ELECTRICITY

The interaction of charged particles

Electric Charge

An imbalance of protons & electrons in a particle

Its creates electric AND magnetic interactions

Positive Charge- More protons than electrons

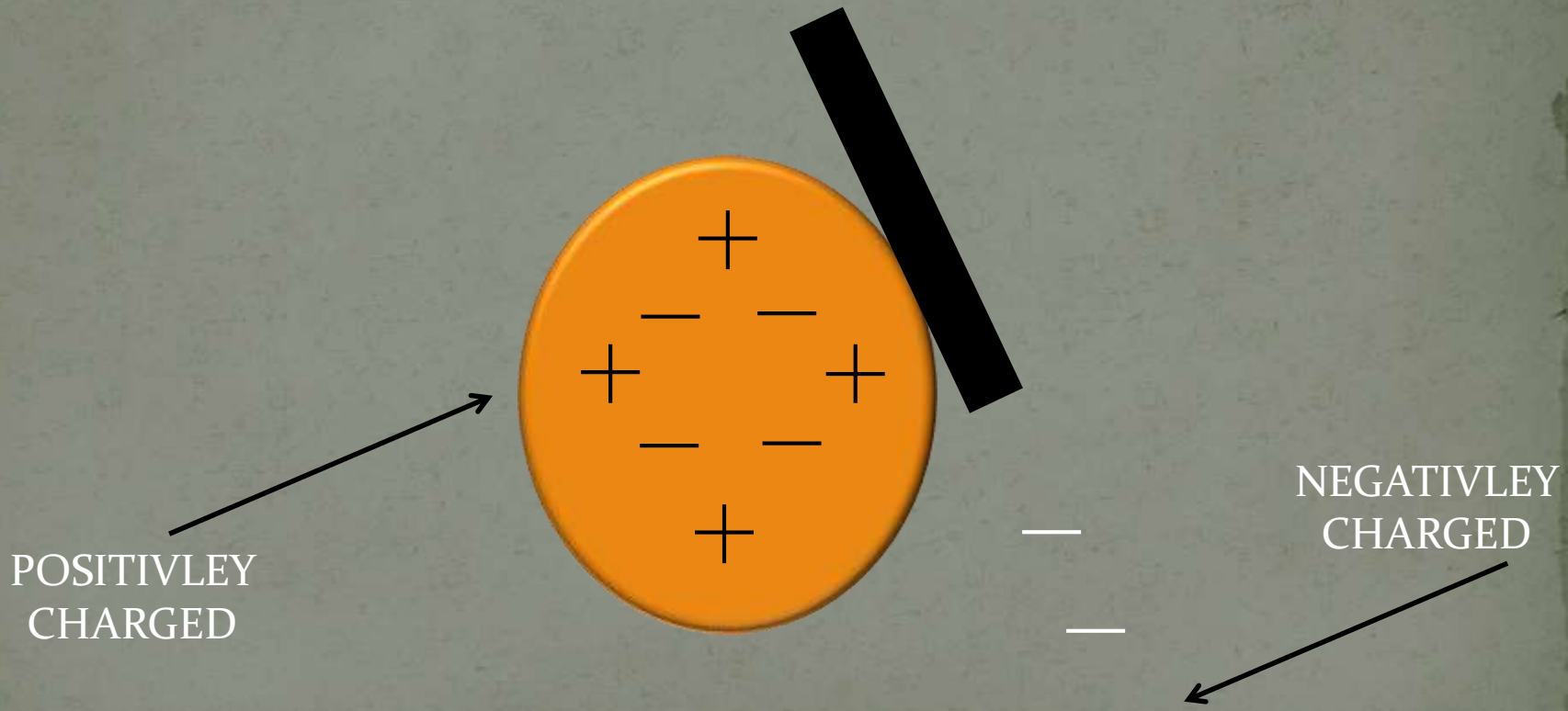
Negative Charge- More electrons than protons

Only electrons move from one object to another!!

How does it work?

When an object is said to be neutral, it has the same number of protons and electrons

When the object is rubbed with wool, it looses electrons, and both objects become charged



Conductors and Insulators

Conductors: Objects in which electric charge moves freely. (i.e. copper wire, water)

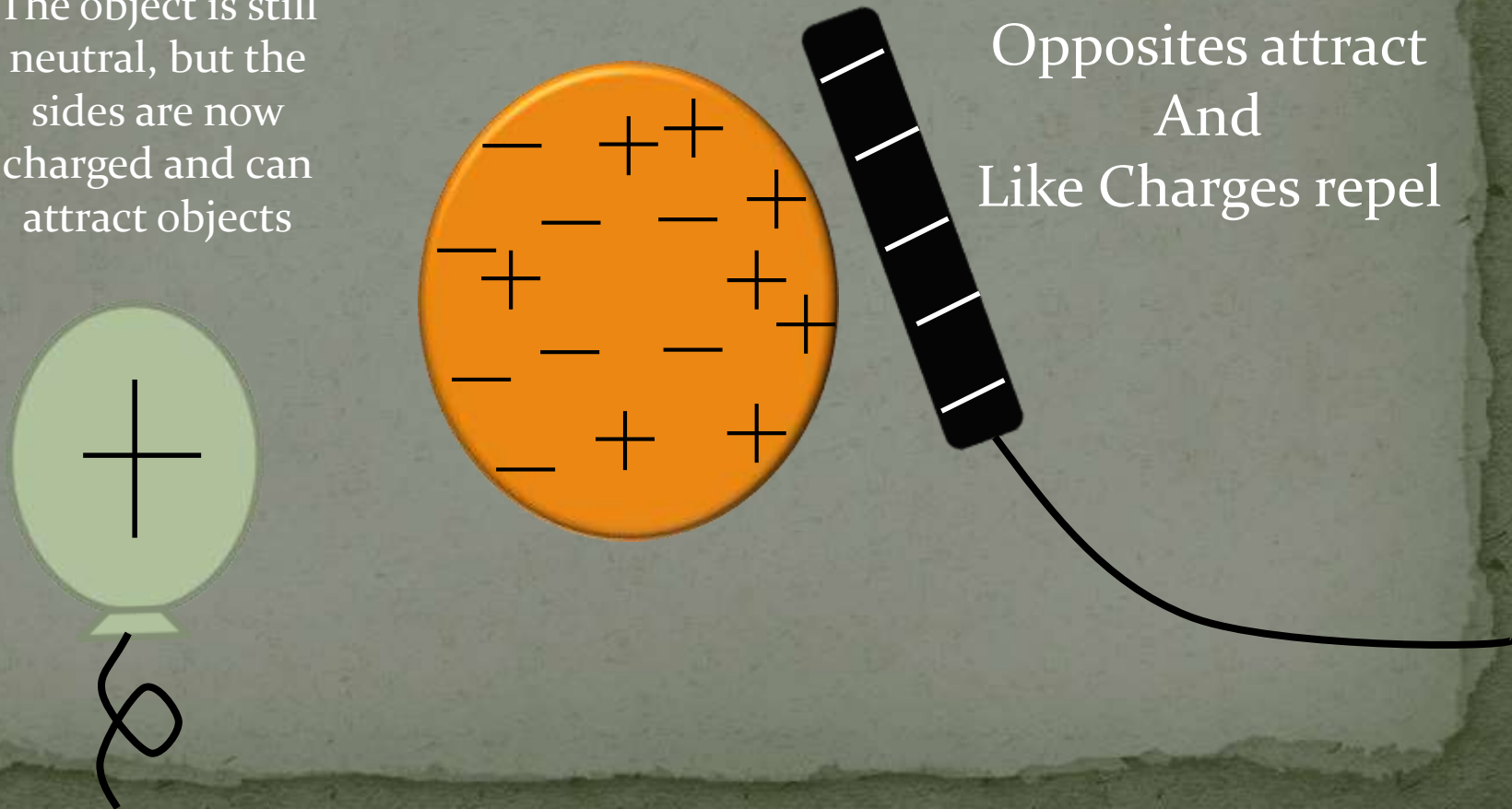
Insulators: Current does not move freely
(i.e. Rubber, wood)

To protect us from electric shock, we often see conductors wrapped in insulators

Induced Charge

A neutral object has opposite charges formed on each side without being touched.

The object is still neutral, but the sides are now charged and can attract objects



Opposites attract
And
Like Charges repel

Electric force and Electric Fields

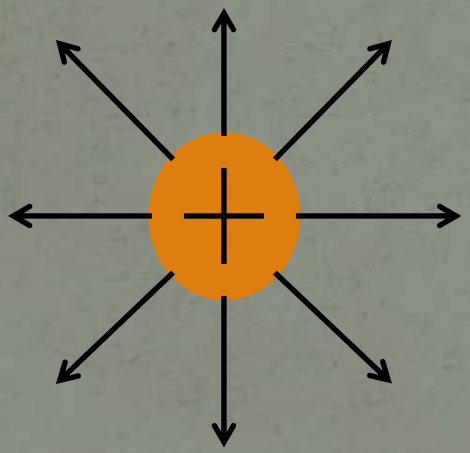
Electric Force- attraction or repulsion of a charged particle due to an electric field.

The Electric Force depends on the size of the charges involved and the distance between the charges

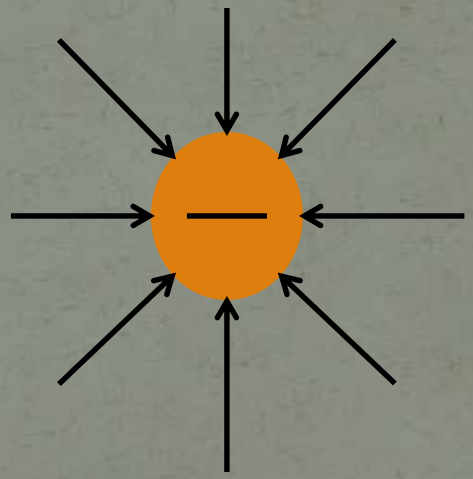
Electric Fields are created by charged particles. It is the space around the particle that affects other charged particles.

Electric Fields

Positively Charged Particle

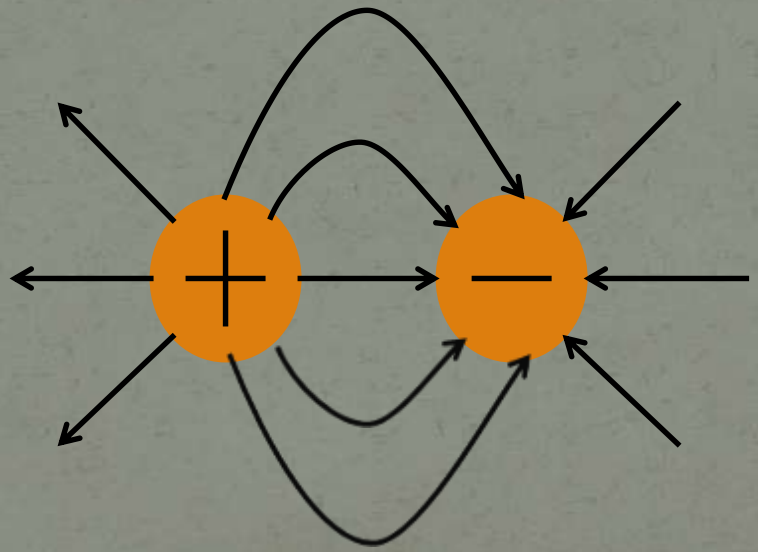


Negatively Charged Particle



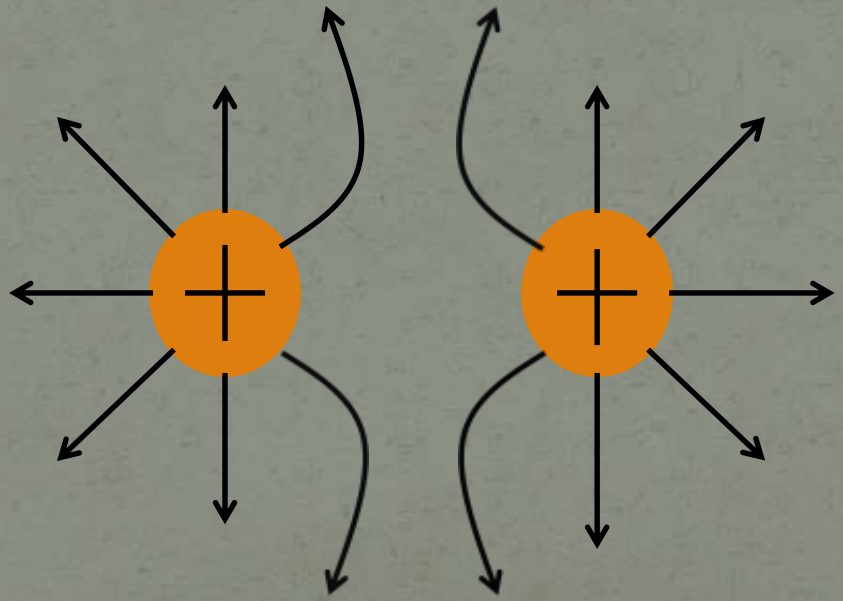
Interacting Electric Fields

Opposite Charges



Interacting Electric Fields

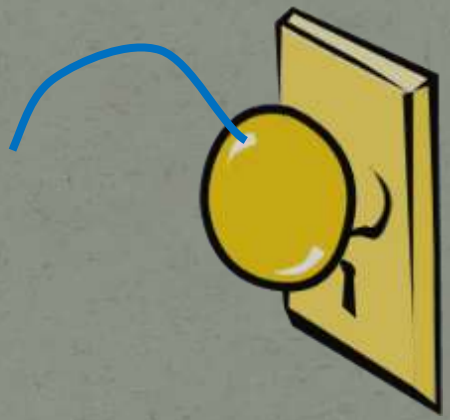
Like Charges



Electric Potential Energy

The ability to move a charge from one point to another

This leads to static shock , the spark



Ohm's Law

Potential Difference-What we call voltage. (Measured in Volts 'V')

Electric Current- The rate at which charge passes through a given point. (Measured in Amp's 'A')

Resistance- Internal friction which slows the movement of charge. (Measured in Ohms 'Ω')

Ohm's Law

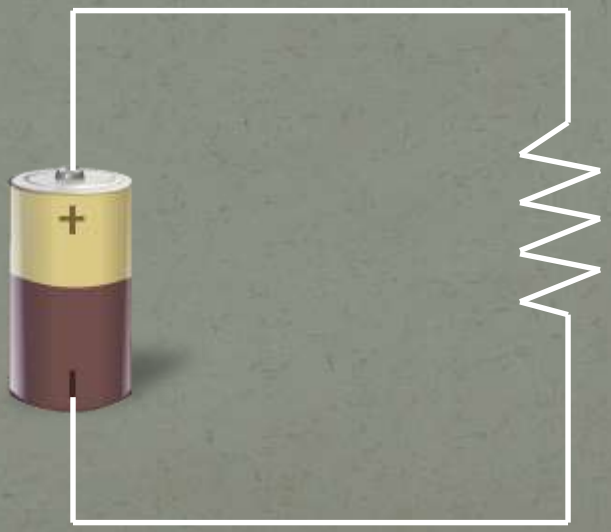
$$V = IR$$

$$I = \frac{V}{R}$$

$$\mathrm{R} = \frac{V}{I}$$

Electric Circuit

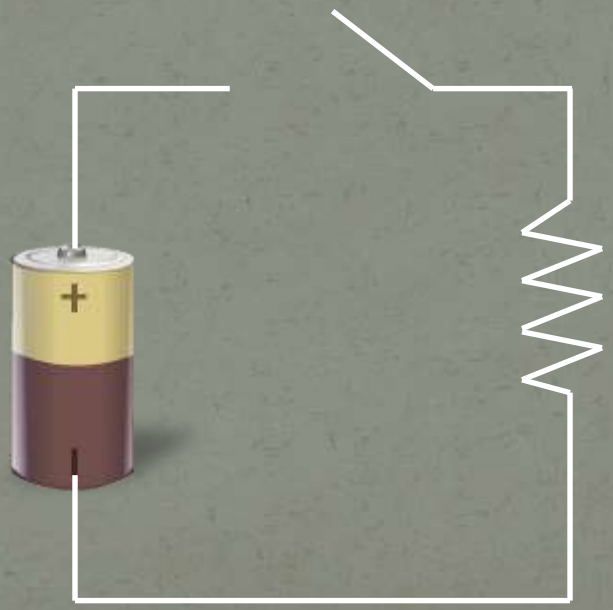
Set of electrical components connected so that they provide one or more complete paths for the movement of charge.



CLOSED CIRCUIT

Electric Circuit

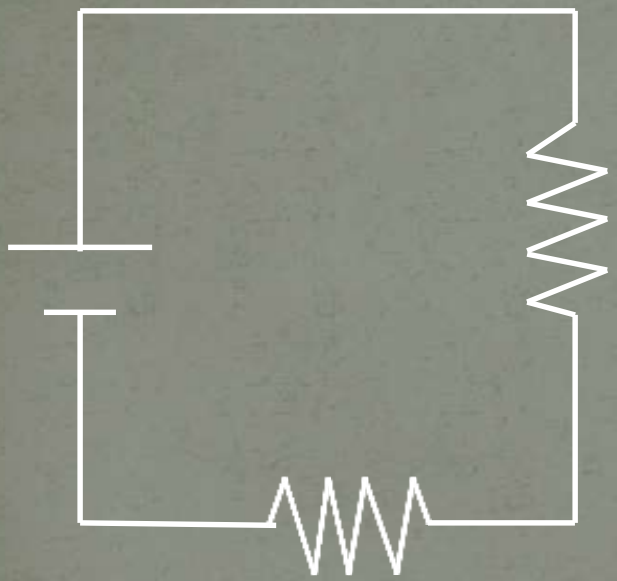
Set of electrical components connected so that they provide one or more complete paths for the movement of charge.



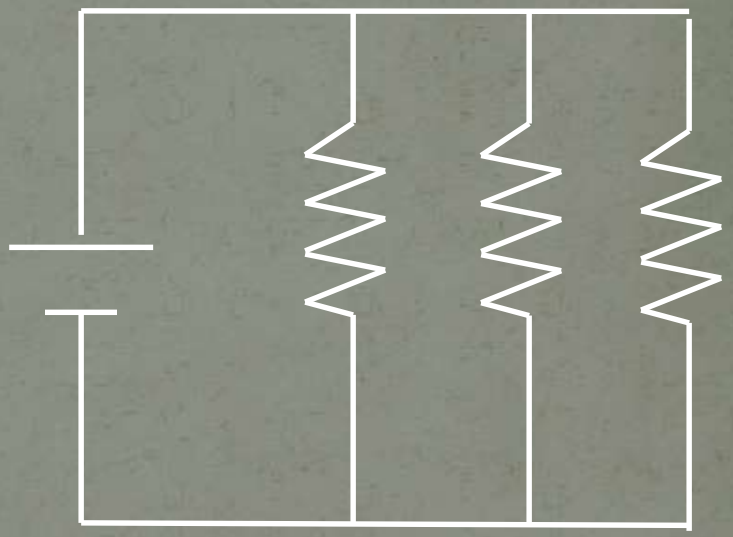
OPEN CIRCUIT

Electric Circuits

Series Circuit



Parallel Circuit



Electric Power

The rate at which electrical energy is converted to other forms of energy

$$P = IV \qquad I = \frac{P}{V} \qquad V = \frac{P}{I}$$

Short Circuit- two wires that touch and create alternate pathways in a circuit

Fuse- Used in series circuits, melt when the current gets too high, a safety measure

Circuit Breaker- Automatically opening switch when current gets too high in a parallel series.