

COMMUNICATING INFORMATION

Waves

know the difference between longitudinal and transverse waves
know that sound waves are longitudinal waves produced by vibrations
know the relationship between pitch and frequency for sound waves
know the relationship between amplitude and loudness for sound waves
know the meaning of frequency, wavelength and amplitude of a wave
understand the relationship between velocity, frequency and wavelength
know that there is no net transfer of matter when sound or electromagnetic waves are transmitted
be able to describe the movement of waves in ropes, water and in springs
■ know that diffraction is the spreading out of waves as they pass through an aperture
understand that diffraction causes waves to spread out from their source, and how the size of the source compared with the wavelength affects diffraction
know that light is an electromagnetic wave
know that the electromagnetic spectrum includes: gamma rays, X-rays, ultraviolet radiation, visible light, infra-red radiation and radio waves
know that all electromagnetic radiation travels in a vacuum at the same speed as light
know about the use of infrared and microwaves for heating

Reflection

know that waves can be reflected
be able to construct diagrams to show the path of light in simple applications of plane and concave mirrors (the periscope, satellite dish)
understand what is meant by critical angle
know that there is no loss of energy on total internal reflection
know how total internal reflection of light in optical fibres can be used to carry information

Communication

know how radio waves, microwaves, infra-red and visible light may be used for communication
understand how microwaves and radiowaves can be used for global transmission of information by satellites
know that long-wave radio signals are reflected from the ionosphere and can be used for long-range communication
know that short-wave radio signals and microwaves pass through the ionosphere and so need repeater stations or satellites for long range communications
understand the use of concave reflectors to direct and capture electromagnetic waves

Refraction

know that waves can be refracted
be able to construct diagrams to show the path of light in simple applications of convex lenses (eye, camera, projector)
know that the speed of light is different in different media
know that refraction (change in direction) occurs when waves cross from one medium into another
be able to construct diagrams to show the path of light into, through and out the other side of transparent blocks
know the main parts of the eye and their functions
understand how a clear image is formed on the retina of the eye