

Lab 10: Static Electricity

1. *Imagine* that you vigorously rub together a styrofoam plate and an acrylic (plastic) sheet and hang the foam plate from threads on a stand. Now imagine that you rub another foam plate with the acrylic sheet and bring this foam plate near the hanging foam plate hanging.
 - (a) Predict what you think will happen between the foam plates - do you think they will be attracted to one another, repel each other, or will nothing happen? Explain.

 - (b) Now imagine that you bring the acrylic sheet that has been rubbed with a foam plate near the hanging foam plate. Again, predict what you think will happen and explain your thinking.

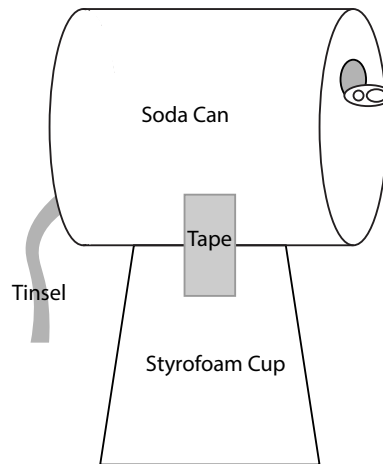
2. Now perform the experiment described above.
 - (a) Do the observed results match your predictions? If not, how can you modify your thinking to account for the differences?

 - (b) What can you conclude about what happens when the foam plate and acrylic sheet are rubbed together?

3. *Imagine* that instead of rubbing the hanging styrofoam plate with the acrylic sheet, you rub it instead with a second styrofoam plate.
 - (a) Predict what will happen when the two styrofoam plates that you rubbed together are brought close to one another - will they attract, repel, or have no effect? Explain your thinking.

 - (b) Now do it - rub the two plates together and test to see if they attract, repel, or have no effect. Write your observations below.

4. For the next part of this lab, you are going to use an electroscope to view the effects of static electricity. Construct an electroscope from a soda can, a Styrofoam cup, and some tinsel as shown below:



You will be charging objects by rubbing them together and bringing them close to the electroscope (do not get close enough to actually touch any part of the electroscope). If the tinsel moves away from the soda can, that indicates that the object has an electrical charge.

- (a) *Imagine* that you rub the styrofoam plate and the acrylic sheet together and then bring the foam plate first near the tinsel end of the electroscope, then the other end. What do you think will happen at each end?
- (b) Now imagine that you do the same thing but instead bring the acrylic sheet near the ends of the electroscope. Predict what will happen.
5. Now perform the experiment with the foam plate and the acrylic sheet. Be very careful not to actually touch the electroscope with them.
- (a) Were your predictions correct?
- (b) Describe what happened as you brought the plate near each end of the electroscope.

- (c) What happens when you move the styrofoam plate closer, then farther away? Describe what happens for each end.

 - (d) Describe what happened as you brought the acrylic sheet near each end of the electro-scope.

 - (e) What happens when you move the acrylic sheet closer, then farther away? Describe what happens for each end.

 - (f) Why do you think the tinsel is behaving the way it is?
6. Rub the foam plate and acrylic sheet together again.
- (a) Predict what you think will happen to the tinsel if you now actually touch the rubbed foam plate or acrylic to the soda can and then remove it.

 - (b) Perform the experiment described above. Were your predictions correct?

 - (c) When you touched the soda can with the charged object, the tinsel should have remained extended even after the object was removed. How does this differ from the previous behavior of the tinsel when you didn't touch the soda can with the object?

 - (d) Why do you think the tinsel behaves this way?