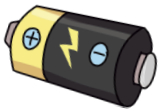



Y6 - Electricity

Key Question: What is electricity?

Overview Of Learning

During this unit of work, children will consolidate and extend previous learning from year 4 by constructing simple series circuits and drawing them using scientific symbols. They will conduct investigations to determine how the voltage in a circuit affects the brightness of a bulb. They will use their 'working scientifically' skills to plan an experiment to investigate variations in how components function and use the results to write a clear and concise conclusion. They will use the internet to research information about renewable and non-renewable energy sources and communicate this information in the form of a leaflet.

Previous Learning

KS1 - Electricity is not taught as a discrete topic in KS1 however some children may have looked at which items use electricity in other curriculum areas (e.g. Toys topic in history)
Year 4 - During the unit on electricity, children may have learnt to sort common electrical appliances into battery and mains powered; construct simple series circuits containing a variety of components. They may be able to identify whether or not a bulb will light in a simple series circuit and put forward ideas to fix incomplete circuits. The children may have conducted investigations to discover which materials make good insulators and designed and tested their own switches.

Knowledge And Understanding Objectives

Pupils should be taught to:
- 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

Future Learning

KS3 – Children will study electricity in more depth, including; current and static electricity, parallel and series circuits. They will learn how current is measured and work out potential differences; calculate differences in resistance between conducting and insulating components (quantitative).

Key Vocabulary To Explain

appliance – a device or piece of equipment that has been made to perform a specific task
battery – a small item used to power small appliances
circuit – a route through which electricity flows
components – the parts of a circuit
conductor – allows electricity to flow through it
electrical – something that uses electricity to work
insulator – doesn't allow electricity to flow through it
mains power – electricity provided by power stations
pylon – a tower used for keeping electrical wires above the ground
renewable energy – energy from a source that is not depleted when used, such as wind or solar power
non-renewable energy – energy from a source that is depleted when used, such as coal, gas and oil

Working Scientifically Objectives

Pupils in Upper Key stage two should be taught to:
- plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter, bar and line graphs
- use test results to make predictions to set up further comparative and fair tests
- report and present 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
- identify scientific evidence that has been used to support or refute ideas or arguments

Misconceptions

When adding several components to a circuit, children may think that the bulb is the brightest or the first buzzer makes the most noise. This misconception often arises from the idea that electricity comes out of the battery so the first is the brightest and the last is the dimmest. In fact, all the bulbs would be the same level of brightness (the electricity is 'shared' between the components).
When making a circuit with different coloured wires, the children may 'wrongly' assume that the different coloured wires have different properties.
Children may think that the bigger the battery, the more electricity is contained in it and will make a bulb shine brighter. Although it is true to say a battery's voltage does affect the brightness of a bulb, the size of the battery isn't always related to the voltage e.g. a 1.5V battery can come in 4 different sizes.

Unit Overview

Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Key question: How do I draw a scientific diagram of a circuit?	**Key question:** How does voltage in a circuit affect the brightness of a bulb?	**Key question:** How do I plan a fair test experiment to investigate variations in how components function?	**Key question:** How do I write a conclusion for my investigation?	**Key question:** What is renewable and non-renewable energy?
Learning objective: I can use symbols when drawing a simple circuit diagram	**Learning objective:** I can associate the brightness of a lamp with the number and voltage of cells used in the circuit.	**Learning objective:** I can investigate variations in how components function.	**Learning objective:** I can investigate variations in how components function and write a conclusion.	**Learning objective:** I can name renewable and non-renewable sources of energy.
Success criteria: By the end of this lesson, children will be able to construct and draw a variety of circuits using scientific symbols to represent each component. They will be able to look at a drawing of a circuit and work out if it will work or not.	**Success criteria:** By the end of this lesson, children will have conducted an investigation to discover the effect that increasing the voltage in a circuit has on the brightness of a bulb. They will be able to describe this relationship and draw conclusions.	**Success criteria:** By the end of this lesson, children will be able to plan and conduct a fair test investigation to determine variations in how components function in a circuit.	**Success criteria:** By the end of this lesson, children will be able to write a clear conclusion using the data collected in their investigation.	**Success criteria:** By the end of this lesson, children will have produced a leaflet to explain renewable and non-renewable energy.
Cumulative Quiz: Q1 – Q3	**Cumulative Quiz:** Q4 – Q6	**Cumulative Quiz:** Q7 – Q9	**Cumulative Quiz:** Q10 – Q12	**Cumulative Quiz:** Q13 – Q15

Stretch and Challenge ideas across the unit

Children could:

- Children are presented with a diagram of a circuit and asked if it will work. They need to explain their thinking
- Children are presented with a circuit and asked to give two ways in which they could change the brightness of the bulb
- Children are given a table of results from an investigation; some of the values are missing. They are asked to estimate what the values might be and draw a line graph to display the data
- Children draw a bar graph or a line graph using the data they have collected in their investigation
- Children use their research skills to answer this question: How has non-renewable energy led to climate change?

Assessment

- The pre-unit assessment should be given before the unit to see where gaps are and what the children know. This will provide insight of the children who already know about the topic and give an opportunity for the teacher to plan activities that stretch these children and develop higher order thinking skills
- The knowledge organisers can be used to support children. These can be on display, on the tables, sent home or used for pre-teaching key vocabulary or concepts
- The post-unit test can be used to assess the knowledge and understanding objectives that have been taught throughout the unit. This can be done independently or in small groups with a teacher
- There is a cumulative quiz with questions that can be used to assess children throughout the topic. The quiz questions will link directly to each objective. They can also be used at the end of each lesson to give immediate feedback to inform future planning and give the opportunity to identify children who do not understand.