

Science

Electricity Year 4

Remember when

Electricity is a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for devices. (Y3)

Sources of light and sound may need electricity to work. (Y3)

Sticky knowledge

- Electricity is generated using energy from natural sources such as the sun, oil, water and wind. These can also be called fuel sources.
- Some appliances use batteries and some use mains electricity. Batteries come in different sizes depending on how much and for how long the appliance is used.
- A complete circuit is a loop that allows electrical current to flow through wires.
- A circuit contains a battery (cell), wires and an appliance that requires electricity to work (such as a bulb, motor or buzzer).
- A switch can break or reconnect a circuit. It controls the flow of the electrical current around the circuit. When the switch is off, the current cannot flow.
- Objects that are made from materials that allow electricity to pass through a create a complete circuit are called electrical conductors.
- Objects that are made from materials that do not allow electricity to pass through and do not complete a circuit are called electrical insulators.

Key vocabulary

appliance	flow
battery	insulator
bulb	plug
cells	light
circuit	mains
conductor	materials
current	natural
devices	sources
electrical	switch
positive	wires
connect	negative

National Curriculum

- Identify common appliances that run on electricity
- Construct a simple series circuit, identifying/naming its basic parts, including cell, wire, bulb, switch and buzzer
- Use their circuits to create simple devices
- Draw the circuit as a pictorial representation (not necessarily using conventional circuit symbols)
- Identify whether or not a lamp will light in a simple series circuit/
- 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.

Common Misconceptions

Some children may think that:

- 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.

LO and Enquiry type	Knowledge and Skills	Lesson outline
<p>Lesson 1</p> <p>LO: To know which items need electricity.</p> <p>Enquiry type: Grouping and classifying</p>	<p>SK: Electricity is generated using energy from natural sources such as the sun, oil, water and wind. These can also be called fuel sources.</p> <p>Some appliances use batteries and some use mains electricity. Batteries come in different sizes depending on how much and for how long the appliance is used.</p> <p>Skill: Identify differences, similarities or changes related to simple scientific ideas and processes</p>	<p>https://www.bbc.co.uk/bitesize/topics/z2882hv/articles/zcwnv9q</p> <p>What is electricity?</p> <p>STEM https://www.stem.org.uk/resources/elibrary/resource/30647/things-use-electricity - Things that use electricity.</p> <p>Selection of appliances. Discuss which use mains and battery. What appliances can use both? Why? Sort using a Venn diagram</p> <p>LA – Group into mains and battery electricity. Practical activity real objects Natural fuel sources are _____.</p> <p>ARE – Group into main and battery electricity Description of each kind of electricity.</p> <p>GD – Group into main and battery electricity. Give reasons for grouping. Which do they think is the best/ eco friendly etc?</p> <p>Where does mains electricity come from? Discuss different sources of electricity– natural sources (include solar) and fuel sources. Discuss each source. Brainstorm examples of what uses the natural sources of electricity.</p>

<p>Lesson 2</p> <p>LO: To construct a series circuit and name the parts</p> <p>Enquiry type: Problem solving</p>	<p>SK: A complete circuit is a loop that allows electrical current to flow through wires.</p> <p>A circuit contains a battery (cell), wires and an appliance that requires electricity to work (such as a bulb, motor or buzzer).</p> <p>Skill: Record findings using drawings and labelled diagrams</p>	<p>How can we make a light bulb light? Discuss meaning of a circuit/ Introduce parts that make a circuit.</p> <p>Children to be in pairs. All given equipment to make light bulb work. No support given. Experiment and investigate.</p> <p>Drawing of circuit to be pictures and not symbols.</p> <p>LA - Draw and label circuit. ARE – Draw and label the circuit. Questions/ investigations to solve on labels GD – Draw and label circuit. What would happen if ___? Questions/investigations on labels. Examples: What would happen if both wires were attached to the same end of a battery? Can you make a bulb light without a holder?</p>
<p>Lesson 3</p> <p>LO: To know how a switch works.</p> <p>Enquiry type: Problem solving</p>	<p>SK: A circuit contains a battery (cell), wires and an appliance that requires electricity to work (such as a bulb, motor or buzzer).</p> <p>A switch can break or reconnect a circuit. It controls the flow of the electrical current around the circuit. When the switch is off, the current cannot flow.</p> <p>Skill: Identify differences, similarities or changes related to simple scientific ideas and processes</p>	<p>Recap on previous learning of making a circuit. Small groups. Circuits constructed again.</p> <p>Introduce switches. Construct circuit including the switch. Repeat for the buzzer.</p> <p>STEM https://www.stem.org.uk/resources/elibrary/resource/31666/circuit-clowns</p> <p>Make a circuit clown face where the clown's nose brights up and then can be switched on and off. Investigate and create a circuit with switches and buzzers.</p> <p>Mixed ability activity. Investigation activity Recorded by photos and Twitter.</p>
<p>Lesson 4</p> <p>LO: To understand why a circuit may or may not light a bulb</p> <p>Enquiry type: Problem solving</p>	<p>SK: A circuit contains a battery (cell), wires and an appliance that requires electricity to work (such as a bulb, motor or buzzer).</p> <p>A switch can break or reconnect a circuit. It controls the flow of the electrical current around the circuit. When the switch is off, the current cannot flow.</p> <p>Skill: Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p>	<p>Recap on previous lessons based upon circuits.</p> <p>What equipment was needed? Recap on uses of each part and how a battery works.</p> <p>https://www.bbc.co.uk/bitesize/topics/zj44jxs/articles/zqgfp4j</p> <p>Selection of circuits to discuss. For example, if it is complete, broken, connected in the incorrect way, missing components. Make sure to include a switch in the off position.</p> <p>LA – Pictures of circuits to identify which work and which do not. Label the mistake. ARE – identify and explain why the circuit is broken. GD identify and explain why it is broken. Explain why would be needed to make the circuit complete.</p>
<p>Lesson 5</p> <p>LO: To recognise conductors</p>	<p>SK: Objects that are made from materials that allow electricity to pass through a create a complete circuit are</p>	<p>What are conductors and insulators?</p> <p>https://www.bbc.co.uk/bitesize/topics/zj44jxs Definition of what conductor and insulator.</p>

<p>and insulators.</p> <p>Enquiry type: Comparative and fair tests</p>	<p>called electrical conductors.</p> <p>Objects that are made from materials that do not allow electricity to pass through and do not complete a circuit are called electrical insulators.</p> <p>Skill: Set up simple practical enquiries, comparative and fair tests</p>	<p>Enquiry question – Does electricity conduct through all materials? Mixed ability groups investigation. Selection of objects/materials provided. How can we test the materials. What properties do they have? Discuss as a class. Each group to have own materials and components for making circuit.</p> <p>LA- I predict _____ will be good conductors. I predict _____ will be insulators ARE/GD predictions and reasons for their predictions.</p> <p>Results recorded on a table. Conclusion – What have they found out? Is there a pattern? Do conductors/insulators have common properties. Are all conductors metal?</p> <p>LA –I have found that conductors are made from _____. I have found that insulators include _____. ARE – common factors for insulators and conductors. How do they know? GD- Explain what they have found. How do they know?</p> <p>Investigate various materials, identifying their properties involving common conductors and insulators. GD – explanations needed. Reasons why.</p> <p>https://www.youtube.com/watch?v=PeMe0mO9TMw</p>
<p>Lesson 6</p> <p>LO: To make a simple circuit and switch for a product.</p> <p>Enquiry type: Problem solving</p>	<p>SK: A switch can break or reconnect a circuit. It controls the flow of the electrical current around the circuit. When the switch is off, the current cannot flow.</p> <p>Objects that are made from materials that allow electricity to pass through a create a complete circuit are called electrical conductors.</p> <p>Objects that are made from materials that do not allow electricity to pass through and do not complete a circuit are called electrical insulators.</p> <p>Skill: Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p>	<p>This lesson will be included in the DT project – torches.</p> <p>For content of lesson see DT planner.</p>