Oobleck

Materials:

1. Measuring cups
2. Mixing bowl
3. Water
4. Cornstarch
5. Food coloring and add ons (i.e. glitter, optional)

Procedure:

1. Pour 2 cups of cornstarch into a mixing bowl
2. Add food coloring and add ons to 1 cup of water (the more dye, the darker the color)
3. Gradually add the water to the mixing bowl with cornstarch, mixing as you go
4. Keep adding more water until the mixture becomes thick and it hardens when you tap it
5. Add more cornstarch if it gets too runny, or more water if it becomes too thin.

The Science behind it:

Applying pressure to the mixture increases its viscosity (thickness). A quick tap on the surface of Oobleck will make it feel hard, because it forces the cornstarch particles together. But dip your hand slowly into the mix, and see what happens—your fingers slide in as easily as through water. Moving slowly gives the cornstarch particles time to move out of the way.

Oobleck and other pressure-dependent substances (such as Silly Putty and quicksand) are not liquids such as water or oil. Oobleck feels like a solid and looks like a solid. When you hold the oobleck, it does not retain its shape, instead falling apart like a liquid. So what is the state of matter of oobleck? Considering that oobleck has the properties of both a solid and a liquid, we can identify it as a non Newtonian fluid. This substance's funny name comes from a Dr. Seuss book called *Bartholomew and the Oobleck*. A non-Newtonian fluid is a fluid that does not follow Newton's law of viscosity, (constant viscosity independent of stress). In non-Newtonian fluids, viscosity can change when under force to either more liquid or more solid.

Questions:

1. What is happening when you squeeze the Oobleck?

2. What is happening when you release the pressure?

3. Does the Oobleck remind you of anything else?

4. If you were trapped in a tub of Oobleck, what would be the best way to escape?

5. What would happen if you added more cornstarch?

More info:

- http://www.mathscareers.org.uk/article/non-newtonian-fluids/
- https://www.scientificamerican.com/article/oobleck-bring-science-home/
- https://www.youtube.com/watch?v=FXkwv_zWL84
- https://www.youtube.com/watch?v=M6T0stw9Xc0