

BUBBLE SCIENCE

What Is a Bubble?

A bubble is a thin film of soapy water. Like a balloon, a bubble's very thin skin surrounds a volume of air. Most bubbles that you see are filled with air, but you can make a bubble using other gasses, such as carbon dioxide. The film that makes the bubble has three layers: a thin layer of water is sandwiched between two layers of soap molecules.

Are Bubbles Always Round?

No matter what shape a bubble is a first, it will try to become round and form a sphere. You can use wire to make bubble wand in lots of different shapes: rectangular, triangular, square. Try it for yourself!

What Color are Bubbles?

Like the colors in a rainbow or an oil slick, we see the colors in a bubble through the reflection and the refraction of light waves off the inner and outer surfaces of the bubble wall. You can't color a bubble since its wall is only a few millionths of an inch thick. A bubble reflects color from its surroundings.

What Happens When Bubbles Meet?

When two bubbles meet, they will merge and share a common wall to minimize their surface area. If the bubbles are the same size, this wall will be flat. If the bubbles are different sized, the smaller bubble, which always has a higher internal pressure, will bulge into the larger bubble. Bubbles meet to form walls at an angle of 120 degrees. If enough bubbles meet, the cells will form hexagons.

Ingredients in Bubble Solutions

Most bubble solutions consist of detergent in water. **Glycerin** often is added as an ingredient. It is a colorless, odorless, viscous (thick and sticky) liquid that's good for dry skin and great for making bubbles last longer. Detergents form bubbles in much the same way as soap, but detergents will form bubbles even in tap water, which contains ions that could prevent soap bubble formation.

Why Does Soap Make Bubbles?

Adding soap to water weakens the pull of the surface tension and makes the surface of the water much stretchier. It spreads out enough for you to blow air inside – kind of like blowing up balloons.

How Slow Can You Blow?

When you blow into a bubble wand, you are moving air. When you blow softly, you move air slowly and stretch the bubble solution slowly. When you blow hard and fast, you move air fast and stretch the solution fast.

LITTLE-KNOWN FACT: Eiffel Plasterer was a farmer, educator, and bubble fanatic known as Professor Bubble who lived in Huntington, Indiana. He once blew a bubble that lasted for 341 days!

Other bubble resources:

Tom Noddy's Bubble Magic <http://tomnoddy.com/>
<https://tinyurl.com/y9tdjh5n> (6:45 min video with Tom Noddy from BBC)

<https://tinyurl.com/yc2ws69q> (30sec. Torus bubble video)

Steve Spangler Science <https://www.stevespanglerscience.com/lab/experiments/bubble-inside-a-bubble/>

From Science X/Phys.org <https://phys.org/news/2018-08-uncover-science.html>

OUTDOOR BUBBLE ACTIVITIES

Abstract Bubble Art

Let's see what bubbles leave behind when they pop. Place sheets of white paper and small containers of colored bubble solution on each table and tell kids to blow their bubbles onto their papers. Look at the various shapes and sizes that the bubbles left behind.

Blow Bubbles With Your Fingers

Make a circle with your thumb and fingers, dip it in the bubble solution, and blow!

Blowing Bubbles That Aren't Round

Make bubbles with 3D-shaped wands to explore how wand structure affects the shape of the inverted bubbles that form. Take a pipe cleaning and bend it into another shape. These are now bubble wands with different shaped heads (triangle, square, heart, moon, etc.) to dip into pans of bubble solution.

Touchable Bouncing Bubbles

What happens when you try to touch a bubble? With this experiment, you can hold a bubble in your hand and even bounce it around.

Put on gloves or put a pair of clean socks on your hands. Blow the bubbles or have a friend blow them. Try to catch the bubbles with your hands. Can you get the bubbles to bounce around now?

The gloves/socks are the key. A bubble's worst enemies are oil, dirt, and gravity. Our hands have dirt and oil on them, which causes bubbles to pop by breaking the thin soap film that forms the bubble. So with the gloves/socks on, the bubbles have a surface that they can land on and even bounce off. Try using other fabrics and surfaces to see which works best.

PLEASE NOTE: We are currently curating a list of links and resources gathered from the internet, co-workers, and personal experience. In our haste to get activity ideas out to our patrons during this health emergency, we make no claims to the originality of the projects contained in the activity sheets and apologize to any individuals and/or organizations that we may not have credited directly.

BUBBLE SOLUTION RECIPES

BUBBLE SOLUTION 1

2/3 cup dishwashing soap
1 gallon water
2 to 3 tablespoons of glycerin

BUBBLE SOLUTION 2

1/2 cup of dishwashing liquid
2 cups of water
2 teaspoons of sugar
(You can add food coloring to your solution, if you'd like. Great for making Abstract Bubble Art!)

BUBBLE SOLUTION 3

4 cups of water
1/2 cup corn syrup
1/2 - 2/3 cup dish soap

For this recipe, you want the water to be fairly warm. Heat it up in a kettle and, well before it starts to boil, take it off the heat and dump it into your bubble jar. If you have really hot tap water, you can use that instead.

Add the corn syrup to the warm water and stir it until it dissolves. Then add the dish soap.