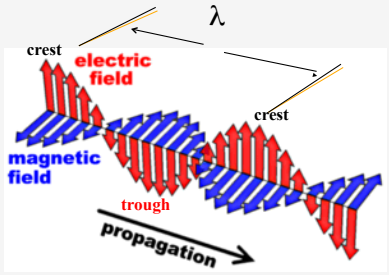
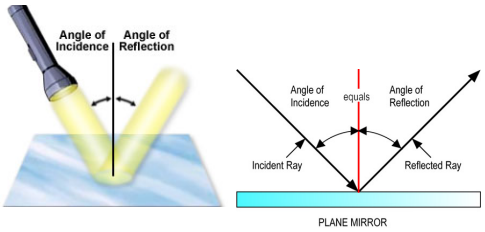
Light is an electromagnetic and transverse wave



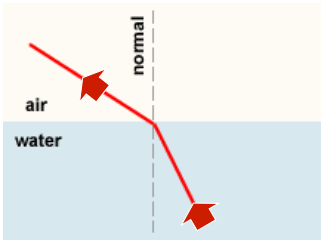
Light is an ***electromagnetic*** and ***transverse*** wave

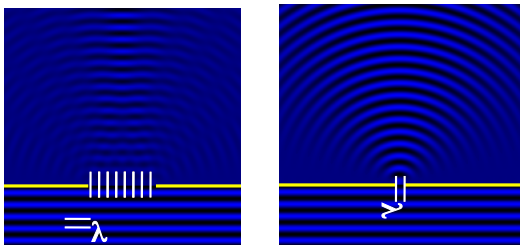


http://micro.magnet.fsu.edu/primer/lightandcolor/reflectionintro.html

http://onlinetutor.eagetutor.com/images/stories/reflection_1.jpg

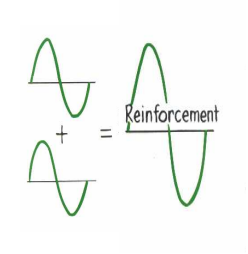
Refraction



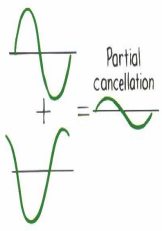


http://www.phy.ntnu.edu.tw/ntnujava/index.php?action=printpage;topic=2314.0

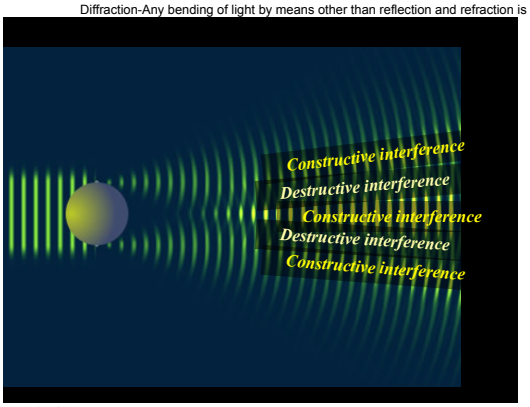
Diffraction-Any bending of light by means other than reflection and refraction is called diffraction.

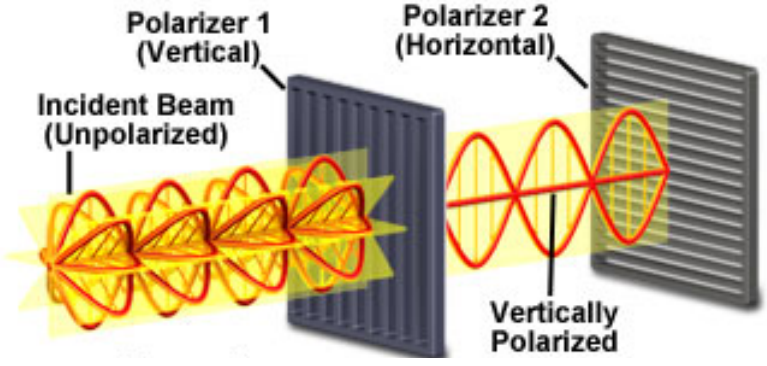


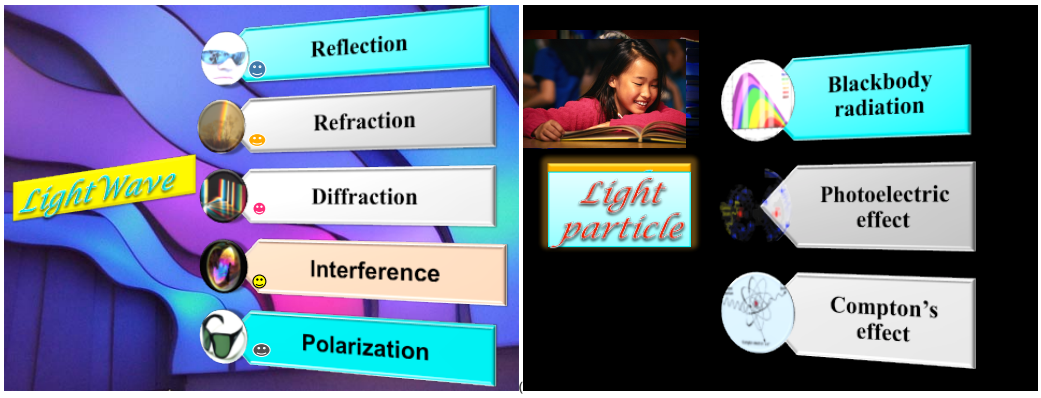
Constructive interference



Destructive interference





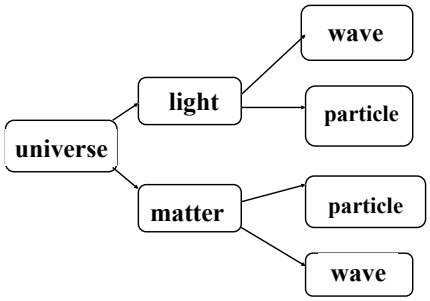


***Photoelectric effect is the result of the interaction between a single photon of light and a single electron.(*Particle-Particle interaction)**

The photon is completely absorbed and its energy is transferred entirely to the electron.

Einstein's Explanation
(Nobel Prize in 1921)

1. Light energy comes in DISCRETE packets (photons) and <u>not</u> continuously as waves.
2. Energy comes all at once in a bundle.
E = nhf n = 1,2,3,…
3. Energy is localized in a small volume of space.



Wave-particle duality

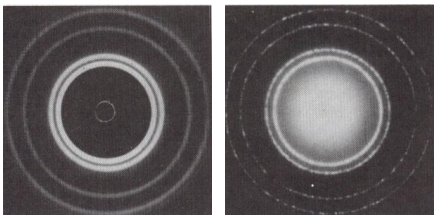
De Broglie Hypothesis

- **A moving <u>particle</u> behaves in certain ways as though it has a <u>wave</u> nature**
- **Wavelength of a moving particle**

$$\lambda = \frac{h}{mv}$$

h = Planck's constant = 6.63 x 10 $^{-34}$ J-s

Diffraction patterns



by X-RAYS **by ELECTRONS**