Static Electricity

Physical Science | Lesson Guide

Kindergarten

Photo Description

A big blue balloon sits on top of colorful paper circles. The paper circles are red, yellow, green, blue, and white. They are scattered all around on a dark table.

Scientific Phenomena

This image demonstrates static electricity as an anchoring phenomenon. The balloon has been rubbed against hair or fabric, giving it an electric charge. This charge creates an invisible force that can attract or repel lightweight objects like the paper confetti. The electric force is strong enough to make small pieces of paper "jump" toward or away from the balloon, even when they're not touching it.

Core Science Concepts

1. Forces and Motion: The balloon creates an invisible pushing or pulling force that can move objects without touching them
2. Static Electricity: Rubbing materials together can create electric charges that attract lightweight objects
3. Properties of Materials: Different materials (rubber balloon, paper) behave differently when charged
4. Cause and Effect: Rubbing the balloon causes it to gain electric charge, which effects how it interacts with other objects

Pedagogical Tip:

Have students make predictions before demonstrating the balloon experiment. Ask them to draw what they think will happen, then compare their predictions to observations. This builds scientific thinking skills.

UDL Suggestions:

Provide multiple ways to engage with this concept: visual demonstrations, hands-on exploration with balloons and paper, and kinesthetic activities where students can "be" the electrons moving around.

Zoom In / Zoom Out

1. Zoom In: At the microscopic level, tiny particles called electrons are moving from one material to another when we rub the balloon. These invisible particles create the electric charge that makes the force.

2. Zoom Out: Static electricity is all around us in nature - it creates lightning during thunderstorms, makes our socks stick to our shirts in the dryer, and helps some animals like sharks detect other creatures in the ocean.

Discussion Questions

1. "What do you think will happen if we bring the balloon closer to the paper pieces?" (Bloom's: Apply | DOK: 2)
2. "Why do you think some pieces of paper moved toward the balloon while others moved away?" (Bloom's: Analyze | DOK: 3)
3. "What other things in our classroom might be attracted to a charged balloon?" (Bloom's: Apply | DOK: 2)
4. "How is this balloon force different from when you push a toy car with your hand?" (Bloom's: Compare | DOK: 2)

Potential Student Misconceptions

1. Misconception: "The balloon is magnetic like a magnet on the refrigerator"
   Clarification: Static electricity and magnetism are different forces. Static electricity works on many materials, while magnets only attract certain metals.

2. Misconception: "You have to touch things to move them"
   Clarification: Some forces, like static electricity, gravity, and magnetism, can push or pull objects from a distance without touching.

Cross-Curricular Ideas

1. Math + Science: Count the colored paper circles before and after the balloon experiment. Sort them by color and create simple bar graphs showing how many of each color moved versus stayed still. This connects to K.CC (Counting & Cardinality) and K.MD (Measurement & Data).

2. ELA + Science: Read the book "Balloons and Static Electricity" and have students draw pictures of what happened in the story. Then ask them to dictate or write simple sentences like "The balloon made the paper move" to practice writing and speaking about scientific observations.

3. Art + Science: Create a "static electricity art project" where students rub balloons and use them to pick up colored tissue paper scraps to make a picture or collage. This combines fine motor skills with hands-on science exploration and allows creative expression.

4. Social Studies + Science: Discuss how electricity helps people in our community (lights in homes, hospitals, schools). Connect the idea that scientists and electricians study forces and electricity to help keep our communities safe and working well.

STEM Career Connection

1. Electrician: An electrician is a person who works with electricity to make lights, power tools, and machines work in homes and buildings. They understand how electricity flows and moves, just like the force in our balloon experiment. They keep our schools, homes, and hospitals safe and bright! Average annual salary: $56,000

2. Physicist: A physicist is a scientist who studies forces and energy, including static electricity, magnetism, and motion. They ask questions like "Why does this happen?" and "How do things move?" Physicists help invent new technology and explain how the world works. Average annual salary: $122,000

3. Electrical Engineer: An electrical engineer designs and builds things that use electricity, like phones, computers, toys, and video games. They use their knowledge of electricity and forces to create cool inventions that help people every day. Average annual salary: $105,000

NGSS Connections

- Performance Expectation: K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object
- Disciplinary Core Idea: K-PS2.A - Forces and Motion
- Crosscutting Concept: Cause and Effect

Science Vocabulary

* Force: A push or pull that can make things move
* Static electricity: A special kind of force that happens when you rub certain things together
* Attract: When objects pull toward each other
* Repel: When objects push away from each other
* Charge: The invisible electric power that builds up on objects

External Resources

Children's Books:
- Balloons and Static Electricity by David Dreier
- What Is Static Electricity? by Robin Johnson
- Forces and Motion by Peter Riley