



# The Canons CE Primary School



| Year 6 – Electricity  |  |  |  |
|---|--|--|--|
| Prior Learning  | In Year 6  | Future Learning  |  |
| <p>In Year 4 children will be taught to:</p> <ul style="list-style-type: none"> <li>describe how to work safely with electricity</li> <li>identify metals that are good conductors</li> <li>recognise and describe some common insulators</li> <li>recognise and describe some common conductors</li> <li>describe the impact of an open and/or closed switch on a simple series circuit</li> <li>describe what will happen if the circuit isn't complete</li> <li>create a simple series electrical circuit using basic parts</li> <li>identify the basic parts of a simple series electrical circuit e.g. cells, wires, bulbs, switches and buzzers</li> <li>identify common appliances that run on electricity.</li> </ul> | <p>In Year 6 children will be taught to:</p> <ul style="list-style-type: none"> <li>investigate and describe the variations in how components function e.g. the brightness of bulbs, loudness of buzzers and on/off position of switches</li> <li>investigate the impact the and voltage of cells has on the volume of a buzzer</li> <li>investigate the impact the number and voltage of cells has on the brightness of a lamp</li> <li>construct simple series circuit diagrams using recognised symbols.</li> </ul> | <p>In KS3 children will be taught about:</p> <ul style="list-style-type: none"> <li>electric current, measured in amperes, in circuits, currents add where branches meet and current as flow of charge</li> <li>potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current</li> <li>differences in resistance between conducting and insulating components (quantitative)</li> <li>static electricity.</li> </ul> |  |
|   | <b>Key Vocabulary</b>  |  |  |
|   | <p>circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage</p> <p><i>NB Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words "cells" and "batteries" are now used interchangeably.</i></p>  |  |  |



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| Famous Scientists   | Common Misconceptions  | Possible Evidence to be Secure   |
|---|--|--|
| <ul style="list-style-type: none"><li>• Thomas Edison (1847 – 1931) – inventor of the fuse</li><li>• Benjamin Franklin (1706 – 1790) – showed that lightning is caused by electricity</li><li>• Charles Augustine Coulomb (1736 – 1806) – he invented instruments for measuring the forces between magnets and between charges. The unit for measuring an amount, or charge, of electricity is named after him. One coulomb (symbol C) is the amount of electricity that flows past any point when a current of one-amp flows for one second</li><li>• Alessandro Volta (1745 – 1827) – invented the first battery. The volt, the unit of electromotive force, is named after him.</li><li>• Andre-Marie Ampere (1775 – 1836) – his studies allowed people to measure the amount of electric current flowing through a circuit. Thus, the current is measured in units called amperes (amps)</li><li>• Nikola Tesla – founder of the AC electric system (<i>links to light topic too</i>)</li></ul> | <p>Some children may think:</p> <ul style="list-style-type: none"><li>• larger sized batteries make bulbs brighter</li><li>• a complete circuit uses up electricity</li><li>• components in a circuit that are closer to the battery get more electricity.</li></ul> | <p>Children can:</p> <ul style="list-style-type: none"><li>• make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs, can be changed by increasing or decreasing the number of cells or using cells of different voltages</li><li>• draw circuit diagrams of a range of simple series circuits using recognised symbols.</li></ul> |



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## Working Scientifically

### National Curriculum Statutory Requirements

1. Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
2. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate.
3. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
4. Use test results to make predictions to set up further comparative and fair tests.
5. Report and present findings from enquiries, including conclusions, casual relationships and explanations of result, in oral and written forms such as displays and other presentations.
6. Identifying scientific evidence that has been used to support or refute ideas or arguments.

Highlighted = main focus during this topic

### Teaching Ideas – Different Types of Scientific Enquiry

| Comparative and Fair Testing   | Identifying and Classifying   | Observation Over Time   | Pattern Seeking   | Research                              |
|--|---|---|---|---------------------------------------|
| Which make of battery lasts the longest?<br>Which type of fruit makes the best fruity battery?<br>How does the voltage of the batteries in a circuit affect the brightness of the lamp?<br>How does the voltage of the batteries in a circuit affect the volume of the buzzer? | How would you group electrical components and appliances based on what electricity makes them do? | Does the temperature of a light bulb go up the longer it is on?<br><i>(Pattern seeking too)</i> | Does the temperature of a light bulb go up the longer it is on? | How have batteries changed over time? |

### Teaching Ideas – How Pupils Could Work Scientifically

### Teaching Ideas – Possible Evidence to be Secure

(Bracketed Number = National Curriculum Statutory Requirement Link)

- Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower. (1, 4)
- Make circuits to solve particular problems, such as a quiet and a loud burglar alarm. (1, 4)
- Carry out fair tests exploring changes in circuits. (1, 4)
- Make circuits that can be controlled as part of a DT project. (1, 4)

Children can:

- incorporate a switch into a circuit to turn it on and off (1)
- change cells and components in a circuit to achieve a specific effect (1, 2, 4)
- communicate structures of circuits using circuit diagrams with recognised symbols (3)
- devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test (2)
- predict results and answer questions by drawing on evidence gathered. (4)