

Oobleck Experiment

Docent Notes:

1. The Oobleck experiment can get messy. Have the students roll up their sleeves and remove their jackets.
 2. **DO NOT PUT OOBLECK DOWN THE DRAIN. IT WILL CLOG THE DRAIN. THROW ANY REMAINING PORTIONS IN THE TRASH.**
 3. **HAVE THE STUDENTS RINSE THEIR HANDS IN A BOWL OF WATER FIRST TO REMOVE ALL THE CORNSTARCH** before washing with soap and water at the sink. The bowl of water can be thrown in the grass outside the lab.
 4. Have all students wear eye protection and aprons.
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Oobleck (work in a group of 3-5, depending on the number of docents available)

Estimated time: 15 -20 minutes

Objective

Students create a substance that acts both like a solid and a liquid.

Materials:

- A large bowl
- 16 oz. or 2 cups corn starch
- Pitchers of water – you will need about 1 cup per bowl
- Food coloring
- Spoons
- Measuring cups

Preparation:

1. Pre-measure the cornstarch in each bowl before the class arrives.
2. Line the tables with butcher paper.
3. Place the remaining materials on the table.

Procedure:

1. Take time to feel the cornstarch. Cornstarch does not feel like any other powder. It has a texture that can be compared to that of whipped cream. The grains of cornstarch are so small that they will fill into grooves of your fingerprints and make the prints stand out.
2. Add the food coloring to the water. You will need about 1 cup of water.
3. There are no exact formulas regarding how much water to add, but it will end up being about 1/2 cup (120 ml) of water per cup (235 ml) of cornstarch. The secret is to add the water slowly and mix as you add it. Students can dig in with their hands and really mix it up. This will be very messy.
4. Add enough water so that the mixture slowly flows on its own when mixed. The best test is to reach in and grab a handful of the mixture and see if you can roll it into a ball between your hands – if you stop rolling it and it “melts” between your fingers – success!
5. Play with your new creation. Notice the Oobleck doesn’t move or splash when you hit it quickly.
6. Squeeze it hard to see what happens.

Questions to ask during the experiment:

1. Did you create a solid, liquid or a gas?
2. Was this a chemical or a physical change?
3. How long can you get the strands to drip?
4. What happens when you let the Oobleck sit on the table a minute and then try to pick it up?
5. How does it feel?
6. How does it move?

What Happened?

Oobleck is an interesting substance. When a little pressure is applied, it flows like a liquid. A spoon or your finger can easily be pushed to the bottom of a cup of Oobleck if you do it slowly. When more pressure is applied, Oobleck begins to act like a solid. It will keep its shape and resist movement. Stirring Oobleck quickly is impossible. Since Oobleck doesn’t follow the rules of most liquids, we call it a non-Newtonian fluid.

So, what makes Oobleck act like both a liquid and a solid? The mixture can be thought of as a suspension. The little grains of cornstarch do not dissolve in the water. They mix with the water, but they stay intact and solid. If you let the mixture stand for a while, the starch will settle to the bottom and a layer of clear water will form on top.

To further explain Oobleck’s strange behavior, imagine each granule of cornstarch surrounded by water. The surface tension of the water keeps it in the spaces between the granules. The cushion of the water provides quite a bit of lubrication and allows the granules to move around.

Rapid movements cause the water to be squeezed out from between the granules, and the friction between them increases rather dramatically.

Clean up:

- If docents have time and want to bag up the Oobleck in plastic zip lock bags, the students can take a portion home. If not then just throw any remaining portions in the trash.
- Rinse hands in a bowl of warm to remove large pieces of cornstarch.
- Oobleck will brush off clothes when it dries.
- Use a wet rag or paper towel to wipe down tables.
- There is a vacuum cleaner in the room if needed.

Informational Video on Newtonian Fluids for docents:

https://www.youtube.com/watch?v=2mYHGn_Pd5M