Static!

Summary

In this lesson, students will watch a demonstration on attraction and repulsion. Then they will demonstrate, on their own, the build up and release of static electricity.

Time Frame

2 class periods of 45 minutes each

Group Size

Small Groups

Materials

For the teacher:

- *All About Electricity*
  by Melvin Berger. Publisher: Scholastic, Inc., ISBN 0-590-48077-4
  Two inflated balloons
  String

For each student:

A comb
Tissue paper
Various other supplies as requested by students

Background for Teachers

Static electricity exists when an object has lost or gained electrons. All matter is made of atoms. The nucleus of an atom contains protons, having a positive charge, and neutrons having no charge. Electrons, which have a negative charge, spin around the nucleus. Usually the protons and electrons are in balance; however when an object loses some of its electrons, it is positively charged, and an object with extra electrons is negatively charged. Both objects now have static electricity. The electricity is at rest; it does not flow through the object as in current electricity.

Examples of static electricity can be found in our environment. In cold, dry areas, static electricity is more evident. If the area is humid, it is more difficult to observe or create static electricity. Some examples of static electricity are walking across a carpet and touching a doorknob, brushing hair so that it crackles or follows the brush, rubbing a hard rubber rod with fur, rubbing a glass rod with silk, rubbing a balloon on clothing, or static cling created by clothes tumbling in a dryer.

This activity uses working definitions. A working definition is a definition determined by students. It may or may not be completely correct; however, it should be used and corrected by the students as they gain more experience with and understanding of the concept. The strength of a working definition is that it is an indicator of student understanding and can be used by the teacher to guide further experiences.

There is a science misconception that lightning is an example of static electricity. This is not true. Particles in clouds rub together and create static electricity in the clouds. Particles build up both positive and negative charges. When the charges jump to the ground or to another cloud, the energy is neutralized. The flash of lightning seen is an example of current electricity.

Intended Learning Outcomes

Observe events and report observations.
Plan and conduct simple experiments.

Know science information.
Describe and explain observations.

Instructional Procedures

Read and discuss *All About Electricity*.
Use the string to hang the two inflated balloons from the ceiling about 1 foot apart.
Rub one of the balloons on a student's head.
Ask students to predict what will happen when you release the balloon.
Release the balloon and the two balloons should come together.
Ask the students why this happens. [Rubbing the balloon has created a charge. Because the balloon is now electrically unstable, it is attracted to the other balloon.]
Now rub the other balloon on someone's head.
Ask the students to predict what will happen when you release the balloon.
Observe what happens when you stand back. The two balloons should move apart.
Discuss the reason the balloons are no longer attracted. (The charges are now alike and like charges repel.)
Instruct the students to use their comb and tissue to show the build up and release of static electricity.
Tell them to run the comb through their hair several times.
Ask them why they think they're doing this.
Ask them to predict what will happen when they hold the comb over the tissue paper.
Have them hold the comb above the tissue.
Tell the students to record what happens and explain why it happened.
Ask the students (either individually or in student groups) to design an additional demonstration of static electricity.
Instruct them to write down the steps to their proposed demonstrations as well as an explanation of what they think will happen when they perform their demonstration.
Look at their written proposals and, if necessary, help them clarify their proposed demonstration.
Help students implement their plan.
Once they are done with their demonstration, they should record their results and write an explanation why things happened the way they did.
Have each student or student group share the results of their demonstration.
Discuss the demonstrations as a class.

Assessment Plan

Use the Science Writing Rubric to evaluate the paragraphs the students wrote in Step 21.

Rubrics

Science Writing Rubric

Bibliography

This lesson plan is based on a lesson plan written by Kathleen Webb.

Authors

Teresa Hislop
KIRSTIN REED