

P5 Module Outline

- describe wave motion in terms of amplitude, wavelength, frequency and period
- define wavelength and frequency
- describe and apply the relationship between these and the wave velocity
- apply formulae relating velocity, frequency and wavelength
- describe differences between transverse and longitudinal waves
- *show how changes, in velocity, frequency and wavelength, in transmission of sound waves from one medium to another, are inter-related (separate Science only)*
- *describe the effects of reflection, transmission, and absorption of waves at material interface (separate Science only)*
- **describe, with examples, processes which convert wave disturbances between sound waves and vibrations in solids (Higher only) (separate Science only)**
- **explain why such processes only work over a limited frequency range, and the relevance of this to human hearing (Higher only) (separate Science only)**
- describe how ripples on water surfaces are used to model transverse waves whilst sound waves in air are longitudinal waves, and how the speed of each may be measured
- describe evidence that in both cases it is the wave and not the water or air itself that travels
- recall that electromagnetic waves are transverse and are transmitted through space where all have the same velocity
- explain that electromagnetic waves transfer energy from source to absorber
- apply the relationships between frequency and wavelength across the electromagnetic spectrum
- describe the main groupings of the electromagnetic spectrum and that these groupings range from long to short wavelengths and from low to high frequencies
- describe that our eyes can only detect a limited range of the electromagnetic spectrum
- recall that light is an electromagnetic wave
- give examples of some practical uses of electromagnetic waves in the radio, micro-wave, infra-red, visible, ultra-violet, X-ray and gamma-ray regions
- describe how ultra-violet waves, X-rays and gamma-rays can have hazardous effects, notably on human bodily tissues
- **explain, in qualitative terms, how the differences in velocity, absorption and reflection between different types of waves in solids and liquids can be used both for detection and for exploration of structures which are hidden from direct observation, notably in our bodies (higher only) (separate Science only)**
- **recall that radio waves can be produced by, or can themselves induce, oscillations in electrical circuits (higher only)**
- **recall that different substances may absorb, transmit, refract, or reflect electromagnetic waves in ways that vary with wavelength (higher only)**
- **explain how some effects are related to differences in the velocity of electromagnetic waves in different substances (higher only)**
- *use ray diagrams to illustrate reflection, refraction and the similarities and differences between convex and concave lenses (qualitative only) (separate Science only)*
- *construct two-dimensional ray diagrams to illustrate reflection and refraction (qualitative only –equations not needed) (separate Science only)*
- *explain how colour is related to differential absorption, transmission and reflection (separate Science only)*

P5 Formulae to Learn

$$\text{wavespeed (m/s)} = \text{frequency (Hz)} \times \text{wavelength (m)}$$