

Oobleck... SOLID OR LIQUID

Curriculum Topic: Understanding Matter and Energy

Grades and Topic: Two – Properties of Liquids and Solids
Five – Properties of and Changes in Matter
Eight – Fluids

Key Concepts:

- Liquids and solids
- Viscosity
- Pressure

Introduction

If you've ever read the Dr. Seuss book "Bartholomew and the Oobleck", then you'll know why this funny and strange substance was named for it. Oobleck is unique, in that it has the properties of both a **solid** and a **liquid**. When you squeeze or poke it, it feels solid, but if you let go or pour it, it flows like a liquid.

By now, you probably know how substances can change states (from solids to liquids to gases) through changes in things such as temperature, like freezing water into ice or boiling it into steam. This experiment will show you how changes in **pressure** can change the properties in some materials.

Background

A key factor in this experiment is **viscosity**. Viscosity can be thought of as the thickness of a fluid. When applying pressure to the Oobleck mixture, you are increasing its viscosity. When simply poking the surface of the Oobleck quickly, it will feel hard. The quick tap forces the cornstarch particles together, creating a hard surface. Try slowing dipping a finger in, and you'll find it sinking in. This reduced pressure and slow movement gives time for the cornstarch particles to move out of the way.

The technical term for a substance like this is a **non-Newtonian fluid**. These fluids are not like your typical liquids like water or oil. Can you think of another example of a non-Newtonian fluid found in nature? Find the answer below!

Materials

- 2 tbsp water
- ¼ cup cornstarch (tapioca or potato starch will also work)
- Fork or spoon
- Mixing bowl
- Food colouring (optional)

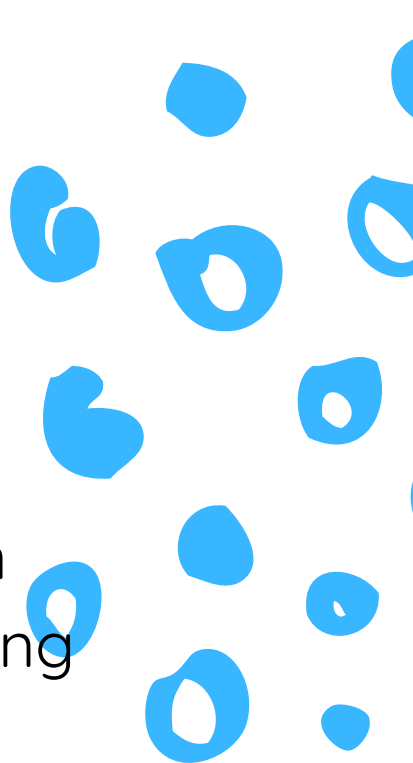



Preparation

1. If using colouring, mix that in with the water.
2. Add the cornstarch to the bowl, followed by the water.
3. Use a fork or spoon to mix the two, until well combined. You may need to switch to your hands as I did in the video.
4. Mix until well combined. Test out the substance. If the surface isn't solid when you tap it, add a bit more cornstarch. If it's too thick, add a bit more water.

Procedure

After you're sure your Oobleck is ready, it's time to get messy! Grab a fistful of Oobleck and see what happens, and then open your hands. Notice the difference? Pour out the Oobleck onto a surface and touch it afterwards. How does it behave? Record your observations and talk about it with your friends or parents.



Bonus

This recipe makes a very small batch of Oobleck. However, you can double or even quadruple the recipe! Make enough to stick your entire hand into the Oobleck. Feeling even more adventurous? Make an entire tub of Oobleck and stick your feet in! Can you stand or walk on it? What happens if you let your feet sink in? Try it out and record your observations again.

Cleanup

Wash your hands well with water. When disposing of the Oobleck, make sure to add plenty of extra water before pouring it down the drain. Wipe any dried cornstarch with a dry cloth, following by a damp one to remove any remaining residue.

Answer: Quicksand! Quicksand works very similar to Oobleck, as it is a mixture of sand and water. Standing in quicksand will cause you to sink slowly. If you made a large batch of Oobleck and tried standing in it, you'll know how that feels!

