

Oobleck: Solid liquid

Overview: Students are typically familiar with the use of addition or reduction of heat energy to cause changes in the states of matter. Ice cream melting in the hot sun, steam rising over a pot of boiling pasta, Kool Aid freezing into popsicles in the freezer, etc. However, they may not be as familiar with other varieties of energy, such as motion/kinetic energy that can cause changes in states of matter as well. Through the following experiment, students will observe change in states of matter caused by the addition and removal of motion and pressure by creating “Oobleck”.

Procedure: Begin class with discussion of states of matter. Review with students how an ice cube (solid) can be changed to water (liquid) by the addition of heat energy and steam (gas) by adding even more heat energy. Discuss how there are other types of energy that including motion/movement (kinetic) energy. Illustrate this phenomenon by creating and experimenting with Oobleck.

1. Place about 1 cup of cornstarch in a bowl. Have students feel/observe the cornstarch in this state of matter.
2. Measure $\frac{1}{2}$ cup of water (you can add food coloring to the water if you like, but not required).
3. Stir the water into the cornstarch. Do this gradually and mix with hands. Add more water to make the mixture thinner, more cornstarch to make it thicker.
4. Play with the mixture (Oobleck, named after a Dr. Seuss creation). When you roll or move the mixture in your hand, press on it in the bowl, etc. it should be come solid. When the motion stops, it will turn back into a liquid. Roll the mixture into a solid ball in your hands and when you stop it will turn to liquid and run through your fingers.
5. Experiment with the Oobleck in different ways. One fun way to do this is to pour it onto a stereo speaker covered in plastic wrap. Turn on the music (the more bass the better) and observe how the Oobleck behaves.

ASOL Covered in this Activity:

3S-FME2: The student will investigate and understand basic properties of solids, liquids, and gases. Key concepts include:

c) changes in phases of matter with the addition or removal of energy.

5S-SI 2: The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

- i) inferences are made and conclusions are drawn.

8S-FME 5 The student will investigate and understand the nature of matter. Key concepts include

- d) physical properties.

Materials Needed:

- Water
- Cornstarch
- Measuring cups
- Mixing bowl
- Plastic wrap
- Speaker (one that can get dirty).
- Food coloring (optional).

Instructional Setting: Classroom.

Community Connections and/or Peer Interaction:

Use the creation and experimentation with Oobleck as an inclusion opportunity with peers from other classes. Invite peers to join in and perform a magic show.

Schedule a field trip to the local grocery store or market to purchase the ingredients needed to create the Oobleck.

Functional Activity/Routine:

Students will create the Oobleck by following the sequential directions in the above recipe.

Students will measure liquid and solid ingredients needed to make Oobleck.

Strategies to Collect Evidence:

Have students demonstrate how to turn the Oobleck into a solid (with motion/pressure) and a liquid (stop touching/moving). Keep a checklist of successes, prompts, and errors.

Following the experiment, create an assessment including motion as a potential correct answer as type of energy that can stimulate and change a state of matter.

Specific Options for Differentiating this Activity:

For students unable or unwilling to handle the Oobleck, a similar experience can be had by simply stirring the mixture with a long spoon.

Provide visuals to support the sequential written directions in the recipe.

Provide a voice output device to allow students to answer questions and requests to demonstrate changes to the Oobleck.

Extension Ideas:

Take pictures of your Oobleck and experiments. Create an adapted book using PowerPoint, iBooks Author, Tar Heel Reader, etc. describing your experiments and findings.