

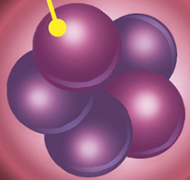
To understand magnetism, you must first understand atoms.



Atoms are tiny particles too small to see with your eyes. They make up everything in the universe.

Every atom holds a nucleus surrounded by a cloud of electrons.

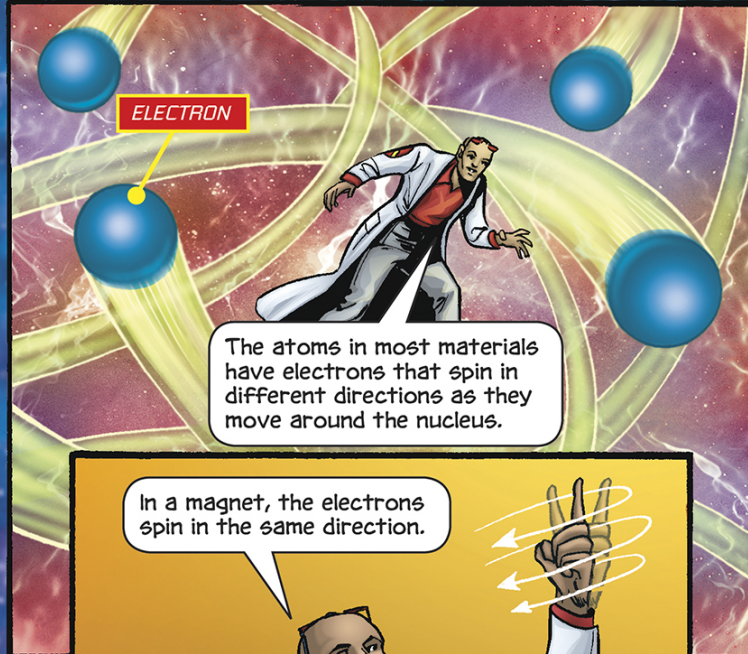
NUCLEUS



ELECTRON CLOUD

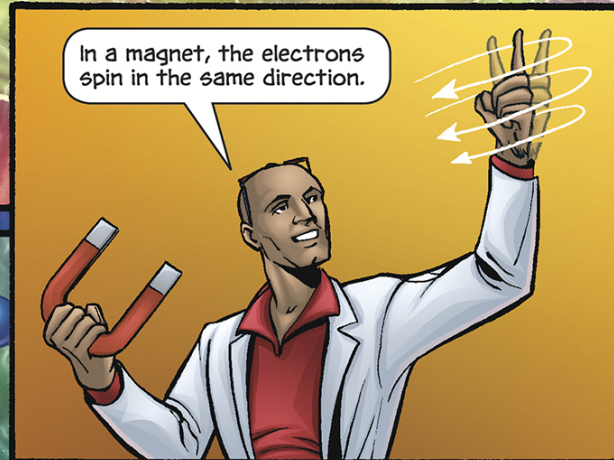


ELECTRON



The atoms in most materials have electrons that spin in different directions as they move around the nucleus.

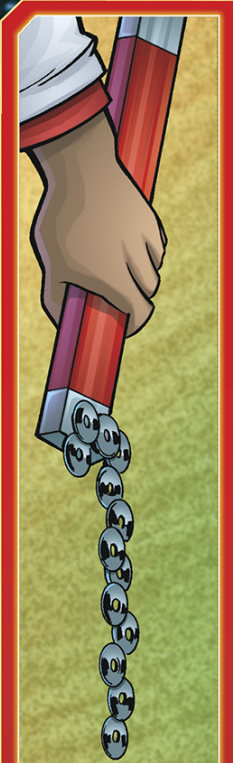
In a magnet, the electrons spin in the same direction.



By spinning in the same direction, the electrons create a force.



This force is magnetism.



Magnets pass their magnetic power to the objects they attract. A steel washer stuck to a magnet becomes a temporary magnet itself. In fact, a chain of washers can dangle from the magnet as the magnetic force is passed from one washer to the next.

The compass needles, bar magnets, and refrigerator magnets we've seen all have something in common.

They're all permanent magnets. Their magnetic power never stops working.

But not all magnets have their power all of the time.

Electromagnets get their power from electricity and their magnetism is temporary.

Electromagnets sound complicated, but they're really quite simple.

When electricity flows through a wire, it creates a magnetic field. In a straight wire, that magnetic field is weak.

But if the wire is coiled around an iron bar, the field becomes much stronger.

MAGNETIC FIELD

MAGNETIC FIELD

Electromagnets, like the one on this crane, are very useful because they can be turned on and off.

Powered up, the magnet can lift a car off the ground with ease.

Then, with the flip of a switch, it can release the car from its grip.