Making Oobleck at Home: Fun with Physics!

Key Information:

- Everyday materials generally fit into one of three states of matter: Solid, Liquid, Gas
  - Solid – Definite shape and volume; rigid; not easily compressible; does not flow easily
  - Liquid – No definite shape, but definite volume; non easily compressible; flows easily
  - Gas – No definite shape or volume; assumes the shape and volume of the container it is in; compressible; flows easily
- Sir Isaac Newton proposed that fluids flow at a predictable, and constant rate. Many fluids, such as liquid water, behave this way. Oobleck does not behave this way.
- Oobleck is a non-Newtonian fluid that has properties of both liquids and solids. This means that it acts like a liquid when being poured, but like a solid when a force is acting on it.
  - Non-Newtonian fluids respond differently depending on how quickly you try to move them. Non-Newtonian fluids act as liquids when moving slowly but like a solid when moving quickly.
- Oobleck gets its name from Bartholomew and the Oobleck by Dr. Seuss.
- Other common non-Newtonian fluids include, ketchup, mayonnaise, and jelly. What other non-Newtonian fluids can you find around your home?

Source:

- Phases of Matter & Oobleck (Jim Cronin – DMNS Educator/Performer):
  https://youtu.be/_Q6qQAtvt-A

Age: Grades 4-6

Prep (Time): 10 minutes

Activity Time: 30-60 minutes

Prep: Gather materials to do the activity.

Materials:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Water</td>
<td>1 cup</td>
</tr>
<tr>
<td>Corn Starch</td>
<td>1.5-2 cups</td>
</tr>
<tr>
<td>Food Coloring (Optional)</td>
<td>A few drops</td>
</tr>
<tr>
<td>Large Bowl (Variable)</td>
<td>1</td>
</tr>
<tr>
<td>Mixing Spoon (Variable)</td>
<td>1</td>
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</tbody>
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Steps:

1) Add water to the bowl.
2) Add the corn starch in small amounts to the bowl. Begin mixing with the mixing spoon and eventually you may use your hand.
3) Continue mixing until the consistency of the Oobleck reaches a consistency that is both liquid when poured but also solid when grabbed. It should be a gooey consistency, not powdery and not wet in the sense that it will splash when hit.
4) Add food coloring to the Oobleck and thoroughly mix with your hand.
5) Play with your Oobleck! See Suggested Activities below.
6) Store your Oobleck in an airtight container to save for later!

Suggested Activities:

- Try stirring the Oobleck. Stir quickly, it should act like a solid and resist. Stir slowly, it should act like a liquid and give way.
- Grab a handful of Oobleck, squeeze it, and let it flow out of your fingers.
- Slowly dip your and into the Oobleck (It should act like a liquid).
- Punch the Oobleck (It should feel solid).
- Shake your Oobleck in a container.
- Compare Oobleck to solid water (ice) and liquid water.
- Design other experiments to test how Oobleck behaves like a solid or a liquid, record your findings!