Unbreakable Bubbles

Have you ever wanted to hold a bubble without it popping right away? Well, now you can! Learn the secret—and science—behind unbreakable bubbles!

TEKS:
MATH 3.6 A: The student is expected to classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language.
SCI 4.5 B: The student is expected to compare and contrast a variety of mixtures, including solutions.

Materials:
- Bowl
- ¼ cup corn syrup or glycerin
- ¼ cup dish soap (preferably not an “ultra” variety)
- 1 cup water (filtered or distilled water works best)
- Measuring cup
- Soft gloves or socks
- Spoon
- Straw
- Wire or bubble wand (optional)

Experiment/How-To:
1. Add 1 cup of water to a bowl.
2. Use a spoon to gently stir in ¼ cup of dish soap.
3. Next, gently mix in ¼ cup of corn syrup or glycerin.
4. Your bubble solution is ready! You can use this solution to blow bubbles right away, but if you let it sit for a day or two, you may notice stronger bubbles.

We recommend doing the next part of the experiment outside as the bubbles can be pretty sticky!

5. Dip the end of the straw into your bubble solution. Blow into the opposite end of the straw to make bubbles! Alternatively, you can use a bubble wand or piece of wire twisted into a circular shape.

6. First, try and catch the bubbles with your bare hands!

7. Next, put soft winter gloves or socks on your hands and try to catch the bubbles. Notice any difference?

Want to try and make even better “unbreakable bubbles?” Experiment with these bonus STEM challenges!

- What happens if you use more dish soap, corn syrup, or glycerin?
- Can you make bubbles using liquids like orange juice or milk, instead of water?
- What about different types of sugar, like brown sugar or powdered sugar, in place of corn syrup?
- How do different types of soap, like shampoo or hand soap, affect bubble formation?

**STEM Connection:**

Bubbles soar through the air and have a rainbow shine. In fact, these mysterious, fragile objects seem like mesmerizing, floating orbs from another world. What are bubbles made of, and how and why do they form? There is a science behind these fascinating spheres.

First of all, you may notice that bubbles are always perfectly round. Spheres have the lowest surface area of any geometric shape which means that the formation of spherical bubbles requires the least amount of energy. Also, as you may have guessed, bubbles are mostly air! This is why they are able to float through the sky. The bubble’s air is trapped by an extremely thin, soapy film. This soap film is made from a mixture of soap and water and actually contains three layers. The outside and inside surface of a bubble are made of soap molecules, and between these surfaces is a super thin layer of water. This arrangement happens because soap molecules have some very special properties. One end of a soap molecule really wants to touch water, and this is known as the hydrophilic head. The opposite end of the same soap molecule really does not want to touch water, and this is known as the hydrophobic tail. These soap molecules surround the thin layer of water with their hydrophilic heads facing in and their hydrophobic tails facing out.

This seems pretty strong, right? So why are three layers of soap film so easy to pop? Well, as soon as the super thin layer of water between the soap evaporates, the bubble pops! This evaporation can happen from the sun, wind, or even our dry skin. Also, when a bubble touches our skin or another object, the water inside the film is pulled out of the spherical film formation, causing the bubble to pop. Our skin has oils and dirt on it that easily break through the bubble’s film, making it nearly impossible to touch a regular bubble without it popping. Adding corn syrup or glycerin to the bubble mixture helps prevent popping, though!
Molecules of corn syrup or glycerin can squeeze in between water molecules to make the bubble’s skin thicker and help the bubble’s film stretch without breaking. Also, wearing soft gloves protects the bubbles from our skin’s dirt and oil, making them not pop as quickly.

**Career:**

Chemists study the properties of matter. They may specialize in a specific area of chemistry such as organic or physical chemistry. These scientists must understand the structure, properties, and compositions of various substances. They study the dynamics of systems and processes at a molecular level.

**Resources:**

[https://www.thoughtco.com/bubbles-that-dont-pop-recipe-603922](https://www.thoughtco.com/bubbles-that-dont-pop-recipe-603922)
[https://www.sciencekids.co.nz/experiments/dryicebubble.html](https://www.sciencekids.co.nz/experiments/dryicebubble.html)
[https://www.kidsdiscover.com/teacherresources/bubbles-for-kids/](https://www.kidsdiscover.com/teacherresources/bubbles-for-kids/)
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