PS 100 Experiment #2 Chapter 4 Date_____

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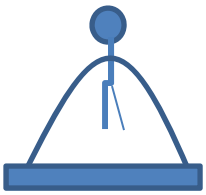
Title: Electric charge

Objectives: Students will observe the behavior of charged objects. They will charge an electroscope both by direct contact and by induction.



Instructions: You should have an electroscope (the ball with foil leaves hanging from the post), an acrylic tube, a piece of PVC, a piece of wool (fuzzy cloth), a piece of vinyl. Make predictions where indicated, then conduct the following activities and record your observations and explanations.
PVC and wool rubbed together leaves a negative charge on the PVC. Vinyl and acrylic rubbed together leaves a positive charge on the acrylic.

You'll be using scientific reasoning skills to answer questions. Use the "If…And…Then…And/But…Therefore" format.

1. If… 1. Like charges repel and opposite attract. 2. Electrons (-) can move in metals. Nuclei (+) cannot.
   And…I rub the PVC rod with wool and transfer the charge to the top of the electroscope by wiping the rod across the top of the can.
   Then…What do you think will happen to the leaves at the bottom of the electroscope and <u>why</u>?

   And/But…What actually happened when you did this?

   Therefore….What can you conclude?

2. If… 1. Like charges repel and opposite attract. 2. Electrons (-) can move in metals. Nuclei cannot.
   And… you charge the PVC rod with wool again and bring it near the top of the negatively charged electroscope **without touching** it.
   Then…What do you think will happen to the leaves at the bottom of the electroscope and <u>why</u>?

   And/But…What actually happened when you did this?

   Therefore….What can you conclude?

3. If… 1. Like charges repel and opposite attract. 2. Electrons (-) can move in metals. Nuclei cannot.
   And… you charge the acrylic rod with vinyl and bring it near the top of the negatively charged electroscope **without touching** it.
   Then…What do you think will happen to the leaves at the bottom of the electroscope and <u>why</u>?

   And/But…What actually happened when you did this?

   Therefore….What can you conclude?

4. If… 1. Like charges repel and opposite attract. 2. Electrons (-) can move in metals. Nuclei cannot. And… I discharge the electroscope by touching the top. Place a positive charge on the electroscope using the acrylic rod and repeat steps 1-3 with the positively charged electroscope.
   Then…What do you think will happen to the leaves at the bottom of the electroscope in each case and why?

   And/But…What actually happened when you did this?

   Therefore….What can you conclude?

We haven't told you what charge you get when you rub the PVC pipe with vinyl. You're going to use the information from the previous experiments to figure it out.

5. If I have _____charge on the PVC rod when I rub it with Vinyl.

   And ….I put a _____charge on the electroscope and bring the charged rod near it.

   Then…What do you think will happen to the leaves at the bottom of the electroscope and why?

   And/But…What actually happened when you did this?

   Therefore….What can you conclude?

Up until now, we've been telling you what measurement/observation to make. In "real science" figuring that out is the biggest challenge. For the next activity you are going to charge the electroscope by *induction*, predict what the charge is, and develop an experiment to see if you're right or not.
Discharge the electroscope. Bring a charged rod near the top of the electroscope, but do not allow the rod to touch the electroscope. (If you touch it, just discharge it and try again.) While holding the rod near the electroscope, touch the bottom rim. Move your finger off of the bottom and then move the charged rod away from the top. This process is known as charging by induction. Keep track of the charge on the rod you used. Predict what charge was left on the electroscope. (You can use the if, and, then pattern for this prediction too.)

6. If a _____charge on the rod induces a _____charge on the electroscope,

   And ….What observations are you going to make to see if your prediction is correct?

   Then…What do you think will happen to the leaves at the bottom of the electroscope and why?

   And/But…What actually happened when you did this?

   Therefore….What can you conclude?

I personally participated in the activity and wrote the response in my own words: Signatures:

_____ _____

_____ _____