

Name: _____

ELECTROSCOPE LAB

INTRODUCTION

A commonly available brand of plastic tape can gain or lose negatively charged electrons when you stick it to a surface and rip it off. By suspending pieces of tape from a straw you can build an electroscope, a device that detects electrical charge. A plastic comb or ruler will enable you to identify whether the pieces of tape are positively or negatively charged.

ASSEMBLY

Press the end of a drinking straw into each of the two holes in a rubber stopper. Bend over the flexible part of the straws so they are at a 90 degree angle. Repeat this procedure so that you have two electroscope set-ups.

PROCEDURE

Tear off two 4-inch pieces of tape. Press each piece firmly to a table top, leaving one end of each tape sticking up as a handle. QUICKLY pull the tapes from the table and stick one piece on the arm of the straw on one stopper and do the same thing on the second stopper.

Move the two stoppers so that the two tapes are face to face, about 10 cm (4-5 inches) apart. Then move the stoppers closer together.

1. What happens? **Describe**.
2. What can you **conclude** about the charges of the pieces of tape?
3. Draw a diagram of the tape with the charges. (Draw a picture and include the charges)

Tear off two more pieces of tape. Place the sticky side of one to the smooth side of the other, leaving one end of each tape sticking out as a handle. **QUICKLY** pull the tapes apart and stick them to the two remaining arms.

Bring the two arms close together.

4. Describe what happens. What can you **conclude** about their charges? Provide evidence.
5. Do the two pieces of tape act upon each other from a distance or do they have to touch each other to interact? What kind of interaction is this (HINT: What are we learning about today)?
6. Draw a diagram of the tape with the charges. Draw arrows to indicate attraction or repulsion.

Rub a plastic utensil or comb on your clothes or on your head. Then hold the utensil/comb near the dangling tapes.

7. Describe what happens.
8. What happens when the plastic utensil is held near the tape pulled off the table?
9. What charge is the plastic utensil after it was rubbed?
10. Knowing the charge of the plastic utensil, what are some basic conclusions about the electrical charges of the tape? What is your evidence?

PART II

STATIC ELECTRICITY

What happens when a charged object is brought near metallic and nonmetallic objects that are not charged?

Procedure:

1) Obtain 2 balloons per group

2) Rub the balloon against your hair or clothing and pick up a few billion electrons and see if the electrostatic attraction holds it to the following objects. Write yes if the object sticks or no if it does not.

1. piece of paper
2. aluminum foil
3. whiteboard
4. back of chair
5. brick wall
6. book
7. laminated poster
8. metal chair leg
9. lab partner

3) What charge is the balloon? How do you know? (HINT: what does it pick up when rubbed? See step 2)

4) The electrons stay on the balloon and do not flow off very easily. Do you think the balloon is an insulator or a conductor? Explain.

5) Complete a simple diagram showing the charges on the balloon and the chalkboard.

QUESTIONS

1. Define static electricity.
2. From your lab, how do objects become electrically charged?
3. What does your hair supply to the balloon?
4. What happens when a charged object is brought near metallic and nonmetallic objects that are not charged?
5. List 10 ways electricity improves your life?