**you need:**

- **ch 4 notes**
- **EMS packet**
- **Notes from yesterday**
- **high lighter?**
- **blank sheet of paper**

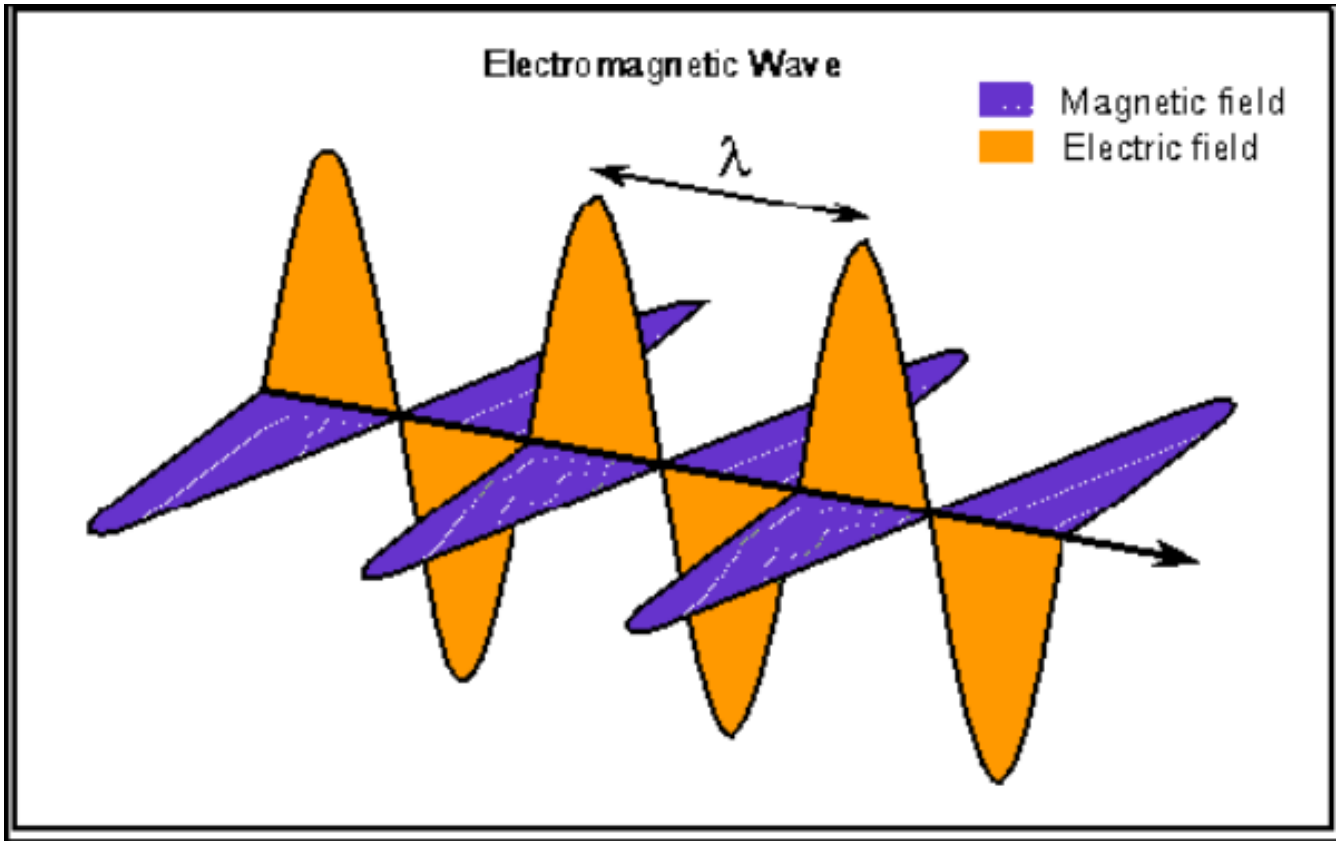
***Electromagnetic waves*** are:

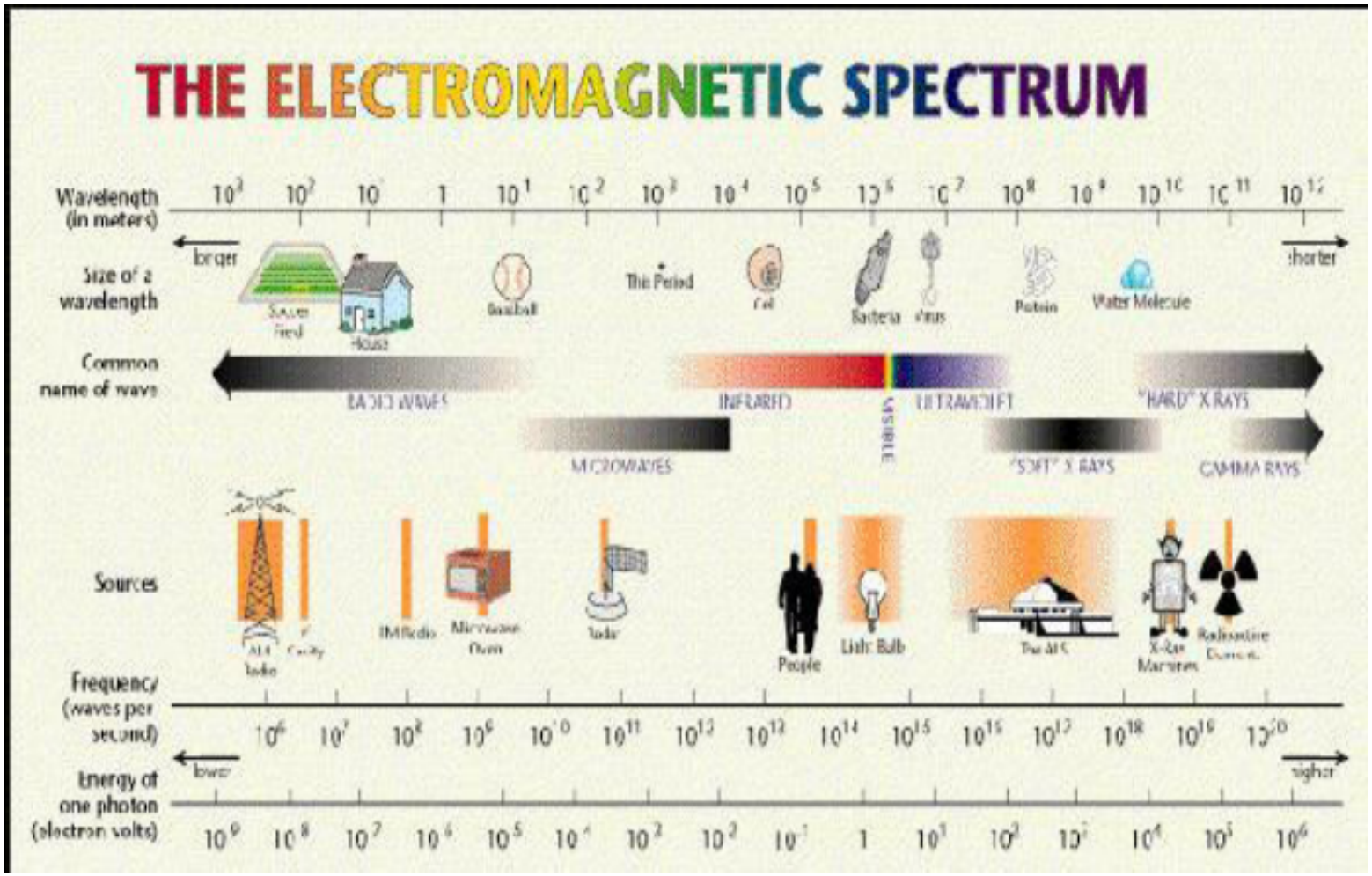
- a disturbance in an electrical or magnetic field that moves electric or magnetic energy from one place to another.

***Electrical field:*** moving electrically charged particles (protons + electrons -)

***Magnetic field -*** when electrons moving around certain atoms are spinning in the same direction a magnetic field is generated.

**Electromagnetic waves travel as TRANSVERSE waves. The higher the frequency and shorter the wavelength the more energy it has.**




THE ELECTROMAGNETIC SPECTRUM
Wavelength (in meters)
Size of a wavelength
Common name of wave
Sources
Frequency (waves per second)
Energy of one photon (electron volts)
longer
shorter
lower
higher
This Period
Baseball
Cell
Bacteria
Virus
Protein
Water Molecule
House
INFRARED
VISIBLE
MICROWAVES
"HARD" X RAYS
GAMMA RAYS
People
Light Bulb

**3 things can happen when an electromagnetic wave strikes an object:**
**Reflected, Transmitted, Absorbed**

**Reflection- EM energy bounces off**
**2 kinds of reflection**
**Diffuse- strikes a rough surface so that energy is reflected in all directions, not just back toward source. *This is why we can see things!***
**"Regular" - EM energy bounces back toward the direction it came from. *Like a mirror!***

*****the type of energy stays the**

**Transmitted- EM energy can go through the object to some degree**

**Transparent- Almost all of the EM energy gets through. *like a window***

**Translucent- only some of the EM energy gets through. *Like looking through frosted glass.***

**Opaque - none of the EM energy gets through. *Like a wall!***

******The energy remains the same and the direction remains the same******

**Absorbed- The EM energy is taken in by the material and TRANSFORMED to another type!**

******The EM energy is no longer EM energy!! it is transformed to another type and is therefore gone!******

***example:  infra red energy absorbed by the ground is transformed to thermal energy.  It is still energy, just not electromagnetic.***