



Year group: Year 4

Term: Spring

Subject: Design Technology – Electrical - simple circuits and switches

Key vocabulary

Circuit, conductor, insulator, prototype, push to break/make switch, reed switch, toggle switch, system, output/input devices

Prior learning

EYFS

They experiment with light, sound, and movement, noticing what happens when they press buttons, flip switches, or push objects.

What comes next?

Year 2 Wheels and Axles

The children will have experience of using construction kits with wheels and axles to make a product that moves.. They will know how wheels and axles may be assembled as either fixed axles or free axles.

Notes and guidance

- Model the correct use of equipment (batteries, bulbs, wires, switches) safely.
- Use diagrams and physical examples to show circuit connections and components.
- Encourage predicting, testing, and troubleshooting before and after building circuits.
- Scaffold problem-solving by asking guiding questions:
- Check that children follow safety rules: handle batteries carefully, avoid short circuits, don't touch exposed wires unnecessarily.

DESIGN

Substantive Knowledge

Children learn that electricity flows around a complete circuit, switches can open or close the circuit, and some materials conduct electricity while others do not.

Disciplinary Knowledge

Children learn to investigate, test, and predict how circuits work, using observations and experiments to explain electrical flow and the effect of switches.

Procedural Knowledge

Children learn to build simple circuits, use switches safely, connect components correctly, and test their circuits to see if they work.

Links to other curriculum areas

Science – electricity
Computing – debugging programmes

End Points

- Design and build simple electrical circuits using batteries, bulbs, buzzers, and switches.
- Explain how their circuits work, including the role of switches and conductors/insulators.
- Test and troubleshoot circuits, predicting and investigating why a circuit may not function.
- Apply their knowledge to make improvements and solve problems independently or in a group.

DESIGN

Key Vocabulary Explanations

- Circuit — A complete path that electricity flows through to make something work.
- Conductor — A material that lets electricity pass through, like metal.
- Insulator — A material that stops electricity from passing through, like plastic or wood.
- Prototype — A first model or trial version of something, used to test ideas.
- Push-to-break / make switch — A switch that opens or closes a circuit when you press it.
- Reed switch — A switch that uses a magnet to open or close a circuit.
- Toggle switch — A switch that flips up or down to turn a circuit on or off.
- System — A group of connected parts working together, often including input and output devices.
- Output device — Something that shows the result of a circuit, like a bulb, buzzer, or motor.
- Input device — Something that controls the circuit, like a switch or sensor.

Resources to use

- Batteries (AA or AAA) and battery holders
- Bulbs and bulb holders
- Buzzers (optional, for output variation)
- Motors (optional, for moving parts)
- Wires (insulated, with stripped ends or crocodile clips)
- Switches:
 - Push-to-make / push-to-break switches
 - Toggle switches
 - Reed switches (if available)
- Card, plastic, or wood (to mount circuits)
 - Paper or cardboard strips (for prototyping)
 - Blu Tack, masking tape, or glue (to secure components)

DESIGN