Physics Topic 5 - Waves 1 – Light and Sound Year 7

Sound Introduction	Pitch, Frequency and Volume	Speed of Sound	The Ear	Light Properties	Reflection 1	Reflection 2	Colour

Key Words

Key Word	definition
Vibration	A back-and-forth motion that repeats
Volume	How loud or quiet a sound is, in decibels (dB).
Amplitude	The maximum amount of vibration, measured from the middle position of the wave, in metres.
Wavelength	Distance between two corresponding points on a wave, in metres.
Frequency	The number of waves produced in one second, in hertz.
Echo	Reflection of sound waves from a surface back to the listener
Opaque	When all of the light is absorbed so no light can pass through. This is not see through.
Translucent	When some of the light is absorbed but the rest can still pass through. You will be able to see shapes but not detailed images.
Transparent	is when none of the light is absorbed and all of the light passes through the material. This is see through.

Misconceptions

The 3 primary colours **are not** the same as they are in art.

In science the primary colours are red, green and blue. No yellow!

The speed of sound is **not** close to the speed of light.

The speed of light is much quicker than the speed of sound.

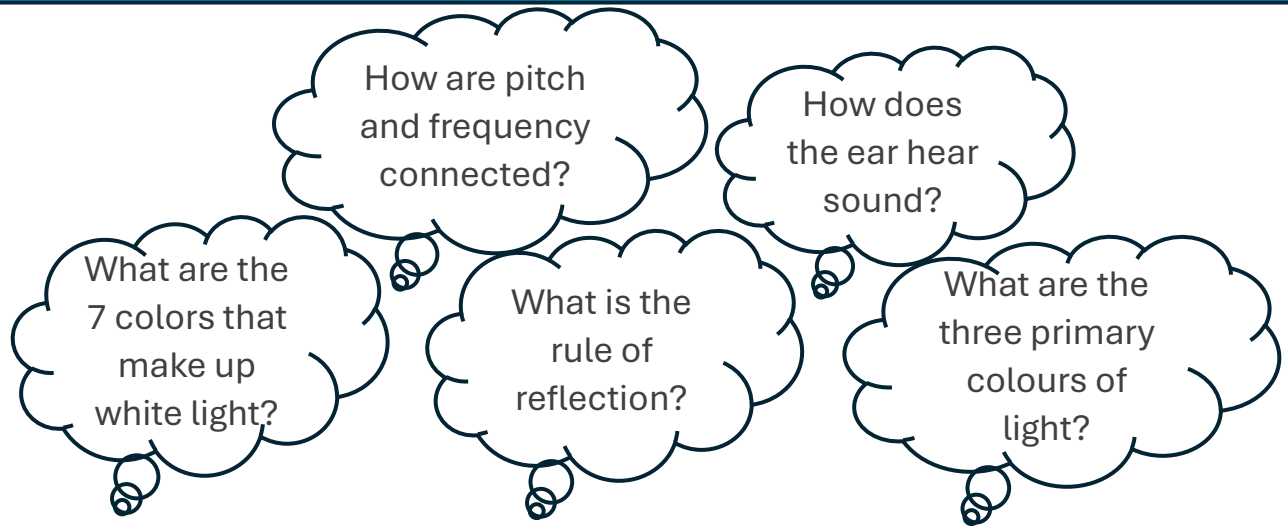
Sound waves **do not** carry particles from one place to another.

Sound waves only transfer energy only and not matter (particles). Just like all waves.

Humans can not hear all possible sounds.

Humans can only hear a specific range. (20Hz – 20,000HZ). Some Animals can hear outside this range.

Key Questions



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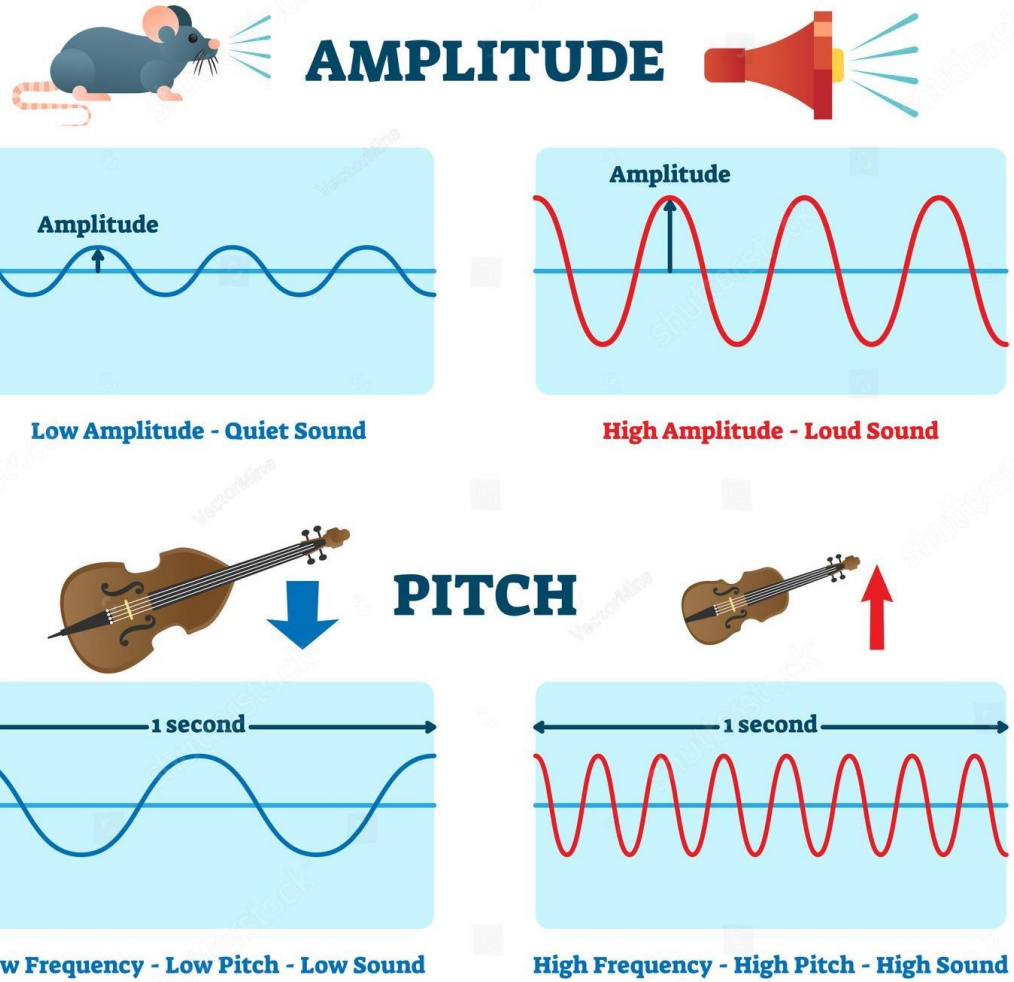
Sound

Sound is produced by vibrations in particles.
Sound can not not travel through a Vacuum as there are no particles.

Pitch, frequency and Volume

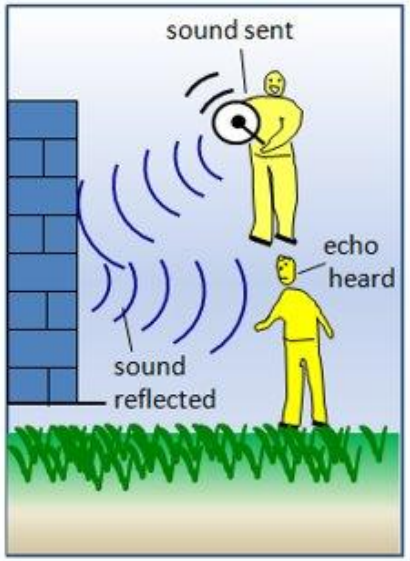


Speed

$$\text{SPEED (m/s)} = \frac{\text{DISTANCE (m)}}{\text{TIME (s)}}$$

Calculating the speed of sound using an echo

- We can calculate the speed of sound using an echo.
- Sound has to travel to the wall and back again. The time it takes is the echo time.
- If we know the distance away from the event happening, we can the use:



$$Speed = \frac{Distance}{time} = \frac{2\ x\ distance\ to\ the\ wall}{echo\ time}$$

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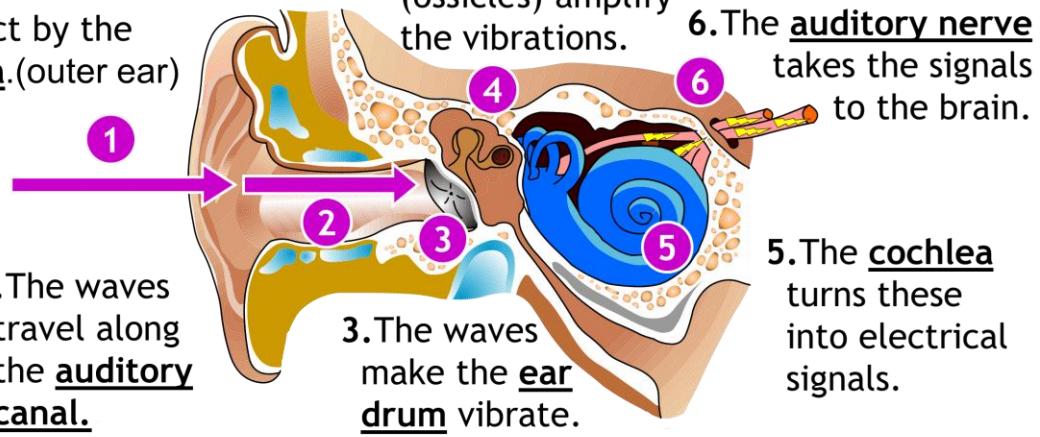
The Ear

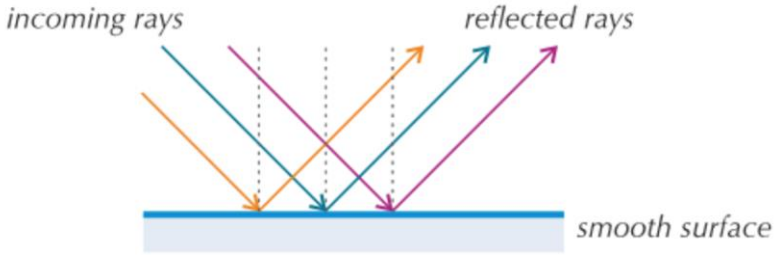


- Humans can hear between 20 and 20,000 Hz
- Some animals have different hearing ranges to humans.

Light Properties

- Light is the fastest thing in the universe. It travels at speed of 300,000,000 m/s. (much faster than sound)
- Light always travels in straight lines

Specular Reflection



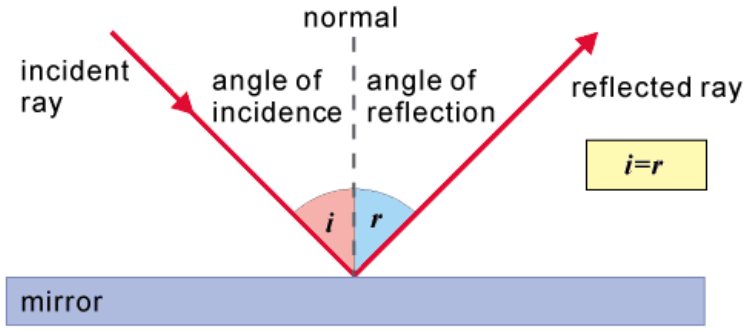
This happens when parallel waves are reflected in a single direction.

Colour

There are 3 primary colours of light are: **Red**, **Green**, **Blue**.
From these 3 colours all other colours can be made.

The light spectrum is made up of 7 colours:
Red, Orange, Yellow, Green, Blue, Indigo, Violet
(Richard Of York Gave Battle In Vain)

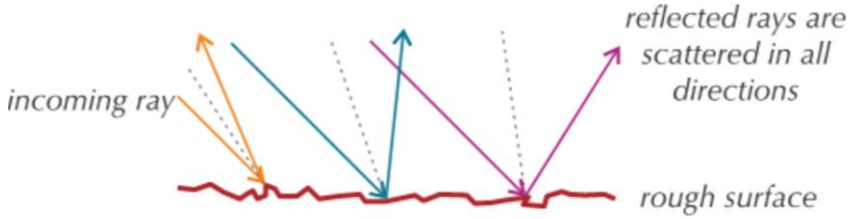
Reflection



The law of reflection states:

The angle of incidence is the same as angle of reflection

Diffuse Reflection



This happens when parallel waves are scattered in lots of different directions due to a rough surface.