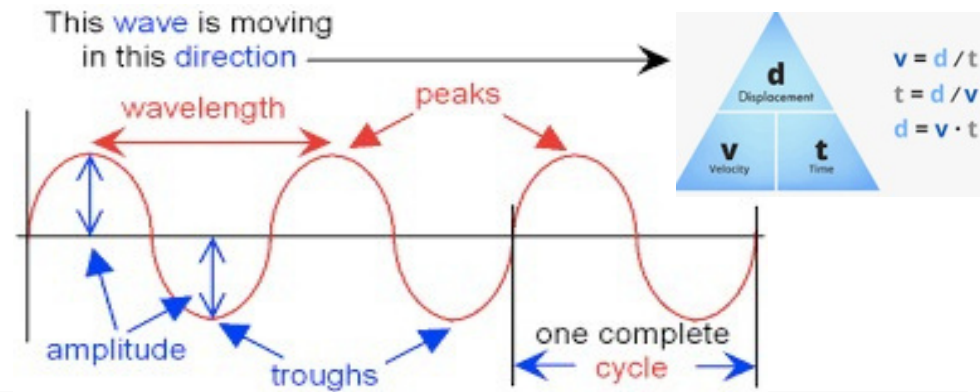
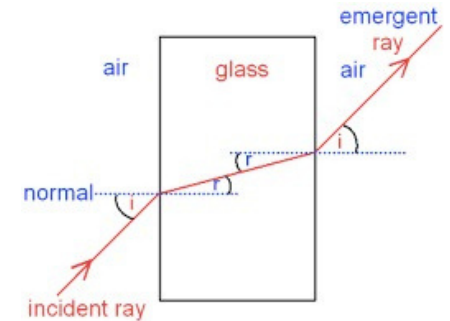


1	Waves transfer energy.
2	A longitudinal wave oscillates in the same direction that energy is transferred (parallel).
3	An example of a longitudinal wave is sound . Longitudinal waves need particles to travel.
4	A transverse wave oscillates perpendicular (at a 90° angle) to the direction of energy transfer.
5	An example of a transverse wave is microwaves . Transverse waves do not need particles to travel.
6	All waves in the electromagnetic spectrum are examples of transverse waves .
7	The frequency of a wave is the number of complete waves that pass a point each second . The frequency of a wave is measured in hertz (Hz) .
8	For sound waves , the frequency is related to the pitch. A high frequency = high pitch sound . A low frequency = a low pitch sound .
9	The period is the length of time it takes one wave to pass a given point.
10	The wavelength is the distance from one peak (or trough) to the very next peak (or trough) and is measured in metres (m).
11	The amplitude of a wave is the maximum distance of a point on the wave from its rest position and is also measured in metres (m).
12	For sound waves , the amplitude is related to volume . Greater amplitude means a louder volume.
13	The velocity of a wave is how fast the wave is travelling in its direction of energy transfer. Waves travel at different speeds in different materials.
14	Speed = distance ÷ time



$$v = f \lambda$$

v = velocity
 f = frequency
 λ = wavelength



16	Sound travels at 330 m/s in air
17	Wave velocity (m/s) = frequency (Hz) x wavelength (m) $V = f \times \lambda$
18	Waves can change direction when they travel through a different medium with a different density. This is called refraction .
19	When a wave ' bounces off ' a surface this is called reflection .
20	When a wave passes through a material and is not absorbed or reflected it is transmitted .
21	When a wave transfers all of its energy to an object or material it is absorbed.

- 1 When a sound wave reaches a solid object, some of the energy it is transferring is reflected and some is transmitted through the solid or absorbed by it. **(higher tier only)**
- 2 Sound waves cause the particles in a solid to vibrate and the vibrations can be passed on both as longitudinal and as transverse waves.
- 3 In human ears, vibrations caused by sound waves are passed on through parts of the ear until they are detected and converted to electrical impulses that travel to the brain.
- 4 The eardrum is a thin membrane that can vibrate due to sound waves.
- 5 The cochlea is found inside the ear and is a coiled tube containing liquid.
- 6 A healthy cochlea can detect sounds from 20Hz to 20000Hz.
- 7 Ultrasound is sound made by waves with a frequency greater than 20000Hz
- 8 Ultrasound scans can be used to make images of things inside the body.
- 9 Other uses of ultrasound include sonar, cleaning and treatment of medical conditions such as kidney stones.
- 10 Infrasound is sound made by waves with a frequency less than 20Hz.
- 11 Infrasound waves travel further than higher frequency waves before they become too faint to detect.
- 12 Natural events such as volcanic eruptions and earthquakes create infrasound waves.
- 13 The energy released by an earthquake can travel through the Earth as a longitudinal P wave or as a transverse S wave.

