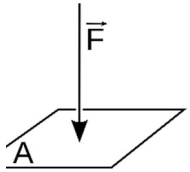
9P1 Knowledge Organiser – **Work**

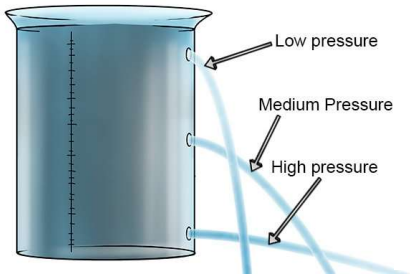
Pressure

Pressure measured by ratio of force over area – acting normal to any surface



- With a constant area, increasing the force increases the pressure.
- With a constant force, increasing the area decreases the pressure. This is because the weight can be spread over a larger area.

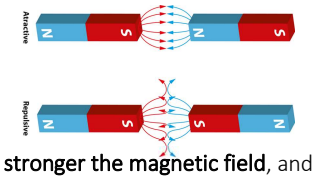
$$[\text{Pa}] \quad P = \frac{\text{Force}}{\text{Area}} \quad \frac{[\text{N}]}{[\text{m}^2]}$$

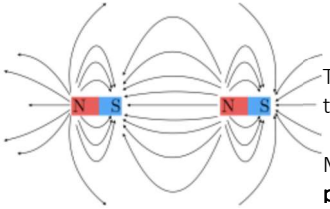


- atmospheric pressure, decreases with increase of height as weight of air above decreases with height
- The pressure in liquids, increasing with depth

Magnets and field lines

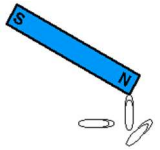
Opposite poles **attract**, like poles **repel**. Magnetic field lines point from north to south.





The closer the field lines the **stronger the magnetic field**, and the greater force it can produce.

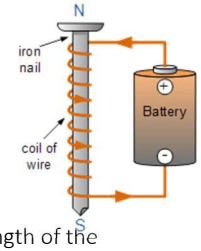
Magnets made from magnetic elements are called **permanent magnets** or fixed magnets.



An **induced magnet** becomes a magnet when it is placed in a magnetic field. Iron filings or paperclips sometimes appear to have the properties of a magnet for a short while but the induced magnetism is quickly lost when it is removed from the magnetic field.

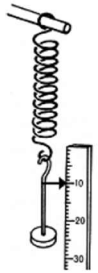
A flow of **electric current** also produces a magnetic field. We can make an **electromagnet** with a battery and a coil of wire.

Placing an iron rod or nail inside the coil makes the induced magnet stronger.

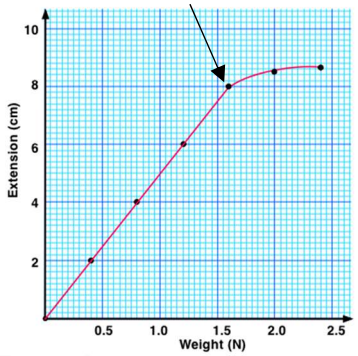


You can increase the strength of the electromagnet by increasing the number of **coils**, the strength or the **core** or the **current.**

The extension of a material or a spring is its increase in length when pulled. (spring deformed)



Elastic limit reached.



The extension of an elastic object is directly proportional to the force applied to it. In other words: if the force applied is doubled, the extension doubles. If no force is applied, there is no extension.

- the steeper the line, the stiffer the spring
- if you apply a force above the elastic limit then the spring won't return to its original length

Magnetic materials

3 elements are magnetic: Iron, Cobalt and Nickel. Steel, which is made from Iron, is also magnetic.

These elements will always bet attracted with a magnet. Never repelled.

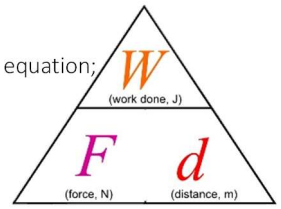
26	27	28
Fe	Co	Ni
Iron	Colbalt	Nickel

Work: Work is done whenever a force moves something.

Everyday examples of work include walking up stairs, lifting heavy objects, pulling a sledge and pushing a shopping trolley. Whenever work is done, energy is transferred from one place to another.

To calculate work done you use the equation;

work done = force x distance



This man has done 20J of work

Moments: simple machines give bigger force the longer the handle. To make the work easier (less force) it is best to have a longer leaver to move a load.

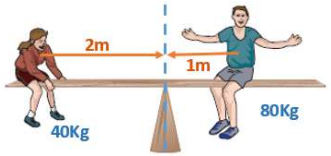
Having a **longer** lever will require **less force.**

Having a **shorter** lever will require **more force.**

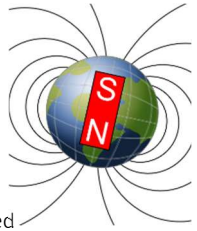
The moment as the turning effect of a force and can be calculated using the equation;

moment = force (N) x distance from pivot (cm or m)

This seesaw is balanced, can you explain why?
https://www.bbc.co.uk/bitesize/guides/zttfyrd/revision/6



A compass is a small magnet which will line up with a magnetic field. We can use a compass for navigation because the Earth has a magnetic field that lines up well with the north and south poles. The Earth has a magnetic field because it has iron in the core.



A compass can also be used to draw the **magnetic field lines** around a magnet.

You can sprinkle iron filings around the magnet to find the pattern or use a plotting compass to show that the field lines travel from the **North to South** poles.