Name _____ Hour _____

LIGHT Notes

We **see an object** in 2 ways:

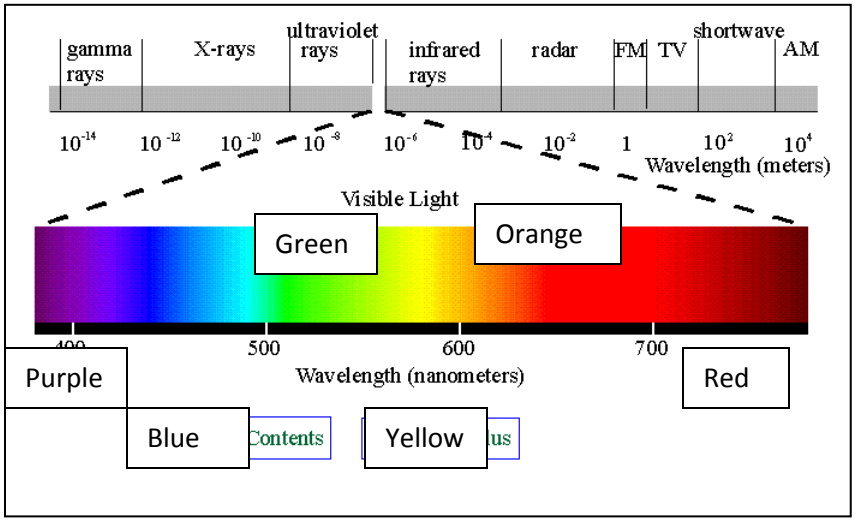
1. The object is the source of light

Ex:

2. By light reflected from an object which enters our eyes and allows us to see object

_____: Energy in the form of electric and magnetic fields- called **electromagnetic radiation**. Acts like both a particle and a transverse wave as it travels.

Types of Electromagnetic Energy:



Electromagnetic Spectrum:
TV, Radio: long λ, low *f*
Infrared: Heat
Ultraviolet: UV rays emitted
Sun, tanning booths
Birds, bees may see them

X-rays: Fires e- at Tungsten which releases x-rays
Gamma rays: high energy found in stars, cancer treat.

Cosmic rays: highest energy
Solar flares, supernovas

Light:

Visible light is **electromagnetic radiation** with a λ of 4×10^{-7} m to 7.5×10^{-7} m

*Travels in straight lines called _____

*Does NOT need a _____ to travel through (why light travels in space)

*Behaves like both a _____ and a _____

The speed of light is _____

Speed of light (c) = _____

If the wavelength of light increases, what will happen to the frequency of the wave?

Which color (purple or red) has a greater frequency? (more waves/sec) Explain your answer.

Name _____ Hour _____

Spectroscope Lab:
Use the spectroscope to find the wavelength of each colored line, and then use C = *f* x λ to calculate the frequency of each. Determine what each element is from list below.

Control/Practice: White Light

Unknown Element #1: _____

Unknown Element #2: _____

Unknown Element #3: _____

The frequencies of possible elements:
Mercury (3 lines): 6.7 x 10^{14} Hz, 5.5 x 10^{14} Hz, 5 x 10^{14} Hz
Hydrogen (3 lines): 7 x 10^{14} Hz, 6.1 x 10^{14} Hz, 4.3 x 10^{14} Hz
Neon (3 thick lines, 1 faint line): 5.5 x 10^{14} Hz, 5 x 10^{14} Hz, 4.6 x 10^{14} Hz, 4.5 x 10^{14} Hz

Take home lab: Calculate the speed of light: DUE _____

1. Completely cover the bottom of a paper plate with marshmallows (or chocolate chips, velveeta cheese, shredded cheese, etc.
2. Cook on low heat (30-60 sec) until you see some parts of the food start to melt.
3. Measure the distance between the melted spots: _____ **cm** = _____ **m**
4. The distance from #3 is equal to **½ a wavelength**. What is the microwave **λ**? _____ **m**
5. Find the **frequency** of your microwave (use **2450 MHz** if can't find it). _____Hz
6. Use v = *f* x λ to **calculate the speed of light** _____

   Show work here:

7. The accepted value for speed of light is: _____
8. Determine a % error for your calculation. $\frac{\text{(acc-expt)}}{\text{acc}}$ x 100 % _____
   Show work!

Must be done in a non-rotating microwave!