

CREEPY SCIENCE

LEADER GUIDE

PURDUE
EXTENSION | **LOCAL FACES**
COUNTLESS CONNECTIONS



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MAKING OOBLEK

Introduction

Oooh What?? It's an oobleck!! A non-Newtonian Fluid

Oobleck is considered a non-Newtonian fluid. It is a substance that exhibits properties of both a solid and a liquid. It is made with a mixture of cornstarch and water. Food coloring can be added for fun.

What is a non-Newtonian Fluid?

A non-Newtonian fluid is a fluid whose viscosity is variable based on applied stress or force. The most common everyday example of a non-Newtonian fluid is cornstarch dissolved in water. Behavior of Newtonian fluids like water can be described exclusively by temperature and pressure. However, the physical behavior of non-Newtonian fluid depends on the forces acting on it from second to second.

Interesting properties of Non-Newtonian fluids

If you punch a bucket full of non-Newtonian fluid such as cornstarch, the stress introduced by the incoming force causes the atoms in the fluid to rearrange such that it behaves like a solid. Your hand will not go through. If you shove your hand into the fluid slowly, however, it will penetrate successfully. If you pull your hand out abruptly, it will again behave like a solid, and you can literally pull a bucket of the fluid out of its container in this way. Non-Newtonian fluids help us understand the wide variety of fluids that exist in the physical world.

Materials:

1/3 cup water
Food coloring
1 cup cornstarch
Bowls
Mixing Spoons
Airtight container or Ziploc bag

Procedure:

Pour cornstarch in a mixing bowl or Ziploc bag. Add a few drops of food coloring to your water. Slowly add water and mix until goop becomes thick. Use your senses to record observations of what type of matter is made from this mixture. Store in an airtight container.

Questions to Ask:

1. What are some properties of solids, liquids, and gasses?
2. What are some physical properties of Oobleck?
3. What types of changes took place when you made Oobleck?



EXPLORING VISCOSITY WITH POP ROCKS



Introduction

Can you hear science? You bet! We have 5 senses that make us who we are and hearing is one of them! Today we are exploring our sense of hearing with an invitation to explore pop rocks science. Which liquids make pop rocks pop the loudest? We are going to test a variety of fluids all with a unique viscosity. Grab a few pop rocks and don't forget to taste them, too! That's the most fun way to hear pop rocks science!

What is viscosity?

Viscosity is a measure of the resistance of a fluid which is being deformed by either shear stress or external stresses. The resistance of a liquid to flow, or its' "thickness". All real fluids have some resistance to stress, but a fluid which has no resistance to shear stress is known as an ideal fluid or inviscid fluid.

What makes Pop Rocks so interesting?

Pop Rocks are a very cool candy that pop when you put them in your mouth. They make a sizzling sound as they dissolve, the tiny explosions feel interesting, plus they taste good! Pop rocks are a hard candy that has been gasified with carbon dioxide using a patented process. They are made by mixing sugar, lactose, corn syrup, water, and artificial flavors/colors.

Materials:

Pop Rocks (try different colors)

Water

Oil

Corn Syrup

Non-Newtonian Fluids (try the experiment another time with various fluids with these properties)

Procedure:

Pour equal parts water, oil, and corn syrup into three different cups. Carefully pour some pop rocks into each cup. See what happens!

Questions to Ask:

1. Which fluids pops the loudest?
2. Which fluid is the least viscous?
3. What other liquids would make the Pop Rocks pop?



DISSOLVING PEEPS

Introduction

Who does not love Peeps? I know I do! They aren't just a "yummy" treat, but they also are so fascinating to dissect and manipulate. What better way to learn creepy science than with an experiment in dissolving peeps?

What are peeps made of?

Peeps are made with a mixture of marshmallow, sugar, corn syrup, gelatin, and a few other special ingredients whipped into a marshmallowy goo that will become the shaped candy.

Fun Peeps Facts

-- Just Born, Inc, produces 1.2 billion marshmallow goodies each year for all occasions -- that's a heap of Peeps. Chicks and bunnies are the most popular shapes and are made year-round at the plant.

-- In 1953, Peeps were made by hand with a pastry tube. Making one Peep took about 27 hours. Today, Peeps can be made in just six minutes.

-- Just Born is named for Sam Born, who grew up in Russia and came to America in 1910. He started his business with a small candy shop in New York City. The company's headquarters has been in Bethlehem, Pennsylvania, since 1932.

-- Peep chicks come in five colors, listed here in order of popularity: yellow, pink, lavender, blue, and white.

Materials:

5 peeps

Milk

Water

Tonic Water

Oil

Vinegar

Timer



Procedure:

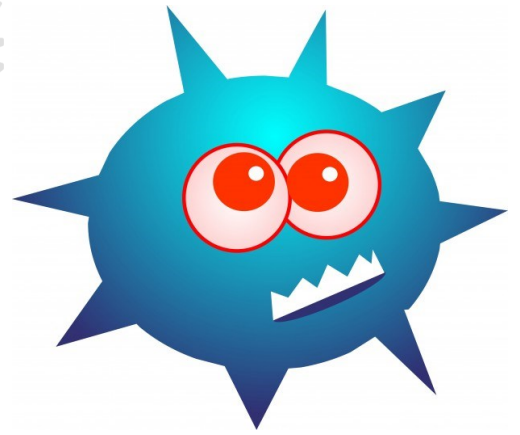
Make predictions about what you think will happen to the peeps in each liquid. How long will it take for them to dissolve? Fill 5 cups with the same amount of liquid in each glass. Place the peeps of your choice into each liquid. What happens after 5 minutes? 10 minutes? 20 minutes? Record your observations.

Questions to Ask:

1. What happens to the peeps when placed into each liquid?
2. How long did it take for them to dissolve?
3. Which liquid dissolved the peeps first? What is unique about that liquid?



SCREAMING BALLOONS



Introduction

Here's an easy-to-do experiment using only a balloon and a hex nut from your local hardware store. This is the perfect science of sound activity because kids will love it and parents will be left shouting, "STOP!" What a cool way to make spooky sounds!

Materials:

Clear latex balloons (9" to 11" work great)
Some 1/4" hex nuts from the hardware store

Procedure:

1. Squeeze the hex nut through the mouth of the balloon. Make sure that the hex nut goes all the way into the balloon so that there is no danger of it being sucked out while blowing up the balloon.
2. Blow up the balloon, but be careful not to overinflate the balloon, as it will easily burst. Tie off the balloon and you're ready to go.
3. Grip the balloon at the stem end as you would a bowling ball. The neck of the balloon will be in your palm and your fingers and thumb will extend down the sides of the balloon.
4. While holding the balloon, palm down, swirl it in a circular motion. The hex nut may bounce around at first, but it will soon begin to roll around the inside of the balloon. What is that sound? Could the balloon be screaming? The sound every parent loves...
5. Once the hex nut begins to spin, use your other hand to stabilize the balloon. Your hex nut should continue to spin for 10 seconds or more.

Questions to Ask:

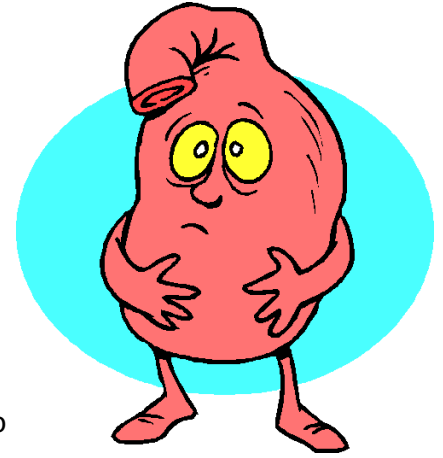
1. What happens when you swirl the balloon in a circular motion?
2. What happens if you change the size of the balloon? The size of the hex nut?
3. What happens if you use another object such as a penny? Marble?

What is really happening?

This is actually a 2 for 1 experiment – you're learning about the science of motion and sound. The hex nut circles inside the balloon due to *centripetal* force. Centripetal force is the inward force on a body that causes it to move in a circular path. It is a "center-seeking" force. A hex nut has 6 sides, and these flat edges cause the hex nut to bounce or vibrate inside the balloon. The screaming sound is made by the sides of the hex nut vibrating against the inside wall of the balloon.



BELCH MODEL



Introduction

BEELLLLCH! Ever wonder what those noises are coming from your belly? Do you think they could be gasses trying to escape? Have they ever escaped?

Materials:

Vinegar
Medium or large balloon
Funnel
Baking Soda
Teaspoon

Procedure:

1. Pour 2 teaspoons of vinegar into the bottom of balloon (your stomach).
2. Place funnel into neck of balloon; add one heaping teaspoon of baking soda to balloon stomach.
3. Very quickly close the balloon by pinching its neck (your esophagus).
4. Watch your balloon stomach expand with gas.
5. Stretch and slightly un-pinch the esophagus to release gas (belch!).
6. Keep practicing the pinch release until you can make the belch model sound like a real burp.

Questions to Ask:

1. What was your favorite part?
2. In what ways do you think this is like our stomach?

What is really happening in there?

- Inside your stomach is a little pocket of air. When this air becomes squeezed, or when you add extra gas from drinking carbonated drinks or talking fast, you belch. In both of these cases, your stomach does nothing to create new gas.
- If you take an antacid or sodium bicarbonate for an upset stomach, you may belch like crazy. Now you've actually produced gas in your stomach. Your stomach excretes lots of acid to break down food. When you're uncomfortable with too much of that acid, you might take an antacid. When the chemicals in the antacid react with the acids in your stomach, gas is created. The gas builds up and up until you just can't hold it anymore BEELLLLCH.

