Activity 3: The Electric-Charge Interaction

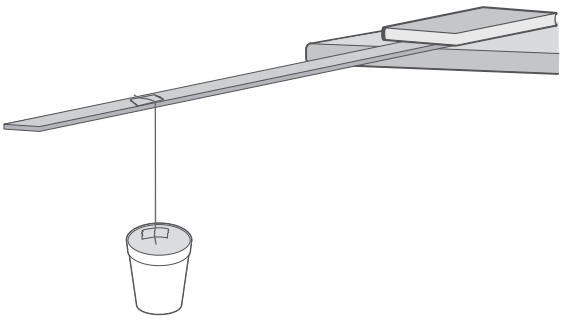
Name Date Class

An Electric-Charge Interaction That You May Try at Home!

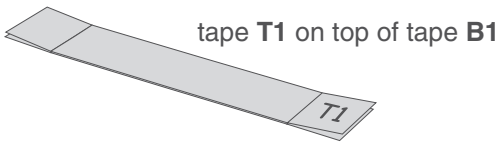
If you have these materials, you can perform this simple experiment at home. Otherwise, answer the questions as if you were making predictions and observations using ideas about electric-charge interactions.

You will need:

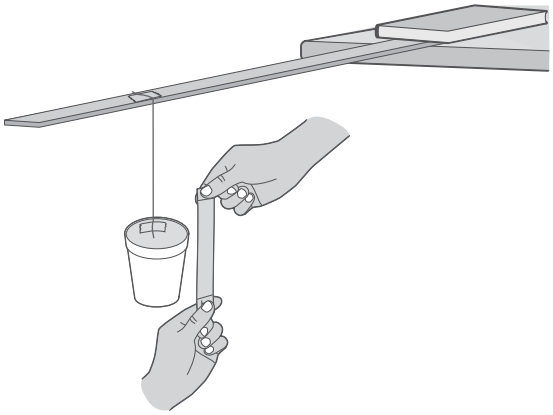
- 2 small styrene foam cups (very light plastic cup can also be used)
- string (about 30-cm long)
- roll of clear tape
- pen and paper
- cloth like a silk scarf or cotton towel
- long stick (like a ruler, towel rack, etc.) to hang tapes and cups from



STEP 1 Tape a piece of string about 30 cm (about 1 foot) long to the inside top of a styrene foam cup. Tape the other side of the string to hang from a ruler or towel rack.
Do not treat the styrene foam cup in any special way that would cause it to have an electric charge. If you think the cup is charged, you may clean its outside surface with window cleaner and allow it to dry.



STEP 2 Prepare charged tapes like you did in Experiment 2 of Activity 3. See especially Steps 4, 5, and 6. Lift up tapes T1 and B1 together off a table, and pull both pieces of tape between your fingers to provide better results.



STEP 3 Rip the two pieces of tape apart. Hang each piece from a ruler or towel rack.

STEP 4 Hold the top charge T1 by the two end flaps and move the non-sticky side toward the hanging styrene foam cup (without touching it).

1. What happens (*attract*, *repel*, or *no effect*) to the uncharged styrene foam cup?

2. What do you think will happen if you hold the bottom charge B1 by the two end flaps and move the non-sticky side toward the uncharged styrene foam cup? Explain your prediction.

STEP 5 Test your prediction. Hold B1 by the two end flaps and move the non-sticky side towards the hanging styrene foam cup.

3. What actually happens (*attract*, *repel*, or *no effect*) to the uncharged styrene foam cup?

STEP 6 Hold the styrene foam cup, and rub *all around* the outside surface with a cloth (silk scarf, cotton towel, etc.). Allow the cup to hang down. Move the non-sticky side of B1 towards the hanging cup. You should see that the cup is slightly repelled by the charge on B1.

4. Compared to the charge on B1, what charge is on the charged styrene foam cup *(same*, *different*, or *neutral*)? Explain your answer.

5. What do you think will happen (*attract*, *repel*, or *no effect*) when the top charge T1 is held close to the charged styrene foam cup? Explain your prediction.

STEP 7 Test your prediction. Move the non-sticky side of T1 toward the cup.

6. What actually happens (*attract*, *repel*, or *no effect*) when T1 is held close to the cup?

STEP 8 One at a time, hold your hand, then a metallic object like a spatula or pie pan, and finally the second (uncharged) styrene foam cup close to the (charged) hanging styrene foam cup.

7. What effect (*attract*, *repel*, or *no effect*) does each object (cup, hand, and metal object) have on the charged styrene foam cup?

STEP 9 Prepare another hanging styrene foam cup, and charge it by rubbing the entire outside of the cup with the cloth. Hang it close to the first styrene foam cup.

8. What effect (*attract*, *repel*, or *no effect*) do the charged hanging styrene foam cups have on each other?

9. Why does this make sense?