# KS2: MEDIUM TERM PLANNER
# Electricity Y6

Pupils should be taught to:

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
- 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.
- Use recognised symbols when representing a simple circuit in a diagram.

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships, and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping, and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking 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, spell, and pronounce scientific vocabulary correctly. During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes, and skills through the teaching of the programme of study content:
planning different types of scientific enquiries to answer questions, including recognising, and controlling variables where necessary
taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar, and line graphs
using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships, and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments.

| **Prior Learning:**<br>• Identify common appliances that run on electricity. (Y4 - Electricity)<br>• Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches, and buzzers. (Y4 - Electricity)<br>• Identify whether a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery. (Y4 - Electricity)<br>• Recognise that a switch opens and closes a circuit and associate this with whether a lamp lights in a simple series circuit. (Y4 - Electricity)<br>• Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity) | **Future Learning:** Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. (KS3)<br>• Potential difference, measured in volts, battery, and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. (KS3)<br>• Differences in resistance between conducting and insulating components (quantitative). (KS3)<br>• Static electricity. (KS3) | | |
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| **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)* |
| **1) How has electricity impacted our lives?**<br>SCIENCE CAPITAL: *How does this lesson connect with children in my class? What is electricity used for? What was electricity used for in WW2?*<br>Science Working scientifically Skills:<br>Science Enquiry Type<br>**Research**<br>*Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing* | **Science reasoning task: explorify: Odd one out** Take your turn - Explorify<br><br>**Activity 1:** Electricity quiz<br><br>**Activity 2:** Look at different historical and current appliances and create own Venn diagram to classify objects.<br><br>**Activity 3:** Research through reading comprehension about significant historical milestones.<br><br>**Activity 4:** Independent research of Thomas Eddison using secondary resources.<br><br>**Misconception:**<br>Some children may think:<br>• larger-sized batteries make bulbs brighter<br>• a complete circuit uses up electricity<br>• components in a circuit that are closer to the battery get more electricity. | **Activity 1:** PowerPoint<br><br>**Activity 2:** Appliance pictures and Venn Diagram.<br><br>**Activity 3-** Reading comprehension questions.<br><br>**Activity 4-** Research and write Thomas Edison Biography. | **Assessment:** Pupils able to ask questions.<br><br>**Homework:** Research key historical figures linked to electricity. |

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| *happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.* | | | |
| **2)What are the scientific symbols of components of a circuit?**<br>SCIENCE CAPITAL: *How does this lesson connect with children in my class? Where do you find these symbols?*<br>Science Working scientifically Skills:<br>  <br>Science Enquiry Type<br>**Research/ observation/ asking questions**<br>*Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a* | **Science reasoning task: explorify: What's going on?** Soak up some rays - Explorify<br><br>**Activity 1:** PowerPoint- identify the symbols and name them.<br><br>**Activity 2:** label different circuits with correct symbol name.<br><br>**Misconception:**<br>Some children may think:<br>• larger-sized batteries make bulbs brighter<br>• a complete circuit uses up electricity<br>• components in a circuit that are closer to the battery get more electricity. | **Activity 1:** PowerPoint<br><br>**Activity 2:** different circuits. | **Assessment:** Pupils able to identify the different parts of ta circuit and label the diagrams using correct names.<br><br>**Homework:** hunt different symbols on a variety of appliances. |

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| *battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete, and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.* | | | |
| **3)How does voltage affect the circuit?**<br>SCIENCE CAPITAL: *How does this lesson connect with children in my class? What appliances do you use that use a high or low voltage?*<br>Science Working scientifically Skills:<br>  <br>Science Enquiry Type<br>**Comparative**<br>*Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a* | **Science reasoning task: explorify: Have you ever?** Tried to turn something on when it wasn't turned on at the plug? - Explorify<br><br>**Activity 1:** PowerPoint- watch https://www.youtube.com/watch?v=WUR4oAKqWHc<br><br>**Activity 2:** Define the difference between current and voltage.<br><br>**Activity 3:** Carry out and conclude and evaluate experiment.<br><br>**Misconception:**<br>Some children may think:<br>• larger-sized batteries make bulbs brighter<br>• a complete circuit uses up electricity<br>• components in a circuit that are closer to the battery get more electricity. | **Activity 1:** PowerPoint<br><br>**Activity 2:** Youtube link<br><br>**Activity 3:** Concept cartoons to discuss and posit note planning template. | **Assessment:** Are pupils able to use working scientifically skills?<br><br>**Homework:** identify different appliances and the voltages they have. |

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| *buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.* | | | |
| **4)How does a dimmer switch affect resistance?**<br>SCIENCE CAPITAL: *How does this lesson connect with children in my class? What different types of switches do you have in your house?*<br>Science Working scientifically Skills:<br>  | **Science reasoning task: explorify: Zoom in and zoom out** Is bigger always better? - Explorify<br><br>**Activity 1:** PowerPoint to understand volt meaning, know difference between switch and dimmer switch.<br><br>**Activity 2:** setting up experiment to see if increased or decreased resistance impacts circuit light bulb.<br><br>**Misconception:**<br>Some children may think:<br>• larger-sized batteries make bulbs brighter | **Activity 1:** PowerPoint<br><br>**Activity 2**: Planning template and various length of pencil led. | **Assessment:** Able to explain the role of resistance in a circuit.<br><br>**Homework:** Hunt different types of switches in your house. Compare switches and dimmers. |

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| Science Enquiry Type<br>**Comparative**<br>*Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.* | • a complete circuit uses up electricity<br>• components in a circuit that are closer to the battery get more electricity. | | |
| 5) **Can I explain how a circuit works?**<br>SCIENCE CAPITAL: *How does this lesson connect with children in my class? Are different* | **Activity 1:** Planning proforma for explanation text and WGOL. Pupils plan explanation text on proforma.<br><br>**Activity 2:** write explanation text marking against individual checklist. | **Activity 1:** PowerPoint / proforma<br><br>**Activity 2:** human body templates and statements for and against. | **Assessment:** Are pupils able to use scientific language to explain how a circuit works. |

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| *circuits useful for different things?*<br>Science Working scientifically Skills:<br>  <br>Science Enquiry Type<br>**Research/ observation /Asking questions**<br>*Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit* | **Misconception:**<br>Some children may think:<br>• larger-sized batteries make bulbs brighter<br>• a complete circuit uses up electricity<br>• components in a circuit that are closer to the battery get more electricity. | . | |

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| *symbols to draw simple circuit diagrams.* | | | |
| **6) Can I plan an investigation?**<br>SCIENCE CAPITAL: *How does this lesson connect with children in my class? What do you think affects how an appliance works efficiently (wires, number of bulbs etc)*<br>Science Working scientifically Skills:<br>  <br>Science Enquiry Type<br>**Comparative**<br>*Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the* | **Activity 1:** PowerPoint go through and discuss concept cartoons about which components affect bulb brightness. (Wire length/ amount of bulb<br><br>**Activity 2:** Pupils plan own line of enquiries.<br><br>**Activity 3:** conclude experiment<br><br>**Misconception:**<br>Some children may think:<br>• larger-sized batteries make bulbs brighter<br>• a complete circuit uses up electricity<br>• components in a circuit that are closer to the battery get more electricity. | **Activity 1:** PowerPoint go through,<br><br>**Activity 2:** Plan line of enquiry<br><br>**Activity 3:** draw conclusions using results and knowledge of circuits. | **Assessment:** Are pupils able to identify the effects of wire or batteries on a circuit? |

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| *circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.* | | | |
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