How Electricity Flows Through Circuits

KS3 Ages 11-14 ⏰ 3 min read

What Is a Circuit?

A **circuit** is a closed loop that electricity travels around. It starts at the **power source** (like a battery), flows through **conductors** (usually wires), and powers devices like bulbs or motors before returning to the power source. Without a complete loop, electricity cannot flow.

Think of it like a train track. The train (electricity) needs a complete circular route to travel around. If the track is broken anywhere, the train stops and cannot complete its journey.

How Does Electricity Flow?

Electricity flows from the **positive terminal** of a power source through a circuit to the **negative terminal**. This movement of **electrons** (tiny charged particles) creates electrical current. The electrons move very quickly, almost at the speed of light, even though each individual electron moves quite slowly through the wire.

Conductors like copper wire allow electrons to move easily because their atoms release electrons freely. **Insulators** like plastic or rubber prevent electricity flowing through them, which is why they wrap around wires to keep us safe.

Open and Closed Circuits

A **closed circuit** has a complete, unbroken path, so electricity flows and devices work. An **open circuit** has a break in the path, so electricity stops flowing and devices turn off. A **switch** controls whether a circuit is open or closed by breaking or completing the path.

Think of it like a water pipe. When the tap is turned on (closed circuit), water flows. When you turn it off (open circuit), the water stops because the path is blocked.

Resistance and Safety

Resistance is the opposition to electricity flowing through a material. Some materials resist electricity more than others. **Light bulbs** create resistance that slows down electrons, causing them to release energy as heat and light.

Too much current flowing through a circuit can be dangerous and cause fires. **Fuses** and **circuit breakers** protect buildings by breaking the circuit automatically if current becomes too high. This stops electricity flowing before damage or injury can happen.

Think of it like a crowd in a doorway. Too many people trying to squeeze through creates a dangerous jam, so security guards stop the flow to keep everyone safe.