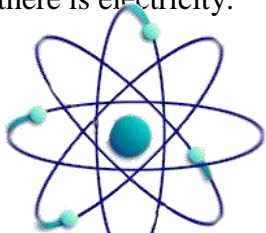


Electricity, Part 1

Keyterms: electricity, static charge, insulator, conductor, electric discharge

Electric Charge

Electricity is the movement of negative charges, electrons, from one place to another. Everything is made of tiny particles called atoms, and all atoms are made of even smaller particles called protons, electrons, and neutrons. Protons and neutrons are contained within the nucleus, center of the atom, while the electrons are swarming around the nucleus like a bunch of bees. Protons carry a positive charge (+), electrons carry a negative charge (-), and neutrons carry both positive and negative which make them have no charge. Most of the time atoms carry an equal number of protons and electrons which give the atom no charge because the charges equal out to 0. But sometimes there may be more electrons than protons because electrons can flow freely from or to other atoms, while protons and neutrons are generally locked within the nucleus. When electrons move from one place to another there is electricity.

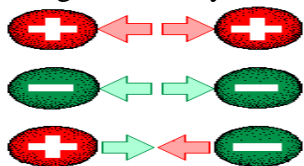


Static Charge

Electrons can be transferred from one object to the other sometimes through rubbing two objects together. When these two objects rub together, electrons are ripped from one object and collected on the other object. Now there are more electrons on one object and fewer on the other. If there are more electrons (-) than protons (+) then the object is said to have a negative charge. If it has more protons than electrons then it is said to have a positive charge.

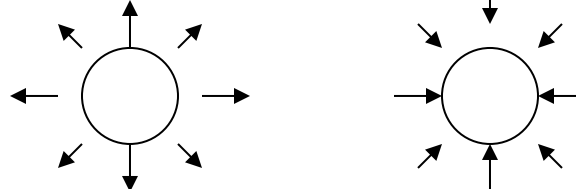
Electric Forces

Just like a magnet charges exert a force on each other depending on the charges. If there are two unlike charges then they attract each other.



If there are two like charges then they repel each other away.

Charges by themselves exert a force either outward or inward called an electric field. Charges don't have to be touching each other to effect other charged particles. Protons have an electric field that is drawn away from the proton while electrons have an electric field that is drawn into the electron.



Insulators

Electric charges flow easier through certain materials while other materials provide more of a resistance to charges passing through them. Materials that allow charges to pass through them are called conductors, while insulators are materials that do not allow charges to pass through them very easy.

Induced Charges

Charges that keep building up create a large difference or inequality between the two objects that contain these opposite charges. When opposite charges end up building up too much, they discharge to try to equal each other out. This discharge can be as small as an electric shock from your hand touching the doorknob to as big as a bolt of lightning millions of volts strong.

Ground

Many things that run on electricity are grounded to prevent a buildup of charges to flow through them causing the equipment to fail because of a power surge. Grounded objects have a path for the electricity to flow from one end to a ground which could be a metal object or in most cases the Earth.

Section 1 Review

- 1.) What is the difference between an object that is negatively charged and one that is positively charged?
- 2.) Two electrically charged objects repel each other. What can you say about the type of charge on each object?
- 3.) Suppose Earth's surface were an insulator instead of a conductor. Would lightning still strike Earth's surface? Why or why not?