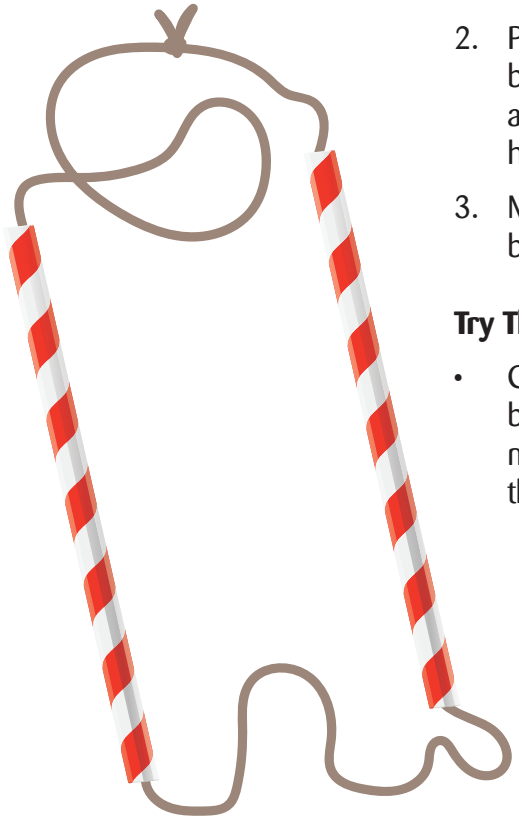
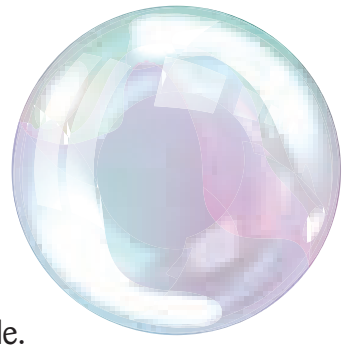
Big Bubbles!!

Who doesn't love bubbles, especially in the middle of the summer! But what makes bubbles possible? Why do they look the way they do? What makes the best bubble liquid?

What You'll Need

- Bubble solution (our recipe is six cups of water, one cup of Dawn soap and one tablespoon of glycerine)
- Jar or bowl (to make bubble solution easier to access)
- Straws
- Thick string or yarn
- Scissors
- Pipe cleaners
- Colored pencils or crayons





What You'll Do

Build your bubble makers:

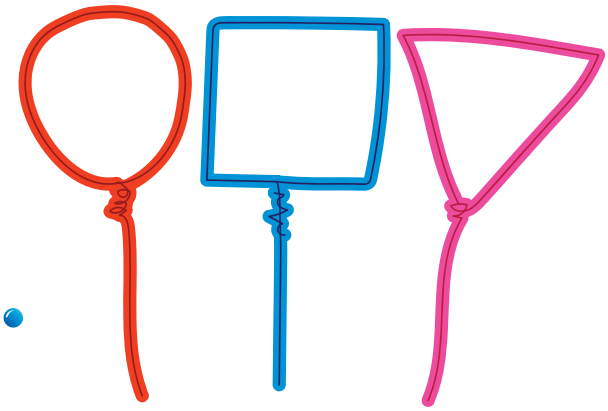
1. Cut your straw in half. Cut a piece of string approximately two feet long. Feed it through your straws, then tie the string ends together.
2. Bend one end of your pipe cleaner into a circle.
3. Make another bubble wand, but instead of making a circle, bend one end into a square.
4. Make one more bubble wand with a triangle.

Test out your bubble makers:

1. Blow a bubble with your circle bubble wand. Now try out your square bubble wand.
2. Put your straw contraption in the bubble solution and use it to make bubbles! Hint: make sure the string is saturated with the bubble solution, and when you spread it out with one hand on each straw, make sure you have a bubble covering the span.
3. Make some bubble observations! What size, shape and colors are your bubbles? Use the chart on the last page to record your findings.

Try This:

- Can you try making a bigger bubble? How would you build a bigger bubble contraption? Can you blow a smaller bubble? Is it possible to make a differently shaped bubble, like a square? How about a bubble that takes longer to pop? Try tweaking your bubble recipe!



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What's Going On?

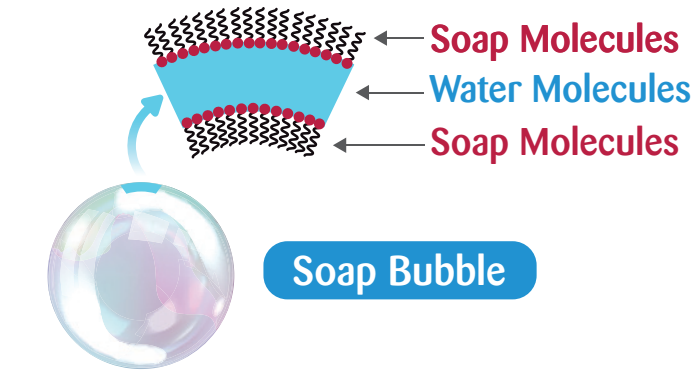
- Each bubble is actually made with three different layers: a layer of soap molecules, then a layer of water molecules, then another layer of soap molecules.

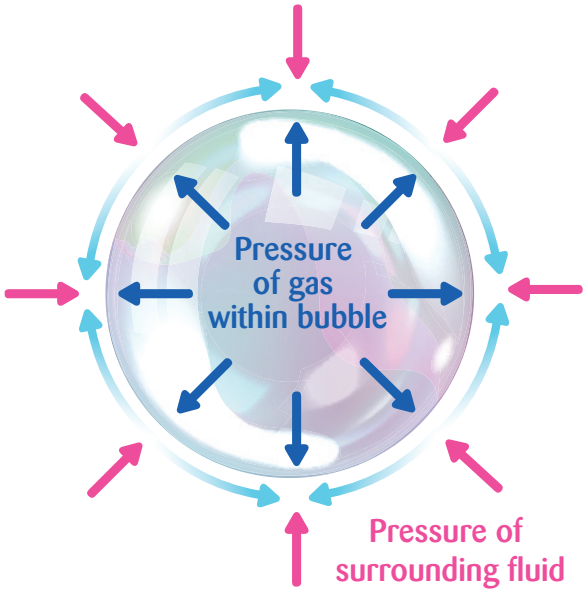
- A bubble is naturally round because of the surface tension. The air pressure inside the bubble is balanced by the inward surface tension so the shape stays a sphere. So, even when you blow a bubble with a square wand, it will turn out as a sphere. You can build a square or cube frame and get a bubble to form on it, but as soon as you blow on it and the bubble becomes free flowing, it becomes a sphere again!

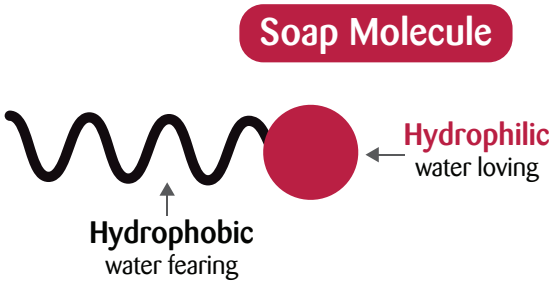
- Eventually, bubbles pop. Usually they pop because they dry out. Either the water evaporates or they hit a dry surface. Adding glycerine or a little sugar can help a bubble to not dry out as quickly which makes it last longer without popping!

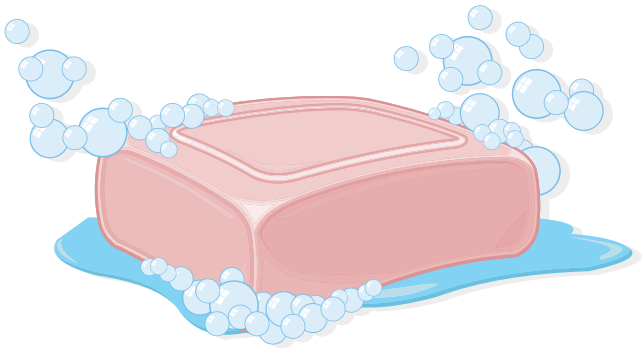
- You can tell how thick a bubble is by the color. The inside and outside layers are reflecting light. Where the soap film is thick, red light is canceled out leaving the bubble looking blue or green. When the film is thinner, green is canceled, leaving the bubble film magenta. Right before a bubble pops, they look almost colorless.

- Soap molecules have two ends. One end is attracted to water –hydrophilic or "water loving"- and the other is repelled by water -hydrophobic or "water fearing" - end. The hydrophobic end avoids water and attaches to oils, such as those in the coating of viruses and microbes! The hydrophilic end avoids oil and attaches to water. Soap thus helps attach oily dirt to water so the dirt can be washed away from clothes and dishes.









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Where Can I See Bubble Science in Action?

- Have you ever eaten ice cream? By freezing ice cream slowly in an ice cream churn, lots of little bubbles are incorporated into the cream. Obviously they aren't soap bubbles, but without that process, your ice cream would be more frozen like ice and less creamy!

- Have you ever tried a flat soda? It's really not very good is it? The bubbles are what makes a soda so refreshing! During the manufacturing process, carbon dioxide (CO_2) gas is forced into the soda mixture and then the bottle is sealed. The pressure of the sealed container keeps the CO_2 dissolved in the liquid. As soon as you open the bottle, the decrease in pressure allows the CO_2 bubbles to be released!

Bubble Maker	Observations
Circle wand	
Triangle wand	
Square wand	
Straw contraption	