Electrostatics

How do we charge objects?

1. Friction: Basically, when an object is rubbed it loses electrons, thus gaining a charge.

Ex: Rubbing your socks on the carpet.

Ex: Rubbing a balloon with your hair.

1. Conduction: When a charged object touches another object, part of the charge goes to the object.
2. Induction: Charging an object by grounding it.

How charges interact:

Liked charges repel (- and -) or (+ and +)

Unlike charges attract (- and +)

Coulomb’s Law:

$$F\_{E}=\frac{kq\_{1}q\_{2}}{r^{2}}$$

*k=9.0x109Nm2/C2*

*q1= Charge 1 (measured in Coulombs [C])*

*q2= Charge 2 (measured in Coulombs [C])*

*r= the distance between the charges (measured in m)*

*µC = x10-6C*

Ex1: Find the electric force between a 45C charge and a 25C given that they are 1.0cm apart.

Ex2: Find the Electric force between a 2.2 µC and a -3.1 µC given that they are 3.1mm apart.

Ex 3: Find the distance between the two charges given that they are 3.0C and 5.0C and they experience a repulsive force of 3.20x102N.

**Conductor:** A material that allows electrons to flow freely. An example would be copper.

**Insulator:** A material that does not allow electrons to flow easily. An example would be rubber.

**Neutral:** When an object has an equal number of positive and negative charges.

**Ion:** A charged atom

**Polarization:** When an objects charges separate (to their poles).

**Electric Fields**

This is a space around a charged object where another charged object will experience a force.

\*When drawing Electric Field Lines, draw the lines in the direction that a positive charge would go.

**Electric Field Formulas**

**1)** $E=\frac{F\_{E}}{q\_{1}}$

Ex1: What is the electric field strength 10.m from a 324µC?

Electric Field Strength (E) has N/C as units

Ex 2: What force would an electron experience as it passed through the point described in example 1? (Please note: The charge of an electron is 1.6x10-19C).