






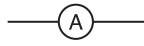
Electrical circuits

Electricity is a flow of **electrons**. Electricity can flow through **conductors** but not through **insulators**. Metals are good conductors of electricity. Plastics are good insulators.

Cells and power packs provide safe, low-voltage electricity. Most appliances use **mains electricity**. This can be dangerous if it is not used properly.

A complete **circuit** is needed for electricity to flow.

We use symbols when we draw circuits:

Component	Symbol	Component	Symbol
cell		switch	
battery of cells		fuse	
bulb		ammeter	

The **current** is the amount of electricity flowing in the circuit. The unit for current is the **amp (A)**. Current is measured using an **ammeter**.

The **resistance** of a circuit is a way of saying how easy or difficult it is for electricity to flow.

- high resistance = hard for electricity to flow = small current
- low resistance = easy for electricity to flow = large current

Thin wires and resistors have high resistances. Thick wires have low resistances.

Electricity and heat

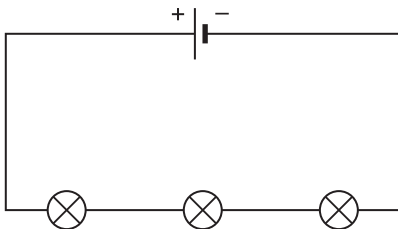
When electricity flows through a wire, the wire can get hot. Hot wires are used in electric fires, irons and cookers.

A **fuse** is a thin piece of wire that melts if too much electricity flows through it. It is used for safety.

Models

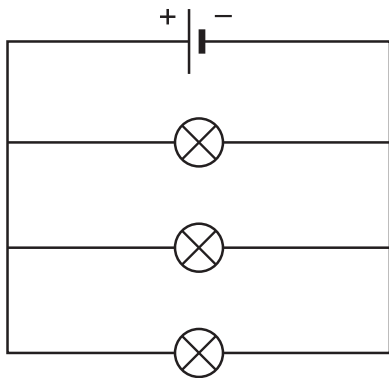
We can use models to help us to think about electricity and circuits. One model for a circuit is a central heating system. The boiler and pump represent the cell, the pipes represent the wires, and the radiators represent bulbs.

Circuits can be **series** or **parallel circuits**.



SERIES CIRCUIT

- 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 CIRCUIT

- 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.

Electricity and your body

Electrical signals in your body travel along nerves. If an electric current passes through your body you may get an electric shock. This could burn you, or stop your heart or lungs working.

Electricity can be used to help the body. A pacemaker is used to help people whose hearts do not work properly. A defibrillator can be used to start someone's heart if it has stopped beating.