



Firphill High School



Summary Questions: P1 Electricity & Magnetism

WHAT SHOULD I KNOW?

Success Criteria	Before reading	After reading	Before my test
I can state the polarity of basic bar magnets.			
I can draw the magnetic field line patterns for the interaction of different combinations of magnets.			
I can state the purpose of the earth's magnetic field.			
I can describe what static electricity is.			
I can name the 2 types of charge and explain how to charge an object.			
I can label a diagram of an atom.			
I can state electrons are negative charges.			
I can describe current as a flow of negative charges.			
I can name the instrument used to measure current.			
I can explain the difference between conductors and insulators.			
I can name and draw the symbol for common components.			
I can draw simple circuit diagrams.			
I can explain what the 'resistance' of a circuit is.			
I can state the factors that affect resistance.			
I can recognise and draw series circuits.			
I can explain what happens to the brightness of bulbs in a series circuit.			
I can recognize and draw parallel circuits.			
I can explain what happens to the brightness of bulbs in a parallel circuit.			
I can design an electrochemical cell.			

MAGNETS

The earth is formed of layers.

Magnets have two poles: a north pole and a south pole.

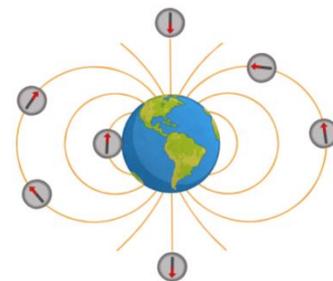
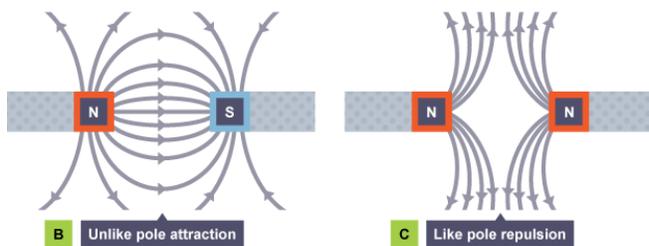


When a north pole is placed beside another north pole they repel.

When a south pole is placed beside another south pole they repel.

When a North pole is placed beside a south pole they attract. (Opposites attract!)

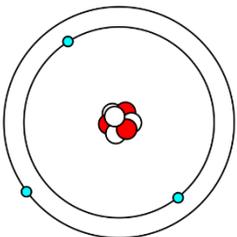
Magnetic field lines are drawn from the north to the south pole. They show how the different poles interact.



CHARGES

What is inside the atom?

There are two types of charges: **positive** and **negative**.

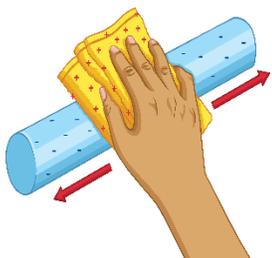


Electrons are **negative** charges. They circle the outside of the atom.

Protons are **positive** charges, they are found in the middle of the atom beside neutrons which have no charge.

What is static charge?

Most objects are **neutral**, this means they have an even number of positive and negative charges so have no overall charge.



- When a polythene strip is rubbed with a cloth, the negative charges move from the cloth to the strip.
- The strip becomes negatively charged because it has more negative charges than it needs to cancel out the positive charges.

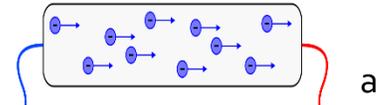
- The cloth becomes positive because it has less negative charges than it needs.
- If a light bulb was moved very quickly along the metal strip it would light up – this is because moving electrons form an electrical **current**!
- **Electrical current** is measured with an **ammeter**.

CONDUCTORS AND INSULATORS

What objects let current flow through them?

Conductors are materials that let electrons flow through them.

Metals are good conductors. Electrical wires have to be made of conductive material to let the current flow through the circuit.

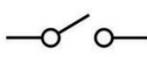
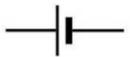
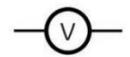
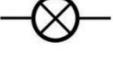
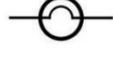
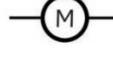
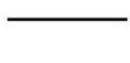


Insulators are materials that do not let electrons flow through them. **Non-metals** are good insulators. Light switches have to be made of **insulating** materials so that you don't get a shock when turning on the lights!

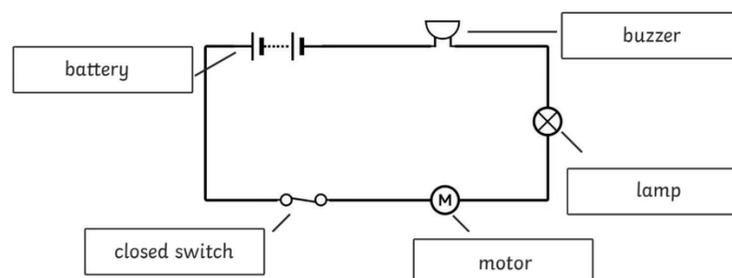
SIMPLE CIRCUITS

Circuit components have different symbols!

All electrical circuits have to form a closed loop. This is so the electrons can flow around the circuits.

 battery	 closed switch	 open switch	 cell	 voltmeter
 buzzer	 lamp	 lamp	 motor	 wire

These symbols can then be used to create circuit diagrams like the one here:



Resistance

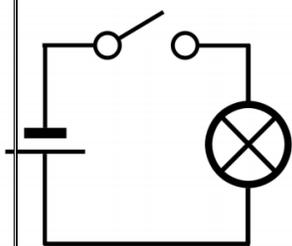
Resistance is how difficult it is for current to flow through a circuit.

The longer the wire the **bigger** the resistance in the circuit.

SERIES CIRCUITS

Series circuits have only one loop!

In a series circuit there is only **one path** for electrons flow.



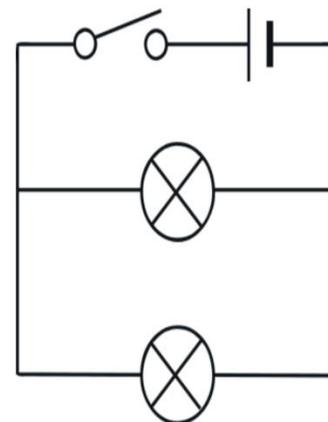
- If one bulb breaks, all the others go off.
- The current is the same everywhere.
- If you put more bulbs in they will be dimmer, because it is harder for the electricity to get through. The resistance of the circuit is higher.

PARALLEL CIRCUITS

Parallel circuits have more than one loop

In a parallel circuit there is **more than one path** for electrons to flow.

- If one bulb breaks, the bulbs in the other branches stay on.
- The current splits up when it comes to a branch.
- The current in all the branches adds up to the current in the main part of a circuit.
- If you add more bulbs, they stay bright. It is easier for the current to flow with more branches, because there are more ways for the electrons to go.



ELECTROCHEMICAL CELL

CAN WE MAKE A BATTERY?

An electrochemical cell is a device capable of generating electrical energy from chemical reactions.