What's the Matter? Solids, Liquids, and Gases!

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Science can be sticky! This interactive lesson with an ooey-gooey ending will solidify your students' understanding of the states of matter!

Learning Objectives

Students will be able to describe each state of matter in terms of its molecular structure.

Materials and Preparation

- Newspaper
- Cornstarch (1 cup per group, pre-measured)
- Water (1/2 cup per group, pre-measured)
- Mixing bowls (1 per group)
- Plastic spoon (1 per group)
- Green food coloring (optional)
- Index cards (1 per student)
- Lined paper

Key Terms

- states of matter
- molecule
- solid
- liquid
- gas
- colloid

Introduction (5 minutes)

- Tell students that they are going to learn about solids, liquids, and gases, or states of matter.
- Ask students if they know what a molecule is.
- Explain that a molecule is the smallest amount of something and that molecules are so small that they can't even be seen with eyes! Tell your students that everything is made up of molecules.
- Tell students that the way molecules move within an object or substance determines whether it is a solid, liquid, or gas.

Explicit Instruction/Teacher Modeling (10 minutes)

- Hand out lined paper to each student for note-taking.
- Draw a square on the whiteboard and label it solid.
- Fill the square with tiny circles that touch each other. Tell students that these circles represent molecules.
- Explain that the molecules in a solid are packed tightly together and move slightly in place.
- Underneath the square, write that solids have a definite shape and definite volume. Have students copy this in their notes.
- Draw another square on the board and label it liquid. Draw circles that are still somewhat close together but do not fill the entire square and are not in perfectly straight rows.
- Explain that the molecules in a liquid are close together and can touch each other, but they can also flow and move around.
- Underneath this square, write that liquids do not have a definite shape but have a definite volume. Have students copy this in their notes.
- Draw a third square on the board. Draw circles that are spaced apart, with lines or arrows around them to show quick movement. Draw a few circles outside of the box.
- Explain that molecules in a gas move around freely and quickly. They can bump into and bounce off of each other and do not stay in a container unless the container has a lid on it.
• Underneath this square, write that gases do not have a definite shape or volume.

Guided Practice/Interactive Modeling (5 minutes)

• Explain that students will be demonstrating the molecules in each state of matter.
• Start with solids. Have students stand shoulder to shoulder with each other and move slightly back and forth while staying in place.
• Next, have students demonstrate the molecules in a liquid. Students should be walking around the room but staying close to their classmates, carefully brushing into one another as they walk around.
• Then, have students demonstrate gas. Have students walk quickly (or run, depending on the nature of the space being used). As they carefully make contact with other students, they should walk or run in another direction. Have them spread around the entire space.

Independent Working Time (25 minutes)

• Explain to your students that they will be making a substance using cornstarch and water called "goop."
• Show students how to put the cornstarch in the mixing bowl and slowly add the water. You can also add two drops of food coloring if desired.
• Tell students that after making the goop, they will have several minutes to play with it!
• Lay down newspapers at students’ work stations and pass out the materials to students. Designate tasks for each student. For example, designate someone to pour the water, someone to stir, etc.
• Write the following questions on the board for students to discuss within their groups: What do you think the molecules in goop look like, and why? What state of matter do you think goop is, and why?
• Give students time to clean up.

Differentiation

• **Enrichment:** Have students research other states of matter (colloids and plasma) and share their findings with the class.
• **Support:** Have students use their notes as they answer the discussion questions.

Assessment (5 minutes)

• Hand out an index card to each student.
• Have students describe the molecules in each state of matter without using their notes.

Review and Closing (10 minutes)

• Ask students to share their responses to the discussion questions with the class. Call on several volunteers.
• Explain that goop is a **colloid**, which is like an "in-between" state of matter because it has properties of a solid and a liquid.
• Give students some other real-life examples of colloids, such as butter, shaving cream, lotion, and ketchup.
• Ask if students can think of any other colloids.
• Challenge students to create a list of solids, liquids, gases, and colloids that they see around their homes!