



DUKE ENERGY SCIENCE NIGHT

Build-a-Bubble

Big idea

Explore the properties of soapy water and geometry by blowing bubbles!

You will need

WHAT WE GAVE YOU:

- Dawn dish soap
- plastic bin
- pipe cleaners
- straws
- string
- Bubble Challenges instruction sheet

STUFF YOU PROVIDE:

- water
- large mixing container
- paper towels
- scissors
- optional: additional supplies for creating bubble wands (hangers, plastic soda rings, funnels, etc.)

Set it up

Mix Dawn dish soap and water together in a large container, like a bucket or mixing bowl, to create a bubble solution. There's no magic formula; a lot depends on humidity and temperature. If the water in your area is very hard, you may have better results with purchasing distilled water. A basic ratio to start with is 1 part Dawn to 4 parts water. Measure the water first and then slowly stir soap into the water.

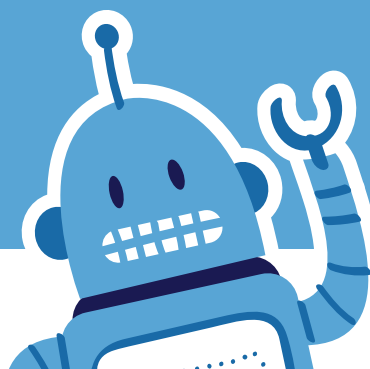
Pour some bubble solution into the plastic bin (about $\frac{1}{2}$ full) and save the rest in your mixing container – you'll probably need to top it off throughout the event. Set out pipe cleaners, straws, string, scissors and Bubble Challenge instruction sheet. It's a good idea to have paper towels on hand for this activity.

It's showtime!

Show students that they can blow bubbles with their hands as long as their hands are wet. They simply need to dip one or both of their hands into the bubble solution, then form a circle with their fingers and blow through it. Then, give them a pipe cleaner and ask them to construct a bubble wand. Show them the challenge sheet and see what kind of bubbles they can create. You can also encourage them to use the straws to blow bubbles within bubbles.

The string can be used to make wands that will create larger bubbles. Start with two straws. Cut a piece of string (about 3 feet long) and thread it through both straws. Then, tie the ends of the string together. Dip everything into the bubble solution. Using the straws as handles, pull the two straws apart from each other, forming a rectangle frame. Carefully pull the frame out of the bubble solution and gently wave it through the air. As you pull it through the air slowly flip the frame up or down to release the bubble. This will take a little practice.

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Why is this science?

From physics to geometry, color to chemistry, bubbles are full of science! Bubbles are made of a very thin film of soap and water with a gas inside. The bubbles we're blowing are full of air, but they can be made with any kind of gas. You can picture a bubble like a balloon – it's a thin, stretchy skin surrounding a pocket of gas.

A single bubble that's not touching any other bubbles will always be round, because a sphere (or ball shape) contains the most gas (air) using the least amount of surface area (soap film). But once a bubble touches other bubbles, it changes shape, because they form a common wall where they touch. Bubbles touching each other create angles of 120 degrees, no matter how big the bubbles are or how many there are. Think about a beehive: the beeswax is arranged in hexagons, with angles of 120 degrees. Just like the beehive, bubbles arrange themselves in a hexagonal pattern that conserves surface area.

North Carolina connection

A man from North Carolina has made a career out of blowing bubbles. Steve Langley from Huntersville, NC is a professional juggler and variety entertainer with the Soap Bubble Circus. He has performed in China, at Disney World, and even at the White House. In addition to performing shows, he also is known around the world for breaking records. In June 2015, he broke the Guinness World Record for the longest chain of hanging soap bubbles by creating a strand of 35 bubbles at Discovery Place Kids in Huntersville. The previous record was 30 bubbles.



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Bubble Challenges

Can you blow a bubble...

- ... bigger than your head?
- ... within a bubble?
- ... on top of another bubble?
- ... that doesn't pop when you catch it with your hands?

