

Electromagnetic Waves

- Radiant energy
- transverse waves
- can travel through empty space
- $c = 3 \times 10^8 \text{ m / s}$
- made by vibrating an electron

$$v = f\lambda$$

Electromagnetic Radiation (a.k.a. LIGHT)

Visible Light
400 nm - 750 nm

Long wavelength
Low frequency
Low energy photons
"Red" end

Short wavelength
High frequency
High energy photons
"Blue" end

Wave Behaviors of Light

Reflection, Refraction,
Diffraction, Interference,
& Polarization

Reflection

- "Bouncing" of light
- Law of Reflection:
 - Angle of incidence = angle of reflection
 - Angles are measured in reference to a line that is perpendicular to the surface called the Normal.

Refraction

- "Bending"
- Change in path of the light because of a change in speed
- Caused by a change in the medium that the light is traveling through.
 - Explains why a pencil looks bent when you place it in a glass of water

Refraction

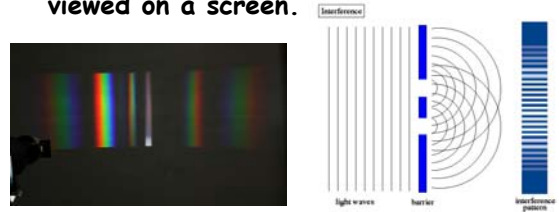
Diffraction

- Spreading out
- When white light shines through a water droplet it spreads out into the colors
- We see the rainbow



Interference

- Constructive and destructive interference results in patterns
- Patterns of light and dark that can be viewed on a screen.



Polarization

- Light waves vibrating in one plane only
- Light from the sun is non-polarized.
- A polarizing filter only allows one vibration through, blocking all others.
- Polarizing lenses are used in sunglasses to block the horizontally vibrating light that causes glare off of water.

