

How Do Bubbles Work?

You won't actually blow any bubbles, but you will learn the science that makes a bubble!

What You Need:

- 2 short glasses of water
- A pie plate or tray
- Gazillion Bubbles Solution



What You Do:

- Put the first glass of water in the center of the pie plate.
- Slowly pour some water from the second glass into the first glass until it is very full and the water forms a dome above the rim of the first glass. Set the glass with less water aside.
- Carefully stick your finger straight down through the dome of the water in the full glass and watch what happens.
- Now put a small drop of dish soap on the tip of your finger and do the exact same thing - stick the finger with soap on it straight down through the dome of water. This time what happens?

What Happened:

Water is made up of lots of tiny *molecules*. The molecules are attracted to each other and stick together. The molecules on the very top of the water stick together very closely to make a force called *surface tension*. Surface tension is what caused the water to rise up above the rim of the glass in the experiment - the water molecules stuck together to make a dome instead of spilling over the side. Why didn't the dome break when you stuck your finger through it? Why didn't the water spill over the glass? Well, the surface tension was strong enough that it just went around your finger. The water molecules still stuck to each other and nothing spilled! What happened when you put your soapy finger into the water? The soap on your finger broke the water's surface tension and some of the water molecules didn't stick to each other anymore and they were pushed out of the glass!

The force of surface tension also creates bubbles. In plain water, the surface tension is strong and the water might make some bubbles, but they will not last very long and they will be very small, because the other molecules in the water will pull on the bubbles and flatten them. Soap needs to be mixed with the water to make bubbles that can float through the air. When you add soap, the water becomes flexible, sort of like elastic, and it can hold the shape of a bubble when air is blown into it.

Can You Make a Square Bubble?

What You Need:

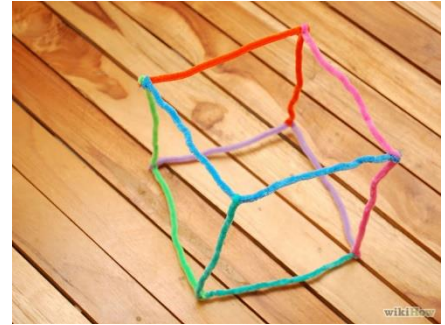
- Gazillion Bubble Solution
- Pipe cleaners or wire

What You Do:

- Bend a pipe cleaner into a square. Wrap the ends around the sides of the square to hold it together. Fold the other pipe cleaner in half and loop it around one side of the square. Twist the ends together to make a handle. Use it as a bubble blower.
- Dip the bubble blower into the bubble solution and slowly blow a bubble through it until the bubble comes loose from the wand. What shape is the bubble?

What Happened:

The bubble was round even though it came from a square! Bubbles are always round when they detach and float through the air because the skin of soap always tries to take up the least amount of space it can and still keep the same amount of air inside the bubble. The soap molecules always stretch into a round shape automatically! A round shape takes up less space than a square shape. Try the trick again, but make a wand in any shape you want - what about a star or a triangle? Do bubbles from those shapes become round too?



Don't Pop the Bubble!

What You Need:

- Gazillion Bubble Solution
- The lid from the container
- Objects with a pointed end like scissors
- Straw



What You Do:

- Set the lid on the table so that the part with the lip is facing up. Fill the lid with bubble solution.
- Dip your straw into the bubble solution container so that it is wet half way up the straw. Touch the straw to the lid and blow a bubble on the lid. Slowly pull the straw all the way out of the bubble.
- Now dip the pointed end of your scissors (or any pointy object) into the container of bubble solution. Make sure they are completely wet. Poke the scissors through the wall of your bubble. Watch what happens. Try it again with other pointed objects, just make sure anything you touch to the bubble is wet. Can you stick your finger through the bubble?

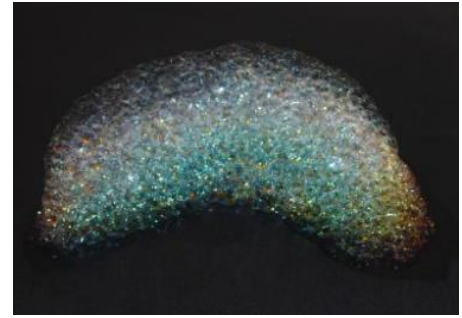
What Happened:

You should have been able to push the scissors through the wall of the bubble without popping it! When something wet touches a bubble, it doesn't poke a hole in the wall of the bubble, it just slides through and the bubble forms right around it. The bubble solution on the scissors filled in the hole that would have been made. If you try poking dry scissors through your bubble, you will see it pop instantly! (If it popped when you put the wet scissors in, something was probably too dry. Try it again and make sure anything that touches the bubble is completely wet with bubble solution.) For another trick, get one hand completely wet in the bubble solution then use the other hand to hold your bubble blower and blow a big bubble in the palm of your wet hand.

Bubble Rainbow

What You Need:

- Sock
- Gazillion Bubble Solution
- Plastic bottle
- Food coloring



What You Do:

- Cut the bottom off of the plastic bottle. If this is a project for kids, leave this part to an adult.
- Slip a sock over the cut end of the bottle. If you like, you can secure it with a rubber band or ponytail holder. Otherwise, a small sock fits just fine or you can hold the sock over the bottle.
- Squirt dishwashing liquid into a bowl or plate. Mix in a little water to thin it out a bit.
- Dip the sock end of the bottle into the dishwashing solution.
- Blow through the mouth of the bottle to make a bubble snake. Cool, right?
- To make a rainbow, stripe the sock with food coloring. You can make any colors you like. [Rainbow colors would](#) be red, orange, yellow, green, blue, indigo violet. For most food coloring kits, this would be red, red + yellow, yellow, green, blue, blue + red. Apply more coloring for a more intense rainbow or to "recharge" the sock if you need more solution.
- Rinse yourself with water when you're done. The food coloring will stain fingers, clothes, etc., so it's a messy project, best done outdoors and wearing old clothes. You can rinse your homemade bubble wand and let it air dry if you wish to use again.

Does Temperature Affect How Long Bubbles Last Before they Pop?



What You Need:

- Identical clear Jars, preferably with lids (baby food jars would work well)
- Gazillion Bubble Solution
- Measuring spoons
- Thermometer
- Stopwatch or clock with a seconds hand

What You Do:

- Use your thermometer to find locations that are different temperatures from each other. Examples might include outdoors, indoors, in the refrigerator, and in the freezer. Alternatively, you could prepare water baths for your jars by filling bowls with hot water, cold water, and [ice water](#). The jars would be kept in the water baths so that they would be the same temperature.
- Label each jar with either where you are placing it or the temperature (so you can keep them straight).
- Add the same amount of bubble solution to each jar. The amount you use will depend on how large your jars are. You want enough solution to totally wet the inside of the jar and form as many bubbles as possible, plus still have a little liquid remaining at the bottom.
- Place the jars at the different temperatures. Give them time to reach the temperature (maybe 15 minutes for small jars).
- You are going to shake each jar the same length of time and then record how long it takes for all of the bubbles to pop. Once you decide how long you are going to shake each jar (e.g., 30 seconds), write it down. It's probably best to do each jar one at a time to avoid getting confused about starting/stopping time. Record the temperature and the total time it took for the bubbles to pop.
- Repeat the experiment, preferably a total of three times.