

Topic: Science	Year group	Term
Electricity	Year 4	Autumn 2 (7 weeks)

Background knowledge

This is the first unit on electricity therefore children will have a range of prior knowledge. Standard symbols for electricity are not used in year 4 but are introduced in year six. In year 4, the children construct series circuits; these are circuits where the current has only one pathway. Parallel circuits are introduced in year 6 where the current is broken up down several parallel pathways. The reach out CPD units; Upper Primary electricity will be useful when planning this topic. The children will study Benjamin Franklin as part of the unit and this can lead into investigations on static electricity. The book "Now and Ben" is available in school. Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on or off.

Metal are good conductor so they can be used as wires in a circuit. Non-metallic solids are insulators except graphite (pencil lead). Water, if not completely pure, also conducts electricity.

Common misconceptions

Electricity flows to bulbs, not through them.

Electricity flows out of both ends of the battery.

Electricity works by simply coming out of one end of the battery into the component.

What should I already know?

Children know about similarities and differences in relation to places, objects, materials and living things. They talk about features of their own immediate environment and how environments might vary from one another. They explain why some things occur and talk about changes. (ELG)

National Curriculum Objectives / Key Skills	The Journey
Identify common appliances that rely on electricity. <u>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</u>	1. Introduce science topic vocabulary. Construct a simple series circuit, drawing a diagram and labelling its components and their function. Predict then identify whether a bulb will light

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

Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.

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

- I can identify and name appliances that need electricity to function.
- I can construct a series circuit.
- I can identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers).
- I can draw a circuit diagram (as a pictorial representation).
- I can predict and test whether a lamp will light within a circuit.
- I can describe the function of a switch in a circuit.
- I can describe the difference between a conductor and insulator giving examples of each.
- I can observe patterns

asking relevant questions and using different types of scientific enquiries to answer them
Setting up simple practical enquiries, comparative and fair tests

Making systematic and careful observations.

Recording findings using simple scientific language, drawings, labelled diagrams and tables

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

in a series of complete/ incomplete circuits.

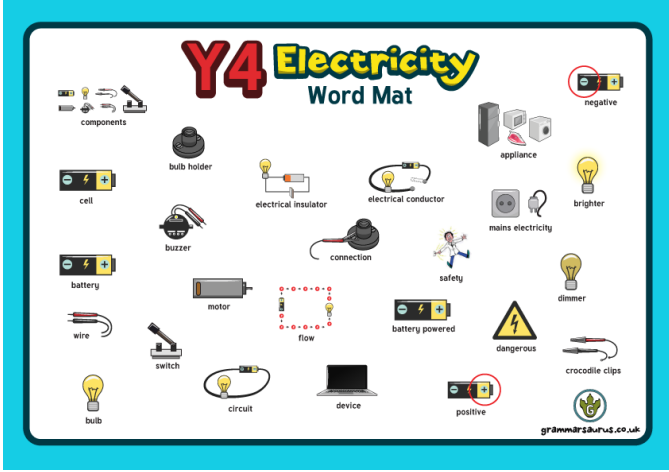
2. Investigate conductors/ insulators looking for patterns e.g. metals tend to be conductors of electricity. Relate to the uses of conductors / insulators e.g. in a wire, the metal conducts the electricity and the plastic acts as an insulator.
3. Consider how switches work relating it to conductors and insulators. Construct own switches.
4. Identify a range of electrical appliances and consider how to use electricity safely.
5. Investigate the effect of altering the number of bulbs in a circuit by posing a question and identifying the pattern. What else could we investigate?
6. Research Benjamin Franklin.
7. Design and construct simple model that uses a working part powered by electricity e.g. spinning bow tie, lit up eyes.

I can plan and set up a simple enquiry to explore which materials are conductors and insulators. I can use a pattern seeking investigation to find out the effect of adding bulbs in a circuit. I can think of further questions having completed this enquiry. I can make careful and accurate observations, I can use different methods to represent my data including, labelled diagrams when drawing circuits and tables recording my findings. I can use and spell scientific language. I can report my findings in different ways including oral and written explanations and presentations. I can draw conclusions based on my evidence and scientific knowledge. I can recognise patterns (conductor and insulators) and causal relationships (number of bulbs in a circuit). I can interpret my data to construct simple comparative statements e.g. the more bulb, the dimmer they are.	
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Outcomes
An overview of what children will know / can do Working towards: I can name several electrical appliances. I can construct and draw a simple series circuit stating the function of each component with support. I can start to say whether a bulb will light in a circuit. I can investigate and identify electrical conductors and insulators. I can what a switch is used for. I can investigate the effect of changing the number of bulbs in a circuit stating what I observed. I can record my findings in a table.

Expected: I can name a range of electrical appliances. I can construct and draw a simple series circuit stating the function of each component. I can say whether a bulb will light in a circuit. I can investigate and identify electrical conductors and insulators giving everyday examples of their use. I can state the function of a switch. I can investigate the effect of changing the number of bulbs in a circuit explaining my findings using a simple comparative statement. I can record my findings clearly in a table.

Exceeding; I can name a range of electrical appliances stating their use. I can confidently construct and draw a simple series circuit stating the function of each component. I can say whether a bulb will light in a circuit explaining why. I can investigate and identify electrical conductors and insulators giving everyday examples of their use stating why they are fit for purpose. I can explain how a switch works. I can investigate the effect of changing the number of bulbs in a circuit clearly explaining my findings using a simple comparative statement suggesting why this may be the case. I can draw and record my findings clearly in a table.

Key Vocabulary	Timeline / Diagrams
Appliances- a piece of equipment. Battery- a device that produces electricity. Bulb- an electrical device that lights up. Buzzer- an electrical device that produces a buzzing sound. Circuit- a complete route which an electrical current can flow around Conductor- lets electricity flow through. Current- a flow of electricity through a wire. Insulator- doesn't let electricity flow through. Motor- a device that changes electrical energy into movement. Wire- a long piece of metal that carries an electrical current covered by plastic for safety. Comparative statement- Comparing one thing with another. Conclusion; To look at our results and explain what we have found out. Investigation - to find something out Observe - to look at something closely Pattern seeking- To look for a pattern in your results. Table- a way of organising your findings.	 The image is a 'Y4 Electricity Word Mat' with a blue border. It contains various icons and labels for electrical components and concepts. The labels include: components, bulb holder, cell, battery, wire, bulb, electrical insulator, buzzer, motor, switch, circuit, device, electrical conductor, connection, safety, mains electricity, battery powered, dangerous, positive, negative, appliance, brighter, dimmer, and crocodile clips. There are also small diagrams showing a simple circuit with a battery, a bulb, and a switch, and a diagram of a battery with its positive and negative terminals labeled.

Key people / places
STEM job; Electrician. Benjamin Franklin.

Assessment questions / outcomes
1. Name things that use electricity. 2. List a range of electrical appliances. 3. Make a simple circuit and tell a friend the name of the different component and what they do. 4. Sort material into conductors and insulators.

5. Why is a wire covered in plastic?
6. Explain how the switch you made works.
7. What happens when you add bulbs to the circuit? Why?
8. Explain how your model works to a friend.