

Am: Electro Statics

Day #1

Electro Statics - Study of electric Charges at rest

Atom = Clouds of Electrons surrounding a dense core known as a nucleus

Particle	^{Elementary} Relative Charge	Charge (C)	Mass (kg)
Electron	-1	-1.6×10^{-19}	9.11×10^{-31}
Proton	+1	$+1.6 \times 10^{-19}$	1.66×10^{-27}
Neutron	0	0.00	1.67×10^{-27}

Proton / Electron has equal, but opposite charges

Protons / Neutrons are much bigger than the electron 2000X

Standard Unit of Charge - Coulomb (C)

* Protons & Neutrons can not be removed from an atom by ordinary means

* When an atom gains/loses electrons, it becomes charged (ion)

Excess Electrons - Negatively Charged

Deficiency of electrons - Positively Charged

Ques

How does a glass rod become positively charged when rubbed w/ silk?

- Glass rod loses electrons it becomes negatively charged

Find the charge of an atom with 8 protons & 2 electrons

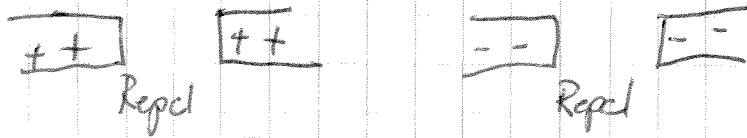
$$8(1.6 \times 10^{-19} \text{ C}) - 2(1.6 \times 10^{-19} \text{ C}) = 6(1.6 \times 10^{-19})$$
$$9.6 \times 10^{-19}$$

* Whenever you look at charges, they always have to be a factor of 1.60×10^{-19}

Aim: Charging Objects

Day 2

Forces on a Charged body



Like Charges Repel

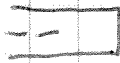
2 objects w/ the same sign charge brought near each other will ~~attract~~ repel by electrical force



Unlike Forces Attract

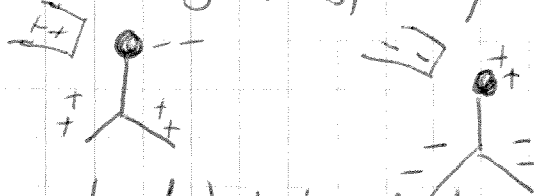
Negatively & positively charged objects attract by electrical force

Transfer of Charge

What happens if 



Induction - Can ~~change~~ redistribute charge of object w/out touching it
Ex. - Electroscope

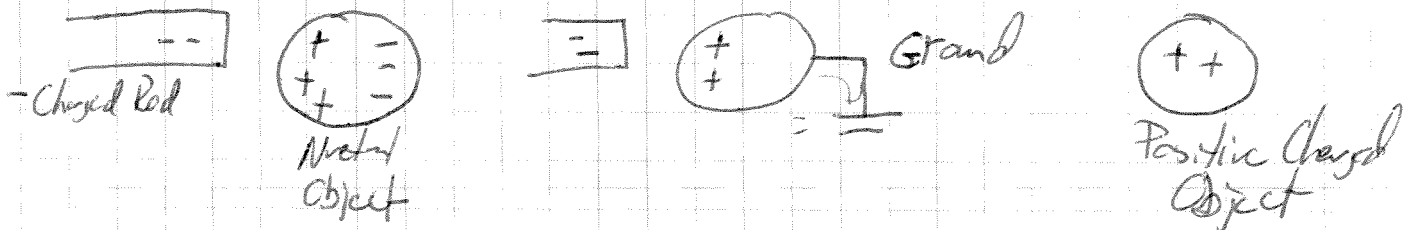


* Once rod is removed, original distribution of charge returns

Conduction ~~When 2 objects are touched~~

When a neutral body is touched by a charged body

Rub a balloon on self & attach to wall



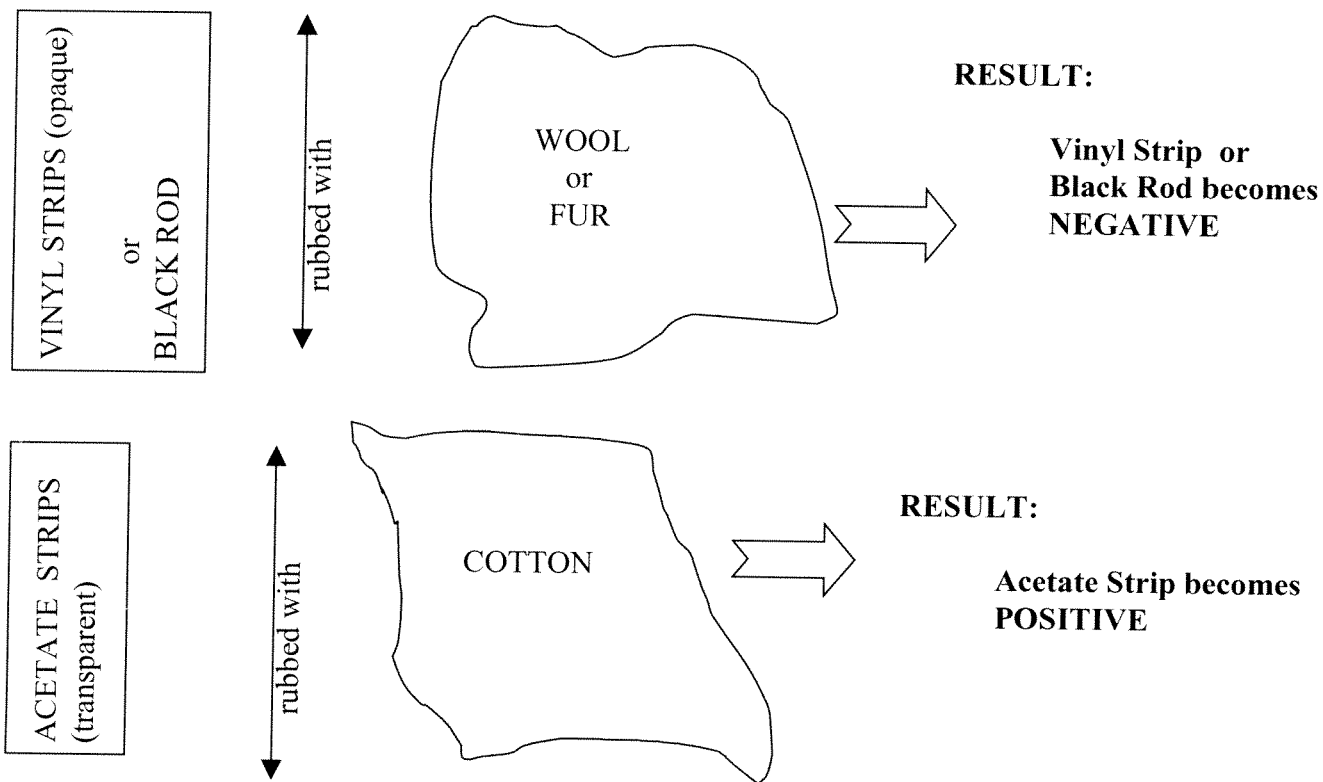
Friction - Rubbing a neutral object along a charged surface
(see exercise)

- Do Ex of Pith ball @ to reinforce

To: My Physics Buddies *Brian*
From: Deb
Re: Electrostatics Lab
Date: 3/12/03

- There are enough materials in Lab 15 and Lab 1 to do the electrostatics lab. Please keep the two sets of material separate.
- Peter please get a class set of pithballs (8 + backup) from Lorraine for the Lab 1 set. Thanks.
- Some additional materials are located in the darkroom.

Students should be given the following information:



Note: the color of the strip is unimportant.

Pith balls are fragile. Please have students take care of them. They are not expensive but we do not have a lot. Thanks.