

Year 4 Physical Science: Electricity (Simple Circuits)

Unit 1

<p>Scientific Model (KS2): Energy Transfer Model</p> <ul style="list-style-type: none"> - Ensure the children understand that electricity is a type of energy by referring to it as electrical energy throughout the unit. Reinforce the idea that energy is not created from scratch but is instead transferred from one form to another. 	<p>Scientific Skills Applied:</p> <p>ASK</p> <ul style="list-style-type: none"> - To ask relevant questions - To decide when to use secondary sources to find answers - To make simple predictions based on knowledge of science <p>BREAKDOWN</p> <ul style="list-style-type: none"> - To set up simple tests - To decide what equipment to use - To learn how to use new equipment <p>CAPTURE</p> <ul style="list-style-type: none"> - To observe carefully - To measure using a range of equipment - To gather data and record in different ways - To make systematic observations - To identify differences, similarities and changes <p>DESCRIBE</p> <ul style="list-style-type: none"> - To draw simple conclusions - To explain what they have found out using correct scientific language - To record finding using correct language in varied ways - To answer questions based on evidence orally and in writing - To suggest improvements to tests
<p>Scientific Investigations:</p> <ul style="list-style-type: none"> - Comparative and Fair Testing 	
<p>Scientists:</p> <ul style="list-style-type: none"> - Thomas Edison - Maria Telkes and her application of solar energy 	

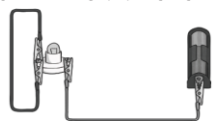
<p>Prior Learning:</p> <ul style="list-style-type: none"> - Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. (Early Learning Goal)
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Curriculum	Learning Intention	Knowledge and Key Vocabulary
<p><u>Making links to learning and discuss the model (if needed)</u> Ensure the children understand that electricity is a type of energy by referring to it as electrical energy throughout the unit. Reinforce the idea that energy is not created from scratch but is instead transferred from one form to another.</p>	<p><u>What is electricity?</u> Introduce Energy Transfer Model. Electricity is energy. Demonstrate electrons moving around the wires. Complete and incomplete circuits.</p>	<p><u>Knowledge:</u> - Electricity is energy.</p> <p><u>Vocabulary:</u> - Electrical energy.</p>
<p><u>Knowledge and skills through investigations</u> Pupils should be taught to:</p> <ul style="list-style-type: none"> - 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 	<p><u>How do you stay safe with electrical energy?</u></p> <ul style="list-style-type: none"> • Identify risks within the home/classroom. • Identify ways to stay safe. <p><u>How do we use electrical energy?</u></p>	<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> - Explain what is needed to make a complete circuit. - Know metals conduct electricity energy. - Know switches turn off a lamp by breaking a circuit.

<ul style="list-style-type: none"> - 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. <p>Notes and guidance (non-statutory):</p> <ul style="list-style-type: none"> - 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. - 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. <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. 	<ul style="list-style-type: none"> • Identify the difference between being mains and battery powered. • Identify devices that use both <p>What is a simple circuit?</p> <ul style="list-style-type: none"> • Investigate a range of circuits • Identify what makes a complete circuit • Draw circuits using pictorial representations. <p>How can you turn a lamp off?</p> <ul style="list-style-type: none"> • Investigate existing switches. • Design a switch. <p>Which materials conduct electrical energy?</p> <ul style="list-style-type: none"> • Plan a fair test. • Investigate materials to test for conductivity. <p>What happens when you add bulbs or cells to a circuit?</p> <ul style="list-style-type: none"> • Investigate the impact of adding more bulbs and cells to a circuit. 	<ul style="list-style-type: none"> - More power = brighter lights. - More bulbs = dimmer lamps. <p>Vocabulary:</p> <ul style="list-style-type: none"> - electricity; electrical energy, electrical appliance/device; mains; plug; electrical circuit; complete circuit; component; cell; battery; positive; negative; connect/connections; short circuit; crocodile clip; switch; bulb; buzzer; motor; conductor; insulator; metal; non-metal; symbol; electrical safety; electrocute; current; voltage; open/closed switch;
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Application and Assessment Activity

7. Will the light bulb in this circuit light up? Explain why or why not.

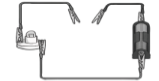


Will it light up? _____

Why? _____

Electrical Investigation

A group of four children have made this circuit to test some different materials to see if they will conduct electricity or not.



8. What do the children mean when they say 'conduct electricity'?

10. Fill in the table below:

	Does it light the bulb?
Wood	
Copper wire	
Plastic ruler	
Paper strip	

11. What should the title of the first column be?

Thinking Deeper:

- Renewable vs non-renewable energy
- Maria Telkes and her application of solar energy

Links to other subjects:

Subject Specific links – DT electrical systems, Maths-data handling

Personal Development – teamwork and making sensible choices together

SMSC – Understanding how to stay safe around electricity

Cultural Capital – considering different faith celebrations which use lights and outdoor sports facilities in UK and abroad

Careers – Scientists (Thomas Edison) and electricians

British Values – The rule of law – following safety rules and instructions to keep everyone safe during experiments.

Equality - Promotion of both men and women as scientists. Respecting different faiths and their celebrations.