Knowledge Organiser	Subject: Science	Topic: Circuits and Conductors	Year: 4

Key Knowledge

- 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.

Common Misconceptions

- Electricity flows to bulbs, not through them.
- Electricity flows out of both ends of a battery.
- Electricity works by simply coming out of one end of a battery into the component.

Key Learning

- Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries.
- An electrical circuit consists of a cell or battery connected to a component using wires.
- If there is a break in the circuit, a loose connection or a short circuit, the component will not work.
- A switch can be added to the circuit to turn the component on and off.
- Metals are good conductors so they can be used as wires in a circuit.
- Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.

Disciplinary Skills

- Classify the materials that are suitable/unsuitable for wires.
- Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm.

Key Concepts

Understanding Circuits and Their Components –

Construct a variety of electrical circuits using cells, wires, and components.

Recognise that a break, loose connection, or short circuit will prevent the circuit from working.
Learn how switches function to control circuits by turning components on and off.

Properties of Conductors and Insulators

Explore which materials can conduct electricity and classify them as suitable or not suitable for use as wires.

Understand that metals are good conductors, while most non-metallic materials are insulators, with exceptions like graphite.

Discover that impure water can conduct electricity.

Design and Problem Solving with Circuits

Apply knowledge of conductors, insulators, and switches to create solutions, such as burglar alarms or DT project circuits.

Experiment with different types of switches and understand their functions in solving specific problems.

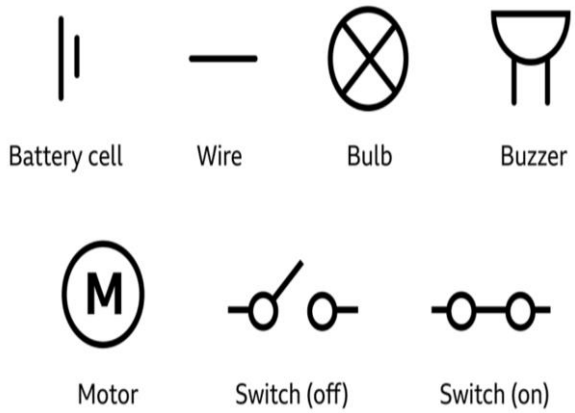
Design and make circuits incorporating custom switches to meet practical challenges

The Big Question

How does electricity power things?

Key Vocabulary	
electricity	A form of energy used for lighting, heating, making sound and making machines work.
electrical circuit	A loop, consisting of component parts, through which electricity can flow.
component	A part that combines with others to form a circuit – for example, a switch, bulb, motor or buzzer.
switch	A component part of a circuit which allows the electricity to flow or stop.
conductor	Material that allows electricity to pass through it.
insulator	Material that does not allow electricity to pass through it.

Electrical Circuit Symbols



Conductors

Some materials let electricity pass through them easily. These are known as electrical conductors. Many metals are good electrical conductors, such as iron, copper and steel.

Linking Thinking Across Our Learning Journey						
Early Years	**Year One**	**Year Two**	**Year Three**	**Year Four**	**Year Five**	**Year Six**
				Circuits and conductors		**Electricity – changing circuits** • 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