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.
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| 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 VocabularyCircuit, 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
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| 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.
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| 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?
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| 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?
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| 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.
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| 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 LinksGoodnight Mr Tom – Michelle MagorianBooks 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> |