

Egg Drop

Can Ooze protect an egg?

Description

In this activity, kids make Ooze and then test the material in an egg drop!

Suitable for kids ages 5 and up.



Materials

Ooze

- 2 measures cornstarch
- 1 measure water
- 2-3 drops food coloring (optional)

Medium bowl

2 Large plastic bags

Small plastic bag

2 Eggs (uncooked!)

Note: If the Oobleck sits for more than a few hours, you may need to add more water. Additionally, you may want to have more eggs on hand to repeat the experiment a few times.



Time

Preparation: 20 minutes

Activity: 15 minutes or longer

Cleanup: 10 minutes

Safety

Although nontoxic, you should be careful handling these materials. Do not consume the Ooze.

Step 1

Grown-ups, prepare the Ooze in a medium plastic bowl. If you're using food coloring, add that to the water first. Then slowly add water to the cornstarch.

TIP

When making the Ooze, you may need to adjust the amount of water. The Ooze solution should harden when pressure is applied, but otherwise will flow like a liquid.



Step 2

Kids, play with the Ooze! What do you notice about this funny material? Try tapping or squeezing the Ooze. Is it a solid or a liquid?

TIP

If you do get messy with the Ooze, you can dunk your hands into a tub of water before washing in a sink. Empty all Ooze directly into the trashcan or compost, NOT the sink. Ooze can clog a sink if too much is put down the drain. If saved for more than a few days Ooze can begin to smell, so throw it out promptly.



What's going on?

When you quickly apply a lot of pressure to Ooze, like tapping or squeezing, it firms up like a solid. When no pressure is applied, it flows like a liquid.

Ooze is one of many materials called non-Newtonian fluids. Most fluids move faster when they are pushed harder, but Ooze (and other non-Newtonian fluid) moves slower when more force or pressure is applied. When you slowly stir the Ooze it behaves like a liquid. The same force applied quickly makes it act more like a solid.



Step 3

Time to experiment! Put one of your eggs into a large plastic bag. Zip it up. Pour about half your Ooze into the other large plastic bag. Place the other egg into the small plastic bag. Add the small plastic bag (with the egg) to the large bag that holds the Ooze. Zip it up.



Step 4

Hold both large bags about 8 inches over a table. Line the eggs up so they are the same height off the table. Drop both bags at the same time. What happens? Do both eggs break?



What's going on?

The Ooze protects the egg. When it hits the ground, a quick direct force is applied to the Ooze.

The cornstarch clumps together and hardens like a solid, absorbing the impact and protecting the egg. Then, the Ooze quickly goes back to acting like a liquid. Researchers are using shear-thickening fluids (STFs) that behave a lot like Ooze to make new gels and fabrics. These fabrics are flexible and comfortable when no force is applied, but when struck quickly they harden and provide solid protection.



The Ooze protects the egg

How is this nano?

The way a material behaves on the macroscale is affected by its structure on the nanoscale. (A nanometer is a billionth of a meter.)

Changes to a material's molecular structure are too small to see directly, but we can sometimes observe corresponding changes in a material's properties.

Nanotechnology takes advantage of the way things behave differently at the nanoscale to make new products and applications.

Researchers have developed new fabrics made with shear-thickening fluids (STFs) that contain suspended nano-sized particles. This new material displays non-Newtonian behavior, similar to Ooze. The fabrics are used in a variety of technologies, from flexible body armor to protective (and fashionable) winter hats.



STFs make a winter hat more like a helmet

Learn more

Learn more at:

www.whatisnano.org

Mr. O Video: Liquid Armor

<http://vimeo.com/73404393>



Credits



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This activity was adapted from Liquid Body Armor, developed by the Children's Museum of Houston for the NISE Network. The original program is available at www.nisenet.org/catalog.

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