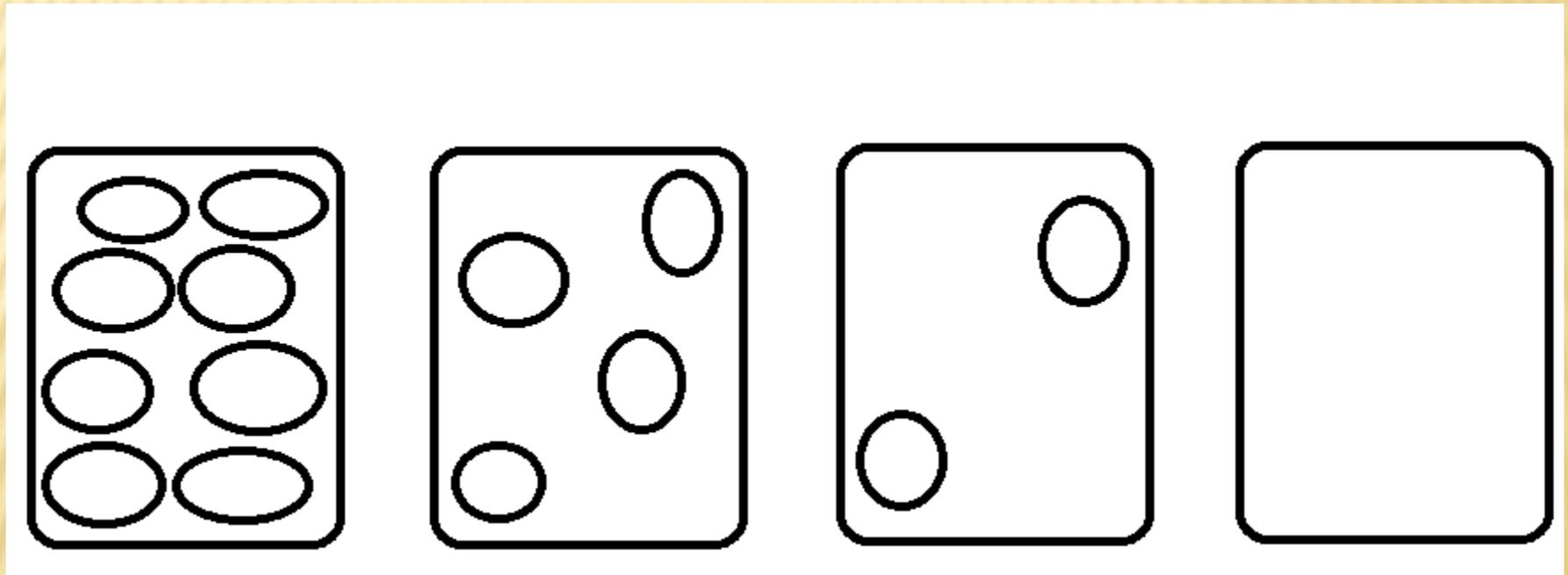
SOUND
FREQUENCY (Hz)

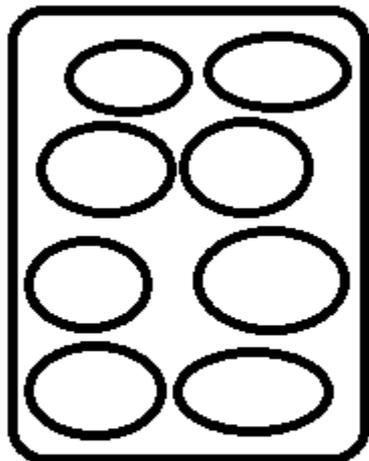
金吉博

In the grand scheme of things,
we're all pretty much blind and deaf.

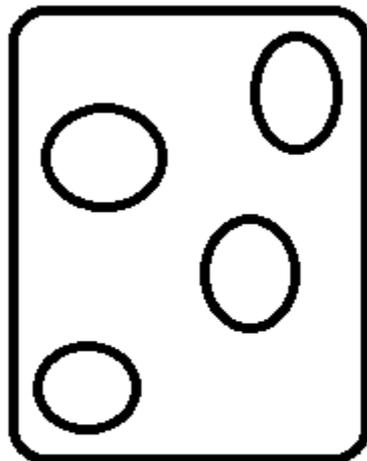
RADIATION

Where is radiation best?

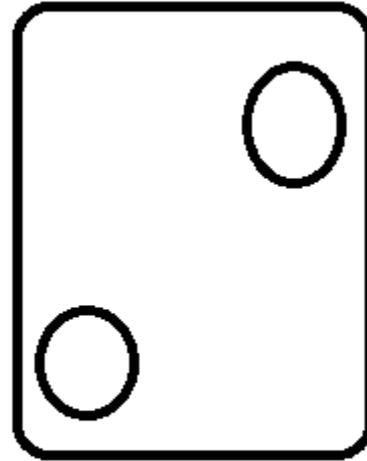




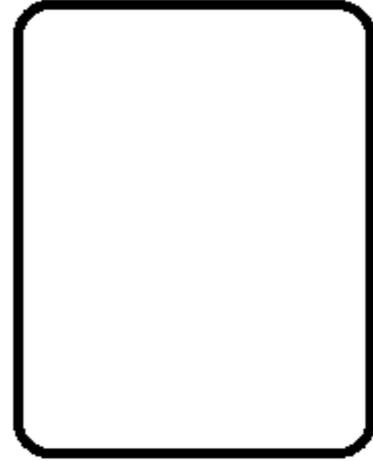
SOLID



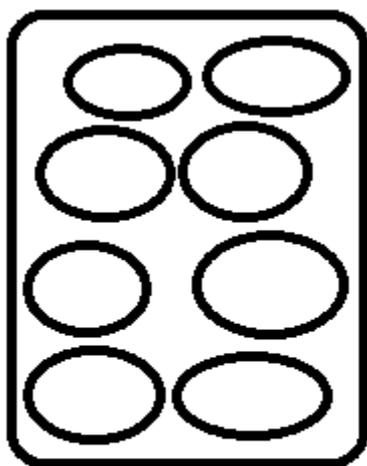
LIQUID



GAS

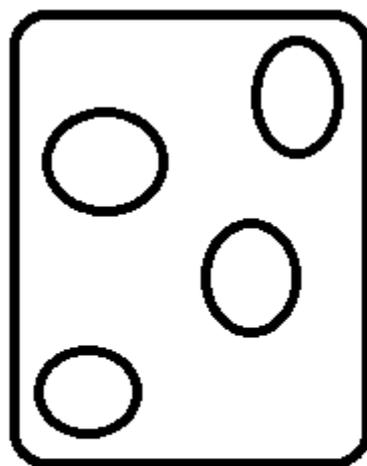


VACUUM



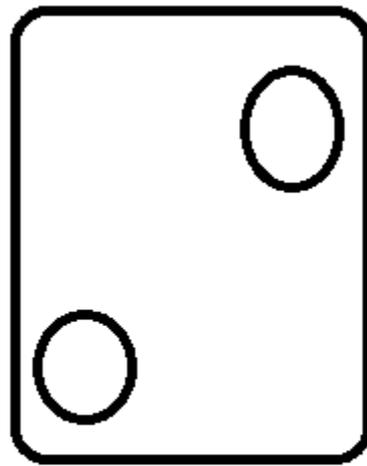
SOLID

Close molecules



LIQUID

Farther apart



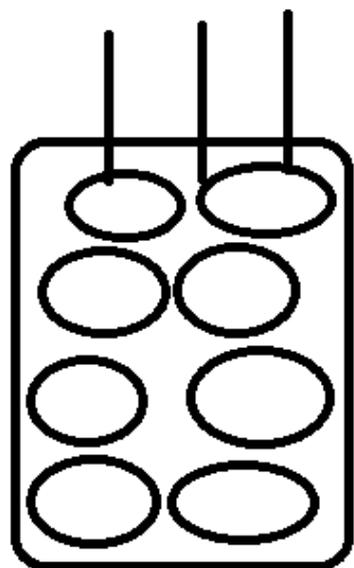
GAS

Farthest apart



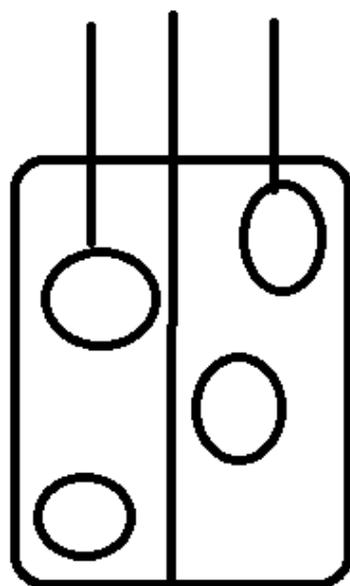
VACUUM

No molecules!



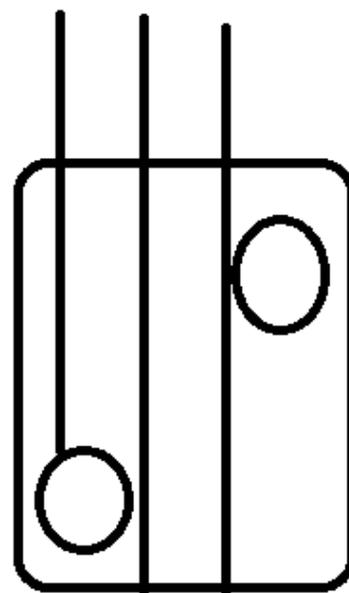
SOLID

Radiation blocked



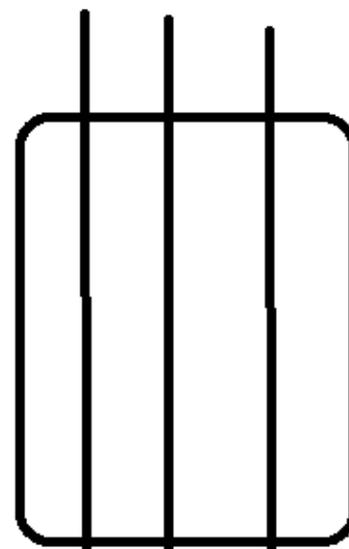
LIQUID

Most radiation blocked



GAS

Some radiation blocked



VACUUM

Radiation passes freely through.

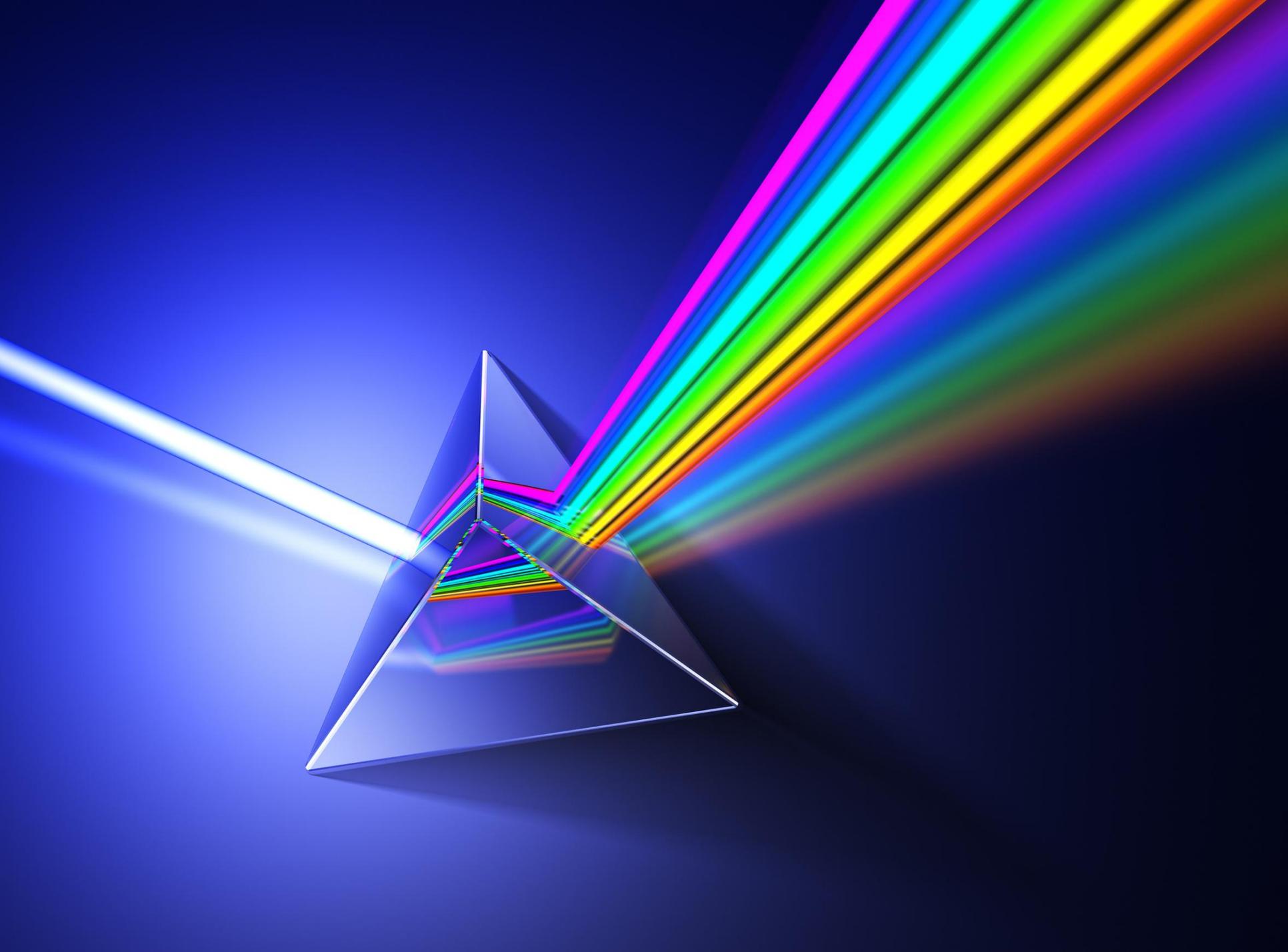
- ✘ What state of matter does radiation travel best through?
- ✘ Radiation passes best through a Vacuum.
- ✘ What is a Vacuum?
- ✘ Vacuum = an area free of matter.
(empty space, not even gas)

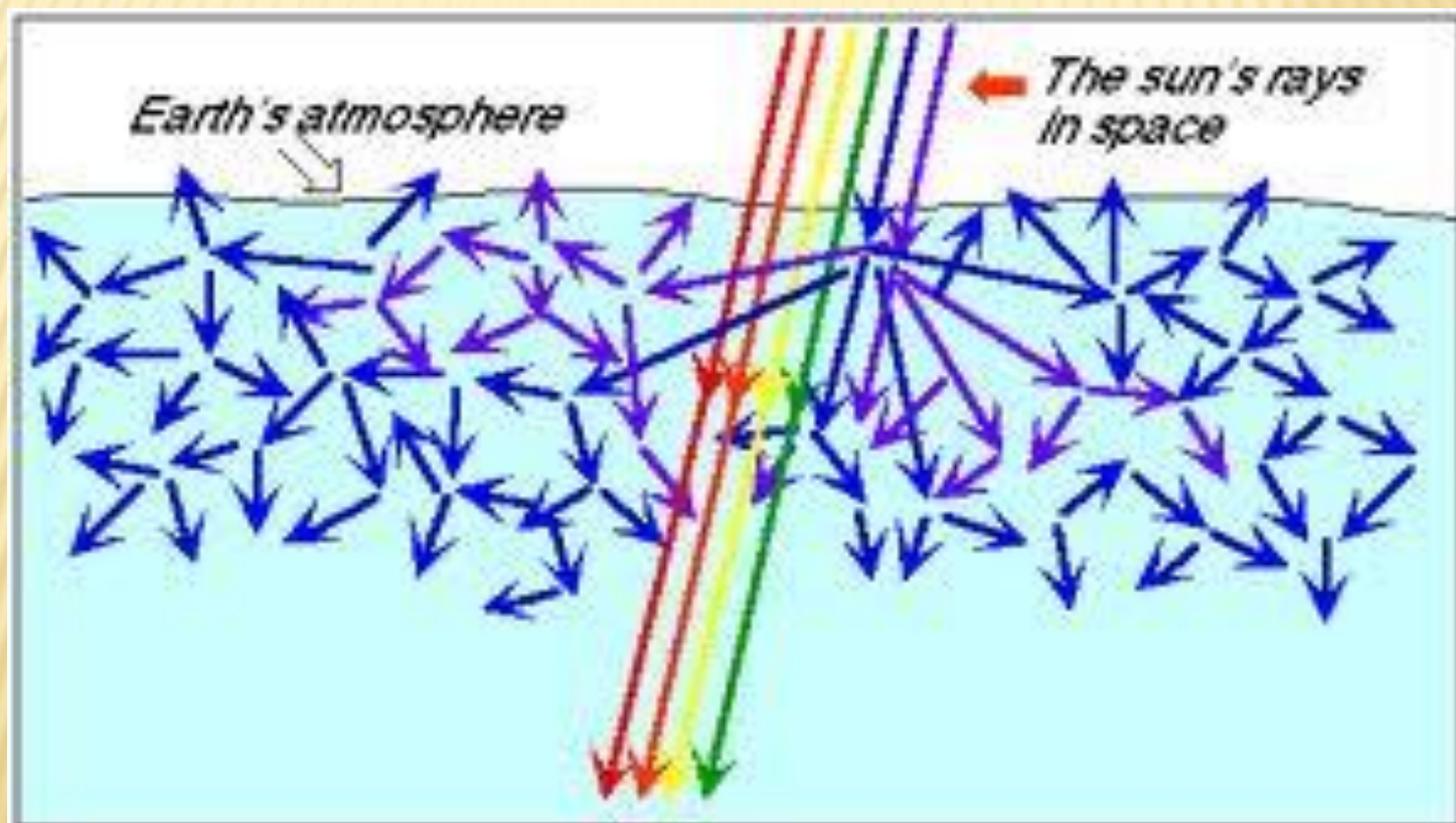
What is an example of a Vacuum?

Outer space is a Vacuum.



-
- × What color is white light?
 - × White light and Sun light are all the colors.
 - × How do we see color (ex. Why is a blue shirt blue)?
 - × We see the color that is reflected by an object.
 - × (all other colors are absorbed)
 - × What does refracted mean?
 - × Refracted means to bend light.





RADIATION

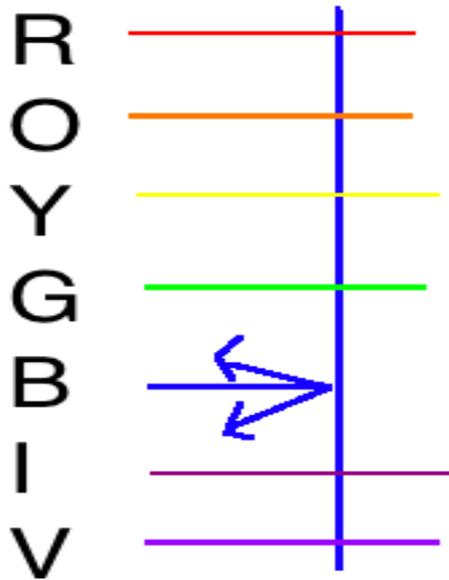
What affects Radiation?

What affects Radiation:

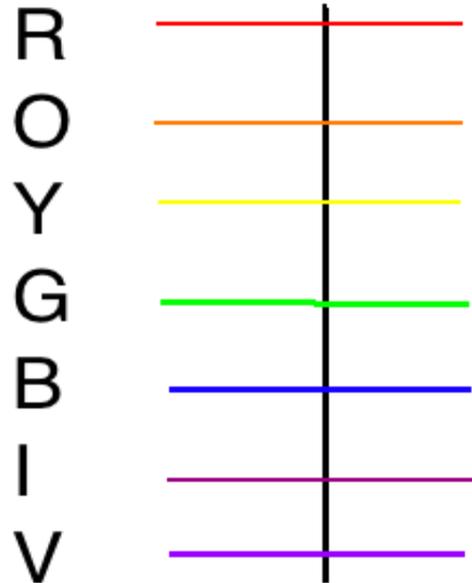
1) Color

Darker = Hotter

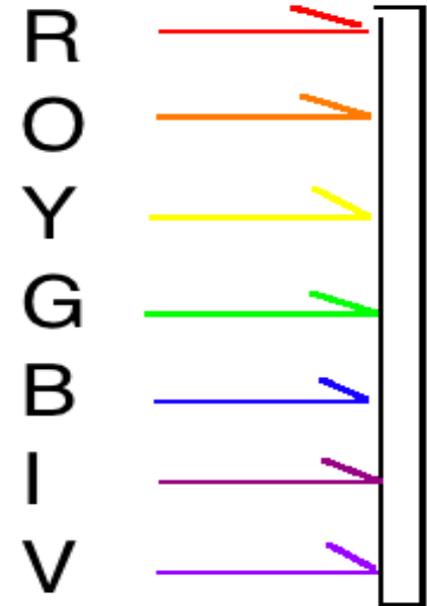
Lighter = Cooler



We see the reflected color

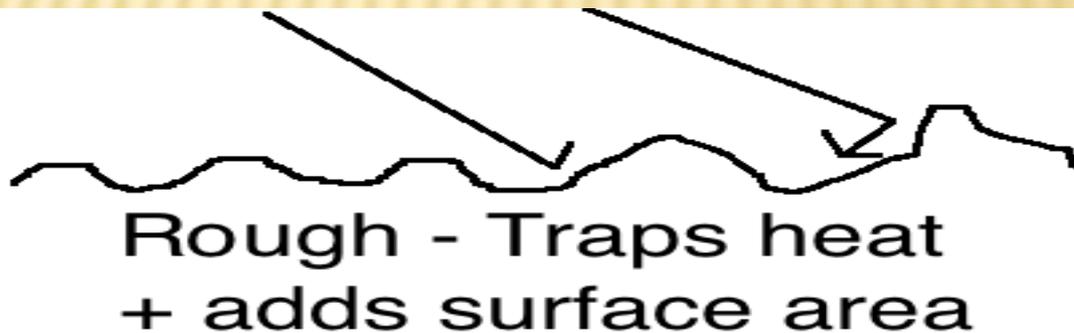
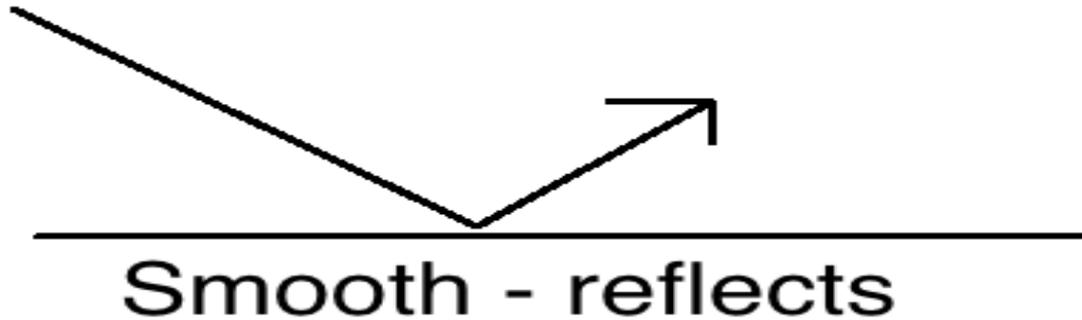


Black = All colors Absorbed
Absorbs more radiation = hotter

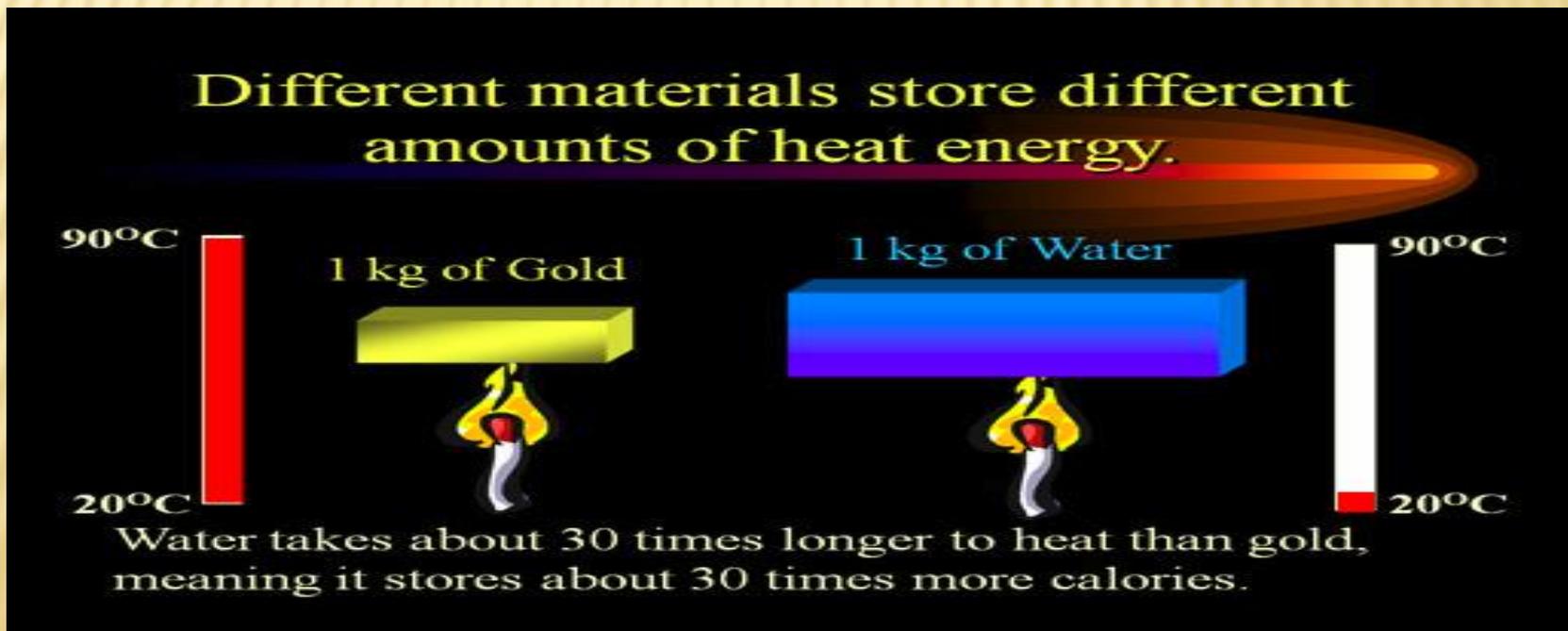


White = All colors Reflected
Absorbs less radiation = cooler

- ✘ 2) Texture -
- ✘ Smooth = cooler, rough = hotter



- ✘ 3) Material
- ✘ Different materials heat at different rates.
- ✘ Water heats slow, land heats fast



(R)

- ✘ Specific heat – how much heat is needed to change the temperature of a material.

MATERIAL	SPECIFIC HEAT (Joules/gram • °C)
Liquid water	4.18
Solid water (ice)	2.11
Water vapor	2.00
Dry air	1.01
Basalt	0.84
Granite	0.79
Iron	0.45
Copper	0.38
Lead	0.13

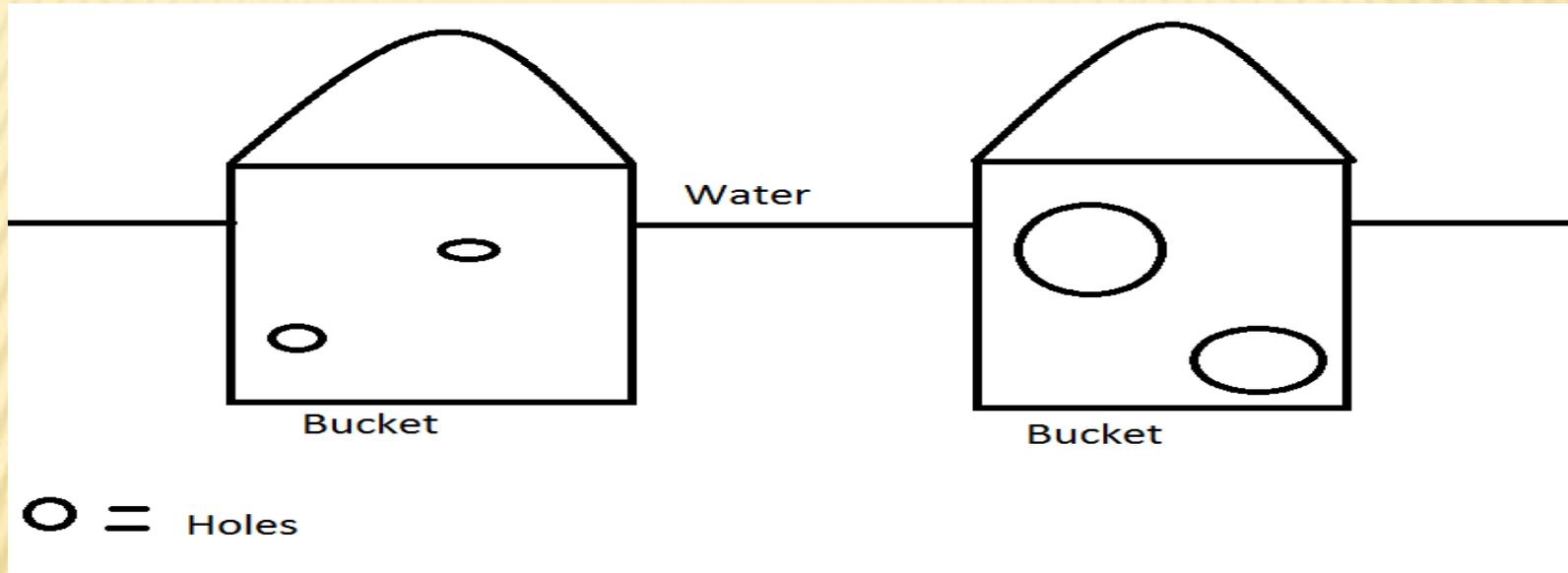
What is a Joule –

A Joule is a unit of heat (our calories).

The more Joules needed. The more energy / time needed to heat up the object

10 Joules will heat 1 g of water 2.39 deg. It will heat 1g of Lead 76.9 deg

-
- ✘ What happens to an object that gains heat quickly in terms of losing the heat?
 - ✘ Objects that gain heat quick, lose heat quick.
 - ✘ Objects that gain heat slow, lose heat slow.



Bucket with small holes
Gains water slowly,
Loses water slowly.

Bucket with large holes
Gains water fast,
Loses water fast.

- ✘ 4) Latitude -
- ✘ Latitude effects insolation (angle sun strikes)

The same energy is spread out over more surface at higher latitudes.

At lower latitudes the Sun's rays are more concentrated.

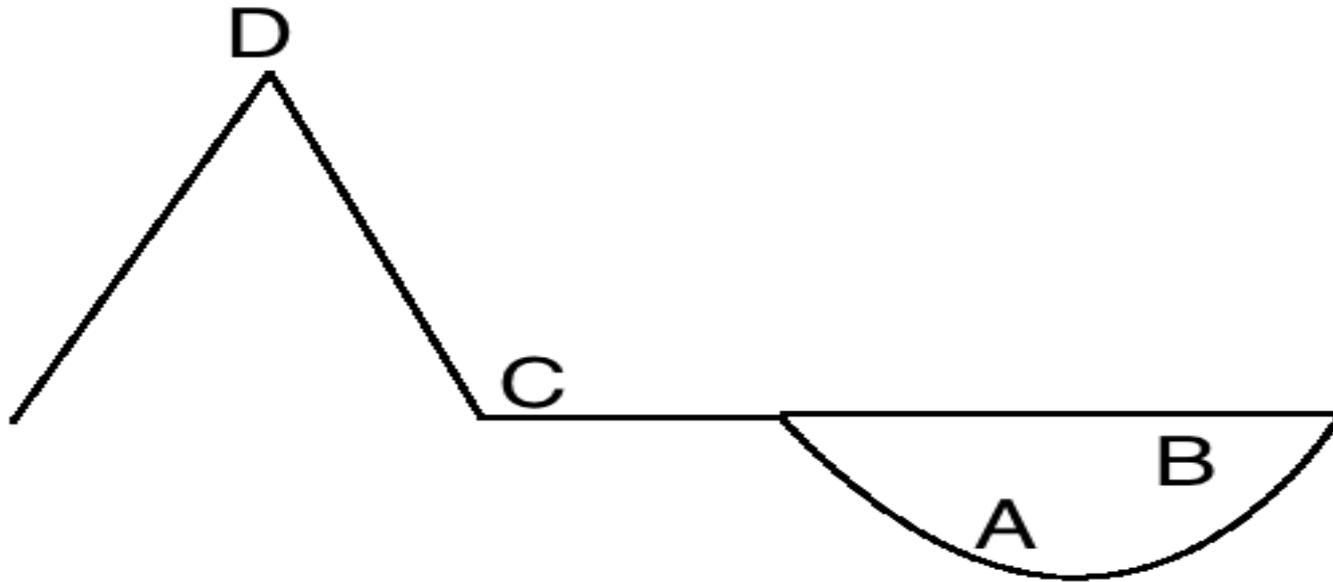


Allied Solar

RADIATION

× 5) Altitude

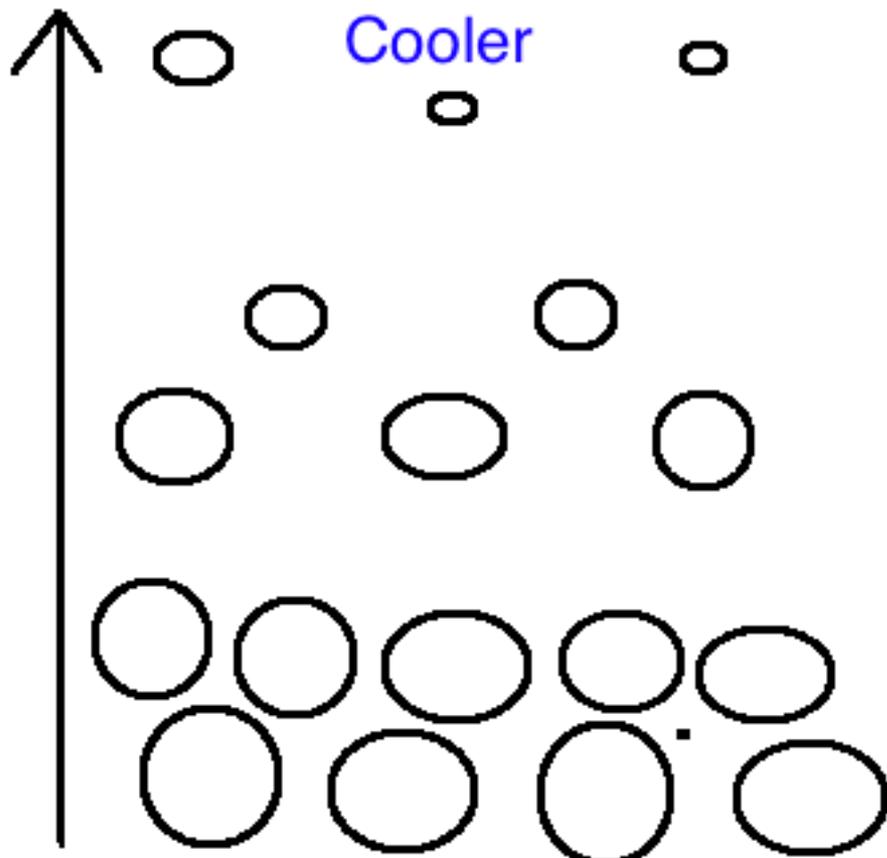
top of atmosphere



A pressure > B (more water above)

C pressure > D (More air above)

P
R
E
S
S
U
R
E



Cooler

M
O
L
E
C
U
L
E
S
S
P
R
E
A
D
O
U
T

Warmer

- ✘ Altitude – As you go higher air pressure drops. That makes air molecules spread out. They do not absorb as much radiation. The temperature is colder.





RADIATION LAB (G) & (R)

- ✘ What is Radiation?
- ✘ Best in what?
- ✘ What is a vacuum (give example)?
- ✘ 3 things that give off Radiation.
- ✘ EXPLAIN 5 things that affect radiation.
- ✘ Why do mountain climbers carry oxygen?