

Making a Charge

Objective

Students will become familiar with the concept of static electricity, and how it relates to practical, real-world applications.

Curriculum Focus

English Language Arts
Art
Science

Materials

- Salt
- Pepper
- Plastic spoon
- Black paper
- Dish cloth/towel
- Balloon
- Notebook paper

Key Vocabulary

Static electricity
Negative charge
Positive charge

Correlations

English Language Arts
K.RI.1
K.SL.1
1.RI.1
1.SL.1
2.RI.1
2.SL.1

Next Generation Science
3-PS2 - 3



Introduction

Electric vehicles (EVs) are powered by electricity. What is the source of this electricity? Can EVs use static electricity? Static electricity naturally exists all around us and serves as a perfect introduction to the world of electricity. Experiments with static electricity are also simpler, as they do not require many additional materials.

Students will learn about the basic properties of static electricity and its use in real-world settings through the magic spoon experiment. This activity also lends itself to further opportunities and experiments if students wish to learn more about the science behind electricity.



Procedure

1. Prepare multiple tables with salt and pepper sprinkled on a black piece of paper (for easy cleanup) with a plastic spoon and a dishcloth.
2. Ask the students for ideas on how to separate the salt from the pepper quickly. Give students a couple minutes to converse with their group and record their answers on a piece of paper.
3. At this point, draw attention back to the front of the room and ask each group to report on one of their ideas. After hearing all the groups' suggestions, pretend to think if there is another way to separate the salt from the pepper. While this is happening, another staff member will rub a balloon on the teacher's head, causing the teacher's hair to stick up.
 - a. This part should be theatrical and comical. One suggestion would be for the teacher to be stroking their chin while thinking of ideas.
4. Explain that your hair stuck up because of a concept called static electricity and that we can use this same concept to separate the salt from the pepper. In science, everything has an electrical charge (either positive, negative or neutral). Opposites attract to each other, and similar charges repel each other.
5. The teacher will demonstrate the magic spoon experiment:
 - a. Rub the plastic spoon on the dishcloth to give the spoon a negative charge.
 - b. Hover the spoon over the salt and pepper (which are both positively charged) and watch as the pepper clings to the spoon before the salt.
6. Have the students repeat the experiment within their group creating their own chart to record their findings.
7. Instruct students to draw their favorite part of the experiment.



Discussion - Experiment

- Why did the pepper move before the salt?
- What other objects can we use for this experiment?
- What would happen if you rubbed the spoon on the dishcloth longer or shorter?
- What would happen if we used a negatively charged object instead of a positively charged one (both objects have the same charge)?
- How much electricity do you think the static electricity is making? (very small amount)

Discussion - Electric Vehicle (EV)

An EV moves using electricity from its battery.

- Can static electricity be used to power an EV? (no, not enough power)
- Lightning is a form of static electricity. Can lightning be used to power an EV? (no, lightning is too powerful)
- How does the EV's battery get electricity? (by being plugged in and charging from home or a charging station)



To Know and Do More

- Perform the same experiment, but use other materials to demonstrate static electricity in various settings. Some examples could include running water, glitter or hair. The students could also experiment by using a balloon instead of a plastic spoon.
- Depending on the grade and interest level of the class, lead a further discussion of how electrons are transferred and attract oppositely charged objects.
- Visit energy.gov/eere/videos/energy-101-electric-vehicles, youtu.be/flvnKKPERZk, or search online for more videos about EVs, EV batteries and EV charging stations.