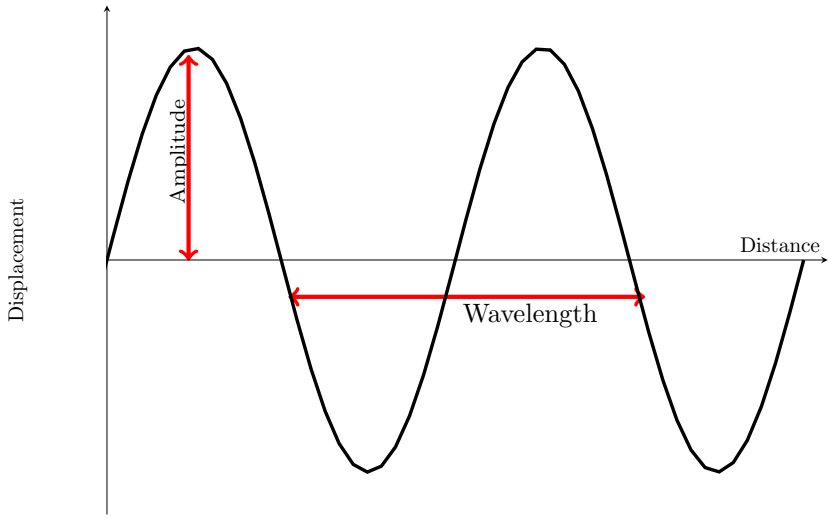
Progressive and stationary waves

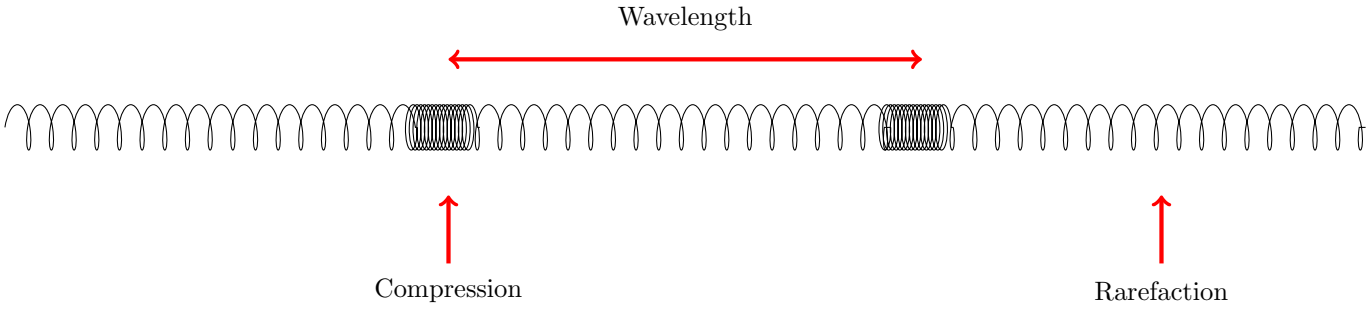
1 Progressive waves

1.1 Transverse wave



Wave direction and energy are perpendicular

1.2 Longitudinal wave



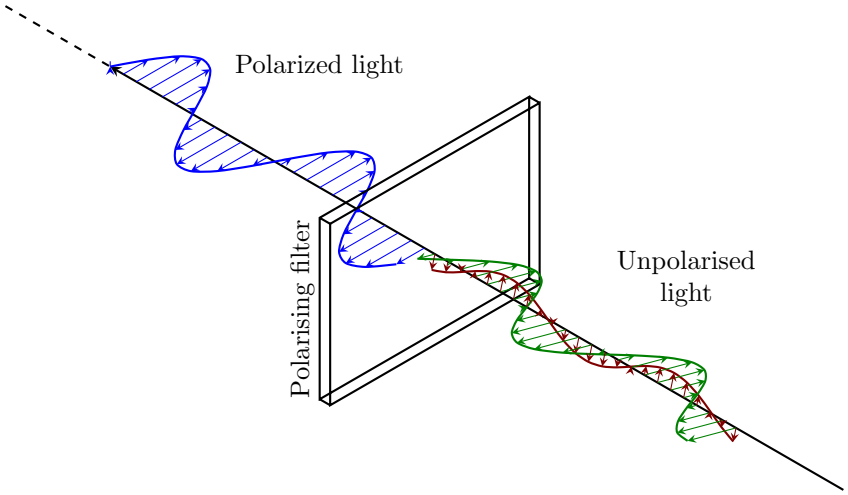
Wave direction and energy are parallel

1.3 Definitions

Displacement - Distance from equilibrium to the position of the particle
Amplitude - The maximum displacement of a particle
Wavelength - The distance from a point on a wave to the same point on the next wave
Complete cycle - The cycle from one point of maximum displacement to the next section of maximum displacement
Period - The time for 1 complete cycle
Frequency - The number of complete cycles per second

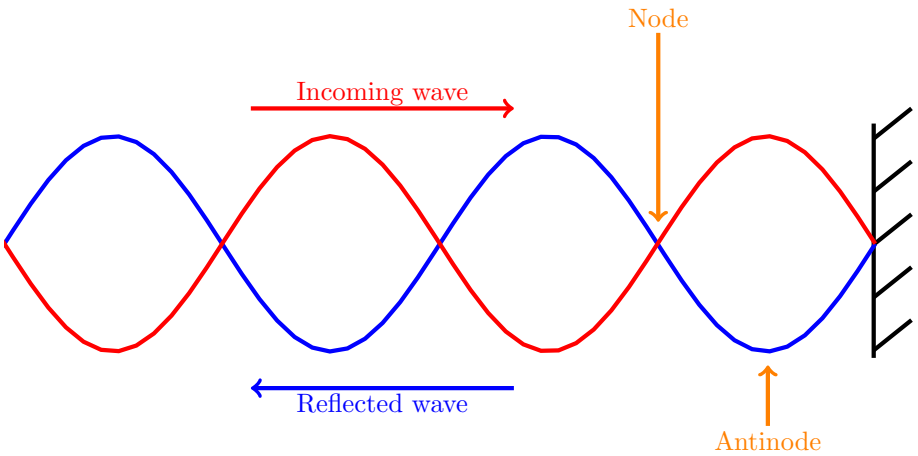
1.4 Polarisation

Polarised light all travels in the same direction
Unpolarised light travels in all directions
Unpolarised light can be polarised using a polarising filter which contains stripes, only allowing one direction of light through
Only transverse waves can be polarised



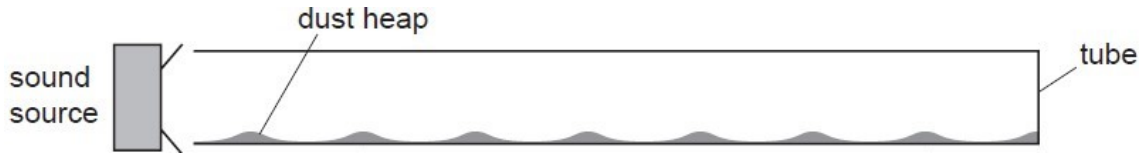
2 The superposition of waves and stationary waves

Stationary waves are formed when a wave collides with itself after reflection



When both waves are at equilibrium there is a **node**
When one wave is at a maximum and one at a minimum there is an **antinode**

2.1 Sound

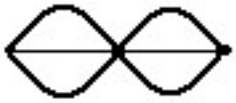
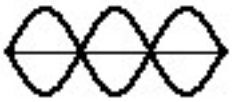
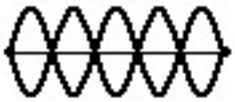
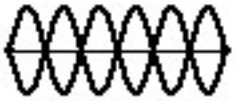


Dust heaps are made at nodes and dips are made at antinodes
λ=Distance between the nodes $\times 2$

2.2 Microwaves

The receiver can be moved to find areas of nodes or antinodes

2.3 Harmonics

Harmonic	Pattern	# of Loops	Length-Wavelengt Relationship
1st		1	$L = 1 / 2 \cdot \lambda$
2nd		2	$L = 2 / 2 \cdot \lambda$
3rd		3	$L = 3 / 2 \cdot \lambda$
4th		4	$L = 4 / 2 \cdot \lambda$
5th		5	$L = 5 / 2 \cdot \lambda$
6th		6	$L = 6 / 2 \cdot \lambda$