

11/3/15

Light (unit 4)

What is Light?

- a type of energy.

*
Test?
?

Light travels at

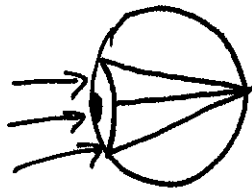
- 186,300 miles/sec
- 3×10^8 m/s

How do we see?

Greeks & Arabics thought signal sent from objects to eye.

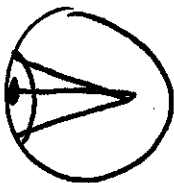
We found out later that light is needed to see.

The eye:

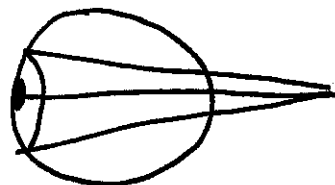


Light hits pupil to enter eye - light hits convex lens in eye & refracts.

Nearsighted



Farsighted



Light gets bent to a focal point.

Scientists:

- Rene Descartes, 1637
 - Book called "Optics"
 - Light is somekind of disturbance but not a material entity, moving at an infinitely high speed. (not correct)
- Isaac Newton, 1666
 - Light has discrete properties with very small masses, if any.
 - Subject to being accelerated.
- Thomas Hobbs, 1644
 - Wavelike character for which speed in dense medium is less than in air
- Christian Huygens
 - Light is a wave phenomenon moving at very high speeds.
- Galileo
 - Velocity of light is finite rather than infinite, but large compared with sound velocity. - studied thunder & lightning. light faster than sound.
- Ole Romer
 - 1st person to give a # for a finite speed of light. - used eclipses of Jupiter's moons.

Velocity of light in empty space.

$$c = 299,792 \text{ km/s}$$

$$c = 3.0 \times 10^8 \text{ m/s}$$

$$c = 186,300 \text{ miles/s}$$

> must know these!

2 types of waves:

Mechanical - require a medium to travel through.

Electromagnetic

Light is an electromagnetic wave.

• James Clerk Maxwell

- showed that light is energy carried in form of traveling wave.

composed of electric & magnetic fields.

3 things make up a light wave:

1- Electricity

2- magnets

3- Energy

A wave is a moving disturbance that transports energy from one place to another.

Mechanical waves:

- 1 - transverse - energy moves in perpendicular motion to wave.
- 2 - Longitudinal - energy moves in parallel motion to wave.

All electromagnetic waves are transverse.