Lab 32-1a: **Electrostatics**

Taking off a sweater can sometimes make your hair stand on end. If you rub a balloon in your hair, it will stick to the wall. Socks cling to everything coming out of the drier. Scuff your feet on a rug and you can give someone a shock.. These are all common examples of what is now called static electricity. But what exactly *is* static electricity and electric charge? You can start to answer this by examining the behavior of some objects that are easily charged by rubbing.

In all of these activities, you will be charging up various objects. You will then be asked to make specific observations. In addition to any other observations you may find, note whether objects are attracted or repelled.

Activity 1: Single piece of Scotch Tape

a. Stick a single piece of tape on the table and tear it off quickly. What happens when you bring the tape near your hand? Near the table? Near your partner? Try it other places.

b. Make a second piece of tape like the first one and repeat your observations. What happens?

c. What happens when the two pieces of tape are brought close?

Activity 2: Scotch Tape Sandwiches

a. Place a piece of tape on the table as you did before. At one end, write "bottom." Place a second piece of tape on top of the first and mark it "top." Quickly tear off the sandwich, and then rapidly pull apart the top and bottom pieces.

b. What happens to the bottom piece of tape when it is brought near something?

c. What happens to the top piece of tape when it is brought near something?

d. What happens when a top is brought near a bottom?

e. Prepare a second sandwich like the first one. Remember to mark the two pieces top and bottom. What happens when a top is near a top?

f. What happens when a bottom is near a bottom?

g. Compare your results with your classmates. Make a general statement of how the charged tape interacts with something.

h. How could you determine if a single piece of tape (from activity one) is charged like a top or bottom piece?

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i. Is a single strip like a top or like a bottom?

Activity 3: Charging by Friction

a. Rub a rubber rod with a piece of fur. Bring it near some little pieces of paper. What happens?

b. What is the "charge" of the rubber rod? What is the charge of the fur?

rubber rod = _____ fur = _____

c. Rub a piece of acrylic with a paper towel. Bring it near some little pieces of paper. What happens?

d. What is the "charge" of the acrylic? What is the charge of the paper towel?

acrylic = _____ towel = _____

e. Rub a piece of styrofoam with a piece of fur or paper towel. What is the "charge" of the styrofoam? What is the charge of the fur or paper towel?

styrofoam = _____ fur/towel = _____

Questions *These are important!*

1. How do "like" charges interact?

2. How do "opposite" charges interact?

3. How does any charged object interact with an uncharged (or neutral) object?

4. Imagine that something is attracted to a "top" piece of tape. What is the charge of the object?

5. Imagine that something is repelled by a "bottom" piece of tape. What is the charge of the object?

6. Exactly how do you tell if a random object is "top", "bottom" or neutral?

7. Give some other, everyday examples of thigns being charged by friction.