Science: It's a Girl Thing!

Oobleck: Solid or Liquid? (For children ages 4-8)

Kids love the gooey green substance in Dr. Seuss's book *Bartholomew and the Oobleck*. But is it a liquid or a solid?

20 – 25 minutes

Skills Developed:

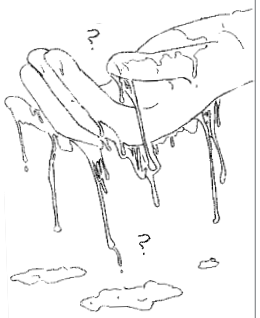
- Observing
- Experimenting
- Measuring
- Estimating
- Fine-motor coordination

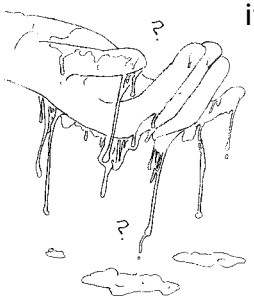
Materials Needed:

- Cornstarch — approximately 1 cup for each half-cup of water
- A small pitcher of cool water
- Green food color (have other colors on hand also)
- Aluminum or plastic containers, 3-4 inches deep
- Popsicle sticks
- Ziplock-type sandwich bag
- 3-4 toothpicks and pennies
- Tablespoons or measuring scoops
- Newspaper (to cover the table)
- Paper towels and sponge for cleanup
- A copy of *Bartholomew and the Oobleck* (optional)

What's the Science?

Water and starch do something unusual when mixed together. The substance they form pours like a **liquid**, but when squeezed with your hands, becomes **solid**. When a substance acts like both a liquid and a solid, scientists call it a **discrepant substance**. Two things commonly cause this type of change—**temperature** and **pressure**. We will see that temperature has no effect on Oobleck and that its solid or liquid state is influenced only by **pressure** (or lack of pressure). Squeezing it in our hands turns Oobleck into a solid. But if we hold it without squeezing, it drips through like a liquid. You can roll Oobleck into a ball, but when the rolling stops, it will become a liquidy mess!





Getting Ready:

This activity has two parts. The first is experimenting with pre-made Oobleck and the second is for your daughter to make her own.

- To pre-make Oobleck, mix one-cup of cornstarch to one-half cup of water in a plastic or aluminum container. Add in a few drops of food coloring to the water. Any color can be used, but Dr. Seuss' Oobleck is green. You may have to adjust the mixture with small amounts of cornstarch and/or water to reach the right consistency. To test it, poke hard with your finger, which should not sink in. Touch lightly and your finger should sink right in.
- For part two, have cornstarch, a small pitcher of cool water, popsicle sticks, and food coloring nearby, but out of sight. A wonderful way to begin is to read *Bartholomew and the Oobleck* which is available at the library or in your local bookstore.

Activity:

Part One

1. Cover the table with newspaper and bring out the pre-made Oobleck.
2. Ask your child to explore the substance with her hands, popsicle stick, or spoon, and to think of as many words as she can to describe it. Encourage her to experiment freely. Write all of her answers on a piece of paper. You can tell her that the name of the substance is "Oobleck".
3. Talk about the color, texture, shape, and smell of the Oobleck. Ask her to try the following:
   - Slowly place her finger in the container and then take it out. What happens?
   - Poke the Oobleck quickly. What happens?
   - Pick some up. How does it feel?
   - Try to roll the Oobleck into a ball. What happens?
   - Place a penny and a toothpick on the Oobleck? What happens?
   - Pour the Oobleck into a container. What happens?
4. As your daughter continues to experiment/observe/play, ask her what she knows about liquids and solids and make a list. For example:
   - A liquid can be poured
   - A liquid takes the shape of the container that it's in
   - A solid can't be poured
   - A solid has a constant shape (or retains its shape).
5. Ask if Oobleck is a solid or a liquid. If your child says solid, ask her to try to pour it. If she says liquid, ask her to roll it into a ball. Lead her to the realization that Oobleck is so interesting because it is both a solid and a liquid!

Part Two

1. Give your child a container of cornstarch, some popsicle sticks, food coloring, tablespoons/scoops, and water. Let her feel the cornstarch and the water. Then explain to her how to make Oobleck. If needed, help her measure the cornstarch and water. She can choose the food color she wants to use and then add the food coloring to the water or cornstarch. Help her adjust the consistency if it gets too dry.
2. When your daughter is finished making and playing with her own Oobleck, you can store it in a ziplock bag in the refrigerator. It will stay fresh for several days.

Additional activities for different age-levels

4 year olds

Put some Oobleck in an open container and some in a closed one. Place both containers on the window sill and observe the changes over time. Have your child draw illustrations of the results.

5-6 year olds

Ask your child to predict what would happen if you put Oobleck in the freezer. What if you heated it in the sun? Try doing these things and compare her findings to her predictions. Write down the results.

7-8 year olds

Have your child experiment with some variations, such as using very cold or very warm water. Write down the findings.

If Your Child Has a Disability

All the activities can be done with children with a wide range of disabilities by making some modifications. You are the best judge of which modifications are needed, but here are some suggestions that have worked well.

For a child who is blind or visually impaired

Encourage your child to touch and experiment with the Oobleck. If she is reluctant, put some into a ziplock bag and allow her to feel it through the plastic. When discussing solids and liquids, have several examples of each for your daughter to touch.

For a child who is deaf or hard of hearing

Review ASL and English (or child's native language) vocabulary words and concepts, such as "solid," "liquid""and "stir." Use hands-on exploration of wet/dry, solid/liquid, and practice measuring ingredients.

For a child who has a physical disability

Secure the container of Oobleck to the table with Velcro or masking tape. Allow your child to choose the food color she wants. You can modify the stirring tools with foam rubber or tongue depressors to make handles longer or easier to grip.

For a child who has learning/emotional disabilities

Cover the table with plain paper or clear plastic (newspaper may be too distracting). If your daughter is uncomfortable touching the Oobleck, put it into a ziplock bag so she can explore it. Create a "recipe chart" to help keep her focused.

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