PROFESSOR POP'S BUBBLE SHOW

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BUBBLE BASICS

How many kinds of bubbles can you name? There are bubbles from bubble gum, bubbles in soda pop, bubbles in your tub and bubbles in the sink. But get this, balloons, basketballs, and soccer balls are also bubbles.

What do they have in common? They are all trapped gas.

Soap bubbles are trapped gas, too. The gas is the same invisible air we breathe and that fills the room around us. What's trapping it? A thin skin or film of soapy water. This film holds the air in because liquids have an interesting property: surface tension.

SURFACE TENSION

If you've ever watched a leaf float on a puddle, you've experienced surface tension. Surface tension occurs because the molecules on the surface of a liquid stick tightly to each other, forming a kind of skin. When you dip your hand into a sink full of water, you're forcing some of the surface molecules apart, breaking the surface tension.

Have you ever tried dipping a bubble-blowing wand into plain water? What happened? The water can't stretch across the hole in the wand because its surface tension is too strong—the "skin" of the water snaps back against itself. Adding soap to the water doesn't break the surface tension but does weaken it. Chemicals in the soap loosen the "grip" the water molecules have on one another just enough that they will form a stretchy film.

What's the next step? You blow air—a gas—against the soapy film. The molecules must move outward as the air presses against them, but surface tension still holds them together. If you

get the air pressure just right, surface tension will wrap that film all the way around that breath of air. Congratulations! You've got a bubble!

POP! GOES THE BUBBLE

What happens if you poke your dry finger through a bubble? You guessed it.

Why do bubbles pop? Remember, surface tension is what makes bubbles possible. So, what happens when you break that surface tension? Right. You've put a hole in the bubble wall and popped it!

Can you think of other reasons that might make a hole form on the surface of a bubble?

- The water evaporates
- Gravity pulls soap and water toward bottom
- The bubble touches a dry object (which absorbs water from the bubble)

ALL THE COLORS OF THE RAINBOW

If you look closely at a soap bubble or soap film, what do you see? Lots of shimmering colors. What causes them?

Just like a prism, soap film causes white light to separate into its component colors. Oil in a water puddle has the same effect. A rainbow is created in a similar way when water droplets in the air brake up sunlight passing through them.

Words and Concepts

Bubble-ology

Gas vs. Liquid

Cube

Forces

Soap Film

Bubble-ologist

Evaporation

Elasticity

Physics

Humidity

Sphere/spherical

Energy

Prism & Spectrum

Surface Tension

Gravity

H2O

Formula

Bubble Fluid

Bubbles are fun to play with, and you can learn a lot about science while you are playing. Here's where you'll learn how to make some clever bubble toys and some bubble fluid. When you play with bubbles be sure and have a grown-up's permission. It's always best to play outside because bubble fluid is messy.

This is the easiest way to make bubble fluid. Just mix one cup of Johnson and Johnson's baby shampoo with ten cups of water. It makes great bubbles and if you get a bubble in your eye, it won't sting. This mixture will make normal sized bubbles that will last longer than the bubble formula you could buy at a store.

If you would like to make really big bubbles like Professor Pop makes, mix 3/4 a cup of Dawn dishwashing soap, a gallon of water, and 2 teaspoons of honey. That will make big bubble fluid.

A lot of grownups say that glycerin is good for making bubbles. It can make some pretty good bubbles but it's not good for grass and plants when you are playing outside.

Bubble Tools

Once you have some bubble fluid, you'll need tools for making bubbles. Or you can just use your hands. Just take your thumb and your first finger and make a letter "O". It's important that your finger and thumb touch. If they are not touching, you won't be able to hold bubble film.

You will be surprised by how many bubbles appear when you blow through your fingers. You will have to experiment with how hard or soft to blow. If you blow hard, you'll get a lot of little bubbles and if you blow soft, you'll get a large bubble.

Two Hands

If you put both of your thumbs together and both of your first fingers together, you can make even bigger bubbles. You will have to make sure your thumbs and fingers are touching the whole time. If you are playing outside, you might not have to blow to make a bubble. The wind might do that for you.

Hold a Bubble

Did you know that you can hold a bubble? When you touch a bubble with your finger, it pops. But, if your hand is wet, you can actually hold on to a bubble. So, now you know three ways you can play with bubbles by just using your hands.

Bubble Snake

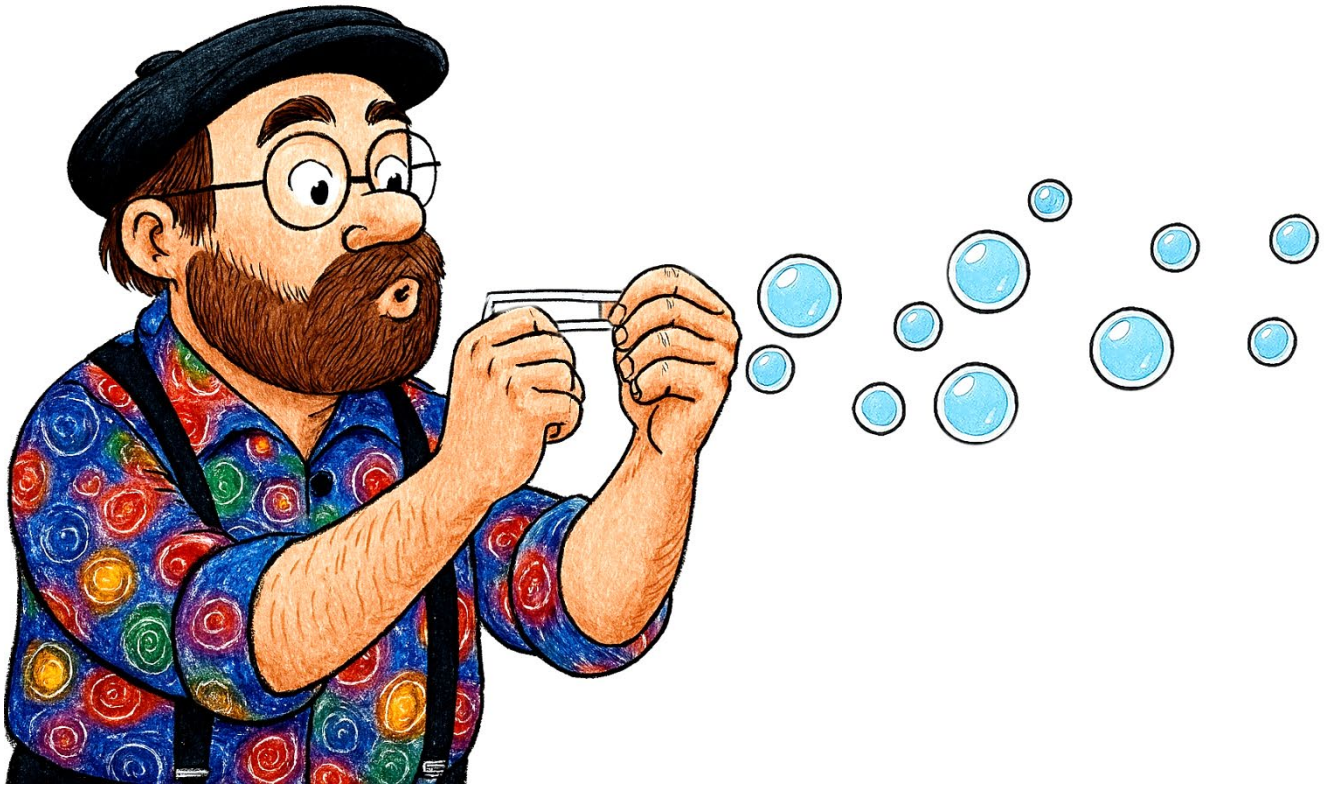
Bubble tools are always easy to build. You can make a bubble snake by holding a bunch of straws together with rubber bands. If you would like to make those bubbles smaller, you can use coffee stirrers. Bubbles are usually round spheres, but if you look at these bubbles very carefully, you'll see bubbles that are cubes and pyramids. Bubbles are different shapes when you stick a whole bunch of them together.

Bubble Window

Another bubble tool is a bubble window. There are lots of things you can do with it and it's also easy to make. You'll need two straws and some string. Cut a piece of string the size of four straws. Run the string through two straws and tie the string together. Dip it in bubble fluid and you have a bubble window. Wet things don't pop bubbles, so, if your hand is wet, you'll be able to pass your hand through the bubble window.

If you blow through the window gently, you can make huge bubbles! And, if you are playing outside, just wave the bubble window around slowly. The wind will make giant bubbles for you. If you look at a bubble carefully, you can see all the colors in the rainbow. The larger the bubble you make, the easier that is to see.

If you flatten out the window, you can make lots and lots of smaller bubbles. So, that’s three things you can do with just one bubble tool.



Toys in Bubbles

Remember, wet things don’t pop bubbles, so you can actually put things inside bubbles. You can use the cardboard tube in a paper towel roll to make giant bubbles, but it will get soggy pretty quick. If you make your bubbles on a small plate, it will be easier for you. Big bubbles are hard to work with. All you need to do is dip a plastic toy in the bubble fluid, put it on a small plate and make a bubble on top of it. This will take a little practice, so don’t worry if it doesn’t work the first time.

BUBBLIOGRAPHY

(FOR FURTHER READING)

Find these titles online using a search engine:

- Bubbles & Balloons: 35 Amazing Science Experiments by Susan Akass (2018)

- Blueberry-Blue Bubbles by Carrie Sharkey Asner (2022)

- You Can’t Kiss a Bubble by Karen A Wyle, illustrated by Siski Kalla (2021)

- Nick and Nack Blow Bubbles by Brandon Budzi, illustrated by Charles Lehman (2021)

- Bobo and Pup-Pup: We Love Bubbles by Vikram Madan, illustrated by Nicola Slater (2021)

- How to Make Bubbles by Erika L. Shores (2018)

- Bubble, Bubble! By Ji-hyeon Lee, illustrated by Eun-jin Ahn (2017)

- Get Messy with Science! Projects that Ooze, Foam, and More by Elsie Olson (2023)

- Bubbles, Rainbow and Worms: Science Experiments for Preschool Children by Sam Ed Brown, revised edition (for teachers, 2021)

- Bubbles, A Narwhal and Jelly Board Book by Ben Clanton (2021