



Electricity– Year 4

Key areas to cover in unit

Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6.

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 and off.

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

Note: pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.

Objectives

- 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.
- Identify 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.
- 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.

Vocabulary:

electricity – The flow of an electric current or charge through a material e.g. from a power source through wires to an appliance

generate – to make or produce.

renewable – A source of electricity that will not run out. These include solar nuclear, geothermal, hydro and wind.

non-renewable – this source of energy will eventually run out and so will no longer be able to be used to make electricity. These include fossil fuels.

electrical appliances/device – A piece of equipment or device designed to perform a particular job, such as a washing machine or mobile phone

battery – A device that stores electrical energy as a chemical.

circuit – A pathway that electricity can flow around. It will need a power supply.

Mains electricity the system of pipes or wires for electricity, gas, or water in the household.

complete circuit – a circuit that electrical current can run through.

			<p>Component – parts that make up a circuit e.g. crocodile clip, bulb, switch, buzzer, motor,</p> <p>N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.</p>
<p>Prior learning/Understanding</p>	<ul style="list-style-type: none"> Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. (Early Learning Goal) 	<p>Working Scientifically Skills coverage:</p>	<ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests gathering, recording, classifying and presenting data in a variety of ways to help in answering questions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions using straightforward scientific evidence to answer questions or to support their findings. <p>Pupils might work scientifically by:</p> <ul style="list-style-type: none"> observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.
<p>Future Learning/understanding</p>	<ul style="list-style-type: none"> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. (Y6 - Electricity) Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. (Y6 - Electricity) Use recognised symbols when representing a simple circuit in a diagram. (Y6 - Electricity) 		
<p>Suggested activities /STEM Lab Opportunities</p>	<ul style="list-style-type: none"> Construct a range of circuits. Explore which materials can be used instead of wires to make a circuit. Classify the materials that were suitable/not suitable for wires. Explore how to connect a range of different switches and investigate how they function in different ways. 	<p>Assessment tasks</p>	<p>Ongoing teacher assessment/judgement.</p> <p>Pupil's may be able to:</p> <ul style="list-style-type: none"> Communicate structures of circuits using drawings which show how the components are connected. Use classification evidence to identify that metals are good conductors and non-metals are insulators. incorporate a switch into a circuit to turn it on and off

	<ul style="list-style-type: none"> Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm. Apply their knowledge of conductors and insulators to design and make different types of switch. Make circuits that can be controlled as part of a DT project. <p>N.B. Children should be given one component at a time to add to circuits.</p> <p>For further ideas and guidance follow the hyperlink below. stem.org.uk/resources/community/collection/12388/year-4-electricity</p>		<ul style="list-style-type: none"> Connect a range of different switches identifying the parts that are insulators and conductors. A dd a circuit with a switch to a DT project and can demonstrate how it works. Give reasons for choice of materials for making different parts of a switch. Describe how their switch works.
<p>Key Local Links:</p>	<ul style="list-style-type: none"> Bright Sparks in the North West deliver workshops to KS2 to help with understanding of Electricity https://www.enwl.co.uk/about-us/transforming-our-communities/powering-your-future/bright-sparks/bright-sparks-workshops/ Note – check overlap with Year 6. 	<p>Common Misconceptions:</p>	<p>Some children may think:</p> <ul style="list-style-type: none"> Electricity flows to bulbs, not through them. Electricity flows out of both ends of a battery. Electricity works by simply coming out of one end of a battery into the component.