

# Traveling Programs

## Electricity Medley

Electricity is all around us, but we do not always think about the attractive and repulsive forces at work. However, by using simple materials, students can “see” these invisible forces in action. In this activity, students will have the opportunity to think about the science behind common electricity experiments with balloons (i.e.: rubbing a balloon on their hair), while trying out a few new ones.

### Materials

- Latex or mylar balloons
- Salt and pepper
- Ping Pong Ball
- Comb
- Paper
- Shallow plate or dish
- String
- Tape

### Directions

#### *Experiment 1: Balloon and Hair*

- 1) Inflate a latex balloon.
- 2) Rub the balloon on a volunteer’s head. The longer the hair, the easier it will be to see an effect.
- 3) Watch and see what happens when you bring the balloon close to the hair, and what happens when you take it away.



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### *Experiment 2: Salt and Pepper*

- 1) Pour some salt and pepper into a shallow plate or dish.
- 2) Inflate a latex balloon and rub it on a volunteer's hair.
- 3) Lower the balloon close to the salt and pepper, without having any of the items touch each other.
- 4) Watch and see what happens to the pepper as the balloon nears.

### *Experiment 3: Comb and Ping Pong Ball*

- 1) Vigorously rub a comb on a volunteer's hair.
- 2) Place a ping pong ball on a flat surface and bring the comb close to the ball, without letting the two touch.
- 3) Slowly move the comb across the flat surface, and watch and see what happens to the ping pong ball.

### *Experiment 4: Shredded Paper*

- 1) Cut or tear a sheet of paper into small pieces and scatter them on a flat surface, such as a table top.
- 2) Inflate a latex balloon and rub it on a volunteer's hair.
- 3) Slowly lower the balloon to the shredded pieces of paper, being careful not to let the balloon touch the paper.
- 4) Watch and see what happens to the pieces of paper as the balloon nears.

### *Experiment 5: Repelling Balloons*

- 1) Cut two pieces of string to 1 foot in length.
- 2) Inflate two latex balloons, and tie one of the string pieces to the end of each balloon.
- 3) Tape the ends of the string to the bottom of a table or desk, so that the balloons hang down next to one another without touching each other or the table. There should be about 2 inches of space between the balloons.
- 4) Rub each balloon on a volunteer's hair at the same time, and release the balloons so that they will fall towards one another again.
- 5) Watch and see what happens to the balloons as they near one another.



## Background Information

The experiments listed above include a medley of examples illustrating either the attractive force or the repulsive force of electricity. When thinking about electricity, it is helpful to consider both positive and negative charges and the effects when these charges come in contact with one another. Like-charges (positive and positive; negative and negative) will repel, while opposite charge (negative and positive) will attract.

Experiments 1-4 emphasize the attractive force, and in all of them, an item (either a balloon or a comb) ends up having an unbalanced charge by rubbing it on a volunteer's head. When this is done, the negative charges from a volunteer's hair are attracted to the balloon or comb, which causes those items to become more negatively charged. When you bring the negatively charged items close to another object, such as the hair (which is now more positively charged), or the salt, pepper, ping pong ball, and shredded paper (which are neutral), they end up attracting to one another. This is a result of the basic rule that opposite charges attract to one another. The one exception is seen with the salt, because salt is more massive than pepper, and although it is attracted to the balloon, gravity overpowers that attractive force and prevents the salt from leaving the table.

Experiment 5 demonstrates the repulsive force of electricity. When both balloons are rubbed onto a volunteer's head, both balloons attract the negative charges from the hair. This results in the hair becoming more positively charged, and the balloons becoming more negatively charged. Since both balloons are negatively charged, when they come into contact they appear to move away from one another because of the rule that like-charges repel from one another.