**Electricity**

**NC Statutory Guidance**

Pupils should be taught to:

* 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

**Working Scientifically**

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

* 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.

**Resources**

Twinkl PlanIt to be adapted.

**Lesson Overview (Statutory in Bold)**

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| WALT | Knowledge to be Taught | Skills to be Taught and Investigations | Vocabulary |
| Explain ways that electricity is generated. | When we refer to electricity, what we usually mean is electric current, which is the flow of electric charge.  Electricity can occur naturally, through lightning, static and bioelectricity.  Electricity can be generated (current electricity).  Electricity powers many devices that we use, either using mains (AC) or batteries (DC).  An energy source is a way of powering something.  Electricity is a secondary energy source. This means it is made from primary sources of energy.  Some primary energy sources are renewable, some are non-renewable. | Report on findings, including oral and written explanations. | electricity  electric current  flow  electric charge  lightning  static  bioelectricity  current  mains  batteries  AC  DC  energy  primary energy source  secondary energy source  fossil fuels  geothermal  nuclear  solar  hydro  wind  renewable  non-renewable |
| Identify electrical appliances and the types of electricity they use. | An appliance is a device, piece of equipment or an instrument designed to perform a task.  Some appliances are electric; some use mains, some batteries.  Mains electricity can be generated in a number of ways (renewable/non-renewable)  Explain how electricity gets from power station to homes.  Explain how batteries work.  Some batteries are rechargeable, like lithium batteries in phones, others are replaced when they run out, eg Duracel in a remote control.  Mains safety. | **Identify common appliances that run on electricity.** | appliance  mains  battery  power station  wind turbine  solar panel  hydroelectric  transformer  pylon  underground wires  chemical |
| Identify complete and incomplete circuits. | Current electricity is the flow of electrical charge though materials.  Every complete circuit must have a power supply. The power supply could be the mains, or it could be a battery.  For a circuit to be complete, there must be wires connected to both the positive and negative ends of the power supply.  Electricity can only flow around a complete circuit that has no gaps. | Visualise and test circuits to see if it is complete.  Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.  **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** | current electricity  electrical charge  complete circuit  incomplete  power supply  positive  negative  flow  cell  crocodile clip |
| Identify and sort materials into electrical conductors or insulators. | Materials are made from tiny particles called atoms.  Atoms have protons, neutrons and electrons.  In some materials (insulators) the electrons cannot move freely and therefore no electric current can be produced.  In some materials (conductors) the electrons can move freely and therefore an electric current can be produced. [https://www.youtube.com/](https://www.youtube.com/watch?v=tvWeHtqFId8)  watch?v=tvWeHtqFId8  Electric charge will flow through conductors but not insulators.  Safety – why is it a bad idea to play golf in the middle of a lightning storm? | Test different materials as part of a circuit to see whether or not they conduct electricity.  **Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.**  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.  **Recognise some common conductors and insulators, and associate metals with being good conductors** | insulator  conductor  bulb  bulb holder  battery (cell)  battery holder  wire  crocodile clip |
| Explain how a switch works and why they are needed. | Bulbs create light, buzzers create sound and motors create movement.  There are different types of switch.  A switch breaks a complete circuit. It stops the flow of electrons when it is off.  When it is on, the switch completes the circuit so that electrons can flow again.  In an incomplete circuit, the electrons cannot flow whether or not there is a switch. | Create circuits that contain a switch.  **Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.**  **Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit** | bulb  buzzer  motor  switch  complete circuit  incomplete circuit  electrons |
| Record and report on an investigation. | Investigate a range of different switches. | Make and investigate different switches.  Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.  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 | bulb  buzzer  motor  switch  complete circuit  incomplete circuit  electrons |