South Carolina 4-H Volunteers’ Newsletter
Volume 3, Issue 1, Suppl. 1
October 2017

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Two 4-H Art Contests!

**National 4-H, 2018 Calendar**
https://4-h.org/4-h-calendar/
deadline: October 20, 2017

**South Carolina 4-H, Holiday Card**
https://www.clemson.edu/extension/4h/project_areas/personal_development/2017%20Holiday%20Card%20Art%20Contest.pdf
deadline: November 3, 2017

2017 National 4-H Volunteer e-Forum

National 4-H Volunteer e-Forum is coming to a Clemson University Cooperative Extension office near you!!! Visit: Clemson.edu/4h/4h_volunteer for more information. Thursday evenings this fall from 6:30 – 8:30pm will provide national networking opportunities in the comfort of a local office!

- October 5, 2017 - Cultivating an Environment for Growing True Leaders
- November 2, 2017 - “STEM”ming into Animal Science, Growing True Leaders
- December 7, 2017 - Helping 4-H’ers Grow in Life & Work

Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, gender, religion, national origin, disability, political beliefs, sexual orientation, gender identity, marital or family status and is an equal opportunity employer.
Monthly 4-H Club Activity Idea

Oobleck Exploration

**Objective:** To explore the properties of a non-Newtonian fluid using scientific inquiry processes.

**Age Range:** All ages

**Hands-on Activity:** Create oobleck and test its physical properties.

**Life Skills:** HEAD = learning to learn, planning; HEART = communication.

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**Introduction**

To begin, what is science? Science is defined as the intellectual and practical activity encompassing the systemic study of the structure and behavior of the physical and natural world through observation and experiment.

Scientific inquiry is the process in which we question the natural world and phenomena, form answers based on evidence, and test hypothetical explanations.

Sir Isaac Newton is well known for his scientific study. He tested the properties of several states of matter and defined the common characteristics of what are now known as Newtonian fluids, such as water, oil, gasoline, and glycerin. These are typically what we consider “normal liquids”. They fill the shape of the container in which they are placed and their viscosity (or ) is a constant with shear rate ( ). This basically means that the “thickness” or resistance to change for these fluids does not change in response to a changing amount force that is applied.

A non-Newtonian fluid does not follow this rule. There are several ways in which these non-Newtonian fluids change their viscosity in response to outside forces.

<table>
<thead>
<tr>
<th>Type of Behavior</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thixotropic</td>
<td>Viscosity decreases with stress over time</td>
<td>Honey – keep stirring and solid honey becomes liquid</td>
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<tr>
<td>Rheopectic</td>
<td>Viscosity increases with stress over time</td>
<td>Cream – the longer you whip it, the thicker it gets</td>
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<tr>
<td>Shear-thinning</td>
<td>Viscosity decreases with increased stress</td>
<td>Tomato sauce</td>
</tr>
<tr>
<td>Shear-thickening (or Dilatant)</td>
<td>Viscosity increases with increased stress</td>
<td>Oobleck – you will get to explore this one for yourself!!!</td>
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</tbody>
</table>

Source: https://www.sciencelearn.org.nz/resources/1502-non-newtonian-fluids
Activity – Oobleck

Materials needed:
- cornstarch
- water
- container
- food coloring
- measuring cups
- Bartholomew and the Oobleck, by Dr. Suess
- additional tools to test/explore with (scissors, hammer, pencils, spoons)

Description:
(If possible, this activity is best done outdoors. Cornstarch will dry and can be easily swept up, but food coloring can stain. Also, do not pour the cornstarch solution down the drain following the activity. The cornstarch will eventually settle out and can potentially lead to plumbing problems.)

Allow youth to mix about 1 cup of cornstarch into about ½ cup of water. If the oobleck is too dry (crumbly), you can add a little more water; or, if it is too runny, you can add more cornstarch. You should know when it reaches the ideal consistency as it will resist contact forces, can be formed into a ball when hands are actively moving, but will ooze when hands are still. Adding food coloring can be done at any time, but it is more challenging to mix it in after the oobleck is made.

As youth are mixing up their oobleck and exploring its properties, you can read the book that inspired the name of this non-Newtonian fluid, Bartholomew and the Oobleck, by Dr. Suess. Youth can try to cut the oobleck, form it into shapes, pour it, and hit it with different objects.

Reflective Questions

Be sure to include time for youth to reflect on their experience and share their conclusions with others.
- In what ways did oobleck differ from water? In what ways were they the same?
- Did the oobleck in the story accurately reflect the oobleck you made? (In what ways were they similar? In what ways were they different?)
- What was easy, what was hard about this activity?
- What do you think oobleck could be used for?
- If you had to land a spaceship on a planet made of oobleck, how would you design the landing gear?
- How could someone use this in decorating for Halloween?!

Conclusion

Enjoy the experience and let youth have fun with this activity. You can reinforce that science is fun and that there are things to discover all around us! The molecular secret to oobleck’s weird properties was not discovered until 2015!!! http://news.cornell.edu/stories/2015/11/secret-oobleck-revealed-last Who knows, you could be working with the youth that conclusively detects dark matter.