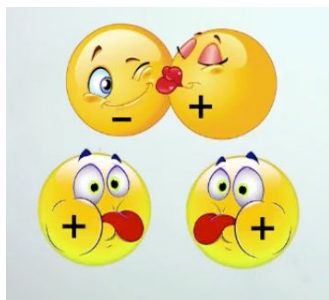


# Charge

So ... what's all this charge stuff about anyway?

Dictionary definition: charge is a fundamental property of the elementary particles of matter, that gives rise to attractive and repulsive forces. Charge is like gravity; nobody knows how it works.

Charge just like love ... you can't explain it, you just know it when it happens ... that inexplicable and irrepressible feeling of attraction, that makes you want REALLY badly to be next to someone else ... or like hate: the similar but opposite feeling towards certain people, that makes you want to run away and hide whenever you see them coming. Let's carry on with the people analogy just a bit, just for the fun of it. When we're talking about lovers, we're often surprised by the choices people make. Oh my God! What the heck does she see in that guy!?! Answer: opposites attract. On the other hand, Jack and Jill seemed like such a good match; they had so much in common ...so what's up with the divorce papers? Answer: They were just too much alike, and bored each other to death! So, there's one of the most fundamental laws of electricity:... unlike charges attract, and like charges repel each other.



Charges happen when the ordinary atomic balance between protons and electrons is somehow disturbed, resulting in an excess of electrons in one area, and a deficiency of electrons somewhere else. The term 'static electricity' refers to situations where charges merely exist, but are more or less stationary.

It usually serves no useful purpose, except when impish little brats shuffle across a carpet with their leather-soled shoes, and then give their victim a shock by sticking their finger next to her earlobe.

You've probably played with static electricity by rubbing a balloon in your hair and then sticking it to the ceiling. I wish I could demonstrate that for you. But ... if I rub these two balloons the same way, they'll repel each other, but they'll stick to the wall.

Stick to the wall!

Voila!

Here again, human nature is analogous when it comes to rubbing.

Some will get a charge out of it, while others might feel like they've rubbed the wrong way.

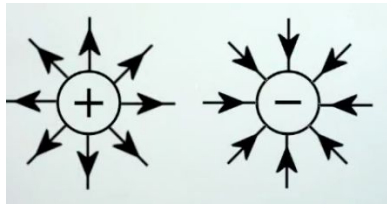
Attraction and repulsion in action.

# Ions & Ionization

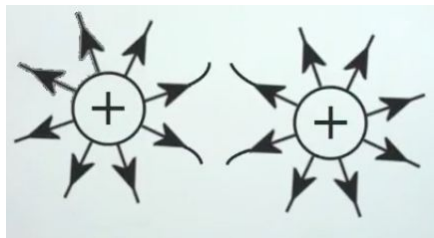
Ions and ionization ... you'll hear the word ion now and then before this is all over. An ion is simply

an atom that is out of balance charge-wise, it's protons and electrons not being equal in number. If there is an excess of electrons, it's called a negative ion. If it's the other way around, it's called a positive ion. The process of producing the unbalanced condition, such as by rubbing a balloon on your hair, is called ionization.

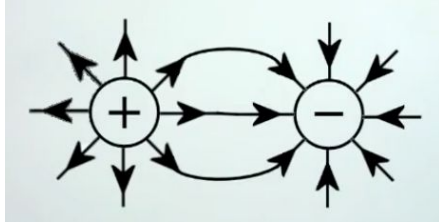
It's probably obvious to you, from simple observation, that this business of charged particles being attracted to, or repelling each other, involves some sort of force.



Since charged objects are able to act upon each other without actually touching, it's also apparent that they're surrounded by some sort of force field. And such is indeed the case: the lines of the force shown here, are imaginary of course, but serve to show that the fields of force surrounding unlike charges are opposite in nature.



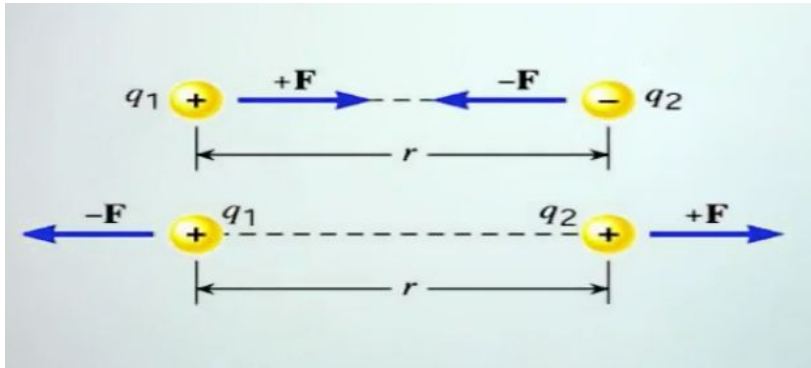
Like fields oppose each other. The fields around opposite charges attract each other.



As a matter of common sense, we could guess that when these fields interact, the forces involved would depend on the strength of their charges, and how far apart they happen to be.

In 1785, a Frenchman named de Coulomb figured out a way to calculate the amount of force between two charges.

By doing a lot of experimenting,



he found out that the electrostatic force is directly proportional to the intensity of the charges, and inversely proportional to the square of the distance between them.