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?