STATIC ELECTRICITY

Summer Science Fun

EXPLORER ACTIVITY SHEET

Have you ever scuffed across a rug and then gotten an electric shock when you reached to touch a metal object like a doorknob? If so, then you have experienced static electricity. There are many easy and fun ways to demonstrate some of the properties of static electricity that can be done with simple materials. Here are some things to try. After you do some of these, see if you can think of others. Remember to record everything you do and observe in your science journal. Also, write down questions that you may have as you work.

In activities that call for rubbing with wool, you can use a sweater, sock, scarf, rug, or anything else that is made out of wool.

You Will Need

A. Stuck-up Balloon

- inflated balloon
- piece of fur, wool, or clean hair from someone's head
- blank space on a nearby wall

B. Dancing Balloons

- 2 inflated balloons
- 2 lengths of thread or lightweight string a meter or so long (exact length is not critical)
- fur, wool, or hair, as in activity A
- tape
- ping-pong balls, Styrofoam, air-popped popcorn, loosely wadded aluminum foil, etc. (optional)

C. Ping-Pong Ball Pet

- comb or inflated balloon
- fur, wool, or hair, as in activity A
- ping-pong ball
- smooth clear area on a table or the floor
- tape

- length of thread or lightweight string a yard (meter) or so long (exact length is not critical)
- Styrofoam, air-popped popcorn, loosely wadded aluminum foil, etc. (optional)

D. Dancing Paper
- comb or inflated balloon
- fur, wool, or hair, as in activity A
- pieces of paper about the size of a small fingernail (enough pieces can be obtained by tearing up a small piece of note paper about 2 inches (5-6 cm) square)

E. Flying Newspaper
- strip of newspaper about 1 inch (3 cm) wide and 30-40 inches (75-100 cm) long

F. Snap, Crackle, and Hop!
- clear plastic box about 1-2 inches (3-5 cm) deep (a food storage box will work)
- sheet of aluminum foil larger than the opening of the box
- dry puffed rice cereal (enough to make a layer one-piece deep that covers about half the bottom of the box)
- Styrofoam, air-popped popcorn, loosely wadded aluminum foil, etc. (optional)

Procedure

A. Stuck-up Balloon

Blow up a balloon and tie the end so that the balloon stays inflated. Without doing anything else, hold the balloon against the wall and let go. What happens? Briskly rub the balloon across a piece of fur or wool or on your hair (works best if your hair is clean and dry). Without doing anything else, hold the balloon against the wall and let go. What happens? Can you explain what happens? If you assume that rubbing the balloon gives it an electric charge, does that help you explain what happens? How long will the balloon stay stuck to the wall? Will a rubbed balloon stick to other materials and objects besides the wall? Which ones? Which ones will it not stick to? Can you explain why?

B. Dancing Balloons

Blow up 2 balloons and tie each one closed. Tie a long thread or string onto the knot of each balloon. Use tape to hang the balloons by their strings from some high support like a doorway. Hang them so they are at the same level and about 2 inches (5 cm) apart. Briskly rub one of the balloons with fur, wool, or your hair as in activity A. Let the balloon go. What happens?

Try it again to make sure the same thing happens every time. Can you explain what happens? Is what happens in B the same as what happens in A? Are there differences between what happens in B and A? Can you explain the similarities or differences?

Briskly rub both of the balloons with fur, wool, or your hair. Let them go. What happens? Try it again to make sure the same thing happens every time. Can you explain what happens? Is what happens when both balloons are rubbed the same as what happens when only one is rubbed? Are there differences between the two cases? Can you explain the similarities or differences? What, if any, are the connections between what happens in this case and in activity A?

What happens if you replace the balloons with ping-pong balls? Try it. Briskly rub a balloon with fur, wool, or your hair. Touch it to one of the ping-pong balls and see what happens to the balls. Try it again to make sure the same thing happens every time. Can you explain what happens? What happens if you touch both ping-pong balls with the balloon that has been rubbed? Are there differences between the two cases? Can you explain the similarities or differences? What happens if you touch the ping-pong balls with the fur (after rubbing) instead of the balloon? What happens if you replace one or both of the ping-pong balls with a kernel of air-popped popcorn or a small piece of Styrofoam (packing material) or loosely wadded up aluminum foil?

C. Ping-Pong Ball Pet

Place a ping-pong ball on a level surface such as a tabletop or a smooth, bare floor. Briskly rub a comb or balloon as in activities A and B. Bring the comb or balloon near the ball. What happens? Try it again to make sure the same thing happens every time. Can you explain what happens? What, if any, are the connections between what happens in this case and in activities A and B? What happens if the ping-pong ball is suspended by a long thread? What else could you use besides a ping-pong ball? Are the observations the same? Why or why not?

D. Dancing Paper

Tear a sheet of paper into small pieces about the size of the fingernail on your little finger. Place the pieces of paper on a table. Briskly rub a comb or balloon as in activities A, B, and C. Bring the comb or balloon near the paper. What happens? Try it again to make sure the same thing happens every time. Can you explain what happens? What, if any, are the connections between what happens this time and in the other static electricity activities you have done?

E. Flying Newspaper

Starting at the fold, tear across the bottom edge of a full sheet of newspaper so that you'll have a strip about 1 inch (3 cm) wide and 30-40 inches (75-100 cm) long (or whatever the width of the newspaper is). Hang the newspaper strip over one finger at the fold, with the two ends dangling freely. Quickly pull the newspaper strip up between two fingers of the other hand. Watch the dangling strips of newspaper. What do they do? Try it again to make sure the same thing happens every time. Can you explain what happens? What, if any, are the connections between what happens in this case and in the other activities you have done with static electricity?

F. Snap, Crackle, and Hop!

Place a thin layer of dry puffed rice breakfast cereal on a sheet of aluminum foil. Then put a clear plastic container (about 1-2 inches (3-5 cm) deep) upside down over the cereal. Vigorously rub the upper outside surface of the container (the bottom of the container, since it's upside down) with a piece of wool or nylon. What happens to the cereal underneath the container? Try it again to make sure the same thing happens every time. Can you explain what happens? What, if any, are the connections between what happens in this case and in the other activities you have done with static electricity? What happens if you replace the puffed rice with air-popped popcorn? With small bits of paper? What happens if you don't use the aluminum foil? What else could you try?

Communicating Science

Review the parts of your science journal in which you wrote about these activities. Try to figure out whether there is an explanation for your observations that seems to fit all of them. Compare your observations and explanations with other explorers and see if you can come to an agreement on the explanation. What questions do you still have? What experiments can you think of to try to answer these questions? Where might you search for the answers others have given?