



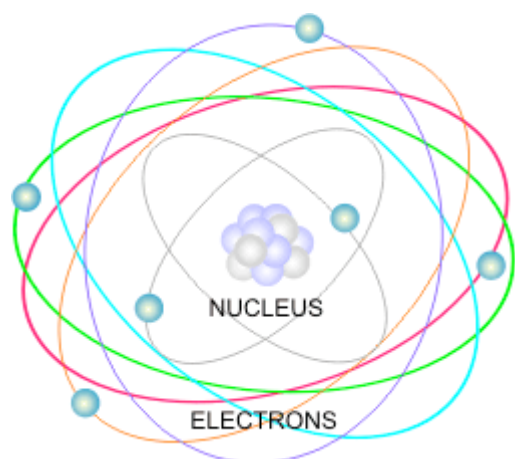
About Atoms

What can lift or haul thousands of tonnes of material, but has no weight of its own? What is everywhere, yet it has no shape; we can't see it, yet it produces light?

Answer: Electricity

To understand how electric charge moves from one atom to another, we need to first learn more about atoms. Everything in the universe is made of atoms - every star, every tree, every animal. We are made of atoms. Atoms are so small that millions of them would fit on the head of a pin.

Atoms are made of even smaller particles. The centre of an atom is called the nucleus, which consists of protons and neutrons. It has a net positive charge due to the positively charged protons.



Electrons

Outside the nucleus are the negatively charged electrons. Because they carry opposite electrical charges, the protons and electrons of an atom are attracted to each other. When an atom is in balance, it has the same number of protons and electrons. The neutrons carry no charge and their number can vary.

Electrons usually remain a constant distance from the nucleus. The electrons closest to the nucleus are strongly attracted to the protons, but sometimes the ones further away do not. These electrons can be pushed out of their orbits, and applying a force can make them move from one atom to another. These moving electrons are electricity.

How Electricity Moves

Materials such as copper metal have a structure that allows electrons to move through it easily (they have a low resistance and are called conductors). Materials that don't allow electricity to pass through them so readily, such as rubber and plastic, are called insulators.

A current of electricity is a steady flow of electrons. When electrons move from one place to another, round a circuit, they carry electrical energy from place to place in the same way that marching ants carry leaves. Instead of carrying leaves, electrons carry a tiny amount of electric charge.

Electromotive Force

For electricity to flow, there has to be something to push the electrons along. This is called an electromotive force (EMF). A battery or power outlet creates the electromotive force that makes a current of electrons flow.

Switching on an appliance allows the current to flow through its element or motor. Every billionth of a second, three billion free electrons pass through the filament of a light bulb when switched on!

