Science Knowledge Organiser
Year 4 Spring (ii)
How do you construct a simple circuit with a switch?

Substantive Knowledge – what will we learn?

To know whether or not a lamp will light in a simple series circuit based on whether or not the lamp is part of a complete loop with a battery

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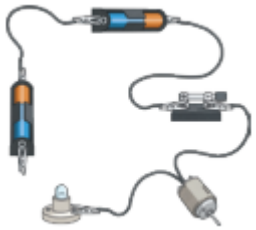
This circuit is complete and will work because it has no breaks and has a power source.

This circuit is not complete and will not work because there is a break in the circuit.



A circuit always needs a **power source**, such as a battery, with wires connected to both the positive (+) and negative (-) ends. A battery is made from a collection of cells connected together.

A circuit can also contain other electrical components, such as bulbs, buzzers or motors, which allow electricity to pass through.

Electricity will only travel around a circuit that is complete. That means it has no gaps. You can use a switch in a circuit to create a gap in a circuit. This can be used to switch it on and off.

To know common appliances that run on electricity.

ITEM	DOES/DOESN'T USE ELECTRICITY?	MAINS OR BATTERY?
Washing machine	Yes	Mains
Oven	Yes (usually)	Mains
Central-heating radiator	No	N/A
Desk fan	Yes	Mains
Laptop computer	Yes	Either
Toilet	No	N/A
Games console	Yes	Yes, or either (e.g. Nintendo Switch)
Mobile phone	Yes	Either
Flashlight	Yes	Battery
Scissors	No	N/A

Core Vocabulary

switch - In relation to electricity, a switch is an electrical component that can be open or closed to interrupt or allow the flow of electricity through a circuit.

electrical circuit - In relation to electricity, a circuit is a closed loop or path around which an electrical current can flow.

series - A series circuit is where one component leads to another like on complete loop.

The basic parts of a simple series electrical circuit include: cells, wires, bulbs, switches and buzzers.

To know how to construct a simple series electrical circuit, identifying and naming the basic parts including: cells, wires, bulbs, switches and buzzers.

A switch opens and closes a circuit by breaking the circuit. With the circuit broken. The electricity cannot flow.

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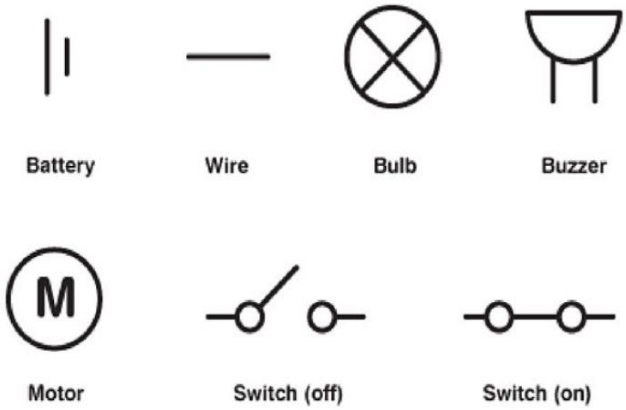

Insulators

Some materials do not allow electricity to pass through them. These materials are known as electrical insulators.

Plastic, wood, glass and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity.

The plastic covering that surrounds wires is an electrical insulator. It stops you from getting an electrical shock.

Conductors

Some materials let electricity pass through them easily. These materials are known as electrical conductors.

Many metals, such as copper, iron and steel, are good electrical conductors. That is why the parts of electrical objects that need to let electricity pass through are always made of metal.

Metal is used in plugs to allow electricity to transfer from the wall socket, through the plug, and into a device such as a radio or TV.

In a light bulb, the metal filament conducts electricity and causes the light bulb to light up.