



How Electrical Circuits Work and Light Up

KS2 DESIGN & TECHNOLOGY

KS3 SCIENCE

Ages 10-14 ⌚ 3 min read

What is an Electrical Circuit?

An **electrical circuit** is a closed loop that allows **electricity** to flow from a power source, through wires and devices, and back to where it started. Think of it like a circular path that electricity travels along.

Every circuit needs three main things: a **power source** (like a battery), a **conductor** (usually a wire that electricity can flow through), and something to power (like a light bulb or motor). Without all three, electricity cannot flow and nothing happens.

Think of it like a merry-go-round: electricity is the person riding, the wires are the circular track, and the battery is the person who gives them a push to start the ride going round and round.

How Does Electricity Flow?

Electrons (tiny particles with negative charge) move through the wire when the circuit is complete. This movement is what we call **electric current**. The battery pushes these electrons around the circuit, giving them energy.

The electricity only flows when there is a complete path. If you break the circuit by opening a switch or unplugging a wire, the electrons stop moving and the light goes out.

Think of it like water flowing through a hose: the battery is the tap that turns the water on, the wires are the hose, and the switch is a valve that controls whether water flows or stops.

What Makes a Light Turn On?

Inside a light bulb is a special thin wire called a **filament**. When electric current flows through it, the filament heats up so much that it glows and produces light. In older **incandescent bulbs**, the filament can reach temperatures of over **2,500 degrees Celsius!**

Modern **LED bulbs** work differently. They use semiconductors that release light when electricity passes through them. This makes LEDs much more efficient because they waste less energy as heat.

Think of it like rubbing your hands together really fast: friction makes them hot and warm. The filament gets so hot from the rushing electrons that it glows bright.

Open and Closed Circuits

A **closed circuit** has a complete loop, so electricity flows and devices work. An **open circuit** is broken somewhere, so electricity cannot flow. A light switch controls whether a circuit is open or closed. When you flick the switch 'on', you close the circuit. When you flick it 'off', you open it.

Understanding circuits helps engineers and designers create everything from simple torches to complex computers. Every electrical device in your home uses circuits to work!