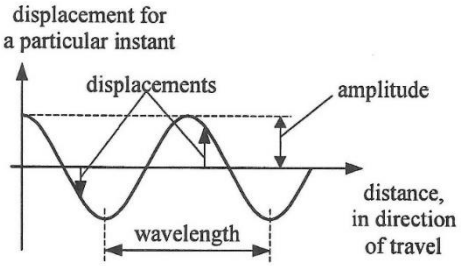
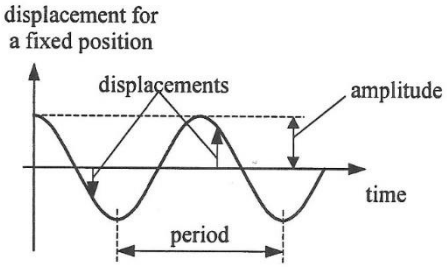
Wave Motion

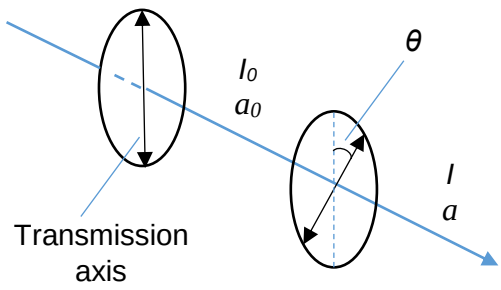
Progressive Waves – energy is transferred in the propagation of the wave

Displacement-distance (All wave particles)	Displacement-time (one particle in SHM)
	

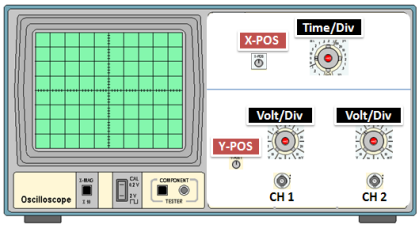
Both graphs can be describing longitudinal (oscillation of medium along the propagation) or transverse (oscillation of medium perpendicular to the propagation) waves.

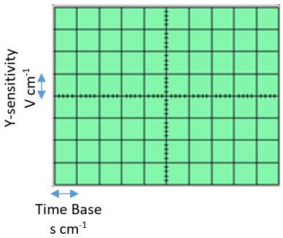
Wave Equation	$f = v\frac{1}{\lambda}$	• Frequency is inversely proportional to wavelength • Speed of wave is constant and is affected by change in medium or temperature.
Phase Difference	$\Delta\phi = \frac{\Delta t}{T} \times 2\pi$ $\Delta\phi = \frac{\Delta d}{\lambda} \times 2\pi$	• Time lapse (Δt) out of the period, T • Distance between two points in a wave (Δd) out of the wavelength, λ
Intensity of wave (determines brightness of light and loudness of sound) Intensity a point source	$I \propto a^2$ $I = \frac{P}{4\pi r^2}$ $I \propto \frac{1}{r^2}$	• Intensity at a point is proportional to the square of the amplitude of the wave at that point. • Intensity is the wave energy incident per unit time per unit area normal to the direction of travel of the wave. • Area incident of a point source is the area of a sphere.

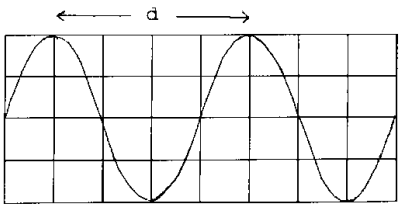
Polarisation

	Malus' Law $I = I_0 \cos^2\theta$ since $I \propto a^2$, $a = a_0 \cos\theta$ • Malus' Law is applicable to a plane polarised light of intensity I_0 and amplitude a_0 passing through a polariser/polaroid. • When a completely unpolarised light passes through a polariser/polaroid, it becomes polarised with halved intensity.

Calibrated Oscilloscope







Let time base setting be x s cm^{-1}

Frequency, $f = \dfrac{1}{xd}$

Wavelength Measurement

(See summary sheet for Superposition)