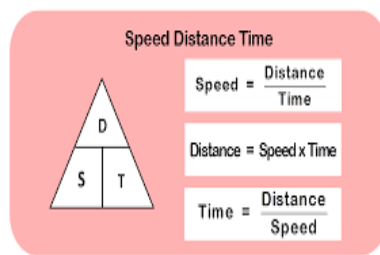


Motion and Pressure

Speed is a measure of how **fast** something or somebody is moving. The units of speed are linked to the units of the **distance** and **time** being used.

Distance Speed Time www.cazoommaths.com



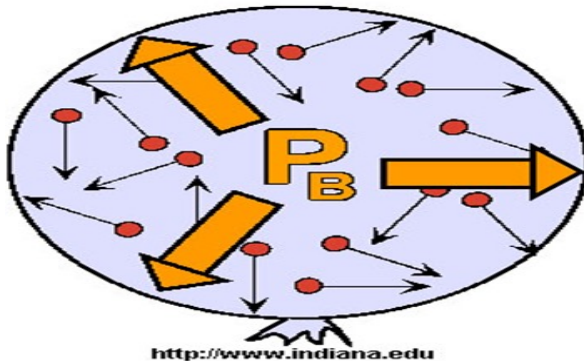
A **formula triangle** is a quick way to calculate the speed, distance or time.

The units are: m/s, km/h, mph (miles per hour).

Gas Pressure is **caused by** the collisions between the atoms of **gas** and walls of the container as those atoms travel in the confined space. More molecules mean more collisions. Increasing the temperature of the gas leads to more kinetic energy of the particles and therefore to more pressure.

Also, pressure increases if the volume is decreased. Pressure decreases with altitude. The higher up above the Earth, the less air particles there are therefore the lower the pressure.

Figure 5.1.1 Internal pressure in a balloon.

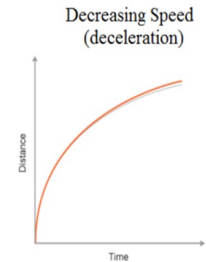
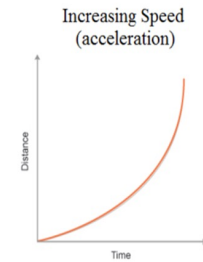
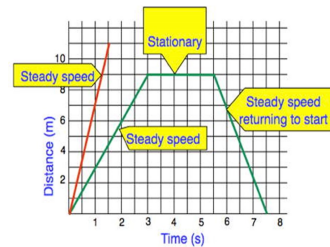


Distance-time graphs.

If an object moves along a straight line, the **distance** travelled can be represented by a **distance-time graph**. In a **distance-time graph**, the gradient of the line is equal to the speed of the object. The greater the gradient (and the steeper the line) the faster the object is moving.

A curved distance time graph can show acceleration or deceleration.

To work out the speed of an object from a graph we have to work out the gradient.

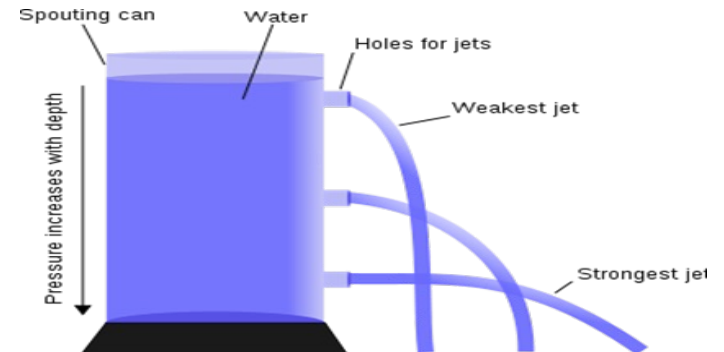


Pressure in liquids

Liquids exert pressure on objects. The pressure in liquids changes with depth. The deeper you go:

- the greater the weight of liquid above it
- the greater the liquid pressure.

Liquid pressure is exerted on the surface of an object in a liquid. This pressure causes **upthrust**. An object placed in a liquid will begin to sink. As it sinks, the liquid pressure on it increases and so the upthrust increases. For a floating object, the upthrust is equal and opposite to the object's weight. An object will continue to sink if its weight is greater than the maximum upthrust.



Pressure in solids

To calculate pressure, you need to know two things:

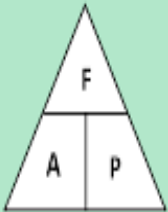
- the force or weight exerted
- the **surface area** over which the force or weight is spread.

Pressure is calculated using this equation:

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Force Area Pressure

Force Area Pressure



$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

$$\text{Area} = \frac{\text{Force}}{\text{Pressure}}$$

$$\text{Force} = \text{Area} \times \text{Pressure}$$

Using pressure

Snow shoes help to decrease the pressure so you don't sink into it. This is because snow shoes have a large surface area.

A nail can be hammered easily into wood. This is because a large pressure can be applied over a small surface area.

Moments

A **moment** is a turning effect of a force. Forces can make objects turn if there is a **pivot**.

Calculating moments

To calculate a moment, you need to know two things:

- the distance from the pivot that the force is applied
- the size of the force applied.

$$\text{moment} = \text{force} \times \text{distance}$$

Law of moments.

When an object is balanced (in equilibrium) the sum of the clockwise **moments** is equal to the sum of the anticlockwise **moments**.

$$\text{Force 1} \times \text{distance from pivot} = \text{Force 2} \times \text{distance from pivot}$$

Is the see-saw balanced?

- Calculate the moments of Jack and Jill

