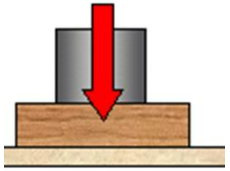
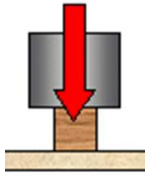
Science: Pressure and Waves

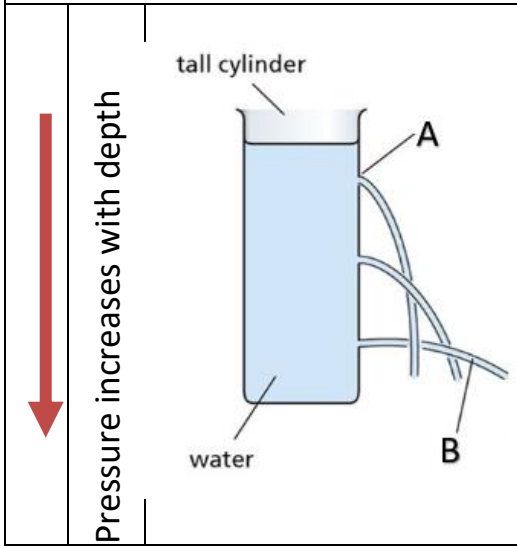
1. Pressure in solids

The pressure exerted on a solid is known as **stress.**

If the force is exerted over a large area, it results in **low pressure.**	If the force is exerted over a small area, it results in **high pressure.**
	
Pressure can be calculated	Presure (Nm^2) = $\frac{\text{Force (N)}}{\text{Area } (m^2)}$

2. Pressure in Liquids

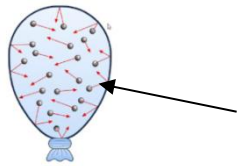
Pressure in liquids



A	At the top of the cylinder the force applied (weight) is small, so it exerts **low pressure – Less particles pushing in all directions.**
B	At the bottom, the force applied (weight) is larger, so it exerts **high pressure – More particles pushing in all directions.**

3. Pressure in solids

Gas pressure is caused by the particles of a gas **colliding** with the wall of the container they are in.



Gas pressure can be increased by:

1	Increasing the heat	The particles have more energy so they collide with the container with more force.
2	Compressing the gas	The same amount of particles are closer together in a smaller volume so there are more collisions.
3	Increasing the number of particles	If more particles are added in the same volume, they will be closer together so there are more collisions.

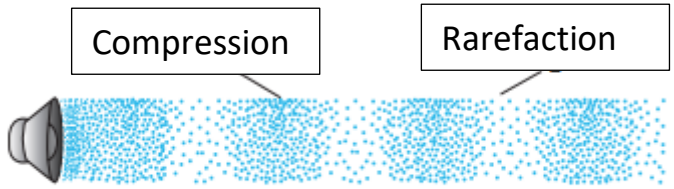
4. Longitudinal waves

Longitudinal waves transfer energy through **vibrating particles.**

Sound waves are a type of longitudinal wave.

Compression
- Particles are close together.

Rarefaction
- Particles are far apart.



Sound waves that are above the frequency of human hearing (20,000Hz +) are called **ultrasound.**

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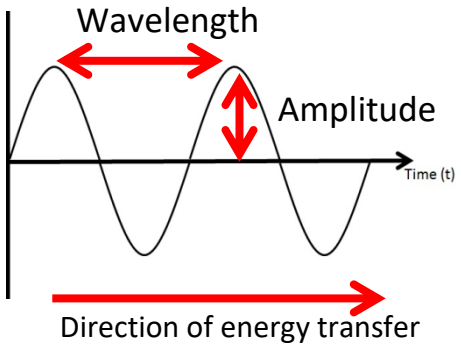
5. Transverse waves

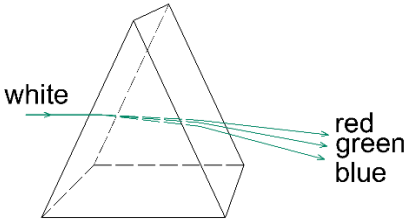
Light is a type of transverse wave.

Wavelength – length of one complete wave

Amplitude – height of the wave



6. Equipment

Newton meter	Prism
	
Tuning fork	**Newton Scales**
	

7. Electromagnetic spectrum

The electromagnetic spectrum is a range of transverse waves with different wavelengths.

As transverse waves do not need particles, they can travel through a **vacuum** E.g. space.

Type of electromagnetic wave	Uses	Dangers
Radio waves	TV signals	Almost harmless
Microwaves	Mobile phones	Can cause internal heating of body tissues
Infrared	Heating and cooking	Felt as heat and can cause burns
Visible light	Photography	Can cause damage to eye cells
Ultraviolet	Detecting forgeries	Skin cells can become cancerous
X rays	Seeing broken bones	Damages cells
Gamma rays	Killing cancer cells	Kills cells

The Sun continuously emits electromagnetic waves. The Earth's atmosphere blocks most of the more harmful rays.