

Light and Optics

THE NATURE OF LIGHT

- ◆ Light is both _____ and particles called _____.
- ◆ Some light is visible (i.e. red, orange, yellow, green, blue, indigo and violet) and some is _____ (e.g. infrared, ultraviolet, gamma rays, Xrays).
- ◆ Light travels in _____.
- ◆ The speed of light in a vacuum is _____ m/s. Light travels more _____ in denser media such as glass and water.

REFLECTION

Draw labelled diagrams to illustrate the following:

The angle of reflection of a light ray equals the angle of reflection.

The object in front of a mirror is the same distance as the image is behind the mirror.

REFRACTION

- ◆ Refraction is the bending of light as it travels from one medium to another (e.g. air to glass).
- ◆ Draw labelled diagrams to illustrate the following:

When travelling from a less dense to a more dense medium (e.g. air to water), light rays refract closer to the normal, and the angle of incidence is more than the angle of refraction.

When travelling from a more dense to a less dense medium (e.g. water to air), light rays refract away from the normal, and the angle of incidence is less than the angle of refraction.

PRISMS

- ◆ A prism is a transparent object with flat surfaces that is used to separate the visible light spectrum into its seven coloured light _____ by refraction.
- ◆ The seven colours of the spectrum in order from the longest to shortest wavelengths are _____

CRITICAL ANGLE

- ◆ The critical angle is the angle of incidence that gives an angle of refraction of 90° with the normal and goes _____ the surface.
- ◆ When light rays travel at the critical angle through an object such as optical fibre, they are _____ .

IMAGES

◆ Images can be:

1. R_____ (able to be focused on a screen) or V_____ (cannot be focused on a screen)
2. M_____ (larger than object), D_____ (smaller than object) or Same Size
3. E_____ (upright) or I_____ (upside down)

LENSES

Draw labelled diagrams to illustrate the following:

Convex lenses are converging lenses that focus the light rays to a point.

Concave lenses are diverging lenses that spread the light rays.

THE COLOUR OF OBJECTS

- ◆ Objects have the colour that is reflected back to our _____. Other light colours are _____ by the object.
- ◆ For example, green plants reflect _____ light and absorb other coloured wavelengths for photosynthesis.
- ◆ Draw labelled diagrams to illustrate the following:

White light is shone onto a green plant.

White light is shone onto a cyan (blue-green) coloured wall.

Magenta light (red and blue light rays) are shone onto a red shirt.