

Photo Description



Scientific Phenomena

This image demonstrates static electricity and water adhesion as the anchoring phenomenon. The balloon likely became charged through friction (rubbing), which allows it to attract small water molecules and hold them against gravity. The water droplets form due to condensation from the air or transfer from nearby surfaces, and they stick to the balloon because of electrostatic attraction and surface tension forces.

Core Science Concepts

1. Static Electricity: When objects are rubbed together, they can gain or lose electrons, creating an electrical charge that attracts other materials
2. Adhesion: Water molecules can stick to other surfaces due to attractive forces between different types of molecules
3. Surface Tension: Water molecules stick together strongly, forming droplets with rounded shapes
4. Gravity vs. Other Forces: While gravity pulls the water droplets down, electrical and adhesive forces can be strong enough to hold them up

Pedagogical Tip:

Have students make predictions about what will happen to the water droplets before conducting balloon experiments. This activates prior knowledge and creates investment in the outcome.

UDL Suggestions:

Provide multiple ways for students to demonstrate their understanding: drawing force diagrams, acting out molecular movement, or creating digital presentations about static electricity in everyday life.

Zoom In / Zoom Out

1. Zoom In: At the molecular level, electrons are moving between the balloon material and whatever rubbed against it. Water molecules (H_2O) have a slightly positive and negative side, making them attracted to charged surfaces like tiny magnets.
2. Zoom Out: This same static electricity phenomenon occurs in nature during thunderstorms when ice particles in clouds rub together, building up massive electrical charges that eventually become lightning.

Discussion Questions

1. What do you think would happen if we touched the balloon with our finger? (Bloom's: Predict | DOK: 2)
2. How might the size of the water droplets change if we waited longer? (Bloom's: Analyze | DOK: 3)
3. What other materials besides water might stick to a charged balloon? (Bloom's: Apply | DOK: 2)
4. Why do you think some droplets are larger than others? (Bloom's: Evaluate | DOK: 3)

Potential Student Misconceptions

1. Misconception: "The balloon is magnetic." Reality: The balloon has an electrical charge, not a magnetic field. Static electricity and magnetism are different forces.
2. Misconception: "Water always falls down immediately." Reality: Other forces like electrical attraction can temporarily overcome gravity, allowing water to stick to surfaces.
3. Misconception: "Only metal objects can be charged." Reality: Many materials including rubber, plastic, and fabric can gain static electrical charges through friction.

Cross-Curricular Ideas

1. Math - Measurement & Data: Have students measure the diameter of water droplets using rulers or calipers, then create a bar graph showing the sizes of different droplets on the balloon. They can also count the confetti pieces by color and create pie charts showing which colors appear most frequently.
2. ELA - Descriptive Writing: Ask students to write detailed descriptions of what they observe in the photo using sensory language. They could also write prediction paragraphs about what happens next, or create comic strips showing the "story" of a water droplet's journey on a charged balloon.
3. Art - Color & Composition: Use the confetti as inspiration for creating colorful collages or paintings that explore color mixing and patterns. Students could arrange colored paper circles to match the confetti distribution, discussing why artists use certain color combinations to make images more interesting.
4. Social Studies - Innovation & Technology: Discuss how understanding static electricity has led to useful inventions like copy machines and air purifiers. Have students research and present on one invention that uses static electricity, connecting science discoveries to how they improve people's daily lives.

STEM Career Connection

1. Electrical Engineer: An electrical engineer designs and builds machines and systems that use electricity. They figure out how to make electricity work safely and usefully in things like power plants, computers, and household appliances. Understanding static electricity is an important first step toward this career. Average Salary: \$104,000 per year
2. Materials Scientist: A materials scientist studies different materials (like rubber, plastic, water, and metals) to understand their properties and how they behave. They might investigate why water sticks to balloons or how to create better materials for technology. Average Salary: \$98,000 per year
3. Physics Teacher or Science Educator: A physics teacher helps students understand forces and energy by creating fun experiments and demonstrations. They design activities like balloon experiments to help students discover how the natural world works. Average Salary: \$62,000 per year

NGSS Connections

- Performance Expectation: 5-PS1-3 Make observations and measurements to identify materials based on their properties
- Disciplinary Core Ideas: PS1.A Structure and Properties of Matter, PS1.B Chemical Reactions
- Crosscutting Concepts: Patterns, Cause and Effect
- Science Practices: Planning and Carrying Out Investigations, Analyzing and Interpreting Data

Science Vocabulary

- * Static Electricity: A build-up of electrical charge on the surface of objects that can attract other materials
- * Adhesion: The force that makes different materials stick together
- * Friction: The rubbing force between two surfaces that can create heat or electrical charge
- * Condensation: When water vapor in the air turns into liquid water droplets
- * Surface Tension: The force that makes water form rounded droplets and stick together

External Resources

Children's Books:

- Balloons and Static Electricity by David Dreier
- The Magic School Bus and the Electric Field Trip by Joanna Cole
- Static Electricity by David Dreier