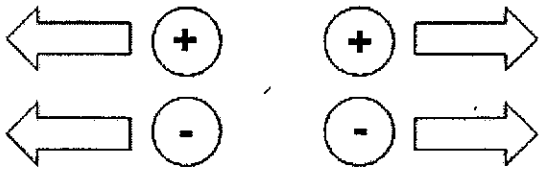
Earth Science Mrs. Nork

Electricity Study Guide

I. Charge in the atom
   a. Atoms have protons (+), electrons (-) and neutrons (no charge)
   b. Electricity is the flow of electrons...Electrons can move!

> When charged particles come together, they exert a force.
> The **electrical force** is a universal force that exists between any two charged objects.

   c. Opposite charges attract, similar charges repel

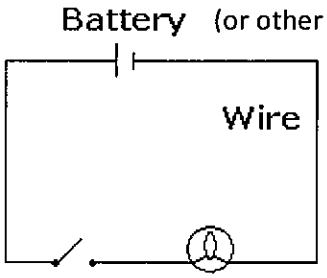


   d. Electrical energy can produce heat, light, motion, and sound

II. Static electricity
   a. Caused by a build-up of electrons (negative charge)
   b. Electrons are discharged when they leave the site of the buildup (ex. Jump from your hand to the doorknob)
   c. Rub a balloon on your hair and it builds up electrons. Place negatively charged balloon near the wall and it sticks.

III. Current electricity
   a. Flows through a path (circuit)
   b. Direct current- flows in one direction (ex. batteries) from the negative end of the battery to the positive end.
   c. Alternating current- generated at a power station (ex. electricity in the wall outlets)

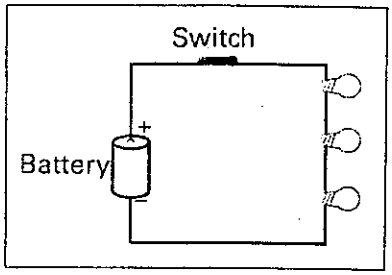
IV. Circuits
   a. A circuit is a closed path through which electricity flow:
   b. A simple circuit has 3 parts →



   c. An electrical circuit must run in a complete **loop**. When there is no break in the loop, it is a **closed circuit**. When there is a break in the loop, it is an **open circuit**. Electricity will **not flow** in an open circuit.

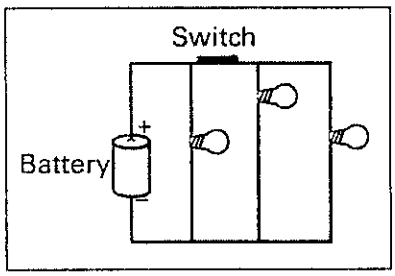
Flip on the switch....close the circuit!!!

V. Series Circuits
   a. Series Circuit- all parts of the circuit are connected in a single loop.
   b. An advantage of series circuits is that they are simpler.
   c. 2 disadvantages:



i. A break anywhere in the path stops the electron flow in the entire circuit. So...if one light bulb burns out, then they all burn out!
ii. As more devices (e.g. light bulbs) are added to the circuit, the total resistance increases. This makes the circuit less efficient.

VI. Parallel Circuits
a. Have more than one path for the electricity to flow to each device.
b. If one device (such as a light bulb) burns out, then the rest stay lit up!



VII. Electricity and Ohm's law

Electrons will flow from an area of high concentration (high potential energy) to an area of low concentration (low potential energy), but it takes **energy** to move the electrons

a. **Ohm's law** shows the relationship between the voltage, current, and resistance.

b. **Voltage (volts)**
- a measure of the energy available to move electrons
- the greater the voltage, the more electrons that may be moved

c. **Current (amps)**
- the flow of electrons through a wire
- measured by counting the number of electrons that pass a given point each second
- the greater the current, the greater the flow of electrons

d. **Resistance**
- the opposition to the flow of electrons
- often produces heat, light, or mechanical energy as a result
- the longer or thinner the wire or the greater the temperature, the greater the resistance

e. **Ohm's Law formula:**
I = V/R or current = voltage /resistance

VIII. Magnetism
a. Natural magnets are found in cobalt, nickel, iron
b. Magnets always have two poles: North and South
c. Magnets can attract or repel each other (opposite poles attract, similar poles repel)
d. Wrapping a nail with copper wire attached to a source of electricity (battery) can produce a magnet
e. Moving a magnet in and out of a coil of wire will produce an electric current (like in a generator)