Year 4 – Electricity



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| National Curriculum Outcomes: Knowledge* 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 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 good conductors
 | National Curriculum Outcomes: Working Scientifically* 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
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| Children might work scientifically by:Observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. (*Taken from the National Curriculum*) |
| Links to prior learning**EYFS** – Recognise that a range of technology is used in homes and schools. | Links to future learning**Year 6** - 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. |
| Key VocabularyElectricity, circuit, series circuit, cell, battery, wire, bulb, lamp, switch, buzzer, conductor, insulator | Common Misconceptions* Children may think that electricity flows to bulbs, not through them
* They may assume that electricity flows out of both ends of a battery
* Children may think that electricity works by simply coming out of one end of a battery in into the component
* They may be very wary of working with electrical equipment as they have often been warned about the dangers of electricity
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| Important knowledge/facts that the children need to know* Some common appliances that run on electricity are TV’s, washing machines, playstation, hair dryer e.t.c.
* The main components of a circuit are: cells, wires, bulbs, switches and buzzers. Children do not need to draw the electrical symbols, this is taught in Year 6.
* A lamp will light if a circuit has a source of electricity, a bulb and is a complete circuit.
* A switch is used to open and close a circuit. This can be used light a lamp in a simple series circuit or turn it off. Switches are used to break circuits so that bulbs, buzzers and motors are off or complete a circuit so that they are on.
* Conductors are substances that electricity can pass through easily. Copper, iron and steel are good conductors. Insulators are materials that do not allow electricity to pass through. Plastic, wood, glass and rubber are good insulators and this is why they are used to cover materials that carry electricity.
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| Important scientists**Thomas Edison** – American scientist who is credited with inventing the light bulb | STEM Career Links**Electrical Engineer** (works with equipment that uses electricity)**Electrician** (installs and maintains electrical equipment)**Renewable Energy Engineer** (works on environmentally conscious energy production) | Links to real life* Where do we use electricity in our everyday lives?
* What if there was no electricity?
* Where can we find switches in our school/home?
* Why are insulators just as important as conductors?
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| Suggested Enquiry Activities |
| Identifying and Classifying* If there was a power cut, which things in our classroom/home would still work and which wouldn’t?
* How can we sort which materials will make good switches?
 | Comparative and Fair Testing* How does changing the length of a wire affect the brightness of a bulb?
 | Observation over Time | Pattern Seeking* This paper clip is magnetic and a good conductor of electricity, Are things that are magnetic always good conductors of electricity?
 | Research using Secondary Sources* How much energy do low energy light bulbs save us?
* What did Humphry Davy invent?
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| Wow Factor Experiences* Create an ‘Operation’ style game
* Visit Drax power station
* Make a lemon battery
* Create circuits with buzzers and switches and use
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| Literacy Links* Write an explanation text about how to build a circuit, including a ‘trouble-shooting’ guide
 | Broader Curriculum Links**Design Technology:** Design and make a product that contains a simple circuit, such as a torch, toy or simple game**History:** How did people in the time period we are studying get by without electricity? |
| Book LinksBlackout – John Rocco |
| Helpful WeblinksAssessment exemplification (could also be useful with planning ideas) – <https://www.planassessment.com/product-page/examples-of-work-electricity-y4-dougal>Teacher CPD for this unit (free) – <https://www.reachoutcpd.com/courses/upper-primary/electricity/>BBC Class Clips – Electricity (useful videos) – <https://www.bbc.co.uk/bitesize/topics/zj44jxs>STEM Learning’s online resource library for this unit - <https://www.stem.org.uk/resources/community/collection/12388/year-4-electricity> |