Sticky Tape Static Electricity

Marc and his classmates built the magnetometer and recorded their initial data. Now it is time for them to move on to the next task. This activity directs students to begin the explora-tion of how forces can act over a distance.

Your Objective

Use tape to investigate how charges interact.

Materials

Four strips of Scotch Magic Tape™or other brand of plastic tape, each about 8 cm long.

Procedure

1. Fold approximately 1 cm of the top of each strip to form a non-sticky tab. This makes it easier to grip and pull the tape strips.
2. Stick two pieces of tape to a flat surface, such as your desk (Figure 3). Run your finger along each strip to be sure that it is in full contact with the surface.
3. Label each strip “B” for bottom.
4. Place a third strip of tape down on top of one of the Bottom strips of tape. Run your finger along the tape to make full contact between the two strips. Label this strip “T” for top
5. Repeat step 4 with the remaining piece of tape, so that you end up with 2 double strips of tape on the table (Figure 4).
6. Carefully pull up one set of both top and bottom tape strips together (Figure 5). If the double strip tends to curl toward your hand, carefully rub the strips between your fingers until they no longer are attracted to you.
7. Have a partner repeat step 6 with the other double strip.
8. Gripping the tabs, rapidly pull the two strips apart and hold one in each hand. Your partner should do the same, so that the two of you have a top tape in one hand and a bottom tape in the other.

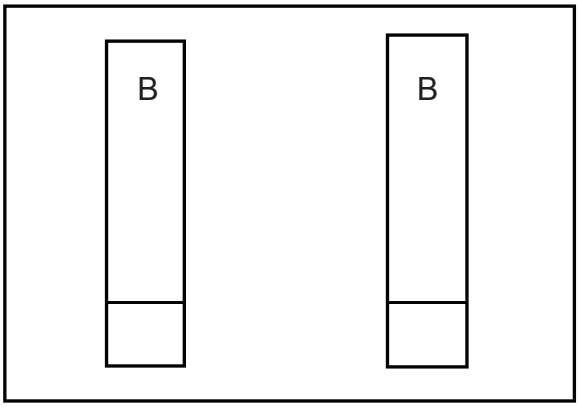

Figure 3
Two strips of tape on a table labeled “B”.

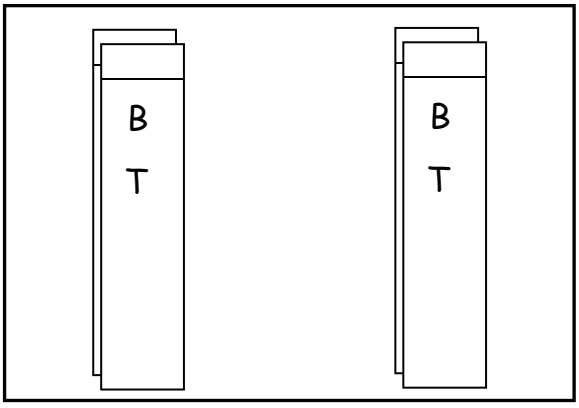

Figure 4
Press a top tape lapeled “T” on each bottom tape.

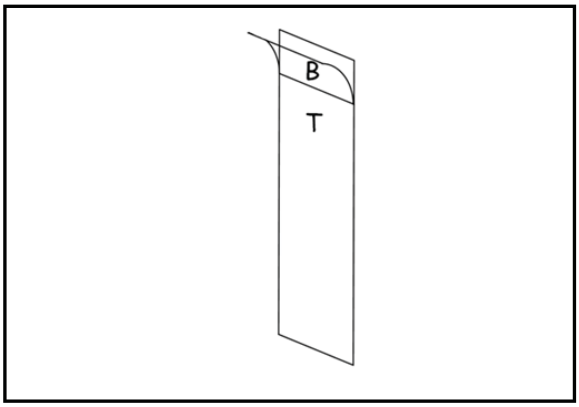

Figure 5
Top and bottom strips ready to be pulled apart.

9. Now, work with your partner to carefully bring your top strips of tape together. Be carefully not to let them touch. What do you notice as the two strips approach each other?
    - You should notice that as you bring them together, an invisible force causes them to swerve and gyrate—they repel each other.
10. Repeat step 9 with your bottom strips of tape.
    - What do you notice this time as the two strips approach each other?
    - What can you conclude from these observations?
11. Next, approach your partner's top tape strip with your bottom tape.
    - What do you notice as the top and bottom strips approach each other?
12. Summarize your results in (Table 1)

What's going on here?

Current understandings of electric charge indicate that there are two types of charges, positive charge (+) and negative charge (-). Typically, these charges exist in equal numbers so that they balance out. Thus, normal matter is uncharged.

Tape Strips	Repel or Attract?
Two Top Tapes	
Two Bottom Tapes	
Top and Bottom Tapes	

Table 1. Tape strip interactions

Matter can become charged when different types of material are rubbed against each other. Such contact between different materials transfers some electrical charge from one object to the other. Use these facts to explain the results of your investigation.