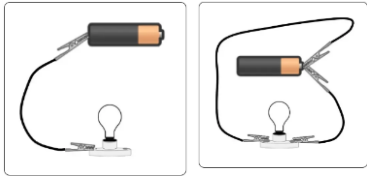
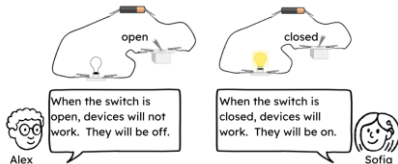
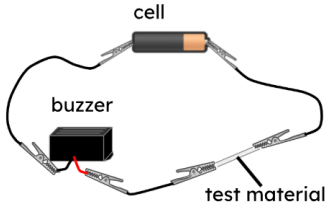


## Hartford Primary School

YEAR GROUP	Year 4	SUBJECT	Science: Electricity	TERM	Autumn (6 weeks)
National Curriculum STUDY	<ul style="list-style-type: none"> <li>Identify common appliances that run on electricity.</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>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.</li> <li>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>Recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul>				
Prior Learning (What should they already know)	<ul style="list-style-type: none"> <li>Use of everyday materials (Y2)</li> <li>Scientific enquiry</li> </ul>				
Misconceptions	Some children may think: • 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.				
RETRIEVAL VOCABULARY	Metal, Glass, Battery, Materials	NEW VOCABULARY	Circuit, conduct/or, insulator, filament appliance, series, component, device, connectors, crocodile clips, switch, variable, mineral, source		

	Essential Learning for this lesson	Suggested teaching tasks/approaches	New Knowledge – What I'm leaving the lesson with
LESSON 1	I can identify, name and group common appliances that run on electricity.	<p>Compile a list of appliances the children identify as running on electricity. Provide some real-life examples of appliances / images.</p> <p>Sort a variety of appliances into categories (require electricity/does not require electricity). Identify that some electrical appliance require mains, while others use batteries. (Useful images in Plymouth Lesson 1)</p>	<p>Electricity is an essential part of modern life.</p> <p>An electric appliance is a device that uses electricity to perform a function.</p> <p>The first electrical appliances, such as the iron, kettle and light bulb, were invented in the 1800s.</p> <p>Some electrical appliances use batteries and some are powered by mains electricity.</p> <p>The parts of the bulb, filament, glass, case, stem and what they are made from and why this detail is important.</p>

		observe light bulbs using a magnifying glass. Explore the components (filament, glass case, stem). Children label diagram of a bulb and begin to discuss the relevance and role of the different parts.	Misconception: that if something is powered by a battery, this is not an electrical appliance
LESSON 2	I can identify and name basic components in a simple electrical circuit and use them to build a series electrical circuit.	<p>Label the parts of a circuit  Allow children time to investigate how they will light the bulb  Refer to the previous lesson and reference materials</p> <p>Exit: show some pictures of incomplete circuits.  Identify if the bulb will work or not and explain why</p> <p>(Useful PP Slides in Plymouth Lesson 1)</p>	<p>Electricity and circuits are just about everywhere and a part of most of our daily lives.  The basic elements of an electrical circuit are called components.  A simple electrical circuit has to have an electrical source, such as a battery.  A simple electrical circuit has to have wires for the electricity to flow through.  A simple electrical circuit has to have a device, such as a bulb, buzzer or motor, that requires electricity to work.  A complete electrical circuit is made when all components are connected together correctly.  Wires must be connected to the positive and negative end of the battery in a complete loop.  A series circuit is when all the components are in the same loop.  Scientists try out different ideas in order to solve problems.</p>
LESSON 3	<p>I can solve problems and improve simple circuits.  I can explain how to be safe around electricity</p>	<p>Remind the children that a circuit needs all the components to work.</p> <p>Allow children to use the components to problem solve e.g buzzers  Useful PP slides included in Plymouth Lesson 2</p> 	<p>A circuit will not work if it is not part of a complete loop with a battery.  Buzzers only work if they are connected in the correct direction.  To solve problems with circuits, scientists test whether they are connected correctly and whether the components work.  Electricians check if circuits have been built incorrectly and with improper wiring.  When we use electricity and electrical appliances, we need to follow rules to stay safe.</p>
LESSON 4	I can explain how a switch is used to open and close a circuit.	<p>Show a variety of switches. E.g. the button on a games console is a switch, a toggle is a switch etc  Children need to understand that a closed switch completes the circuit</p>	<p>Switches are used to control circuits.  Switches can break a circuit by making a space between components where the electricity cannot flow.  Switches are used to turn bulbs, buzzers and motors on and off.</p>

		<p>Allow children time to create their own switch.</p> <p>In electrical <b>circuits</b>, <b>switches</b> are used to turn bulbs, buzzers and motors on and off.</p> 	<p>Different types of switches are used to control many electrical appliances we use everyday.</p>
LESSON 5	I can sort materials into electrical conductors and insulators.	<p>Make a simple circuit</p> <p>Allow children to complete circuits using a range of materials</p> <p>Ensure the children can explain why/not a bulb lights/a buzzer sounds.</p>  <p>Choose a method of recording which materials are conductors and insulators.</p>	<p>An electrical conductor is a material that allows electricity to pass through it easily.</p> <p>An electrical insulator is a material that does not allow electricity to pass through it easily.</p> <p>Metals are the best materials for conducting electricity.</p> <p>There are minerals that can conduct electricity when dissolved in water.</p> <p>Examples of electrical insulators are plastic, rubber, wood, glass and air.</p>
LESSON 6	I can identify objects made from a range of metals and test for electrical conductivity	<p>All metals and only metals conduct electricity? True or false?</p> <p>Give the children a pencil, sharpened at both ends. Ask them to predict what will happen if they include this in the circuit. Test it.</p> <p>Look at some of the objects used in our last lesson and recorded in the table.</p> <p>Allow children to test a range of metals in their circuits.</p> <p>What conclusions can they come to?</p>	<p>Metals are very useful materials, with properties such as strength, stiffness and electrical conductivity.</p> <p>Results of scientific enquiries can be recorded in different ways including charts and tables.</p> <p>All metals conduct electricity, but some metals are better electrical conductors than others.</p> <p>Materials are chosen for particular jobs based on their properties.</p>

		Research the use of metals for specific jobs e.g. titanium in not a good conductor but copes with heat	
LESSON 7	To learn about the scientist Thomas Edison and to know why he is famous.	Children learn about the inventor Thomas Edison who invented the Electric Light Bulb.  Complete a fact file about Thomas Edison.  On Plymouth Science Lesson 4 helpful slide about different scientists related to different aspects of electricity.	Thomas Edison was a famous scientist.  He was an important inventor in history.  He was known for many different inventions but was most famous for inventing an electric light bulb.
Helpful resources to reference		Plymouth Science BBC Bitesize	

According to the National Curriculum for England, electricity is not a required topic for Year 2 (Key Stage 1). It is formally introduced in Year 4 (Key Stage 2), where pupils are taught to construct simple series circuits and understand the function of components like bulbs, buzzers, and switches .[GOV.UK](https://www.gov.uk/guidance/national-curriculum-for-england)

The Ofsted "Research Review Series: Science" emphasizes the importance of sequencing science content to build on pupils' prior knowledge and to address potential misconceptions. Introducing complex or abstract concepts too early can lead to misunderstandings that are difficult to correct later .[GOV.UK](https://www.gov.uk/guidance/national-curriculum-for-england)

Given that electricity involves abstract concepts such as current and circuits, introducing it in Year 2 may not align with pupils' cognitive development at that stage. Therefore, adhering to the curriculum's structure by introducing electricity in Year 4 ensures that students have the necessary foundational knowledge to grasp these concepts effectively.