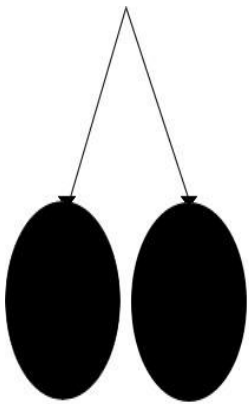


Electron Flow

Electricity All Around Us Backgrounder



Check out this atom!



As you see from the picture, atoms have a nucleus containing protons and neutrons. The protons have a positive charge, while negatively charged electrons zoom around the nucleus. When an atom has the same number of protons (positive charge) and electrons (negative charge) it is neutral and doesn't have an electric charge. Think of it like a game of ball you might play with your friends. Things are "even" (neutral) when both teams have the same number of players. If one side has more players, it has an advantage! If an atom gains an electron (remember, electrons have a negative charge), the atom becomes negatively charged. When an atom loses an electron (which gives the "proton" side more guys on their side) it becomes positively charged.

In the first part of this activity, you will be negatively charging a balloon (no, we don't mean returning it to the store for your money back)

and seeing how opposite charges attract and similar charges repel.

Do you know what is happening? Because of the properties of rubber (the balloon) and wool (your sweater), the balloon is becoming negatively charged as you rub it against your sweater. This means the atoms in the balloon are gaining electrons from the atoms in the sweater.

Turn to your neighbour who has another negatively charged balloon and try holding both balloons by the string ends, letting the balloons fall together. What happens? Why does this happen?

Give your balloons more charge (by rubbing them more) and hold them so they fall together. Now what happens? Try this again with balloons that have no charge. Place your balloon against the wall. What happens? When the balloon is on the wall, positive charges will attract the balloon, which is negatively charged. Remember that opposite charges attract.

Some atoms- like those in metals - have electrons that move easily from atom to atom. Think about whether metal is a good electrical conductor or not. What material is used for wires? What about for lightning rods?

Some materials are made of atoms with electrons that are difficult to bump or move (they must like their teammates and want to stay where they are).

Things like plastic and rubber do not have electrons that move easily. Think about whether rubber and plastic would be good conductive materials.

In materials like metal, an electrical force can make electrons move from atom to atom. If the electrical force is strong enough, the electrons will begin to jump from atom to atom. This movement of electrons is called an electrical current. The current force pushing the electrons through the metal is called the voltage.

What You Will Need

Electron Flow Learner Worksheet

Balloon

Sweater or something to rub the balloon on

String or wool

How to do it

- Blow up your balloon and tie the end
- Tie a piece of string or wool to the end of the balloon
- Rub the balloon vigorously back and forth on your sweater or hair
- Turn to your neighbour who has another negatively charged balloon and try holding both balloons by the string ends, letting the balloons fall together
- Try this again with balloons that have no charge
- Place your balloon against the wall. What happens? When the balloon is on the wall, positive charges will attract the balloon, which is negatively charged. Remember that opposites attract.
- Record your observations on the worksheet.

Think About

How and why do you think static electric shocks occur?