

Key Definitions

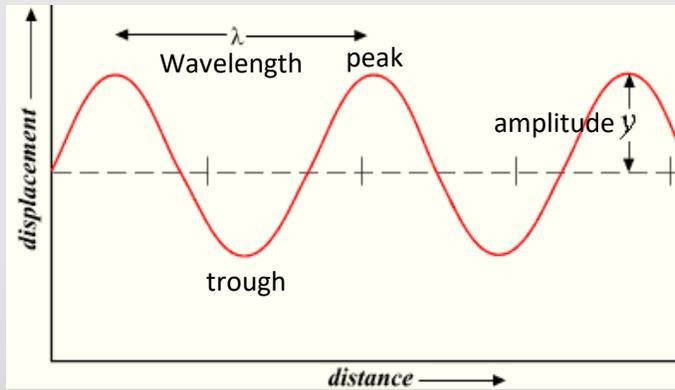
Peak/crest – the top of a wave.

Trough – the bottom of a wave.

Wavelength (λ) – the distance between **identical** points on a wave (metres, m).

Amplitude (A) – maximum **height (or depth)** of a wave (unit – metres, m).

Frequency (f) – the number of waves passing a point per second (unit – Hertz, Hz)



Waves **transfer energy** but **without** transferring matter.

The energy is **transferred by vibrations or oscillations** in the material which the wave is travelling through.

Transverse Waves

The oscillations are perpendicular (right angles) to the direction of energy transfer.

Light waves are transverse waves.

Light Waves

Light waves travel in STRAIGHT lines

Light travels fast, around 300000 km per s.

We see things where light is reflected.

Where light is blocked we see shadows.

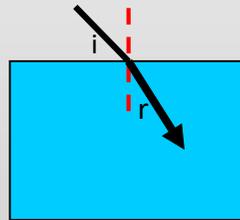
A luminous object is one that produces light.

A non-luminous object is one that reflects light.

Refraction

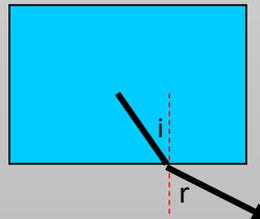
If light rays move from a less dense medium (air) to a more dense medium (glass) they move towards the normal.

Angle of incidence > Angle of refraction



If light rays move from a more dense medium (glass) to a less dense medium (air) they 'move' away from the normal.

Angle of incidence < Angle of refraction



Reflection

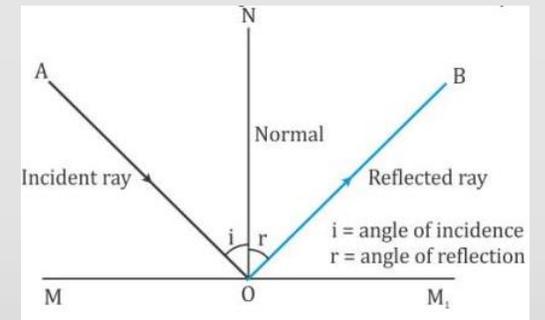
When light hits a surface it can be absorbed (does not pass through), transmitted (passes through the material, e.g. glass) or reflected.

Two types of reflection

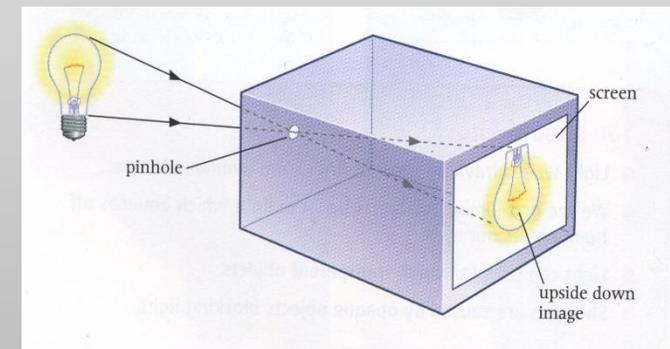
- Specular – occurs at smooth shiny surfaces.
- Diffuse - occurs at rough surfaces and light is scattered in all directions.

The Law of Reflection

The angle of incidence is the same as the angle of reflection.



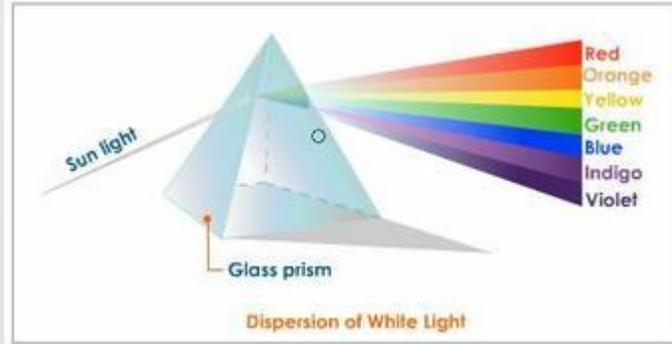
Pinhole Camera – The image is inverted (upside down).



Colour

White light is made up of red, orange, yellow, green, blue and violet (ROYGBIV).

White light can be split using a prism. This is called dispersion.



Red, green and blue are called primary colours. All other colours can be made by combining these in various ways.

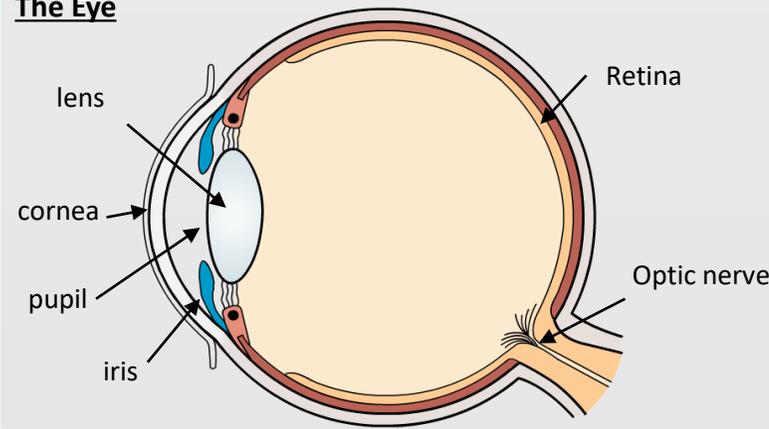
Magenta, cyan and yellow are secondary colours. They are made by combining two primary colours.

We see the colour that is reflected off an object. E.g. a red book will reflect red light into our eye.

Black objects absorb all light shining on them.

White objects reflect all light shining on them.

The Eye



The retina contains cells that detect the light reflected into our eye and it sends the information to the brain via the optic nerve.

Sound waves

Sound waves are longitudinal waves.

Sound waves need particles in order to travel.

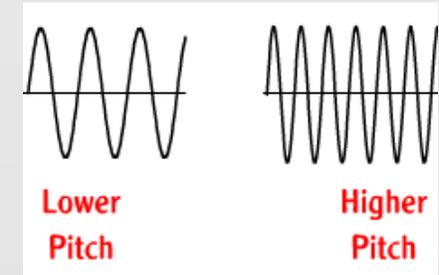
The substance that the sound travels through affects the speed of sound greatly.

In air sound travels at 330 metres per second. Sound travels fastest through solids because the particles are closer together than in a liquid and a gas, so the vibrations are more easily passed from particle to particle.

Pitch and Volume

The higher the pitch of a sound the higher the frequency of the wave. The wavelength will be much shorter.

A low-pitched sound will have a low frequency. The wavelength will be much longer.



A loud sound with a high volume will have a high amplitude and a quiet sound with a low volume will have a lower amplitude.

