

STATIC ELECTRICITY BUTTERFLY

Have you ever touched someone or something, especially in cold weather, and felt a crackle of electricity? You might have even heard a small pop at the same time. Maybe you've experienced this when you pull your cap off and your hair stands out from your head.

These are examples of **static electricity**, which is the buildup of an electrical charge on the surface of an object. **Static** means it stays in one place and doesn't move. There isn't enough electrical power in static electricity to cause a dangerous shock, but it does show you that there is plenty of electricity at work all around.

Electricity happens because of very tiny particles called **atoms**. Atoms are so small that you need a powerful, specialized microscope to see them. Everything is made up of atoms, and each atom is made up of even smaller particles: **protons, electrons, and neutrons**. Protons have a positive electrical charge, electrons have a negative charge, and neutrons have no charge at all.

Atoms usually have an equal number of protons and electrons, so the atom charge is neutral (not positive or negative). Static electricity occurs when positive and negative charges are out of balance. Protons and neutrons like to stay in one place, but electrons like to jump around.

When something (or someone) has extra electrons, it has a negative charge. Opposite charges attract one another. That tiny shock you feel from static electricity is a result of the very quick movement of millions of negatively charged electrons flying through the air and being attracted by a positive charge of protons. Static electricity is most common in winter because the air is drier, making it easier to build up electrons on the skin's surface.

Gather up these items to create a beautiful butterfly and experiment with static electricity:

- cardboard
- tissue paper
- cardstock paper
- pencil
- scissors
- googly eyes or marker to draw your own eyes
- balloon
- glue stick

First, you'll want to cut out a square from the cardboard, about 7 inches by 7 inches. This will be the base for crafting your butterfly.

Draw a pair of butterfly wings as one continuous piece on the tissue paper using the pencil. The wings should be smaller than your cardboard square. Cut out the wings as one continuous piece of tissue paper with scissors, then lay them on top of the cardboard square.



Next, draw a butterfly body on the cardstock and cut it out with your scissors. The body should be long enough so that the head and tail overlap the wings slightly, allowing you to glue the body onto the wings and glue some of the head and tail portions of the body to the cardboard square. Do not glue the tissue paper wings to the cardboard. The wings should remain loose.

Glue googly eyes onto the butterfly head, or draw eyes with your marker. You can also draw some antennae for your butterfly, if you'd like.

Blow up the balloon, and tie a knot in the end when you're done to keep the air from escaping. You may need to ask an adult for help.

Rub the balloon on your hair to give it an electric charge. Hold the balloon directly over your butterfly but don't touch it with the balloon. Watch the wings rise and fall as you move the balloon closer, then farther away. If your balloon begins to lose its power, simply rub it on your head again to recharge.

Why did the butterfly's wings flap? When you rubbed the balloon on your hair, some electrons jumped from your hair to the balloon and created a static charge. When the negatively charged balloon gets close to the positively charged paper, they attract each other just as opposites do. The pull of the attraction is so great that the tissue paper moves toward the balloon.

What happens if you use notebook paper instead of tissue? What other items will charge the balloon enough to cause the wings to move? Try different materials and keep experimenting!

ADDITIONAL RESOURCES:

<https://www.loc.gov/everyday-mysteries/item/how-does-static-electricity-work/>

<https://www.accuweather.com/en/weather-news/how-to-avoid-getting-shocked-by-static-electricity-during-winter-2/432215>

<https://ed.ted.com/lessons/the-science-of-static-electricity-anuradha-bhagwat>