

REVIEW

Unit 3 – Light and Optical Systems

1.0 Explanations, Inventions & Investigations about Light and Vision

- ❖ Scientific experiments to explain how light and vision work
- ❖ Optical devices – **telescopes** and **microscopes** – have lead to **astronomy** and **microbiology**

2.0 Light behaves in predictable ways

- ❖ Ray diagrams are used to describe light
- ❖ The **Angle of Incidence** equals the **Angle of Reflection**
- ❖ **Concave** mirrors **converge** light to a focal point (headlights)
- ❖ **Convex** mirrors **diverge**, or spread light out
- ❖ **Refraction** – light is bent when it passes to and from areas of different densities
- ❖ **Concave and Convex lenses** are **optical devices** that refract light to form **images**

3.0 Electromagnetic Spectrum – Wave Theory

- ❖ Light has the properties of a **wave**
- ❖ **Visible light** has different wavelengths and forms the colors of the rainbow
- ❖ Electromagnetic spectrum also includes (**invisible** light) – radio waves, microwaves, infrared, ultraviolet, X-rays, gamma ray
- ❖ Radio waves carry the least energy – gamma rays the most energy
- ❖ Visible light can be produced naturally (**bioluminescence**, **sunlight**) & artificially (**phosphorescence**, **incandescence** and **fluorescence**)
- ❖ White light combines red light – green light – blue light

4.0 Eyes and Cameras capture Images using Light Properties

- ❖ Similarities – designed to capture and focus light to form an image on a light-sensitive material
- ❖ Insects have **compound eyes** made of many tiny lenses
- ❖ Digital images are made by a computer, which converts the image to **pixels** (a set of numbers)