

OUBLECK

Source: Adapted from an activity, "Planet Oobleck"; on the www.howtosmile.org website developed by the Lawrence Hall of Science and the activity "Glurch vs. Oobleck" on the Click-2-Science website.

Grade Level: K-3, 4-5

Objectives:

- To increase observation skills.
- To give youth an opportunity to explore a strange new substance that is a little liquid and a little solid.

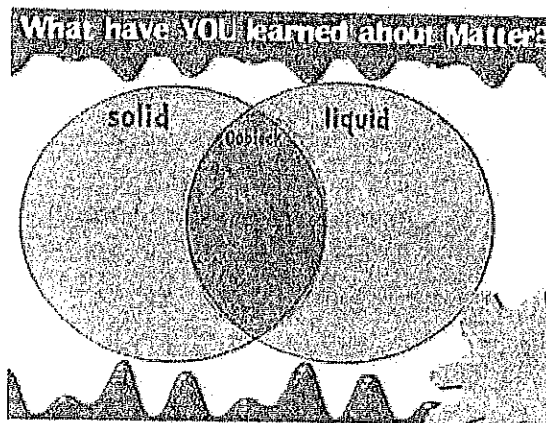
Time: Two 30-45 minute activities

Materials:

- Internet Access and equipment to view an online video
- egg carton
- bar of soap
- paper clips
- aluminum foil
- drinking straws
- plastic knives
- craft sticks
- sponges
- packing foam pieces
- bubble wrap
- Lego pieces
- small drinking cups
- Handout, Tournament of Properties

Preparation (before the session):

1. Mix up a batch of Oobleck. Add about 1 cup of cornstarch to about ½ cup of water. For a large batch, try 3 one-pound boxes of cornstarch and 4½-5 cups of water. To make the Oobleck a different color, you can add a few drops of food coloring to the water before you add the cornstarch.
2. In a large container or bowl, mix up the Oobleck with your hands. (A spoon won't work!) If the Oobleck is too dry, you can add more water or if it's too soupy, you can add more cornstarch until it's good and gloppy.



3. Place the Oobleck on a table. Keep the other materials in a box out of view but easily accessible.
4. Decide if you're going to do part one and two of this activity on the same day. If you decide to do part two a few days later, cover and store the Oobleck in the refrigerator.

Implementation Notes:

1. For the K-3 youth, stop after Part One. Allow more time for the younger children to explore freely.
2. When you're all done with Oobleck, you can save it for a few days in the refrigerator or throw it away in the trash or compost. DO NOT pour it down the sink, because it will clog your drain!

Procedure:

Part One: Exploring Oobleck (30-45 minutes)

Note: For K-3 youth, you might provide some additional time for the children to freely explore Oobleck before engaging them with questions.

1. **(Engage and Connect—2 minutes)** Begin by asking:
 - Who can explain the difference between a liquid and a solid?
 - How many of you think there are some substances that can act like both liquid and solid?
2. **(Introduction and Set Up—8 minutes)** Show the 5:33-minute video, *Slime by Any Other Name*, which features Mr. O at the Children's Museum of Houston--
<http://www.cmhoustonblog.org/2009/10/23/a-slime-by-any-other-name/#>

Get reactions, comments, and questions.

Tell the group that you've already mixed up a batch of Oobleck and they're going to get to mess around with it.

3. **(Playing with Oobleck—15 minutes)** Bring out the Oobleck. Give the group about 5 minutes to freely explore the substance. As they're exploring, ask questions such as:
 - Does it stretch?
 - Can it be rolled into a ball?
 - Does the ball keep its shape?
 - Does it bounce?
 - Can you form a thin layer across your hand?

- Will it ooze between your fingers?
 - What else can you make Oobleck do?
4. Bring out your box of materials. Ask participants to choose some tools and try these different challenges with the substance:
- Can you cut Oobleck? What happens?
 - What things float in Oobleck? Can you make them sink?
 - What things sink in Oobleck? Can you make them float?
 - What happens if you try to bounce things on Oobleck?
5. **(Reflection—5 minutes)** Process the activity with these questions:
- What did you discover during this activity?
 - What are some properties of Oobleck?
 - How should people dispose of the Oobleck when they're finished with it? (Make sure that everyone understands that it can't be poured down the sink or into the toilet because it will stop up the drains.)
 - How do you think Oobleck could stop up a drain?
 - How could you share this activity with friends and families at home?

Part Two: Glurch vs. Oobleck (30-45 minutes)

Background:

- A colloid is a substance that seems like it's one but is actually two separate things. Jelly and paper are both colloids. They clump together and are often murky or opaque such as milk and fog. Colloids will not separate when left standing, like oil and water.
- Oobleck is a colloid that moves from a solid to a liquid and back again. A fluid that is a little solid and a little liquid is called a non-Newtonian fluid.
- Glurch is a colloid that has the consistency of putty.

Materials:

- Oobleck (from the last activity)
- 2 teaspoons Borax powder
- 1 cup warm water
- 2 cups white glue
- 1 ½ cups cool water
- 2 bowls to mix glurch
- Bowls for youth to experiment with the two substances
- Large spoon
- Handout, Tournament of Properties

Preparation (before the session):

1. Make a batch of glurch:
 - Measure 2 teaspoons of the Borax into a bowl.
 - Measure 1 cup of warm water and pour it into the Borax powder.
 - Stir until dissolved and set aside
 - Measure 2 cups of glue and pour it into another bowl.
 - Measure 1 ½ cups of cool water and pour it in with the glue. Mix well.
 - Pour the Borax and water mixture into the glue.
 - Mix with your hands or a spoon.
2. Get enough bowls for each small group to have two bowls.

Procedure:

1. **(Introducing Glurch—5 minutes)** Direct the group's attention to the bowl of Glurch. Explain that it's another strange substance that you want them to explore. Allow 5 minutes for unstructured exploration.
2. **(Comparing Glurch and Oobleck—15 minutes)** Distribute and review the handout, Tournament of Properties. Make sure that participants understand the various properties they will be investigating: resilience or elasticity, viscosity or stickiness, and fluidity.

Divide participants into small groups and give these instructions:

- Get a bowl of glurch and a bowl of Oobleck to conduct your comparisons.
- Work as a team to compare the properties of these two substances.
- Choose a recorder who will write down all of your observations and findings.
- You have about 10 minutes. Be prepared to present your findings.

After 10 minutes (or longer if small groups need it), reconvene the large group and get participants to present their findings. Ask:

- What techniques did you use to compare the two substances?
- What kinds of differences did you observe?

3. **(Reflection—5 minutes)** Process the activity by asking:
 - What did you discover during this activity?
 - What are some other times that you might want to use a technique like this to compare the properties of two things?
 - What kinds of STEM jobs involve carefully comparing the properties of "things?" (Chemist, Toxicologist, Forensic lab technician)

Handout: A Tournament of Properties: Glurch vs. Oobleck

Resiliency (Elasticity)

	Will Bounce Higher	Will Stretch Longer
Glurch		
Oobleck		

Which is more resilient? _____

Viscosity (Stickiness)

	Picks up more newsprint	Glues 2 pieces of paper together more strongly
Glurch		
Oobleck		

Which is more viscid (sticky)? _____

Fluidity (Ability to Flow)

	Flows faster	Squeezes through fingers more easily when pinched
Glurch		
Oobleck		

Which is more fluid? _____