Caroline Haslett Primary School - Science Topic: Electricity Year 4

What should I already know?

- **Electricity** is a form of **energy** that can be carried by wires and is used for heating and lighting, and to provide **power** for **devices**.
- **Sources** of light and sound may need **electricity** to work.

What will I know by the end of the unit?

Where does **electricity** come from?	• **Electricity** is **generated** using **energy** from natural **sources** such as the Sun, oil, water and wind. • These can also be called **fuel sources.**
Which **appliances** run on **electricity**?	• Some **appliances** use **batteries** and some use **mains electricity**. • **Batteries** come in different sizes depending on how much and for how long the **appliance** is used. • Common **appliances** that use **electricity**. 
How does a **circuit** work?	• A complete **circuit** is a loop that allows **electrical current** to flow through **wires**. • A **circuit** contains a **battery (cell)**, **wires** and an **appliance** that requires **electricity** to work (such as a **bulb**, **motor** or **buzzer**). • The **electrical current** flows through the wires from the **battery (cell)** to the **bulb, motor** or **buzzer**). • A **switch** can break or reconnect a **circuit**. • A **switch** controls the flow of the **electrical current** around the **circuit**. When the **switch** is off, the **current** cannot flow. This is not the same as an incomplete **circuit**.
What are **electrical conductors** and **insulators**?	• When objects are placed in the **circuits**, they may or may not allow **electricity** to pass through. • Objects that are made from materials that allow **electricity** to pass through a create a complete **circuit** are called **electrical conductors**. • Objects that are made from materials that do not allow **electricity** to pass through and do not complete a **circuit** are called **electrical insulators**.

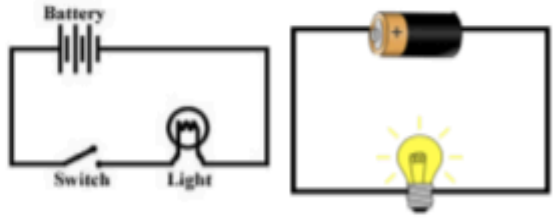
Investigate!

- Research how to work safely with **electricity**.
- Make a variety of **circuits**, investigating which **circuits** work and why.
- Name the basic parts including **cells, batteries, wires, bulbs, switches, motors** and **buzzers.**
- Draw **circuits** using pictorial representations (not circuit symbols).
- Create **circuits** using **switches**.
- Investigate which materials are **electrical conductors** and **insulators**.

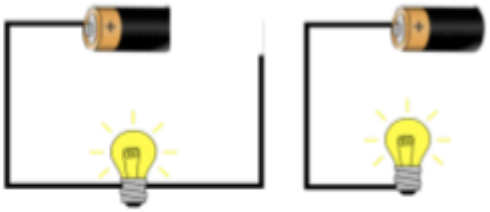
Vocabulary

appliances	a **device** or machine in your home that you use to do a job such as cleaning or cooking. **Appliances** are often **electrical**.
battery	small **devices** that provide the **power** for **electrical** items such as torches
bulb	the glass part of an **electric** lamp, which gives out light when **electricity** passes through it.
buzzer	an **electrical device** that is used to make a buzzing sound
cell	a synonym for **battery**
circuit	a complete route which an **electric current** can flow around
component	the parts that something is made of
conductor	a substance that heat or **electricity** can pass through or along
current	a flow of **electricity** through a **wire** or **circuit**
device	an object that has been invented for a particular purpose
electricity	a form of **energy** that can be carried by **wires** and in used for heating and lighting, and to provide **power** for **devices**
energy	the **power** from **sources** such as **electricity** that makes machines work or provides heat
fuel	a substance such as coal, oil, or petrol that is burned to provide heat or **power**
generate	cause it to begin and develop
insulator	a non-**conductor** of **electricity** or heat
mains	where the supply of water, **electricity**, or gas enters a building
motor	a **device** that uses **electricity** or fuel to produce movement
power	**Power** is **energy**, especially **electricity**, that is obtained in large quantities from a fuel **source** and used to operate lights, heating, and machinery
source	where something comes from
switch	a small control for an **electrical device** which you use to turn the **device** on or off
wires	a long thin piece of metal that is used to fasten things or to carry **electric current**

Diagrams



These are complete **circuits** - they have a **battery (cell)** and a **component (bulb).**
The **wires** are placed in the right places of the **battery** for the **circuit** to work.



These **circuits** will not work as they are incomplete.

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Working scientifically	An observation involves looking closely at objects, materials and living things. Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them. Scientific enquiries can be set up and carried out by following or planning a method. Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. A prediction is a statement about what might happen in an investigation, based on some prior knowledge or understanding. A fair test is one in which only one variable is changed and all others remain constant. Observations can be made regularly to identify changes over time. Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections. Use scientific vocabulary to report and answer questions about their findings based on evidence collected. Draw simple conclusions and identify next steps, improvements and further questions. Results are information, such as data or observations, that have been found out from an investigation. A conclusion is the answer to a question that uses the evidence collected.
Electricity	Electricity is a type of energy. It is used to power many everyday items, such as kettles, computers and televisions. Electricity can also come from batteries. Batteries eventually run out of power and need to be recycled or recharged. Batteries power devices that can be carried around, such as mobile phones and torches. Compare common household equipment and appliances that are and are not powered by electricity. Electrical components include cells, wires, lamps, motors, switches and buzzers. Switches open and close a circuit and provide control. A series circuit is a simple loop with only one path for the electricity to flow. A series circuit must be a complete loop to work and have a source of power from a battery or cell. Construct operational simple series circuits using a range of components and switches for control. Predict and describe whether a circuit will work based on whether or not the circuit is a complete loop and has a battery or cell. Electrical conductors allow electricity to flow through them, whereas insulators do not. Common electrical conductors are metals. Common insulators include wood, glass, plastic and rubber. Describe materials as electrical conductors or insulators.