



## Learning about electricity

### Static Electricity Observation

#### Learning objectives:

Children will begin to understand that positive electrons are attracted to negative electrons.

#### Start learners off

Begin with practical observations using inflated balloons. It's best if you carry out these activities on a dry day, as humidity can effect the results.

First, rub the inflated balloon on someone's hair, or on a wool jumper to 'charge' it. Hold the balloon away from the person's hair and watch what happens! Strands of hair will rise towards the balloon!

Try rubbing the balloon as before and holding it above the small pieces of tissue paper. The pieces of paper will 'jump' and 'stick' to the balloon. You can use this to make moving tissue paper art, using a balloon to wave fronds of tissue paper 'seaweed' or similar effects!

Rub a balloon as before and press it to a wall. The balloon should 'stick' to the wall. This is a very effective way to show the difference between a balloon that has been charged by rubbing it on a surface as above, and one that has not. Try touching one charged balloon against another. They will repel each other.

#### Move learners on

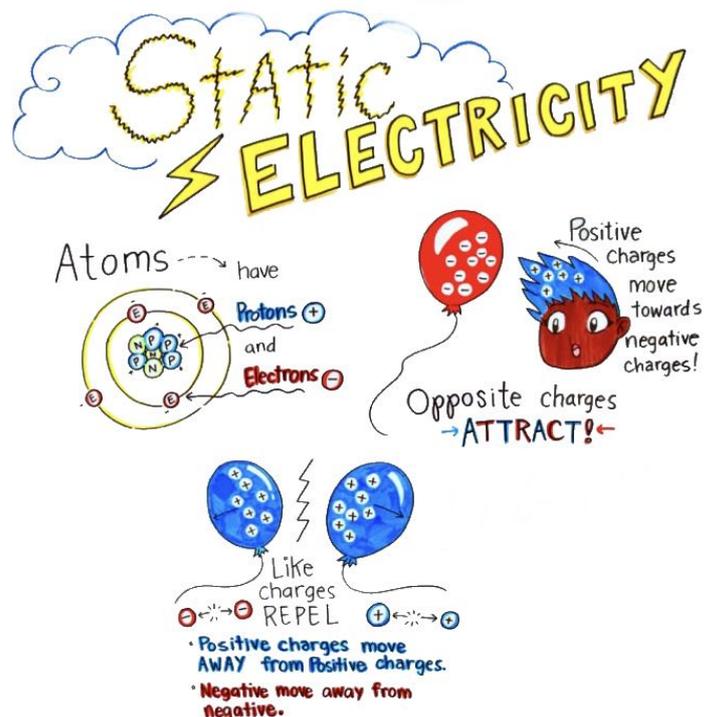
Explain the science behind these observations:

Since everything is made of atoms, everything is made of charges, both positive and negative. When you rub a balloon on your hair, or on a wool jumper, the balloon starts to collect extra negatively charged electrons.

If you hold two of these balloons together, these negative charges will repel each other! When you hold the balloon near a wall, the balloon now has more negatively charged electrons than the wall. The negatively charged electrons in the balloon will be attracted to the positively charged protons of the wall and the balloon will stick! Like charges repel: the two balloons, once charged, will move away from each other. Opposite charges attract: the paper will be attracted to the charged balloons.

Your positively charged hair is attracted to the negatively charged balloon and starts to rise up to meet it.

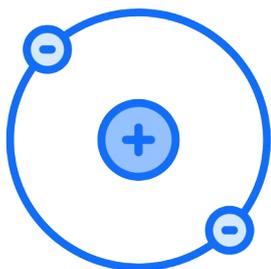
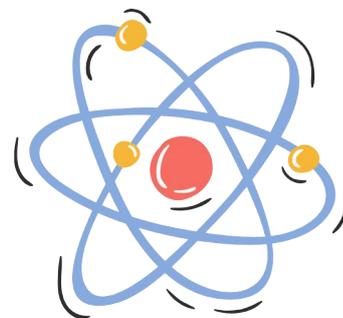
Make simple diagrams and posters using + and - signs to show what is happening.



### Challenge learners further

Children who become very interested in the concept of what is happening inside atoms to

cause the effects above may enjoy looking further at the make-up of atoms. Atoms are the tiny building blocks that make up every part of our known world. In the middle of every atom is the nucleus. Every nucleus is made up of particles called protons and neutrons which revolve round the nucleus in their shells. The protons have a positive charge and the electrons have a negative charge. They are attracted to one another. The positive charge of the protons is the same as the negative charge of the electrons, which makes the atom balanced when they have an equal number of protons and electrons. Neutrons have no electrical charge. The number of neutrons varies from atom to atom.



The electrons that are in the shells closest to the nucleus have a very strong attraction to the protons. Sometimes, the electrons that are in the shells furthest from the nucleus don't have such a strong attraction to the protons. They can be pushed out of their orbits, which causes them to shift from one atom to another. These moving electrons are electricity.

#### At the end of this activity:

**All** children will be able to describe that rubbing a balloon on a surface means that it will stick to / be attracted to another surface such as a wall.

**Most** children will be able to explain that this is because the balloon has a negative charge caused by rubbing it and the wall (or hair, or paper) has a positive charge. Positive charges are attracted to negative charges.

**Some** children will be able to explain this in more detail by describing what is happening inside the atoms in terms of the protons and electrons.