



## States of Matter

**Age(s) / Grade Level(s):** Elementary (2nd/3rd Grade)

**Subject(s):** Science

**Length of time:** 45-60 Minutes

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### Objective(s):

- Students will identify states of matter and related properties.
- Students will follow a procedure for an investigation.
- Students will create models to represent scientific concepts.

### Materials Needed:

- Cornstarch
- Soup bowl
- Tablespoon
- Cup of water
- Dropper or cut straw
- Regular spoon for mixing
- Tray or cookie sheet
- Oobleck procedure in appropriate format (print, braille, etc.)
- Cardstock or braille paper for States of Matter trifold sheet
- Circle stickers

### Lesson/Activity Sequence:

1. Ask students, "would you rather: Be submerged in a bucket of slime for thirty minutes or have Oobleck fill your shoes every morning?" Allow time for each student to provide their answer and explain their choice.
2. Ask students to identify some important science safety rules. Add any additional rules that students did not identify. Tell students, "We will be using these rules during our investigation."

3. Tell students, "Today we will be learning about the states of matter and their properties. We will conduct an investigation and then create models to show what we have learned."
4. Ask students, "What are the states of matter?" (solid, liquid, gas)
5. Then ask them to share what they know about the properties of each state (i.e. solids maintain their shape, liquids take the shape of the container they are in, etc.) Have them give examples of the different states.
6. Tell students, "Now, we are going to conduct our investigation related to states of matter, and we will be making observations." Make sure all students have the appropriate materials. Provide students with a copy of the procedure.
7. Have students follow the procedure, supporting as needed.
8. Ask students the following questions about their observations:
  - What did you notice about the Oobleck as you did different things?
  - What did you do that made it behave like a solid?
  - What state of matter do you think Oobleck belongs in? Why?
9. Have students clear off workstations and wash hands and meet back as a class.
10. Introduce the word molecule. Have students repeat it. Then: explain, "Matter is made of molecules. How those molecules act helps know which state of matter something is. For example, molecules in a solid are tightly packed together, so they don't have any room to move. They vibrate in place. In liquids, the molecules have space between them and are able to move freely and somewhat fast. In gases, the molecules are very spread apart, move freely and very fast. Let's use our bodies to act out how molecules move in each state."
11. Explain to students how to move as a group and with their bodies for each state of matter as follows:
  - Solids: Students group closely together and each bounce up and down on the balls of their feet, staying in place.
  - Liquids: Students spread apart with some space between them and walk around the room.
  - Gases: Students spread far apart from each other and walk quickly or skip around the room. (If you do this part of the lesson outside or in a gym, students may jog or gallop around the room.)
12. Students return to their seats.
13. Ask, "In the Oobleck we made, what were the molecules doing?" (When the Oobleck was pushed, rolled, or poked, the strong, quick force made the particles get close together, like a solid. But when you touched it slowly and gently, it allowed the particles to move more freely like a liquid.)
14. Tell students, "We have done our investigation, made observations, and used our bodies to model what molecules do in different states of matter. Now, we are going to make a paper model to show this."
15. Give students a paper folded into thirds. They can label each of the sections with either solid, liquid, or gas.
16. Provide each student with circle stickers. In each of the sections, they will use stickers to create a model of the molecules for that state of matter. (Solid: stickers will be close

together, even overlapping; liquid: stickers will have a little space between them; gas: stickers will be spread out with lots of space between them)

### **How will I assess student progress?**

- The States of Matter trifold can be used as an assessment to see if students show the differences between the location of stickers in each section.

### **Differentiation:**

- For Emergent Bilingual students, introduce unfamiliar vocabulary ahead of time, including procedure, matter, solid, liquid, gas, and molecule.
- The lesson may be broken into smaller components as needed. For example, do the investigation as one activity, the molecule movement as another activity, and the trifold model creation as a separate activity.
- For students who need support with fine motor or spatial tasks, you can provide a pre folded paper, as well as have them fold it so that only one section is shown at a time. You may also decide to use one sheet of paper for each state of matter.
- For students who are between literacy media, you may choose to provide a paper that is already labeled with each state of matter, or you may also choose to provide students with stickers labeled in print/braille that they can place in each section. Also, these students may also need an audio version of the investigation procedure.