Light Properties

Light is a transverse wave. Light does not require a medium to travel.

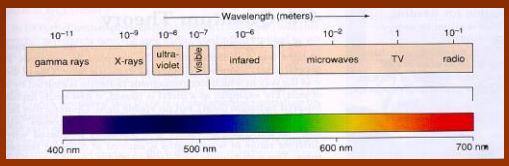
Light travels through space at a speed of 3×10^8 m/s. When light travels through a medium, it is slightly slower.

Not all light produced by a luminous body can be seen. In fact, humans can only see a very small part of the electromagnetic spectrum.

Types of EM Radiation

There are 7 types of electromagnetic radiation:

1) Radio waves - lowest E
2) Microwaves
3) Infrared (IR) - heat
4) Visible Light - only type visible
5) Ultraviolet (UV)
6) X-rays
7) Gamma Rays - highest E



Planck's Theory

As wavelength increases, the ability of the radiation to penetrate bodies decreases. This means that higher frequencies have more energy, which can be related by Planck's theory:

$$E = hf$$

h = Planck's constant = 6.63×10^{-34} J•s

Luminance

Light sources are luminous, or emit light waves. Any object that reflects light is an illuminated body. Illuminance is a measure of the amount of light provided for something.

The formula to find illuminance is:

$$E = \frac{P}{4\pi d^2}$$

Where E is the illuminance (lux) and P is the luminous flux, the rate at which visible light is emitted (lumen).

The Visible Spectrum

The visible spectrum of the electromagnetic spectrum is quite small in comparison to the rest of the electromagnetic spectrum.

Light is produced by a luminous body, and visible light has 7 natural colors which produce a spectrum of light - ROYGBIV

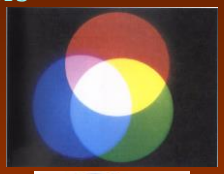
The primary colors of light are red, blue and green. By using different combinations of these lights, other colors can be made.

Colors

The secondary colors of light are magenta, cyan and yellow.

An even combination of all the primary colors produces the color white.

Black is the absence of light.



Types of Materials

Opaque - a material that doesn't transmit light, and objects behind the material cannot be seen easily.

Translucent - a material that transmits light a little, and objects behind the material appear distorted.

Transparent - a material that transmits light easily, and objects behind the material can be seen easily.

- RED
- ORANGE
- YELLOW
- GREEN
- BLUE
- VIOLET