Science: Electricity

Year: 6

Term: Spring

Prior knowledge

Identify common appliances that run on electricity. (Y4 - Electricity)

Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. (Y4 - Electricity)

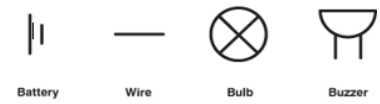
Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. (Y4 - Electricity)

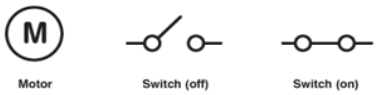
Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (Y4 - Electricity)

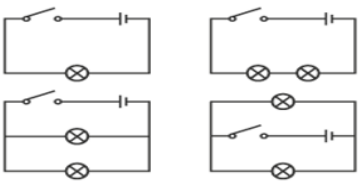
Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity)

Key Knowledge

Children should recognise and use the symbols that are used to represent electrical components when drawing electrical circuits:







Children should associate the brightness of a lamp or the volume of a buzzer with the number and voltage of the cells used in the circuit.

Children should be able to compare and give reasons for variations in how electrical components function (including the brightness of bulbs, loudness of buzzers and the on/off position of switches.

Children should know that electricity occurs naturally e.g.

- Lightning
- Static electricity
- Bioelectricity in living things – electric eels

Children should know that there are two types of electrical currents that we use to power appliances:

- Mains electricity – alternating current (AC)
- Batteries – direct current (DC)

Children should know when to use the term battery or cell when drawing and creating circuits.

Key Vocabulary	
Prior vocabulary Prior vocabulary - batteries, bulb, buzzer, cell, circuit, component, conductor, connected, current, electricity, electrons, generator, insulator, mains power, safety, series circuit, switch, wire, absorption, energy Working scientifically vocabulary – prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis, line graph, relationship, outlier	
Lightning	A natural electricity produced in thunderclouds.
Static electricity	A charge typically produced by friction, which causes sparks or crackling or the attraction of dust or hair.
Bioelectricity	Relating to electric phenomena in living organisms.
Filament	**A conducting wire or thread with a high melting point that forms part of an electric bulb.**
Voltage	**An electrical force that makes electricity move through a wire, measured in volts.**
Parallel circuit	A circuit that has branches that divides the current so that just a part of it passes throught each branch.
Additional vocabulary to discuss across the unit – Motor, charge, negative terminal, positive terminal, chemical reastion	

Key skills

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Make predictions about whether a circuit will work or not based on their understanding of what a circuit requires in order for it to work.

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 to set up further comparative and fair tests.

Identifying scientific evidence that has been used to support or refute ideas or arguments.

Understanding how to work safely with electricity and electrical circuits.

Future Learning

Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. (KS3)

Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. (KS3)

Differences in resistance between conducting and insulating components (quantitative). (KS3)

Static electricity. (KS3)

<u>Deepening and broadening the knowledge and understanding for GDS learners:</u>

- knows the difference between current and voltage
- knows that voltage tells us how much a battery pushes the current
- knows that a cell pushes the current round the circuit and through *e.g. the lamps*

<u>Key Outcomes</u>

1. Why do we use symbols for electrical components and can I show a circuit as a diagram?

Children will draw circuit diagrams of a range of simple series circuits using recognised symbols and understand that we use symbols for these components so that they are universal and there are standard symbols used in circuit diagrams meaning that they can be understood by different people.

2. What affects the brightness of a bulb?

Children will explore series circuits (e.g. fairy lights/LEDS) and be able to explain the process of an electric current. They will make predictions and

• knows that current is a measure of how much electric charge flows through a circuit • explains that the more *e.g. lamps (bulbs)* there are, the harder it is for the current to flow because there is more resistance in the circuit • knows that resistance tells us how difficult it is for the current to flow • explains how a component in a parallel circuit can keep working when another component is removed or damaged • knows that when additional lamps (bulbs) are added to a parallel circuit the brightness of the lamps (bulbs) will not be any dimmer • knows the recognised symbols that represent the common components in a simple circuit • draws a simple (correct) series circuit using the recognised symbols	*explore the brightness of lamps or the volume of a buzzer with the number and voltage of cells used and give reasons for the differences in how components function.* **3. How does a hairdryer work?** *Children investigate the electrical components of a hairdryer identifying its different parts and their functions. Applying previous learning about circuits, they explore motors, fans and switches and draw circuit diagrams representing components as symbols***.** **4. Can I use my scientific knowledge to design and make a fan with a switch?** *Children will plan a scientific enquiry into designing a fan, using a motor, deciding number of cells, position of switch etc. based on scientific understanding. They will draw a scientific diagram including the electrical symbols.* **5. How do I use my knowledge to make a conclusion?** *Children will present conclusions of their investigation drawing on their scientific knowledge of electricity and suggest further tests to check accuracy with their findings.*