# Light & Sound

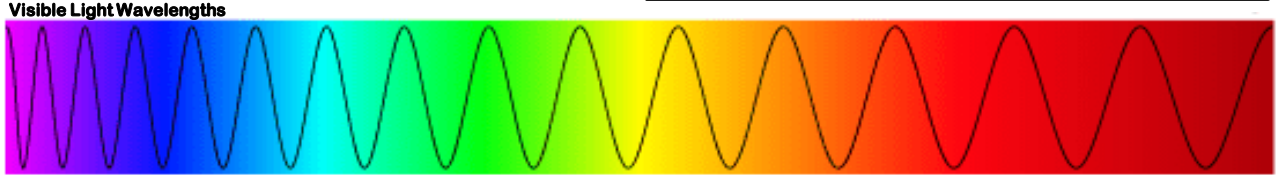


| Keyword | Definition |
|---|---|
| **Angle of Incidence** | Angle between the normal and incident ray. |
| **Angle of reflection** | The angle between the reflected ray and the normal. |
| **Diffuse Scattering** | When light is reflected off a surface in all directions. |
| **Dispersion** | Spreading out of the different wavelengths of light, caused by refraction of light as it passes through a prism. |
| **Frequency** | The number of waves produced each second. The unit of frequency is hertz (Hz). |
| **Amplitude** | The maximum height of a wave from the middle of the wave to its peak or trough. |
| **Wavelength** | The length of a single wave, measured from one wave peak to the next. |
| **Pitch** | The frequency of a sound. Sounds with a high pitch have a high frequency. |
| **Incident Ray** | Light ray moving towards a surface or boundary. |
| **Reflected Ray** | Light ray leaving a surface or boundary. |
| **Law of reflection** | In reflection at a surface, the angle of incidence equals the angle of reflection. |
| **Spectrum** | A series of similar waves arranged in order of wavelength or frequency. |
| **Echo** | A sound caused by the reflection of a sound wave from a smooth surface back to the listener. |

**Further Reading:**

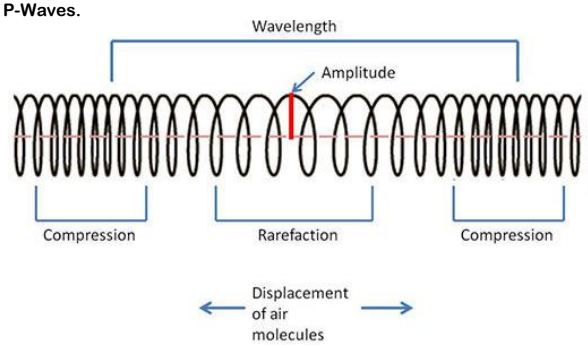
https://www.bbc.com/bitesize/guides/zq7thyc/revision/1
https://www.bbc.com/bitesize/guides/z8d2mp3/revision/1

**Visible Light Wavelengths**



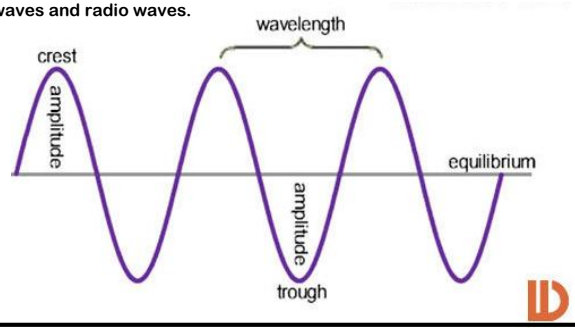
**Longitudinal Waves**

In longitudinal waves, the vibrations are parallel to the direction of wave travel. Examples are: Sound Waves, Ultrasound Waves, Seismic P-Waves.



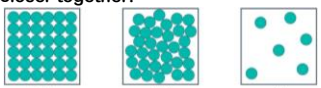

**Transverse Waves**

In transverse waves, the vibrations are at right angles to the direction of wave travel.
Examples include: Ripples on water, vibrations on a guitar string and a Mexican Wave. Electromagnetic waves such as light waves, micro waves and radio waves.




**Speed of Light**
300,000km/s
**Speed of Sound (air)**
343m/s

Light can travel through a vacuum but sound cannot. Sound needs a medium to travel through either a solid, liquid or gas. Sound travels fastest in a solid because the particles are closer together.



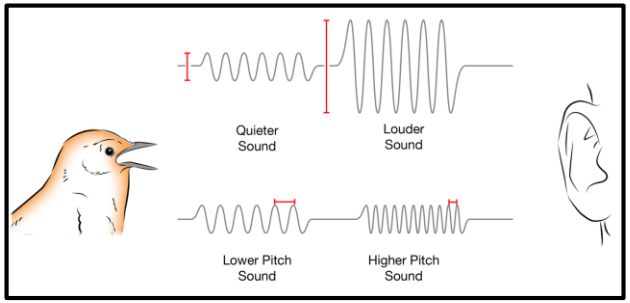

**Calculating Wave Speed**

$$v = f\lambda$$

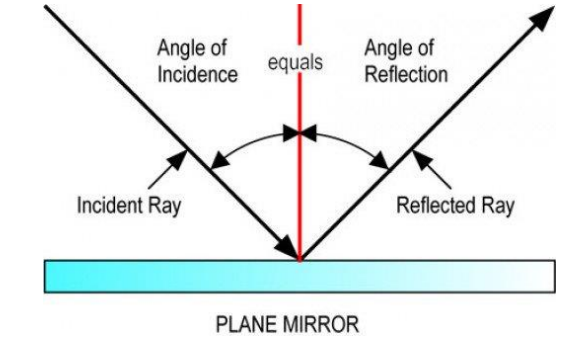
v = velocity
f = frequency
λ = wavelength

**Calculating Speed**

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$




**Reflection**




**Refraction**