

## Student Revision Notes (age 11 – 14): Electric Charge

### Electric Charge

There are two *types* of electric charge – **Positive** and **Negative**.

Electric charge in a solid is carried by particles called electrons, which have a negative charge, and these can move from one place or object to another.

There are three different *states* of charge an object can have:

**Neutral** – this is when the object has an equal number of positive and negative charges and has no overall charge.

**Positive** – this is when an object loses some negative charges and ends up with more positive charges than negative charges.

**Negative** – this is when an object gains some negative charges and ends up with more negative charges than positive charges.

Electrically charged objects like these have static electricity. We can give an object static electricity by rubbing it with something else made from a different material. Everyday examples of static electricity include:

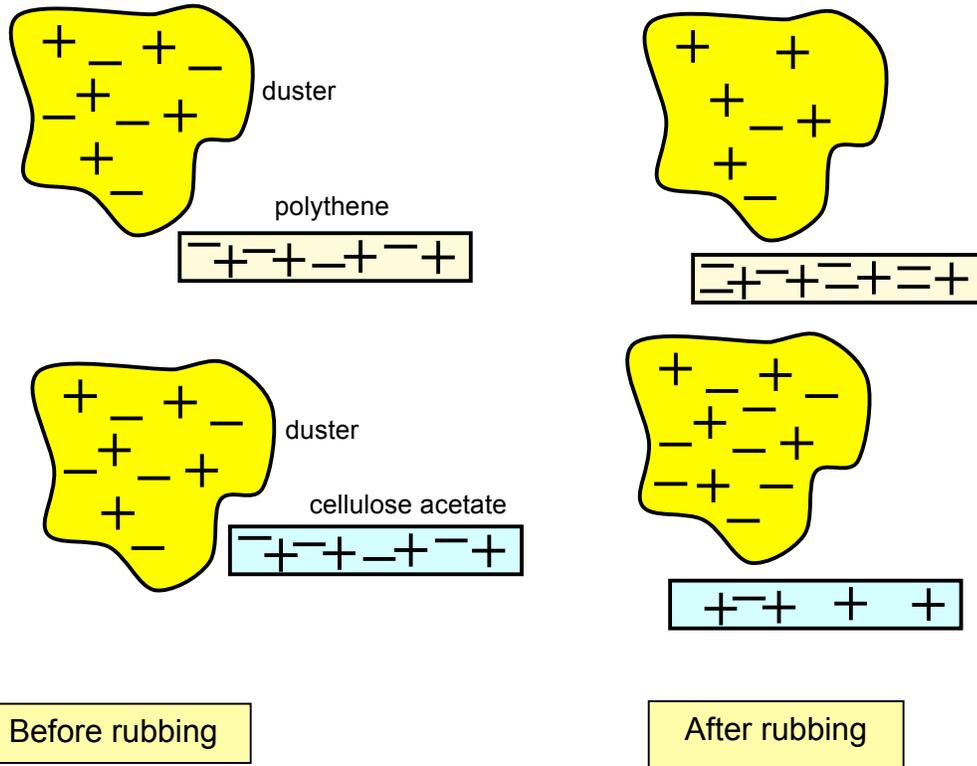
- When you take off a pullover over a nylon shirt there is a crackling sound.
- A pen rubbed with a piece of cloth will pick up small pieces of paper.
- When you rub a balloon on your hair the hair stands on end and the balloon sticks to it.
- A television screen easily collects dust.
- You sometimes get a small electric shock when getting out of a car.

If you take a piece of polythene and rub it with a duster, the polythene becomes charged negatively. The duster becomes positively charged. If a rod of cellulose acetate is rubbed the charge on it is positive. All these things were neutral to start with, in other words they had equal numbers of positive and negative charges.

The diagrams below explain how they become charged by negative charges (electrons) being rubbed off one thing onto another. There is the same amount of positive and negative charge after the rubbing as there was before the rubbing; it is just that it has been distributed differently.

# TWOTHIRTYVOLTS

...and all things electrical



## Forces between charges

If a negatively charged polythene rod is hung up and another negatively charged polythene rod is brought towards it, the two rods repel. A positively charged cellulose acetate rod will attract a negatively charged polythene rod. If a charged rod is put near small pieces of paper they stick to the rod. This simple experiment shows that:

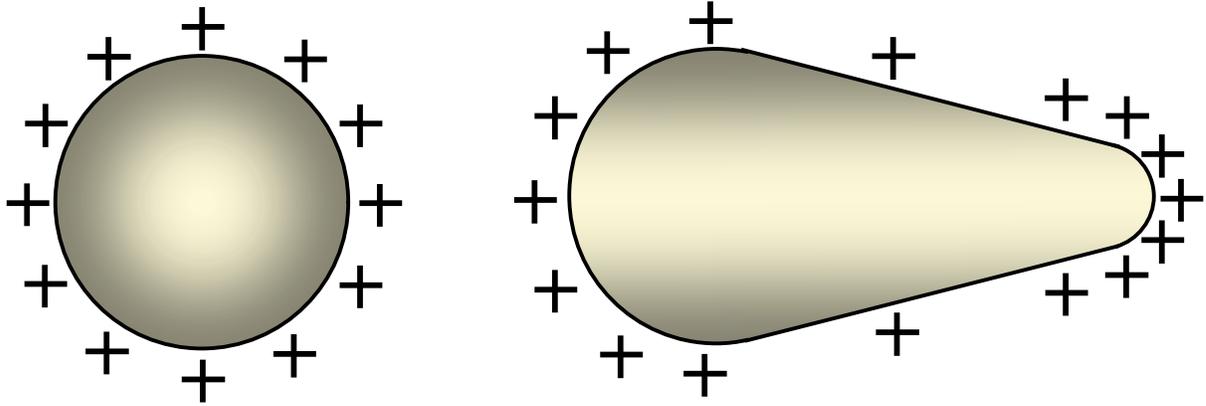
Two charges of the same type - *repel each other*.

Two charges of different types - *attract each other*.

A charged object can - *attract a neutral object*.

The closer the charges get to each other, the bigger the attraction or repulsion becomes. This rule holds right down to the forces between particles inside atoms.

When an object is charged the charges do not always spread equally over its surface. With a round shape they are evenly spread but with a pointed shape the charges are always concentrated around the point.



## Unit of Electrical Charge

One electron has a very tiny charge and so for practical measurement of electric charge we use units called **Coulombs**. One coulomb is the charge of roughly six million million million electrons!

## **Linked Resources**

[www.twothirtyvolts.org](http://www.twothirtyvolts.org):

Electric Charge (11-14) Student Quiz