

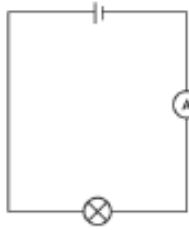
ELECTRICITY

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.

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.



Potential Difference (voltage):

Potential Difference = Current x Resistance

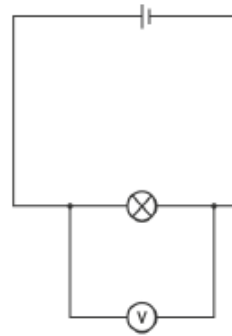
$$V = I \times R$$

Potential difference in Volts (V), Resistance in Ohms (Ω), Current in Amps (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.



Electric Charge

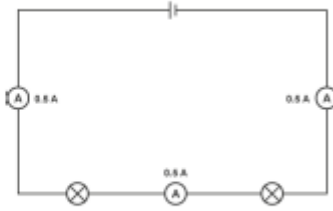
In wires electrons carry an electric charge
An electric current in a wire is a flow of electrons.
For an electric current to flow we need:

- A cell, battery or power pack.
- A complete path for the electrons (a complete circuit)

Series Circuit

In series circuits:

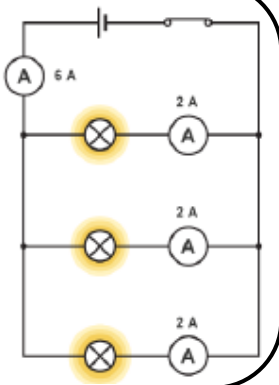
- You get several components one after another.
- If a component breaks, the circuit is broken and all the other components stop working.
- The current is the same everywhere in a series circuit no matter where you put the ammeter – it will give the same reading.



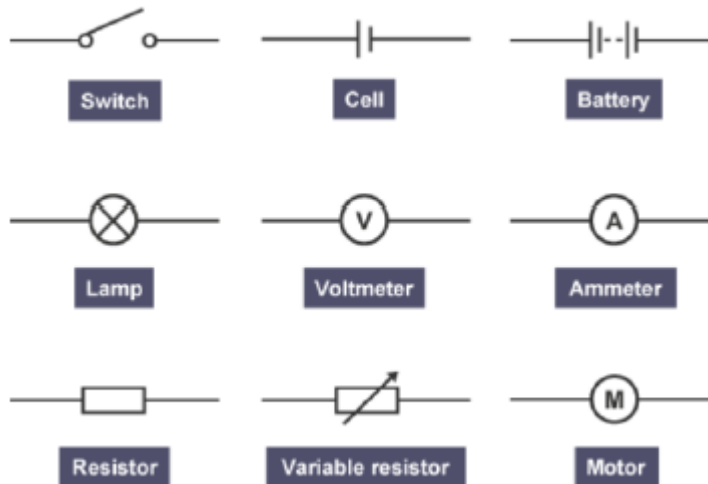
Parallel Circuit

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.



Circuit Symbols



Keyword	Definition
Ammeter	Used to measure current.
Ampere	Unit of current
Cell	A store of chemical energy.
Conductor	A material which allows electricity to flow
Electron	Negatively charged particle that flows in a current
Series Circuit	Circuit where same current flows through each component in turn.
Parallel Circuit	Circuit where current divides into two or more paths.
Insulator	A material that does not allow charge to pass through it easily.
Ohms	The unit of electrical resistance. Unit is Ω
Resistance	How difficult it is for current to pass through a material
Potential Difference	Energy given to the charge in a circuit (also called voltage)
Volt	Unit of voltage
Voltmeter	Used to measure potential difference or voltage.

Links: - Further reading - [Electric charge - Electric current and potential difference - KS3 Physics Revision - BBC Bitesize](#)

Circuit Simulator [Circuit Construction Kit: DC - Virtual Lab \(knowatom.com\)](#)