## Science 8 - Light and Optical Systems - Review notes

# 1.1 Challenge of Light – the various people who contributed to the understanding of light

- a. You should know that our understanding of light has changed. Watch the introduction videos (History of Light) for more details
- b. Speed of light know approximately how fast light travels
- c. Properties of light 5 key points

## 1.2 Optical Devices

- a. Microscope parts and function
- b. Telescope function, difference between reflecting and refracting
- c. Binoculars function, how do they work?

# 2.1 Light travels in Rays and Interacts with materials

- a. Vocab ray diagram, Transparent, translucent, opaque, Luminous, non-luminous, Regular reflection vs diffuse reflection
- b. Use ray diagrams to explain how light travels and how shadows are created

#### 2.2 Law of Reflection

- a. Vocab incident ray, reflected ray, normal line, plane mirror
- b. Angle of incidence = angle of reflection

# 2.3 Reflecting with curved mirrors

- a. vocab concave, convex, focal point
- b. ray diagrams showing what happens with each mirror (convex vs concave)
- c. concave mirrors enlarge the image, convex mirrors shrink the image (but you see more of the surrounding area)

# 2.4 Transparent substance refract light

- a. vocab refraction
- b. how does light change as it goes from air to water and visa versa? How is this related to density of those materials?
- c. Does the speed of light ever change?

#### 2.5 Lenses refract and focus light

- a. concave, convex lenses
- b. how does light change as it goes through different lenses?
- c. Concave lenses spread light out, convex lenses bring light rays together

## 3.1 Wave Model of Light

- a. vocab wavelength, frequency, crest, trough, amplitude
- b. as frequency of a wave increases, the wavelength shortens
- c. speed = wavelength x frequency
- d. light travels in waves the waves travel in straight lines

# 3.2 Electromagnetic spectrum

- a. low frequency, long wavelength, low energy
  - i. radio waves MRI, radios
  - ii. microwaves radar
  - iii. infared radiation heat
  - iv. visible light colours of the rainbow (ROYGBIV) from longest to shortest
  - v. ultraviolet radiation (UV) causes sunburn
  - vi. x-rays
  - vii. gamma rays
- b. high frequency, short wavelength, high energy

# 4.1 Image formation in Eyes and cameras

- a. Vocab pupil, aperture, iris, diaphragm, shutter, retina, photoreceptors, rods, cones, optic nerve, film
- b. How does the eye work to capture images? Compare that to a camera.
- c. How do we correct visions problems? Near-sightedness (focal point too near the lens concave lens), far sightedness (focal point too far from the lens convex lens)

## 4.2 Other eyes in the animal Kingdom

- a. Vocab camera eyes, nocturnal, compound eyes, ommatidium
- b. How do different eyes help species survive?