

Stuck on You!

Introduction:

Electrons are the particles which are involved in chemical interactions since they are located in the outermost parts of the atom. In metals the electrons are loosely associated with all of the atoms in a given sample, allowing the electrons to move easily within a metal. This results in metals being good conductors of energy through the movement of electrons. You will study energy transfer through electrostatic charge/discharge and the effects of charged objects on charged and uncharged objects.

Hypotheses: Answer the following questions on your paper

1. How can a charged object attract a neutral object?
2. How does an electroscope detect electric charge?
3. How can you determine the electrostatic charge (+ or -) of an object?

Materials: Only get what you need for the part you are actually working on

Part A	Part B	Part C
<ul style="list-style-type: none">• 1 inflated balloon• Four sample materials:• 1 paper plate	<ul style="list-style-type: none">• 1 inflated balloon• electroscope	<ul style="list-style-type: none">• 1 inflated balloon• 2 pieces of cellophane tape (~20 cm each)

Part A

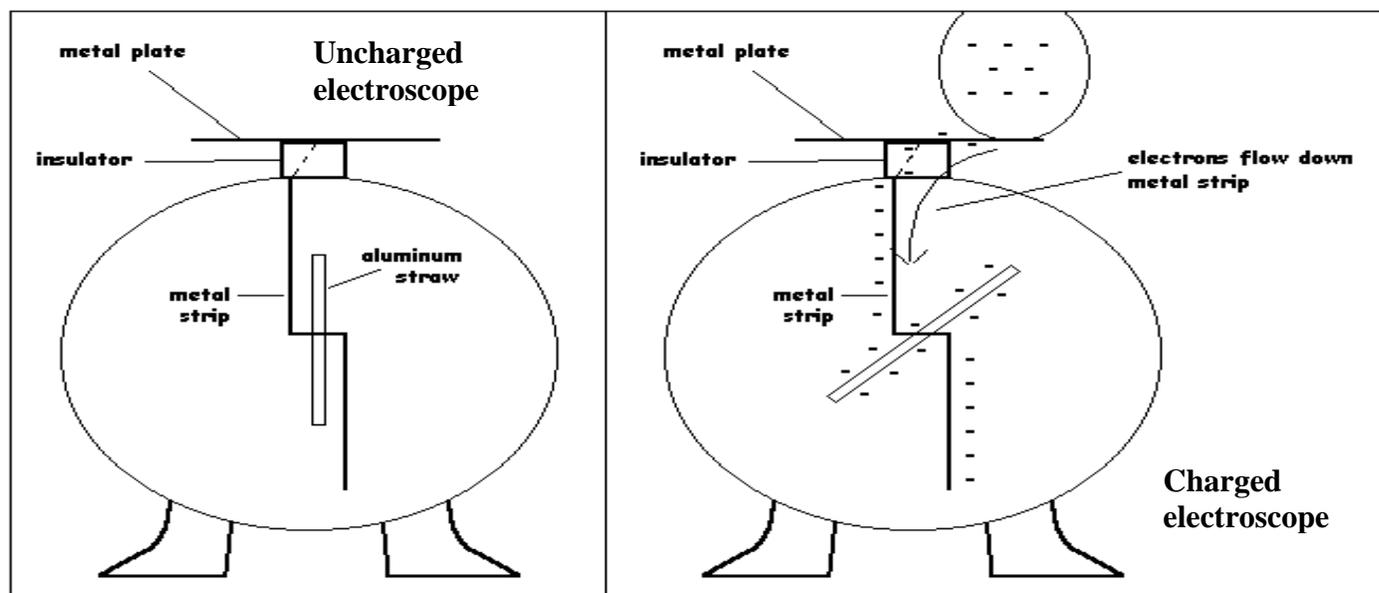
1. Obtain the four sample materials, a paper plate, and an inflated balloon.
2. Put one of the samples on the plate. Briskly rub the balloon on a piece of fabric. Bring the balloon near each sample material. **Record your observations of the sample's behavior.** Return as much of the sample as possible. Repeat for each sample.
3. Based on your observations, which samples are charged the same as the balloon and which samples are charged opposite of the balloon? Explain how you know.
4. The salt was not charged before you brought the balloon near. Explain how the balloon attracted the salt.

Return your lab area to its original pristine condition by cleaning up after yourselves.

Have your teacher approve your work up to this point.

Part B: *The Electroscope – Read this first, then turn to the next page to do the activity*

An instrument called an electroscope can detect an electric charge. A typical electroscope consists of a metal strip with a metal plate at the top and an aluminum foil straw which pivots on the metal strip at the bend. The picture below shows this electroscope and how it detects electric charge.



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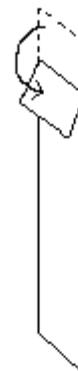
Part B (Continued)

1. Sketch the electroscope on your lab paper.
2. Charge the balloon by briskly rubbing the balloon on a piece of fabric. Bring the balloon near, but do not touch, the top of the electroscope. **Record and explain the electroscope's behavior.**
3. Make sure the electroscope is discharged by touching the top with your finger. The charges on the electroscope pass between you and the ground, leaving the electroscope neutral.
4. Charge the balloon again. Touch the top of the electroscope with the balloon. Remove the balloon. **Record the electroscope's behavior.** At this point the electroscope has the same charge as the balloon. How does the electroscope respond when you bring the balloon near it now? Discharge the electroscope.
5. Charge the balloon again. (a) Bring the balloon near the top of the electroscope, do not touch the balloon to the electroscope. (b) Have your partner briefly touch the top of the electroscope while the balloon is near. (c) Now move the balloon away. **Record the electroscope's behavior during all three steps.** (d) Bring the balloon back near the electroscope. **Record what happens to the electroscope.**
6. What is the charge on the electroscope relative (same or opposite) to the balloon at this point?
7. Return the electroscope to the materials table.

Have your teacher approve your work up to this point.

Part C

1. You will need two pieces of tape. Please get the correct length and be careful with it so as not to waste the tape.
2. Make a handle on each piece of tape by folding about 1 cm of one end of the tape over on itself...sticky side to sticky side.
3. Stick the first piece of tape to your lab table. Rub it a couple of times to ensure it is stuck good. Stick the second piece of tape directly on top of the first, handle over handle. Quickly pull the bottom piece of tape off the lab table then quickly pull the two pieces of tape apart. Slowly bring the non-sticky sides of each piece close to each other. **Record the behavior of each piece of tape when brought close to each other.** Are the pieces of tape charged alike or opposite?
4. Bring each tape's non-sticky side near the charged balloon. **Record the behavior of the pieces of tape.** Are the pieces of tape charged alike or opposite of the balloon?
5. Now stick the two pieces of tape to the lab table next to each other. Quickly pull each piece of tape off the lab table and slowly bring the non-sticky sides close to each other. **Record the behavior of each piece of tape.** Are the pieces of tape charged alike or opposite?
6. Bring each tape's non-sticky side near the charged balloon. **Record the behavior of each piece of tape.** Are the pieces of tape charged alike or opposite of the balloon?
7. Throw the tape away.



Have your teacher approve your work up to this point.

Final Questions

Re-answer the Hypotheses from the start of the lab, only now you should use specific examples from the lab as support for your answers.