

Science Medium term plan

Electricity Y4

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, wires, bulbs, switches, and buzzers.
- Identify whether 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 conductors.

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing, and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships, and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping, and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. 'Working scientifically' is described separately at the beginning of the programme of study but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

'Working scientifically' is related to the teaching of substantive science content, examples show how scientific methods and skills might be linked to specific elements of the content:



During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:




- 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 and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying, and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings





Prior Learning:



- Explore how things work. (Nursery - Electricity)



Future Learning:

- 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)

Key questions (Show how content and concepts link) Differentiated Learning Objectives	Teaching and learning activities (Linked directly to objectives)	Resources (To help pupils reach the learning objectives)	Written and non-written Outcomes (Assessment including homework's)
<p>1)What type of electricity do appliances use?</p> <p>Science capital: <i>What appliances do you use most of? Make a tally and class bar chart.</i></p> <p>Science Working scientifically Skills: Asking questions /</p>   <p>observing</p> <p>Science Enquiry Type Classify</p>  <p><i>Pupil will understand 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.</i></p>	<p>Science reasoning task: explorify ZOOM IN ZOOM OUT: https://explorify.uk/en/activities/zoom-in-zoom-out/inside-out</p> <p>Activity 1: King who banned light stimulus- Discuss what questions they may have about the story linked to electricity.</p> <p>Activity 2: Range of appliances and discuss with TP what is the same and what is different about the different appliances. Discuss and identify renewable and non-renewable electricity.</p> <p>Activity 3: What are the different types of electricity? Discuss mains and battery powered electricity. Identify both types of electricity in appliances around their environment.</p>	<p>Activity 1: Book.</p> <p>Activity 2: pictures of range of appliances/ renewable and non-renewable energy and Venn diagrams to classify.</p> <p>Activity 3: classify/ Venn diagram</p>	<p>Homework: appliance hunt around their environment.</p>

<p>Misconception: 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. 			
<p>2) Why can electricity be dangerous?</p> <p>Science capital: <i>When do you use electricity in your lives? What are the advantages and disadvantages?</i></p> <p>Science Working scientifically Skills:</p>  <p>Science Enquiry Type Classify</p>  <p>Misconception: 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. 	<p>Science reasoning task: explorify Odd One Out https://explorify.uk/en/activities/odd-one-out/electrical-appliances</p> <p>Activity 1: Display picture and pupils to identify the electrical hazards.</p> <p>Activity 2: Share PowerPoint of electrical hazards.</p> <p>Activity 3: Create an information leaflet about keeping safe/ hazards poster explaining the dangers of electricity.</p>	<p>Activity 1: spot the electrical hazard pictures.</p> <p>Activity 2: PowerPoint of electrical hazards.</p> <p>Activity 3: Template of leaflet and poster</p>	<p>Homework: hazards around us.</p>
<p>3) How does a simple circuit work?</p> <p>Science capital: <i>Give an example of electricity that is found naturally?</i></p> <p>Science Working scientifically Skills:</p>  <p>Science Enquiry Type Comparative</p>  <p><i>Pupils will construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Making systematic and careful observations, using a</i></p>	<p>Science reasoning task: explorify Who is? Chi Onwurah? - Explorify</p> <p>Activity 1: Identify the different components of a circuit- what is needed to make a circuit work.</p> <p>Activity 2: Using knowledge of how a simple circuit works pupils to investigate which of the circuits will work.</p>	<p>Activity 1: match the components to their purpose/ name and reasons as to why it is needed in a circuit. Match components to their pictorial and scientific diagram form.</p> <p>Activity 2: range of circuit images to test out.</p>	<p>Science reasoning: discuss what clues pictures can give about the science she is involved in.</p>

<p>range of equipment. Recording findings using labelled diagrams. To identify circuit components and build working circuits.</p> <p>Misconception: 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. 			
<p>4)How does a switch work in a circuit?</p> <p>Science capital: <i>What types of switches do you have around the house? What are they used for?</i></p> <p>Science Working scientifically Skills:</p>  <p>Science Enquiry Type Comparative</p>  <p><i>Pupils will recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</i></p> <p><i>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</i></p> <p><i>To explain how a switch works in a circuit, build switches and report my findings.</i></p> <p>Misconception: 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. 	<p>Science reasoning task: explorify Tried to turn something on when it wasn't turned on at the plug? - Explorify</p> <p>Activity 1: Go on a walk around the school and identify the different switches you notice around and the purpose. To be able to identify the different types of switches and their purposes.</p> <p>Activity 2: follow a set of instructions to build a switch.</p> <p>Activity 3: use the switch created to make circuits work.</p>	<p>Activity 1: school grounds, clipboard and observation sheet.</p> <p>Activity 2: switch building instructions, paper clips, split pins, card</p> <p>Activity 3: range of wires, batteries, bulbs to test out the switch created.</p>	<p>Homework: Survey of different types of switches within a house.</p>
<p>5)Which is the best conductor of electricity?</p>	<p>Science reasoning task: explorify</p>	<p>Activity 1: PowerPoint</p>	

<p>Science capital: <i>What things around the house allow you to conduct electricity safely?</i></p> <p>Science Working scientifically Skills:</p>  <p>Science Enquiry Type Comparative</p>  <p><i>Pupils will recognise some common conductors and insulators. They will be able to set up simple experiment and test out their ideas.</i></p> <p>Misconception: 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. 	<p><u>Everything conducted electricity? - Explorify</u></p> <p>Activity 1: Discuss the differences between conductors and insulators and the purpose of both.</p> <p>Activity 2: Set up post it note experiment as a group.</p> <p>Activity 3: conclude and evaluate the experiment.</p>	<p>Activity 2: Post it note experiment template.</p> <p>Activity 3: PowerPoint.</p>	
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