Electricity Creates Magnetic Fields Around It

KS4 PHYSICS Ages 11-14 ⏰ 3 min read

Yes, Electricity Makes Magnetism

Here's a surprising fact: **electricity and magnetism are connected**. When electric current flows through a wire, it creates an invisible **magnetic field** all around it. This isn't magic—it's one of the most important discoveries in physics, and it powers nearly everything in your home.

A **magnetic field** is an invisible force area around a magnet. Normally, we think of magnets as solid objects with poles—a north end and a south end. But **moving electricity creates the same invisible force**.

How It Works

Imagine electrons flowing down a wire like water through a pipe. As they move, they create a circular magnetic field that wraps around the wire like invisible rings. The stronger the electric current (more electrons moving), the stronger the magnetic field becomes.

Think of it like a stone dropped in water: the ripples spread out in circles from where the stone lands. Similarly, electrons flowing through a wire create magnetic circles that spread outward.

Scientists discovered this in the **1820s** when they noticed compass needles moved near wires carrying electricity. This was revolutionary—they'd found proof that **electricity and magnetism are two sides of the same coin**.

Real-World Uses

Electric motors rely completely on this principle. Inside a motor, electric current flows through coils of wire, creating magnetic fields that push and pull against permanent magnets. This spinning motion drives everything from your phone's vibration to washing machines.

Electromagnets are specially designed magnets that work this way. When you switch on the electricity, they become magnetic. When you switch it off, they stop being magnetic. Hospitals use them in MRI machines, and recycling plants use giant electromagnets to pick up scrap metal.

Think of it like a light switch: flick it on, and you get magnetism; flick it off, and it vanishes. A normal magnet can't do that.

Why This Matters

Generators work backwards: they use moving magnets to create electricity. Power stations use this principle to produce the electricity that powers your home. Wind turbines, hydroelectric dams, and coal plants all rely on this relationship.

This connection between electricity and magnetism opened a doorway to understanding light itself. Scientists realized that **light is also an electromagnetic wave**—a ripple of electricity and magnetism travelling together. Without understanding that electricity creates magnetism, we wouldn't have radio, television, mobile phones, or WiFi.