Enriching lives every day; enabling our school community to learn, achieve and flourish through living 'life in all its fullness'

Sustainability

Subject: Science

Year group: 4

Term: Spring

Unit name: Electricity

National curriculum:

- 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.

Prior Knowledge - Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. (Early Learning Goal)

Scientific enquiry	
Classifying	Conductors and insulators Objects which need electricity and those that don't Electrical components When electricity is dangerous
Observing over time	
Pattern seeking	Electrical circuits Bulbs – what makes them brighter/dimmer?
Comparative/fair testing	Electrical circuits
Researching	Alternatives to electricity

Assessment for learning

Recapping prior knowledge- beginning of unit- what do children already know?

Beginning of each lesson- focus on recall of previous learning (quick quizzes)

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Topic: Electricity	Year: 4	Strand: Physics

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**. 

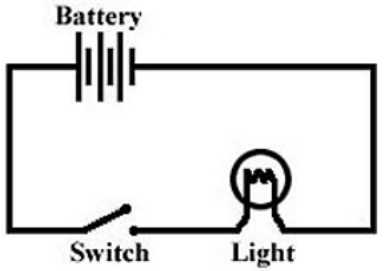
Vocabulary

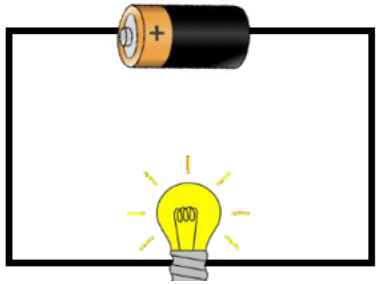
appliances	a **device** or machine in your home that you use to do a job such as cleaning or cooking. **Appliances** are often **electrical**.
battery	small **devices** that provide the **power** for **electrical** items such as torches
bulb	the glass part of an **electric** lamp, which gives out light 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**

	 torch  headlights  television
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**.

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**

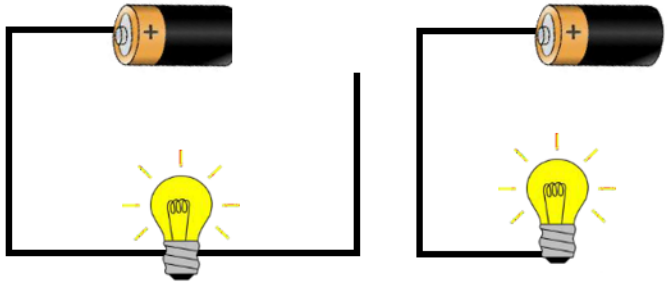
Diagrams





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**.

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.

Lesson Sequence

1. Understand electrical appliances and safety

2. Learn about electrical compounds in a series circuit

3. Investigate electrical circuits

4. Explore conductors and insulators

5. Learn about electrical switches

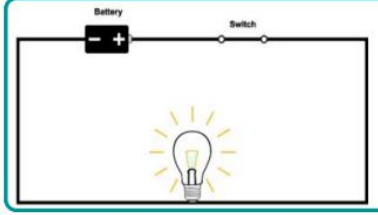
6. Investigate how electrical components can change within a circuit

Key Facts

1. A circuit contains a battery (cell), wires and a component that requires electricity to work (bulb, motor or buzzer).
2. Electrical current flows through the wires from the battery (cell) to the bulb, motor or buzzer.
3. A switch can break or reconnect a circuit.
4. 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.

Conductors and Insulators

- Materials that allow electricity to pass through to create a complete circuit are called electrical conductors.
- Materials that do not allow electricity to pass through and do not complete a circuit are called electrical insulators.

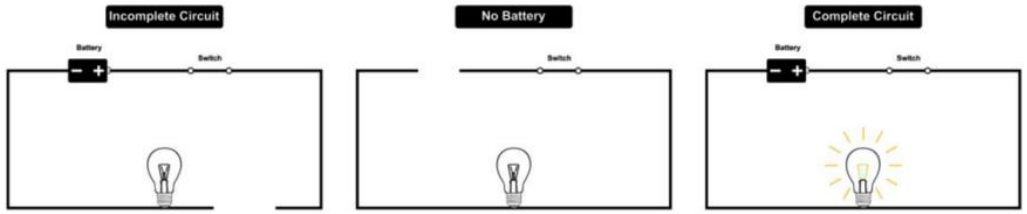


Simple Circuit

A **complete** circuit is a **loop** that allows electrical current to flow through wires.

Simple Electrical Circuit

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.

Electrical Components