



Science Knowledge Organiser:

Science unit: Electricity and circuits

Year group: Y4



Overview: What will we learn in this unit?



In this unit, pupils should be taught to

Pupils should be taught to

Identify common appliances that run on electricity

Construct a simple series electrical circuit identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers

Recognise that a switch opens and closes a circuit and associate this with whether a lamp lights in a simple series circuit

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

Recognise some common conductors and insulators, and associate metals with being good conductors

Key knowledge

Electricity

What is Electricity?	- Electricity is created by generators which can be powered by gas, coal, oil, wind or solar. - The electrical energy can be converted into other types of energy such as light, heat, movement or sound. - Electricity is dangerous, so be careful when using electrical appliances.
What are common appliances that run on electricity?	 Any appliances that need to be plugged in run on electricity. For example: - Television - Computer - Microwave - Lights

An electrical circuit

A series circuit (One pathway around the circuit)	- Electricity can flow through the components in a complete electrical 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.
What is a switch?	- 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. - When a switch is open (off), there is a gap in the circuit. Electricity cannot travel around the circuit. - When a switch is closed (on), it makes the circuit complete. Electricity can travel around the circuit.

Electrical Conductors and Electrical Insulators

Conductors	- Some materials let electricity pass through them easily. They are known as electrical conductors. - Many metals, such as iron, copper and steel, are good electrical conductors.
Insulators	- Some materials do not allow electricity to pass through them. They are known as electrical insulators. - Wood, glass, plastic and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity.



Key skills including Working Scientifically



To know symbols for cells, wires, bulbs, switches and buzzers and use them to draw a simple series circuit and explain how / why it works

To set up practical enquiries and comparative tests - Identify differences and changes related to scientific processes (eg patterns in number of cells and brightness of bulb)

Make predictions; make systematic observations and record findings, and use results to draw conclusions

Investigate which materials are good conductors and insulators

Record findings and use results to draw conclusions



Key vocabulary

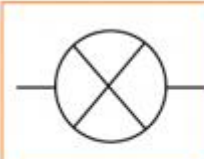
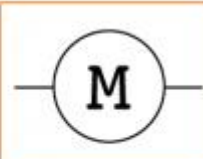
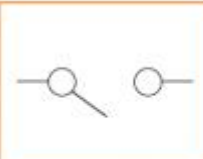
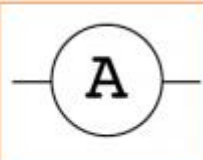
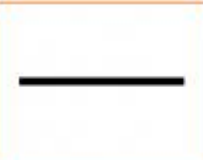
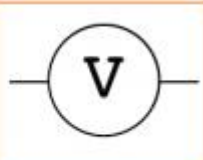
Scientific language



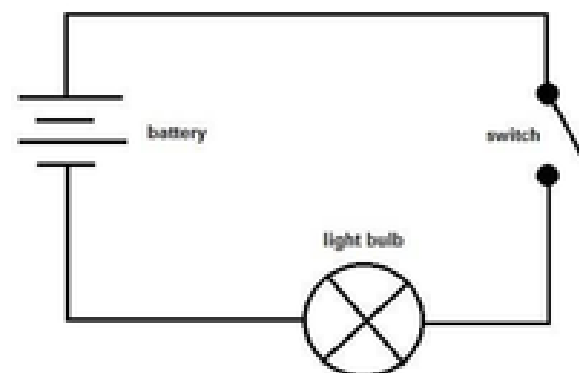
Generator	A machine that makes electrical energy
Cell (Battery)	A cell creates electrical current. 2 or more cells make a battery
Component	A part of something (a part of a circuit)
Circuit	A path through which an electrical current flows
Current	The flow of electrical charge
Connected	Something that is joined or linked
Conductor	A material that lets electricity through it
Insulator	A material that does not let electricity through it

Diagrams and symbols

Symbols used in electrical circuits

			
Lamp / bulb	Motor	Switch	Cell / battery
			
Buzzer	Ammeter	Wire	Voltmeter

An example of a series circuit.



Will the bulb light if the switch is open? Why / why not?

Possible experiences / research opportunities

- Construct series circuits using cells, wires, bulbs, switches and buzzers. Predict if bulbs will light or not.
- Investigate what happens when more cells or more bulbs are added to an electrical circuit.
- Set up a circuit to investigate which materials are good electrical conductors and which are insulators.
Use a glow ball / cosmic ball – link hands in a circle and investigate what happens when you break the 'loop' - what have you found out? Try with different materials in the loop.

Curriculum links



Links to

- DT – designing and constructing circuits including switches and buzzers
- English – writing explanations eg using causal conjunctions to explain why wires are insulated
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Useful websites:

<https://www.bbc.com> <https://stem.org.uk> sigmascience.com

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