

SUBJECT: Science

UNIT: Y7 Electricity



Key Vocabulary

Electrons: Electrons are extremely tiny particles which are found in the outer part of the atoms. They carry a negative charge. In conductors, some of these electrons are free to move.

Current: the flow of electrons carrying charge

Conductors:

Electrical current is carried best by materials known as conductors. Good examples of conductors are metals which is why wires are usually made from metals. Some metals are better conductors than others.

Resistance: The measure of how difficult it is for the flow of charge to move.

Potential difference: the amount of push (energy) provided by the battery/cell to a moving charge.

Electrical Circuit Diagrams

Electrical circuit diagrams are used to represent electrical circuits. They must be drawn with a pencil and a ruler. All wires are drawn using straight lines and the components are drawn using the circuit symbols.

Electrical Circuits

Electrical circuits are made of a battery or cell, connected by wires to other components. A complete circuit must not have any gaps in it.

Electrical components

The main electrical components are listed below:

Switch – opens and closes to break or connect the circuit so current can flow.

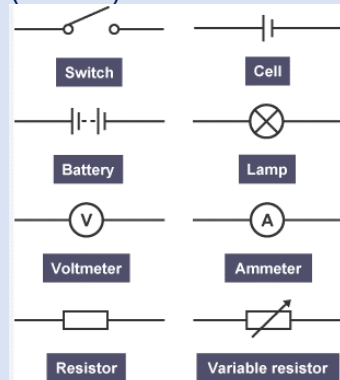
Bulb – emits light

Cell/Battery – provides potential difference

Ammeter – measures current

Voltmeter – measure potential difference

Resistor – slows the flow of charge (current)



Current

Current is the flow of electrical charge around a circuit. The faster the flow of charge, the higher the current. Current is measured in amps (A) using an ammeter.

Potential difference

Potential difference is how hard the battery 'pushes' the electrons around the circuit. The larger the potential difference, the bigger the 'push'. Potential difference is measured in volts (V) using a voltmeter.

Resistance

Resistance is a measure of how difficult it is for the current to flow around a circuit. The higher the resistance, the less current will flow around the circuit. The lower the resistance, the more current will flow around the circuit. Resistance is measured in ohms (Ω). Resistance can be calculated using the equation:

$$\text{Potential difference} = \text{Current} \times \text{Resistance}$$

Ambitious Vocabulary

Current Resistance
Potential difference

Series Circuits

In a series circuit, the components are connected end to end in a loop. If one component does not work then none of them will as the circuit will be incomplete. Current is the same everywhere in a series circuit. It doesn't matter where you place an ammeter it will always show the same reading. Potential difference from the battery is shared between components so the total from the battery will be split between each individual component.

Parallel Circuits

In a parallel circuit the components are connected on separate branches. This gives the current several different paths to flow down. If one component stops working, the other components on different branches will continue working as the current has an alternate path to take. Current is split between branches in a parallel circuit. Potential difference is the same across each branch as each electron carries the same amount of potential difference regardless of which branch they travel through.

Ammeters and Voltmeters

Ammeters are attached in series into a circuit. Voltmeters are attached in parallel to a component.