Year 6 – Electricity



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| National Curriculum Outcomes: Knowledge   * Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit * Compare and give reasons for the variations on 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 | | | | National Curriculum Outcomes: Working Scientifically   * 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 and to set up further comparative and fair tests * Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and 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. | | | | | |
| Children might work scientifically by:  Systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit. (*Taken from the National Curriculum*) | | | |
| Links to prior learning  **Year 4:** 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. 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. 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.  **Year 5:** Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets | | | | | | | | Links to future learning  **Key Stage 3:** Electric current, measured in amperes. In circuits, series and parallel circuits, currents and where branches meet and current as flow of charge. | |
| Key Vocabulary  Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, lamp, buzzer, motor, switch, voltage | | | | | Common Misconceptions   * Children may think that larger-sized batteries make bulbs brighter * They may think that the closer components are in a circuit to the battery, the more electricity they get | | | | |
| Important knowledge/facts that children need to know   * The brightness of a bulb is affected by the voltage in the circuit- the lower the voltage, the dimmer the bulb. * Changes to components in a circuit has an effect on the brightness of its bulb/ volume of its buzzer eg: The higher the number of cells, the brighter the bulbs/ louder the buzzer. * Know the scientific symbols for components in a circuit- cell, switch, wire, buzzer, motor. | | | | | | | | | |
| Important scientists  **Alessandro Volta** – Italian physicist who is credited with inventing the battery  **Edith Clarke** – American scientist who was the first woman to be professionally employed as an electrical engineer in the United States | | STEM Career Links  **Electrical Engineer** (works with equipment that uses electricity)  **Electrician** (installs and maintains electrical equipment)  **Renewable Energy Engineer** (works on environmentally conscious) | | | | | Links to real life   * What if we didn’t have electricity? * Why do we have power cuts? * How do fuses work? * Our mobile phones have a battery, but we have to plug them in too; why? | | |
| Suggested Enquiry Activities | | | | | | | | | |
| Identifying and Classifying   * Which electrical devices use a battery and which use mains electricity? Are there any that use both? | Comparative and Fair Testing   * How does changing components (parts) in our circuit affect the brightness of the bulb? | | Observation over Time | | | Pattern Seeking   * How does the length of a wire affect the brightness of a bulb or loudness of a battery? | | | Research using Secondary Sources   * What did Michael Faraday invent? * Who was Edith Clarke? |
| Wow Factor Experiences   * Make conductive playdough and build some creative circuits (see weblinks below). * Create electrical games such as an ‘Operation’ style game or a steady hand game where a hoop must be moved without touching a metal wire. | | | | | | | | | |
| Maths Links   * Investigate the effect of different lengths of wire (measured precisely and checked systematically) on the brightness of a bulb or sound of a buzzer (this could be measured precisely if you have access to a datalogger). * Investigate how much the electricity for school or home costs and how we could save money. | | Literacy Links   * Write a persuasive letter to parents or others in the community encouraging them to use less electricity. * Write a set of instructions for conductive playdough and an explanation of how it works | | | | Broader Curriculum Links  **Design Technology:** Find out about gravity lamps or dynamo torches. Create an electronic game like Operation or steady hand games.  **Geography:** Where does our electricity come from?  **History:** How was life different in times before electricity? What electrical devices do we have now that weren’t around in the time period we are currently learning about? | | | |
| Story Links  Goodnight Mr Tom – Michelle Magorian  Books with buttons to press that make sounds, such as ‘Around the Farm’ by Eric Carle (children could investigate how to make one of these themselves) | | | | | | | | | |
| Helpful Weblinks  ‘Squishy Circuits’ conductive playdough recipe - <https://www.makerspaces.com/squishy-circuits/>  Teacher CPD for electricity (free) – <https://www.reachoutcpd.com/courses/upper-primary/electricity/>  Assessment exemplification (could also be useful with planning ideas) –  BBC Class Clips (useful videos) – <https://www.bbc.co.uk/bitesize/topics/zj44jxs>  STEM Learning collection of resources for planning and teaching electricity – <https://www.stem.org.uk/resources/community/collection/12390/year-6-electricity> | | | | | | | | | |