Science

Oobleck

Grade Level
4-8

Length of Lesson
45 minutes

Objective
By the end of this lesson, students will have a better understanding of the properties of solids and liquids.

Materials Needed
- Bowl
- Forks
- Water
- Cornstarch
- Measuring spoons
- Food Coloring (optional)

Standards
NGSS
K-PS3-2; 2-PS1-1; 3-LS2-1; 3-LS3-2; 3-LS4-1; 3-LS4-4; 4-PS3-4; 5-PS1-3; MS-PS1-3; MS-ESS2-4

Lesson Summary
This lesson is a fun, hands-on activity designed to engage students by using corn-based materials to make "Oobleck" and experiment with the properties of solids and liquids!

Suggested Sequence of Events:
1. Read through the IAITC Corn Ag Mag, IAITC Soybean Ag Mag, and the IAITC Water Ag Mag to learn more about products that come from corn and soybeans and the impact water has on agriculture! Interactive online versions can be found on our website.
2. Discussion Starters:
    - Is corn used for more than just food?
    - Corn, like soybeans, other crops, and animal products, can often be used to create secondary products we call "by-products."
    - Have students brainstorm the properties of solids and liquids and create a list as a class.
3. Complete the activity following the procedures:
    - Place 4 teaspoons of cornstarch in a bowl.
    - Add 2 teaspoons of water to the cornstarch.
    - Add a few drops of food coloring to the bowl (optional).
    - Blend the mixture with a fork. It should flow when the bowl is tipped but feel solid to the touch. If the substance is too thick, add a little more water. If the substance is too runny, add a little more cornstarch.
    - Play and have fun!
4. Whole class discussion and reflection of activity.
    - Is the Oobleck a solid or a liquid? Refer back to the list you made as a class and use your observations from the experiment to explain your answer.
    - What kind of crop is your Oobleck a by-product of?

TEACHER RESOURCES

Background Information:
Sir Isaac Newton is known for his properties in Physics. During his career, he described solids, liquids, and gasses as having a set of properties that are distinct to their state of matter. When focusing on liquids, he proposed that fluids should flow at a predictable, constant rate. These fluids are called “Newtonian” fluids.

Although Oobleck looks like a liquid, it does not always behave a liquid. Oobleck is a type of material belonging to the “non-Newtonian” class of fluids. Non-Newtonian fluids respond differently depending on how quickly you try to move it around. When a force is acted on Oobleck quickly, it will behave like a solid because the pressure forces all the particles of the corn starch together. When the force is slower, the particles of the corn starch have time to move around the object, just as a normal Newtonian liquid would.

Extension Ideas:

- Have students try using different measurements of the ingredients and observe how that affects the oobleck.
- Let the oobleck sit in a glass for a few hours and observe the separation of the solid and liquid. This is because oobleck is a suspension and not a mixture.
- Have students look into non-Newtonian products in the food industry. Can they think of any? Some examples include mayonnaise, jelly, ketchup, and cranberry sauce.
- Use the Corn and Soybean Ag Mags and read about by-products from those two crops. Do you have any of these items at home?
    - Use our “Indoor BINGO” activity to help students identify common household by-products of agricultural commodities!
- For older students, show them this video and then have them brainstorm how non-Newtonian liquids could be beneficial to engineers. Video can be found at https://www.youtube.com/watch?v=XrvzZewPUJA
- Introduce the scientific term “viscosity” and apply the understanding to this experiment.
- Invite a corn farmer into the classroom to talk about types of corn, their uses, and what it takes to be a corn farmer.
- Make your own biodegradable packing peanuts from cornstarch using our “Packing Peanuts” activity.
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!