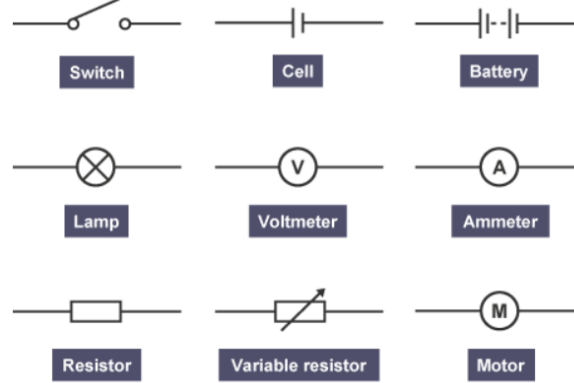


Keyword	Definition
Ammeter	A device used to measure electric charge.
Ampere	Unit of current. E.g. The current in the bulb is 4 amps or amperes (A).
Cell	A store of internal energy that can be transferred as an electric current in a circuit.
Conductor	A material which allows charge to move easily through it.
Electron	Sub atomic particle which flows in a circuit carrying a negative charge.
Series Circuit	A circuit connected in a way that the same current flows through each component in turn.
Parallel Circuit	In a parallel circuit, the current divides into two or more paths before recombining to complete the circuit.
Insulator	A material that does not allow charge or heat to pass through it easily.
Ohms	The unit of electrical resistance. Unit is Ω
Resistance	The opposition in an electrical component to the movement of electrical charge through it. Resistance is measured in ohms.
Potential Difference	The potential difference (or voltage) of a supply is a measure of the energy given to the charge carries in a circuit.
Volt	Unit of voltage. E.g. the voltage across the lamp was 6 volts (V).
Voltmeter	A device used to measure potential difference or voltage.

Circuit Symbols



Electric Charge

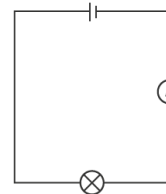
Some particles carry an electric charge. In electric wires these particles are called electrons. An electric current is a flow of charge, and in a wire this will be a flow of electrons.

For an electric current to flow we need:

- Something to transfer the energy to the electrons, such as a cell, battery or power pack.
- A complete path for the electrons to flow through (a complete circuit).

Current

Current is measured in amperes (A). 20A is a bigger current than 10A. An ammeter is used to measure the current. The ammeter must be connected in series.



Equations To Remember

Current

$$\text{Current} = \frac{\text{Charge}}{\text{time}} \quad I = \frac{Q}{t}$$

Current in Amperes (A), Charge in Coulombs (C), Time in Seconds (s).

Potential Difference:

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

$$V = I \times R$$

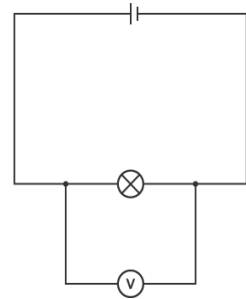
Potential difference in Volts (V), Resistance in Ohms (Ω), Current in Amperes (A)

Potential Difference

Potential difference is a measure of the difference in energy between two parts of a circuit. The bigger the difference in energy, the bigger the potential difference.

Potential difference is measured in volts. A 230V is a bigger potential difference than 12V.

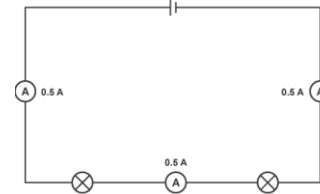
A voltmeter is used to measure the potential difference, and must be in parallel.



Series Circuit

In series circuits:

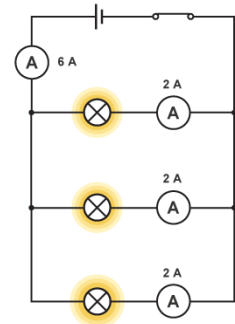
- You get several components one after another.
- If a component breaks, the circuit is broken and all the other components stop working.
- The current is the same everywhere in a series circuit no matter where you put the ammeter – it will give the same reading.



Parallel Circuit

In parallel circuits:

- Different components are connected on different branches.
- If a component breaks, the components on the different branches keep working.
- Unlike series, the lamps stay bright if you add more lamps in parallel.
- Current is shared between the components.

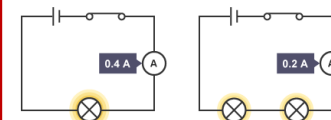


Resistance

The wires and other components in a circuit reduce the flow of charge through them – this is resistance.

The resistance increases when you add more components in series.

The resistance of two lamps is greater than the resistance of one lamp, so less current will flow through them.



Further Reading:

<https://www.bbc.co.uk/bitesize/guides/zsfg82/revision/1>

Use the following link to set up some circuits using the simulation.
<https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab>