

A Hair Raising Experience

Summary

Balloons are used to help students explore static electricity.

Time Frame

1 class periods of 30 minutes each

Group Size

Individual

Materials

For the each student:

One balloon

Bits of tissue, sand, and paper

One plastic bag

Optional (for the entire class):

Glass rod

Metal rod

Fur

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

Make observations.

Conduct investigations.

Explain science concepts.

Cite examples of how science affects life.

Instructional Procedures

Give each student a balloon and a plastic bag. Have the students blow up and tie off their balloons. They should also blow air into their bags and tie them off as best they can. Instruct them to create static electricity by rubbing the balloon on their clothes or hair and testing it for static properties. They should do the same with the plastic bag. Allow students time to explore with static electricity. Students can freely explore around the room, or they may need some direction. Having an "exploration box" with bits of tissue, sand, paper, and other small items available can direct the exploration. If available, have students explore static electricity with the fur and glass and metal rods. Rubbing fur on a glass rod produces a greater charge than rubbing fur with a metal rod. Gather the students together to discuss what they have discovered. The following questions may be used to guide the discussion:

What did you discover about your balloon?

What did you discover about your plastic bag?

Which produced the greater amount of static charge?

What objects will your balloon attract?

How is your balloon like a magnet?

Did your balloon attract objects more easily at some times than others?

Ask the students how these experiences could be called electricity. Help students to determine ways the electricity with the balloons is the same and different from electricity in other situations. Direct students in listing examples of electricity under two headings:

Electricity that moves along a pathway to light a light, moves a motor, etc. (current electricity)

Electricity that acts like a magnet, attracting and repelling objects (static electricity)

Guide students in defining the two kinds of electricity. Use working definitions, definitions created by students. These definitions may not be exactly correct but can be changed through additional experiences with electricity.

As a class, list several occurrences of static electricity that happen in everyday life.

Ask students what the relationship is between static electricity and lightning. Explain to them the relationship. (See information in teacher background.)

Assessment Plan

Ask students to write a list of four occurrences of static electricity in everyday life.

Ask students to write a paragraph describing the relationship between static electricity and lightning.

Ask students to write a paragraph that explains the difference between static electricity and current electricity.

Use the science writing rubric to evaluate their answers.

Rubrics

[Science Writing Rubric](#)

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