

Electrostatics Lab

NAME _____ Period _____
Date _____

Objective: To study the effect of charges through the use of the electroscope

Apparatus: Glass Rod, Silk, Rubber Rod, Fur, Electroscope

The electroscope consists of a conducting metal bar with a metal ball at one end (the top) and two thin metal strips, called leaves, at the other end. The top end of the bar with the metal ball is outside of a glass box and the part with the leaves inside the glass box. The leaves are thin enough to bend when a weak force is applied. Since the bar is made of metal and a good conductor, the electron are free to move from one end to the other. **Do not ever touch the leaves.**

Remember when doing this lab to consider the three things that you know about charges:

Charges are conserved

Like charges repel each other

Unlike charges attract each other

Part 1

First neutralize the electroscope by touching the knob(metal ball at the top of the electroscope). Rub the glass rod with the silk cloth. You may need to do this repeatedly to get a good charge. Bring the glass rod near and keep it there, but do not touch the knob and observe the leaves.

What do the leaves do? _____

Why would the leaves separate? _____

What type of charge is on the glass rod? _____

What type of charge is on the knob? _____

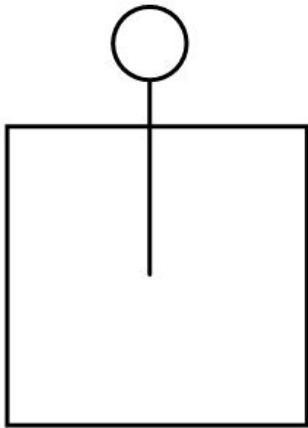
Which particle is free to move in conductor, the electrons or the protons?

What must the charge on the leaves be then? _____

Which type of charging were you doing in this experiment: conduction, induction, or polarization? _____

Now remove the glass rod

Draw in the leaves and positive and negative charges on the picture below.



Now rub the rubber rod with the fur. Then bring the rubber rod near and keep it there, but do not touch the knob of the electroscope.

What do the leaves do? _____

Why would the leaves separate? _____

What type of charge is on the rubber rod? _____

What type of charge is on the knob after you hold the rubber rod near it?

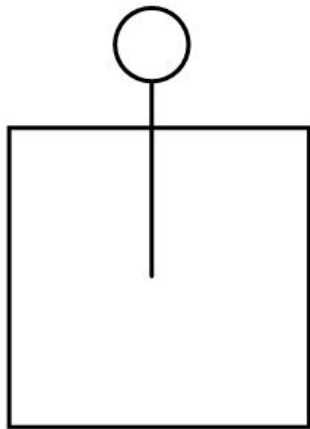
What must the charge on the leaves be then?

Which way did the electrons move this time, leaves to knob or knob to leaves?

If you did not know the charge on the rubber rod or the glass rod before now would this experiment have let you know which Rod was positive and which Rod was negative? _____

Why or Why not? _____

Draw in the leaves and positive and negative charges on the picture below.



Part 2

Now Rub the glass rod with the silk cloth again. Now touch the knob (metal ball of the electroscope) with the glass rod and observe the leaves. Again, you may need to do this several times to get a good charge.

What do the leaves do?

Why would the leaves separate?

What type of charge is on the glass rod, after touching the electroscope?

What type of charge is on the knob now?

What type of charge on the leaves now?

From where and to where did the electrons move this time?

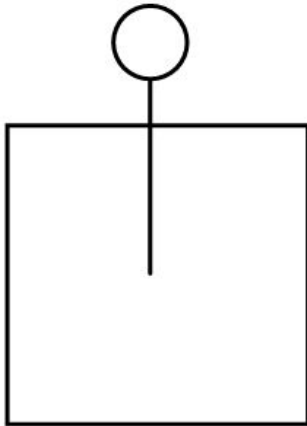
How is this different then the previous case (on the previous page) when you did not touch the glass rod to the knob and why are the charges now different then before?

Now remove the glass rod

What happens to the leaves?

Why?

Draw in the leaves and positive and negative charges on the picture below.



Now rub the rubber rod with the fur. Now without discharging the electroscope (don't touch it) bring the rubber rod near the knob of the electroscope.

What do the leaves do?

What type of charge is on the rubber rod?

What type of charge is on the knob now?

What type of charge is now on the leaves?

Which way did the electrons move this time, leaves to knob or knob to leaves?

Why do the electrons move away or toward the rubber rod?

Now touch the rubber rod to the electroscope

What happens to the leaves?

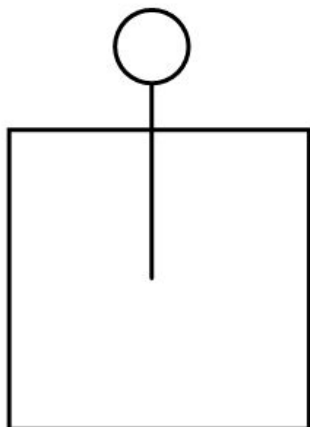
What type of charge is on the rubber rod?

What type of charge is on the knob now?

What type of charge is now on the leaves?

When touching the electroscope with the charged rod you are charging the electroscope by which method: friction-touching (conduction), induction, or polarization? _____

Draw in the leaves and positive and negative charges on the picture below.



Conclusions:

1. Electricity consists of how many types of charges? _____
2. The names we assign to the charges are _____ and _____.
3. Objects that are alike in charge will have a force between them that is which, attractive or repulsive? _____
3. Objects that are different in charge will have a force between them that will do which, attract or repulse? _____
4. In solids which particle (s), the electron, the proton or both, is/are most likely to move? _____
6. In gases which particle(s), the electron, the proton or both, is/are most likely to move? _____

