MIX IT TOGETHER

SUDSY SCIENCE

MOREHEAD PLANETARIUM & SCIENCE CENTER AFTERSCHOOL

BIG IDEA

To make and blow big bubbles!

TIME

30–45 minutes

WHY WE LOVE IT

Students of all ages love bubbles. With this activity, they can make the biggest ones they have ever seen!

READY...

Gather materials:

- **Bubble mix:** You can make your own by combining:
  - 3 bottles of liquid dish soap (Dawn brand works best.)
  - water
  - 1 bottle of glycerine or corn syrup
- pipe cleaners
- 1 Styrofoam bowl per group of 2–3 students
- 4 boxes of straws
- 1 set of measuring spoons
- 1 set of measuring cups
- *Optional but highly recommended:* the giant bubble kit from *http://bubblething.com/store.html*
- *Optional:* food coloring, coffee filters, paper towels, computer paper, metal coat hangers

SET...

You may want to make the bubble mixture ahead of time. A basic ratio to start with is $^{2}/_{3}$ cup of soap to 1 gallon of water with 2 or 3 tablespoons of glycerine or corn syrup mixed in. If the water in your area is very hard, you may have better results with distilled water. Also, keep in mind that the weather of the day can affect your bubble solution. This is a great activity for a beautiful day!

GO!

1. Show students that they can use their wet hands to blow bubbles. They simply need to dip both hands into the bubble solution, then form a circle with their fingers and blow through it.
2. Then give students a single pipe cleaner and ask them to construct a bubble wand. Challenge your students, *Blow a bubble bigger than your head, a bubble within a bubble, a bubble on top of another bubble, and a bubble that doesn't pop when you catch it with your hands.*
3. Have students see what kind of bubbles they can create with a wand made from more than one pipe cleaner. You can also encourage them to use straws to blow bubbles within bubbles.

DIFFERENTIATION

- **K-1:** With this age group, have the bubble solution ready before the activity.
- **2-3:** Challenge this group to make the most elaborate bubble wand they can.
- **4-5:** Allow this group to mix the solution according to the instructions provided.
- **6–8:** Students can draw their own diagram of the molecular structure of bubbles.

[continued on back]

[continued from front]

TRY THIS

1. Have students thread pipe cleaners through the straws and twist the straws into geometric shapes to dip into the bubble solution.
2. Students can place drops of food coloring in the bubble solution and use a straw to makes colorful bubbles in the bowl. Then they can place pieces of computer paper, paper towels, or coffee filters on the bubbles to create works of art.
3. Let students bend metal coat hangers to make bubble wands that can pull bubbles up over themselves.
4. Make enough solution so that students have some to take home!
5. Students can tie string and long sticks or rulers together to make big bubble wands.

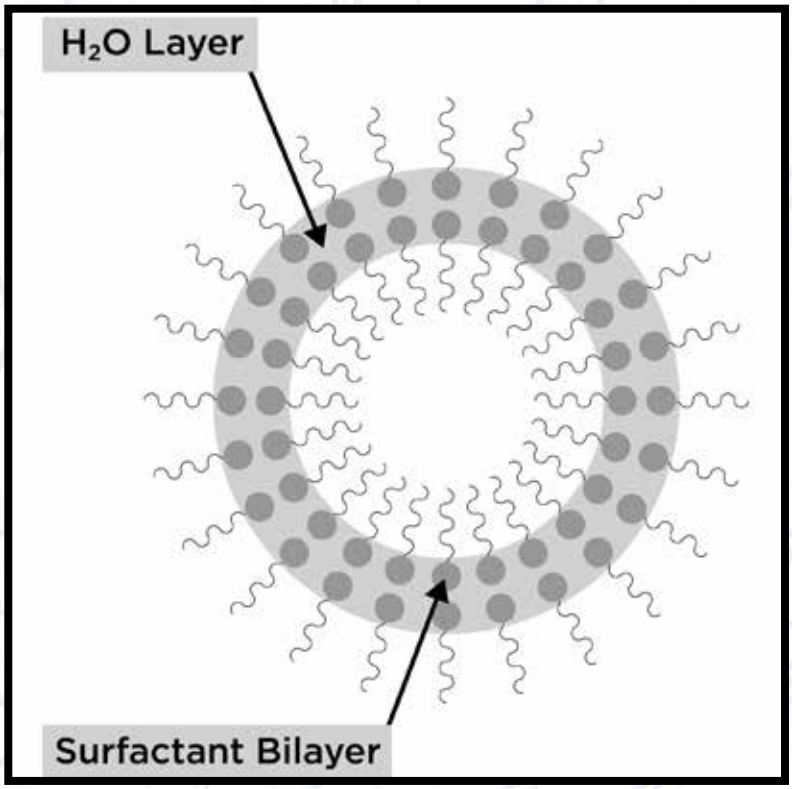

Figure 1: The anatomy of a bubble

WHY IS THIS SCIENCE?

Physics, geometry, light, color, reflection, and dish soap chemistry: bubbles are full of science! Bubbles consist of a very thin film of soap and water with a gas inside. You can point out to students that they are like a balloon—a thin skin stretched around a pocket of gas.

Soap molecules are long and skinny, with heads that are attracted to water (hydrophilic, like salt dissolving in water) and tails that are repelled by it (hydrophobic, like oil floating on top of water). Soap produces bubbles because its molecules are both hydrophilic and hydrophobic, which is called amphipathic. Soap molecules clean by trapping grease and grime, which cannot mix with water, in their tails.

Bubbles form when many soap molecules align together. The surface of a bubble consists of two soap layers that hold a layer of water in between them. The soap molecules' hydrophilic heads face the water in the inner layer, while the hydrophobic tails stick out away from the water layer **(Figure 1).** If your hands are soapy, you can hold a bubble. If your hands aren't soapy, the bubble bursts because the hydrophobic ends are repelled by your skin, which is mostly made of water.

Why is a bubble always round? Nature is efficient: a sphere uses the least amount of surface area (the outer soap film layer) to hold the most gas (the air inside). A bubble changes shape when it touches other bubbles, because bubbles form a shared wall where they touch. Many bubbles together arrange themselves in a hexagonal pattern (like the honeycomb in a beehive). This shape also conserves surface area.

WITH THANKS AND FOR MORE INFORMATION, VISIT:

http://www.exploratorium.edu/ronh/bubbles/

THE UNIVERSITY *of* NORTH CAROLINA *at* CHAPEL HILL