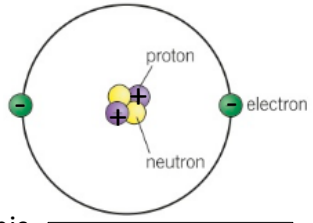
wymondham high

Yr 8 Science P2.1

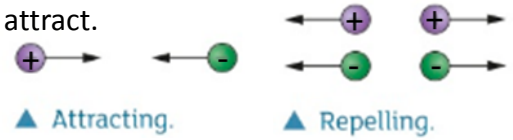
Section 1- Charging Up

Atoms contain 3 types of particles:

- Protons – positive charge
- Neutrons – no charge
- Electrons – negative charge



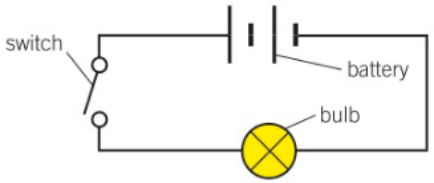
Static charges occur when electrons are transferred between different materials. This can be achieved by rubbing insulators together. Like charges repel, opposite charges attract.



Charged objects have electric fields surrounding them. If you place a charged object in an electric field, a force will act on it.

Section 2 - Circuits and Current

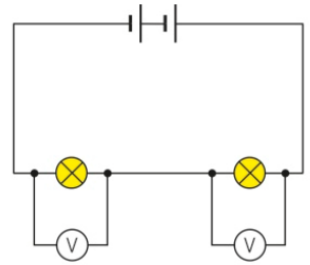
- When you complete a circuit, charged particles move through the metal wires.
- Current is the amount of charge flowing per second.
- Current is measured with an ammeter.
- Current is measured in Amps (A)
- The cell or battery pushes the charge around the circuit.



When the switch is closed, the circuit will be complete and a current will flow.

Section 3 - Potential Difference

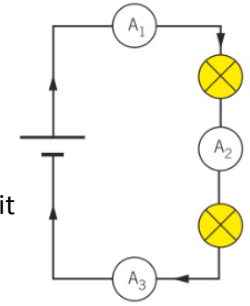
- Potential difference (p.d.) is the 'push' that the battery or cell gives to make charges move.
- Potential difference tells you how much energy can be transferred to the components in a circuit.
- Potential difference is measured with a voltmeter.
- Potential difference is measured in Volts (V).



Section 4 - Series and Parallel

<u>Series Circuits</u>

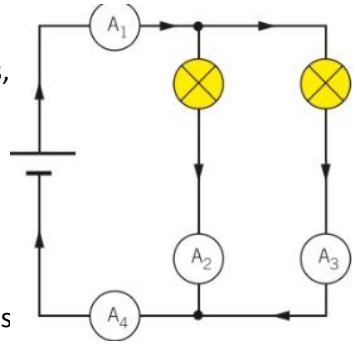
In series circuits, all the components are in the same loop. The current will be the same everywhere in the circuit The more components there are in a series circuit, the smaller the current.



$A_1 = A_2 = A_3$

<u>Parallel Circuits</u>

In parallel circuits, there is more than one loop or branch for the current to flow through. The currents in all the separate branches will add up to make the total current.



Total current = $A_1 = A_4$

Total current = $A_2 + A_3$

Section 5 - Resistance

- Resistance is a measure of how difficult it is for charges to pass through a component.
- Resistance is measured in Ohms (Ω).
- The more components in series, the higher the total resistance in the circuit
- Metals are good conductors and have low resistance.
- Insulators have high resistance.

Calculate resistance by:

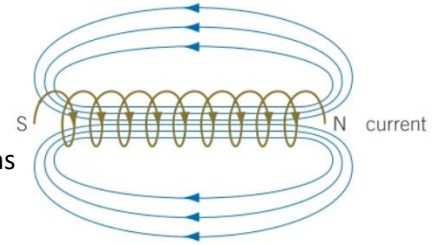
$$\text{Resistance } (\Omega) = \frac{\text{Potential difference (V)}}{\text{Current (A)}}$$

Section 7 - Electromagnets

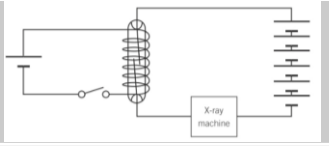
An electric current flowing through a wire has a magnetic field around it. You can make this field stronger by coiling the wire. A coil of wire with a current flowing through it is an electromagnet.

To make an electromagnet stronger:

- Increase the number of turns
- Increase the current
- Add a soft iron core

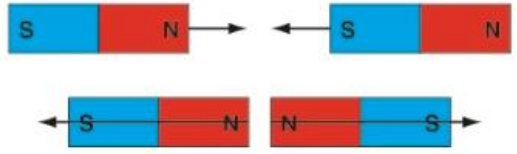


Section 8 - Using Electromagnets

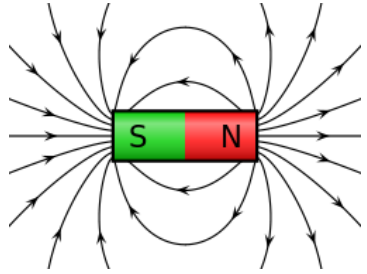
Uses of Electromagnets	How it works
Relay switch – to switch on circuits that use high potential difference safely	
Lifting cars/heavy magnetic objects	The electromagnet can be turned on and off in order to lift heavy objects.
Sorting metals	The electromagnet can be switched on to attract magnetic materials.

Section 6 - Magnets and Magnetic fields

Like poles repel, unlike poles attract.
Magnets will attract magnetic materials: iron, nickel, cobalt (& steel bacause it contains iron)



Magnets generate magnetic fields.
In a magnetic field, magnets or magnetic materials will experience a force.
The closer together the field lines, the stronger the magnetic field.
The arrows always point away from North and towards South



Earth also has a magnetic field.