Name: _____ Phys 12

6.01 Electrostatic Force

Have you ever taken a balloon and rubbed it against another surface? What happened when you took this balloon and held it against something light?

Why does this happen? electrons move from one object another.

Law of conservation of charge: charges cannot be created or destroyed but can be transferred from one object to another

Since everything is made of atoms and atoms contain electrons and protons,
to make a positively charged object: remove electrons from the object
to make a negatively charged object: add electrons (e^-) to the object

Materials that allow electrons to flow easily: conductor
Materials that hinder the movement of electrons: insulators

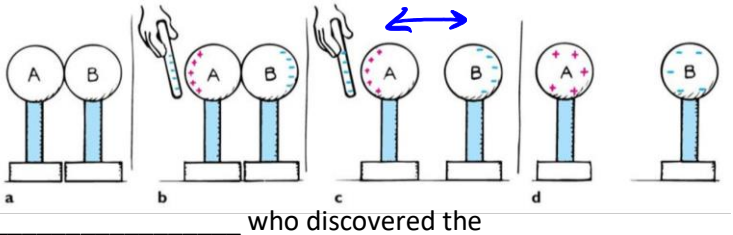
cations
pawsative

Law of Charges

⊕ positive
⊖ negative

1) like charges repel
2) opposite charges attract
3) * neutral charges are attracted to either positively or negatively objects through induction *

How do we get induction?



Charges are measured using the units of Coulomb who discovered the
Coulomb's Law

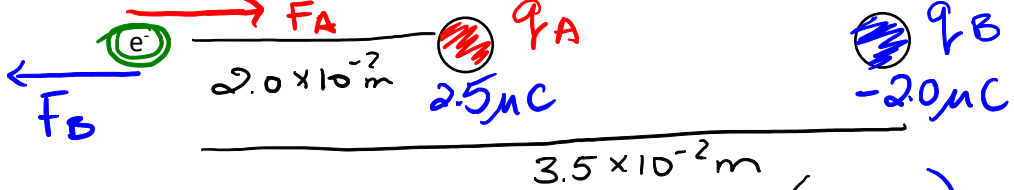
F = (attraction/repulsion)	$\frac{K q_1 q_2}{r^2}$	(N)	q_1 = charge on object 1 (C) q_2 = charge on object 2 (C) r = distance of separation between 1 and 2 (m) k = Coulomb's constant (9.00×10^9 Nm²/C²)

What other Law does this look like....? $F_G = \frac{GMm}{r^2}$

The **elementary charge** for a proton and an electron is 1.6×10^{-19} C.

Ex. 1: An electron is placed 2.0×10^{-2} m from a 2.5 µC charge and 3.5×10^{-2} m from a -2.0 µC charge as shown below.
a) What is the net electrostatic force on the electron? b) What acceleration will this electron experience? ($m_e = 9.11 \times 10^{-31}$ kg, this is also in your data booklet) (6.6×10^{-12} N right) (7.3×10^{18} m/s² right)

µ = micro (10^{-6})



$F_{net} = F_A - F_B = \frac{K e^- q_A}{(2.0 \times 10^{-2}\,m)^2} - \frac{K e^- (2.0\mu C)}{(3.5 \times 10^{-2}\,m)^2}$ (right)

HW: Worksheet 6.01 #1, 3, 5, 6, 8, 9, 10, 13