

WHELMERS Student Activity | Grades 3–5

Balloon Electrosopes

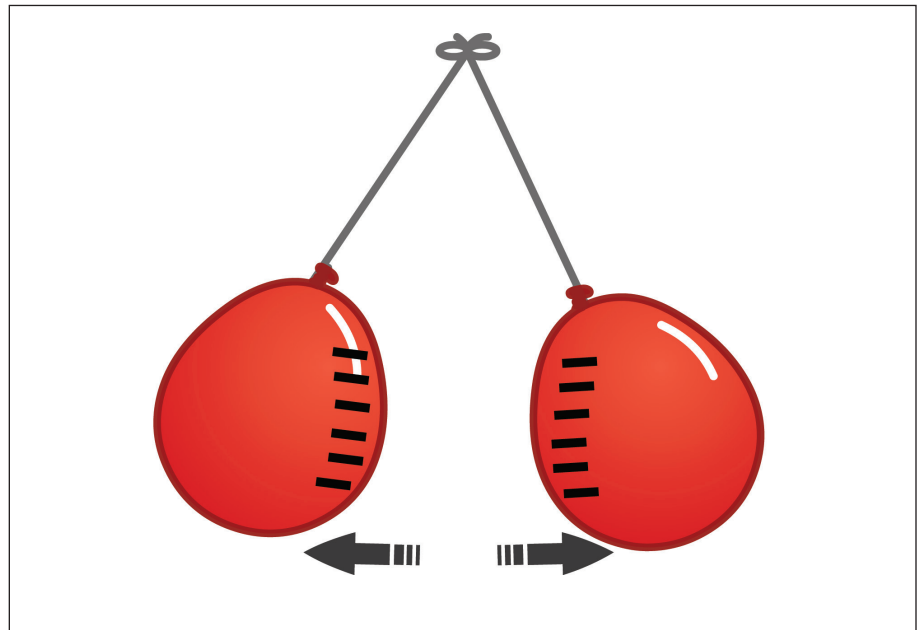
WHAT YOU NEED:

- Two balloons of similar size
- String (4 feet long)
- Tape to attach the string
- Wool cloth
- Nylon cloth
- Plastic wrap
- Newspaper

DESCRIPTION

An electroscope is a device that indicates the presence of static charges. You can use balloons to make an electroscope and witness the effect of static charges before your very eyes!

Note: This activity works best on a cool, dry, low-humidity day.



NEXT GENERATION SCIENCE STANDARDS

- **PS2.B: Types of Interactions**
 - Objects in contact exert forces on each other. (3-PS2-1)
 - Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3), (3-PS2-4)

- **PS3.A: Definitions of Energy**

- Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3)

WHAT YOU DO

1. Inflate one balloon with air and tie it.
2. Inflate the second balloon with air. Make sure it is the same size as the first balloon. Tie it.
3. Attach one end of a 4-foot piece of string to each balloon. Hold the string at the midpoint and allow the balloons to hang freely.
4. Using one of the cloths, stroke both balloons in one direction, not back and forth. Experiment with different cloth types, including plastic wrap and newspaper. One will probably work better than the others, depending on the humidity in the space. The like-charged balloons will repel each other and push apart.

WHAT HAPPENS

What we call electricity is really a collection of tiny particles called electrons. If electrons are in motion, we call them current electricity. If the electrons are not moving, we call them static electricity.

The stroking motion removes a number of electrons from the cloth (which acts as a charging cloth) and deposits them on the balloon, creating a static charge. Rubber is not a good conductor of electrons, so the electrons remain on the surface of the balloon.

Electrons bear a negative charge, and objects with like electrical charges repel. This is why the balloons push away from each other. Objects with unlike electrical charges attract each other. You might notice that the charging cloth often is attracted to the balloons.

WHERE IN THE WORLD

The first electroscope was invented in 1600 by William Gilbert. It was used to learn more about electricity. As improvements were made, it was used to explore electric charges and indicate the presence of a charge. By the 1800s, more advancements were made and the electroscope made it possible to detect radioactivity. Today, the electroscope is commonly used to demonstrate the interaction between charges in learning environments, like school.