Science Y4 Autumn What makes electricity work?

This unit is the first introduction to studying electricity in Key Stage 2. Children will learn about what electricity is and how it was discovered. They will identify which appliances use electricity in their homes and how to keep themselves safe. Children will construct circuits, start to create pictorial circuits, and investigate how easily different types of switches can break and reconnect

In this unit children will:

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 a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery

Recognise that a switch opens and closes a circuit and incorporate one into a circuit.

Recognise some common conductors and insulators and associate metals with being good conductors

Communicate structures of circuits using drawings which show how component parts are connected

Apply their knowledge of conductors and insulators to design and make different types of switches

Investigate which materials are conductors and which are insulators in a comparative fair test

Prior Learning

FS – Talk about how things happen and why things work

Cross Curricular Links

Maths - Measurements.

Key Vocabulary

circuit - A complete route which an electrical current can be flown around.

current – a flow of electricity through a wire.

physics – the study of forces including electricity and the way it affects objects.

battery – a small device that provides power for electrical items.

cell – a device used to generate electricity. A battery is an example of a cell.

conductor – any material electricity can pass through.

insulator – any material that electricity cannot pass through or along.

buzzer - an electrical device that makes a buzzing sound.

motor – a device that changes electrical energy into movement.

wire – a long thin piece of metal that carries an electrical current often covered in plastic for safety.

voltage – an electrical force that makes electricity move through a wire, measured in volts (V).

Key Knowledge

Electricity is generated using energy from natural sources such as the Sun, oil, water, and wind.

These can be called fuel sources.

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.

Many of the items we use every day run on electricity. Electricity can be supplied from the mains (these are plugged into power supplies) or from **batteries.**

Electricity is transported to our homes through **wires** and cables.

Electricity can also be stored in **batteries** (also known as **cells**).

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

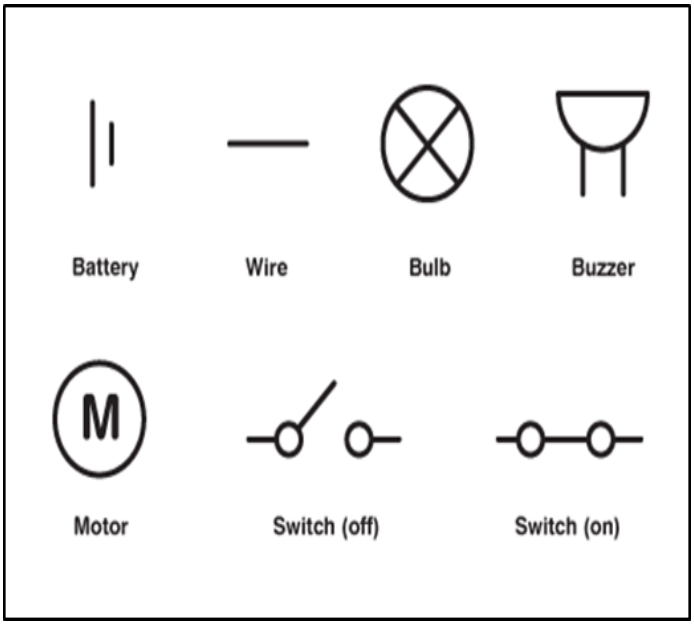
A circuit contains a battery (cell), wires and an appliance that requires electricity to work – such as a bulb, motor, or buzzer.

The electrical current flows through the wires from the battery 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.

When objects are placed in the circuits, they may or may not allow electricity to pass through.



A **conductor** is a material that allows electricity to flow easily throughout the material. Metals are often good conductors; silver, gold, copper steel and salt water are just a few examples.

An **insulator** is a material that does not allow electricity to flow through easily, these can be rubber, glass, oil and diamond.

Thomas Edison invented the light bulb. He was born in 1847 and was known as one of the greatest inventors in history.

Key Questions

How will you know if a material conducts electricity?

Which materials are best for conducting electricity?

What will happen when more batteries are added to a complete circuit?

What is renewable energy?