P10 Waves and their properties

Lessons TBAT	Key Knowledge	Practical	Assessment
Describe a wave Describe the properties of a wave (HT only) Investigate the law of reflection (HT only) Investigate the transmission of light from media to another Explain how to measure waves in a solid, liquid or gas.	Waves may be either transverse or longitudinal. The ripples on a water surface are an example of a transverse wave. Longitudinal waves show areas of compression and rarefaction. Sound waves travelling through air are longitudinal. Students should be able to describe the difference between longitudinal and transverse waves. Students should be able to describe evidence that, for both ripples on a water surface and sound waves in air, it is the wave and not the water or air itself that travels. Students should be able to describe wave motion in terms of their amplitude, wavelength, frequency and period. The amplitude of a wave is the maximum displacement of a point on a wave away from its undisturbed position.	Required practical activity 20: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. AT skills covered by this practical activity: physics AT 4. Investigating reflection: make observations of the angle of light hitting a mirror and the angle at which it's reflected. These angles should be the same. Investigating refraction: make observations of the angles of light rays moving into a transparent medium and if the ray changes direction.	Write a method for measuring the speed of sound (6 marker) Last lesson of topic Maths focus Prefixes and use of standard form

	The wavelength of a wave is the distance from a point on one wave to the equivalent point on the adjacent wave. The frequency of a wave is the number of waves passing a point each second. period = 1 frequency T = 1 f period, T, in seconds, s frequency, f, in hertz, Hz The wave speed is the speed at which the energy is transferred (or the wave moves) through the medium. All waves obey the wave equation: wave speed = frequency × wavelength v = f λ wave speed, v, in metres per second, m/s frequency, f, in hertz, Hz wavelength, λ, in metres, m Students should be able to: identify amplitude and wavelength from given diagrams describe a method to measure the speed of sound waves in air describe a method to measure the speed of ripples on a water surface. (HT only) Different substances may absorb, transmit, refract or reflect electromagnetic waves in ways that vary with wavelength. (HT only) Some effects, for example refraction, are due to the difference in velocity of the waves in different substances.	Key stage 3 • the similarities and differences between light waves and waves in matter • light waves travelling through a vacuum; speed of light • the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface • use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye • light transferring energy from source to absorber, leading to chemical and electrical effects; photosensitive material in the retina and in cameras • colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection

	Students should be able to construct ray diagrams to illustrate the refraction of a wave at the boundary between two different media. (HT only) Students should be able to use wave front diagrams to explain refraction in terms of the change of speed that happens when a wave travels from one medium to a different medium.	

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