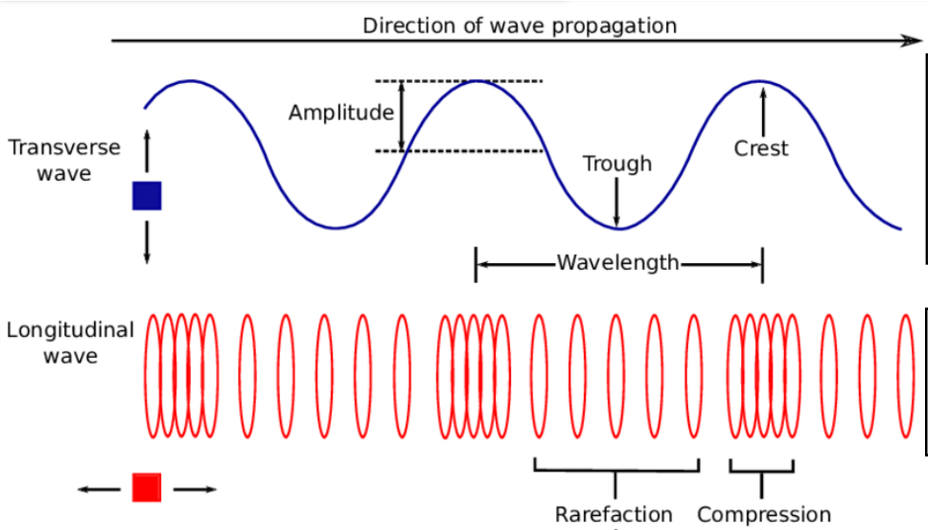
AQA - P6 Waves
Combined Foundation

Required practical's for this topic:
1. **Ripple tank**
2. **Waves on a string**
3. **Infrared**

Properties of Waves

Key word	Definition/description
oscillation	Vibrating back and forth about a fixed position.
wave	The transfer of energy from one place to another without the transfer of matter.
rest position	The undisturbed position of particles when they are not vibrating.
crest (peak)	The highest point above the rest position.
trough	The lowest point below the rest position.
amplitude	The distance from the rest position to the crest or trough.
wavelength	The distance from one point of one wave to the same point on the next wave. Usually measured from crest to crest or trough to trough. Wavelength is measured in metres (m)
frequency	The number of waves passing a point each second. Frequency is measured in hertz (Hz)
perpendicular	Lines that form an angle of 90° when they meet.
parallel	Lines that do not meet.
transverse waves	Where the direction of vibration is perpendicular to the direction of the energy transfer.
longitudinal waves	Where the direction of vibration is parallel to the direction of the energy transfer.

Transverse and Longitudinal waves



Direction of oscillation

Direction of energy transfer

e.g. water, light and secondary S waves of earthquakes

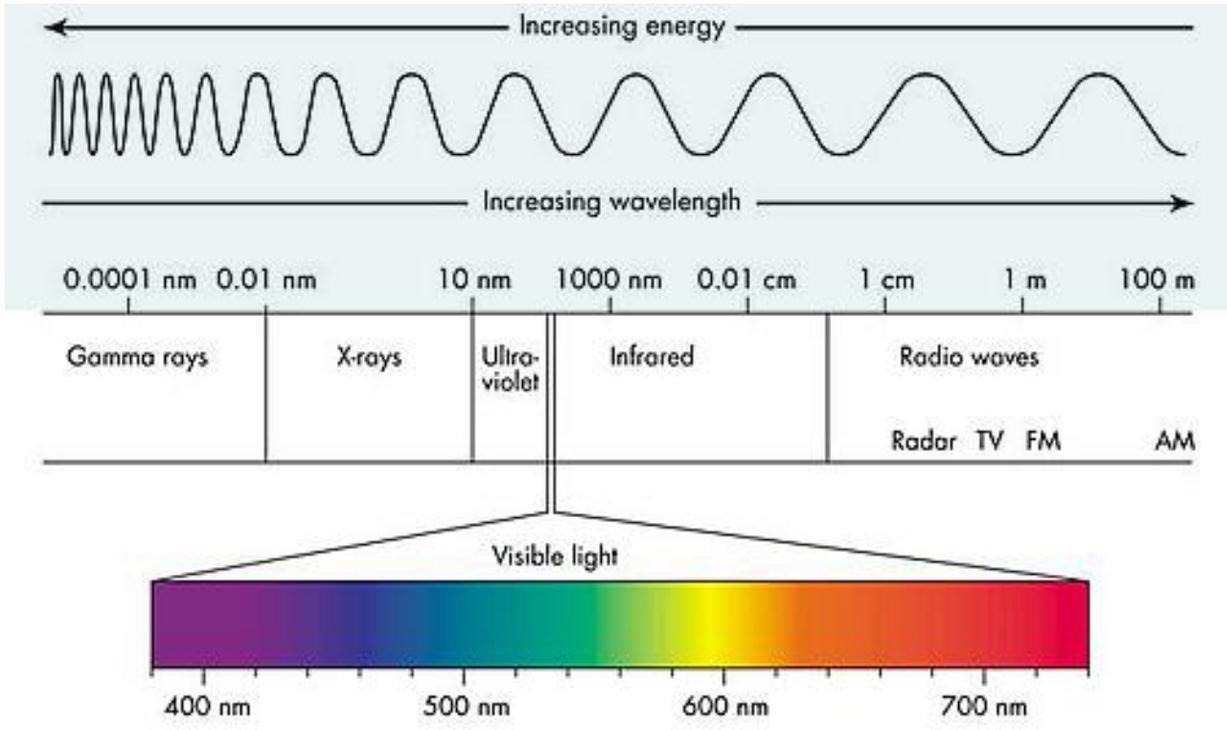
Direction of oscillation

Direction of energy transfer

e.g. sound waves and primary P waves of earthquakes

For a transverse wave the direction of oscillation is perpendicular to the direction of energy transfer, whereas for a longitudinal wave the direction of oscillation is parallel to the direction of energy transfer

The Electromagnetic spectrum – Transverse Waves

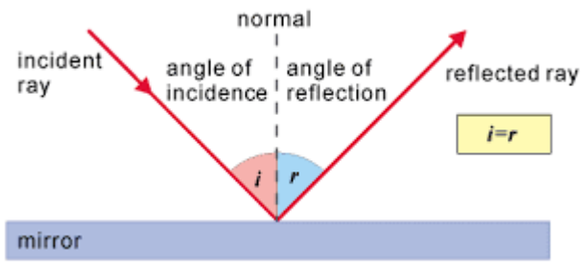


- Shiny surface → smooth → specular reflection
- Matte surface → rough → diffuse reflection
- White and shiny surfaces reflect infrared radiation
- Black and matte surfaces absorb infrared radiation

Reflection

When light collides with a surface some of the light may be transmitted through, some may be absorbed but some may be reflected back.

- The law of reflection states that the angle of incidence is equal to the angle of reflection
- The normal line is an imaginary line drawn perpendicular to the surface at the point where the ray of light collides with the surface
- Angles of incidence and reflection are measure from the normal line to the ray, not from the mirror to the ray



Wave Properties - Equations

Property	Word Equation	Symbol Equation
Wave speed	Wave speed (m/s) = frequency (Hz) x wavelength (m)	$v = f \times \lambda$
Wave period	Wave period (s) = 1 ÷ frequency (Hz)	$T = 1 / f$
Speed	Speed (m/s) = distance (m) ÷ time (s)	$v = s \div t$

Sound – Longitudinal Waves

- Sound waves transfer energy through vibrating particles and therefore require a medium to travel through – sound waves cannot be transmitted through space as there are no particles.
- The speed of sound can be calculated using the equation speed = distance ÷ time