Charges and Coulomb’s Law

Matter is made of particles which are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ charged.

Most objects are \_\_\_\_\_\_\_\_\_\_\_\_\_ meaning they carry the \_\_\_\_\_\_\_\_ amount of positive charge as negative charge

The unit of charge is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( )

Charges are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, meaning that they cannot be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(just \_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one item to another)

The smallest unit of charge is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which is equal to the charge on one proton (+) or one electron (-).

Coulomb determined that the force between two charged objects is proportional to their \_\_\_\_\_\_\_\_\_\_\_\_\_  
and inversely proportional to the square of their \_\_\_\_\_\_\_\_\_\_\_ or:

Where: q1 =

q2 =

r =

k =

There are two important things to notice from this equation.

First, this equation is quite similar to…

Second, electrostatic forces are…

There is also an important difference between gravitational and electrostatic forces:

Gravity ALWAYS…\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Electrostatic force can…\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When solving for electrostatic forces we will NOT \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Instead we will determine the direction of the force based on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Example:

Two point charges of 1.8x10-6 C and 2.4x10-6 C produce a force of 2.2x10-3 N on each other. How far apart are these two charges?

Example:

Two 40 gram masses each with a charge of 3μC are placed 50cm apart. Compare the gravitational force between the two masses to the electric force between the two masses. (Ignore the force of the earth on the two masses)

Example:

Two charges are separated by a distance r and have a force F on each other. What would happen if….

r is doubled?

q1 is doubled?

q1 and q2 are doubled and r is halved?

Example:

A charge of 1.7x10-6 C is placed 2.0x10-2 m from a charge of 2.5x10-6 C and 3.5x10-2 m from a charge of -2.0x10-6 as shown.

What is the net electric force on the 1.7x10-6 charge?

1.7x10-6 C

2.5x10-6 C

-2.0x10-6 C