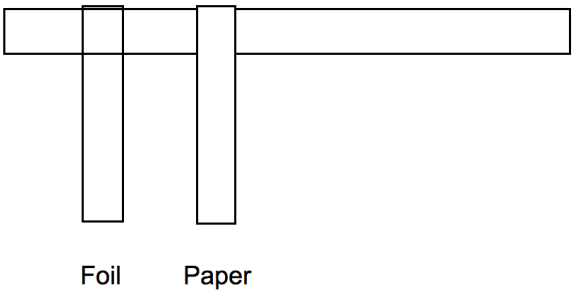
Name_____
Pd____ Date____

E&M1-Sticky Tape Activity

Set-Up Instructions



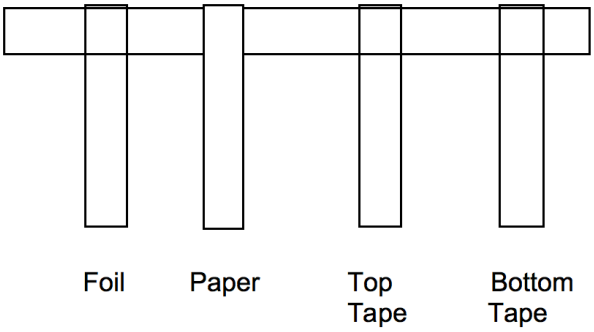
1. Cut two pieces of paper and two pieces of aluminum foil to the following dimensions: 2 cm by 15 cm.

2. Suspend one piece of aluminum foil about 10 cm from the vertical post, and one piece of paper about an equal distance from that, make sure to leave equal spacing for two more things that will hang.

3. Create two tape "sandwiches" following the four steps according to the Sticky Tape Lab Set-Up Handout.

Procedure

1. Gently peel one set of T and B tapes from the table, **keeping the T and B tapes together**. Gently touch the non-adhesive side of the tape on a faucet or your lip until there is no attraction to your hand. Quickly peel them apart.



2. Hang each strip next to the hanging paper and foil.

3. Gently peel the other set of T and B tapes from the table, **keeping the T and B tapes together**. Gently touch the non-adhesive side of the tape on a faucet or your lip until there is no attraction to your hand. Quickly peel them apart.

4. With a T tape hanging from one hand and a B tape hanging from the other, experiment by approaching each of the four strips hanging on your horizontal rod (foil, paper, top tape, bottom tape). *Describe what you see. Include a series of sketches of the tapes as they approach one another with vectors to represent the forces on the tapes. Label the forces.*

5. Use your **top tape** and explore the interaction with the four strips hanging from the horizontal rod. Draw a side view of the interaction.

Top Tape and Aluminum Foil	**Top Tape and Paper**
Top Tape and Top Tape	**Top Tape and Bottom Tape**

6. Use your **bottom tape** and explore the interaction with the four strips hanging from the horizontal rod. Draw a side view of the interaction.

Bottom Tape and Aluminum Foil	**Bottom Tape and Paper**
Bottom Tape and Top Tape	**Bottom Tape and Bottom Tape**

7. Use the left over piece of **aluminum foil** from Step 1 and explore the interaction with the four strips hanging from the horizontal rod. Draw a side view of the interaction.

Aluminum Foil and Aluminum Foil	**Aluminum Foil and Paper**
Aluminum Foil and Top Tape	**Aluminum Foil and Bottom Tape**

8. Use the left over piece of **paper** from Step 1 and explore the interaction with the four strips hanging from the horizontal rod. Draw a side view of the interaction.

Paper and Aluminum Foil	**Paper and Paper**
Paper and Top Tape	**Paper and Bottom Tape**

9. Rub the **PVC rod** with fur and approach each of the four hanging objects. *Draw what you see. Describe the strength of the interactions (none, weak, moderate, strong).*

PVC Rod and Aluminum Foil	**PVC Rod and Paper**
PVC Rod and Top Tape	**PVC Rod and Bottom Tape**

10. Rub the **Lucite rod** with plastic and approach each of the four hanging objects. *Draw what you see. Describe the strength of the interactions (none, weak, moderate, strong).*

Lucite Rod and Aluminum Foil	**Lucite Rod and Paper**
Lucite Rod and Top Tape	**Lucite Rod and Bottom Tape**

Our Model of the Atom and the assignment of (+) and (-) charges

Our current model of the atom is consistent with the existence of 2 types of charge. An atom has a positively charged nucleus surrounded by mobile negatively charged electrons. Materials become charged by the gain or loss of these mobile electrons. Based on observations you will see later we assign the label of **negative to the PVC rod** when rubbed with fur and **positive to the Lucite rod** when rubbed with plastic.

11. Based on your observations from using the two rods:
a. What charge is the **top tape** (+ or -)?

b. What charge is the **bottom tape** (+ or -)?

12. Now that you know the charge on the tape, restate the interaction between **top** and **bottom** tapes, T and T tapes, and B and B tapes using the terms **positive (+)** and **negative (-)** instead of top and bottom.

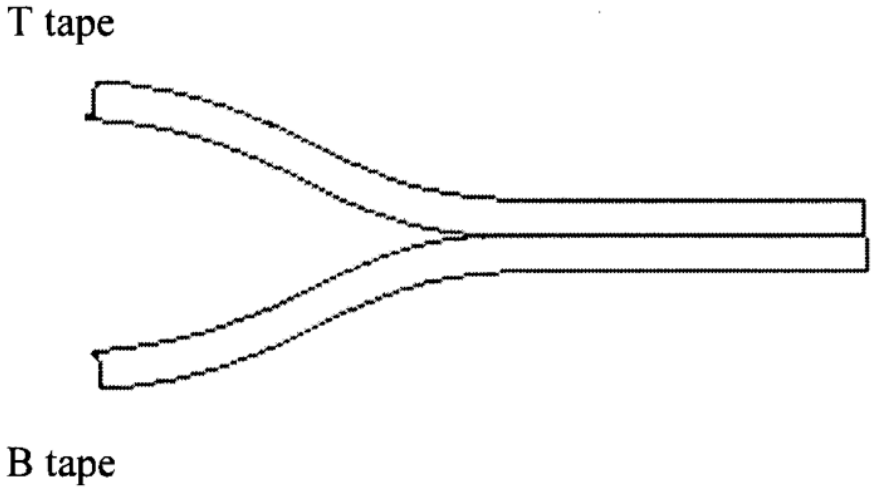
a. Top and Bottom Tapes

b. Top and Top Tapes

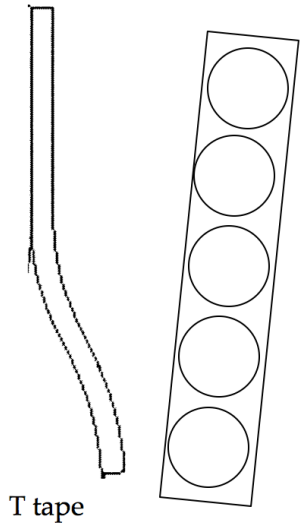
c. Bottom and Bottom Tapes

Thought pages:

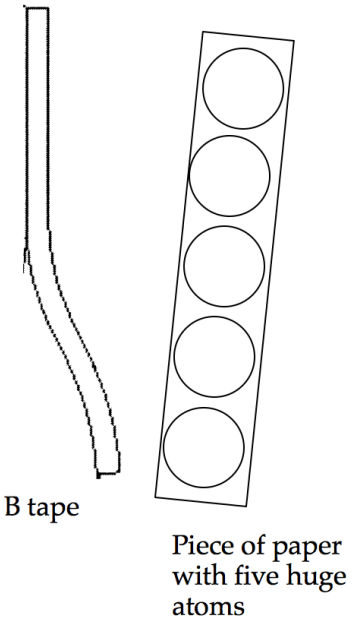
13. Imagine you could see the differences between the top and bottom tapes at the atomic level. On the partially separated T and B tapes invent a way of representing how the tapes change as they are separated.



14. Illustrate the charge distribution that is present when the top tape is attracted to the paper. The paper is neutral and electrons can't move away from the nucleus. Repeat this for the bottom tape.



Hint: Here is a normal atom with a positive nucleus and an electron cloud evenly spread around it.



15. Illustrate the charge distribution that is present when the foil is attracted to the top tape. The foil is neutral and each atom has a free electron that can move around. Repeat this for the bottom tape.