DESIGN & TECHNOLOGY · Y3-Y6

# Electrical Systems

Knowledge Organiser — KS2 D&T

## Key vocabulary

1. **Circuit**
   A complete loop that lets electricity flow from a power source and back again.
2. **Component**
   Each part in a circuit — battery, wire, bulb, switch, motor, buzzer.
3. **Battery**
   The power source. Stores chemical energy and releases it as electrical energy.
4. **Wire**
   The metal pathway electricity travels along.
5. **Switch**
   Something you can press to OPEN (off) or CLOSE (on) a circuit.
6. **Bulb**
   Lights up when electricity flows through it.
7. **Buzzer**
   Makes a sound when electricity flows through it.
8. **Motor**
   Spins when electricity flows — turns electrical energy into movement.

| | |
|---|---|
| 9 | **Series circuit**<br>Components in one loop. If one fails, all stop working. |
| 10 | **Parallel circuit**<br>Two or more loops. If one fails, the others keep working. |

## a circuit works

Electricity needs a complete

- Electricity flows from BATTERY → WIRE → COMPONENT → WIRE → BATTERY.
- If the loop is BROKEN at any point, nothing works.
- A switch creates a deliberate break that you can control.
- Wires must connect to BOTH ends of the battery (positive + and negative –).
- Most components have a positive and negative end — connect them the right way round.
- If your circuit doesn't work, check: is the loop complete? Is the switch on? Is the battery in correctly?

## mon components

What each one does

- BATTERY (cell) — provides the power.
- WIRES — carry the electricity.
- BULB — lights up.
- BUZZER — makes a sound.
- MOTOR — spins something (a propeller, a wheel).
- LED — small light, only works one way round.
- SWITCH — turns the circuit on and off.
- RESISTOR — slows down the electricity, stops bulbs from burning out.

## ries vs Parallel

Two ways to wire compone

- SERIES: all components in ONE loop. If one bulb breaks, ALL go out.
- Christmas lights used to be in series — one bulb out = whole string out.
- PARALLEL: each component on its OWN loop, sharing the battery. If one bulb breaks, the others stay on.
- Houses use parallel circuits — that's why turning off one light doesn't switch everything off.
- Parallel circuits use MORE BATTERY POWER but are more reliable.
- Series circuits make components DIMMER as you add more (the power is shared).

## a product with a switch

What to think about

- PURPOSE: what should it do? (Light up at night? Buzz when opened?)
- USER: who is it for? Should it be easy to switch on?
- SWITCH TYPE: push button, slide, lever, magnetic?
- SAFETY: tape over wire ends, no exposed metal where fingers go.
- POWER: battery size — too small = won't light, too big = too heavy.
- TEST often. Most circuits don't work first time.
- Always disconnect the battery when not testing — saves the battery and prevents short circuits.