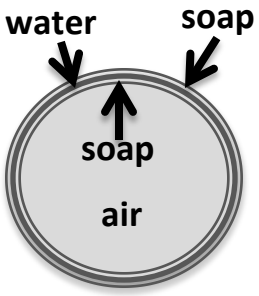
Science Fun with Floating Bubbles (and other stuff)

Elementary school-aged kids can learn several important math concepts through bubbles, while having a great time! They'll enjoy these fun activities with bubbles floating through the air, so much so that they may not realize how much they're learning.

Activities for Library and Home

- Science lesson: Just what *are* bubbles? The film that makes a soap bubble has three layers: a thin layer of water sandwiched between two layers of soap molecules. A bubble can exist because the surface layer of a liquid (usually water) has a certain surface tension, which causes the layer to behave somewhat like an elastic sheet. However, a bubble made with a pure liquid alone is not stable and needs something, like soap, to stabilize it. A common misconception is that soap increases the water's surface tension but it actually does the opposite, decreasing it to about 1/3 the surface tension of pure water. Soap does not strengthen bubbles, it stabilizes them. As the soap film stretches, the surface concentration of soap decreases, which causes the surface tension to increase. Thus, soap selectively strengthens the weakest parts of the bubble and tends to prevent them from stretching further. In addition, the soap reduces evaporation so the bubbles last longer, although this effect is relatively small. Their spherical shape is also caused by surface tension. Surface tension will cause the film on bubbles to enclose the greatest volume of air inside the smallest surface area possible, which results in a sphere.



- STEAM activity: Have kids create their own bubble wands using chenille stems, funnels, string/yarn, tubing, paper cones, straws—whatever you have on hand, and wherever their imagination takes them. Let them try out their wands, making adjustments as they need to. Will the unusually shaped wands produce unusually shaped bubbles? Does a particular size or shape of wand create bubbles that are larger, last longer, or float better?

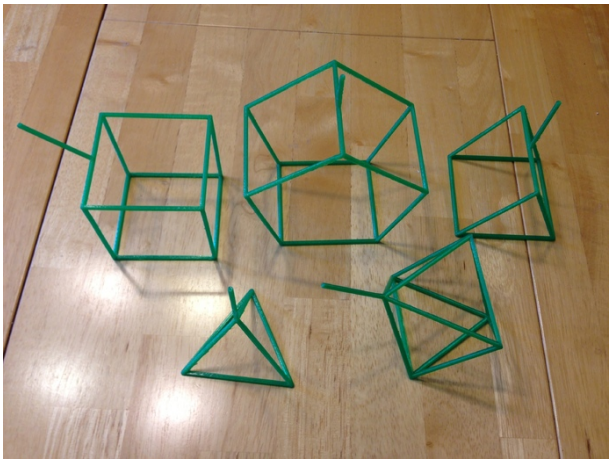
- Scientific observation: With the help of the kids, research different bubble solution recipes online (there are dozens!); most of them have the same ingredients in common (water, dish soap, glycerin or corn syrup, and sometimes baking soda), but will have different proportions. Also research what role each ingredient has (glycerin and corn syrup make bubbles last longer, for instance, because they slow down water's evaporation). Select a few recipes to test. Have the kids measure and mix the solutions, being careful to match the recipe to the solution.

Then have the kids blow bubbles with each solution and observe which make the bubbles that last the longest, make the biggest, and are the most resilient to bumps. You can also have the kids test to see if different brands of dish soap work better, if distilled water works better than tap water, if it makes a difference to use hot or cold water, and if it makes a difference to let the solution sit for a few days before using it.

- Observation and contest: See who can blow the biggest bubble, and the one that lasts the longest. Have the kids try to determine if some techniques are better than others.

- Art: Mix about a 1/2 cup of water, 2 tablespoons of tempera paint, and a few squirts of dish soap in a paper or plastic cup. Add a straw to each cup and let the kids blow into the mixture! Once they have bubble foam on the top of their cups, they can lay a piece of paper on top to catch the bubbles. The bubbles will "POP" and create a print! They can also set the cup on a piece of paper and let the bubbles spill over the top of the cup to land on the paper to make the print.

- Math + Science: 3D bubbles. Work with the kids to create 3D shapes from chenille stems or on a 3D printer; cubes, tetrahedrons, and pyramids are examples (and great vocabulary words!). Include short handles on each shape so kids will have a handle for dipping and observing. Have kids hold each shape by its handle and gently immerse it in bubble solution. Slowly pull it out and hold it steady; do not wave the shape in the air. Observe the soap film on the shape to see what happens. The film will stretch and pull itself to create new bubbles inside the shape. Ask the kids why this happened. The answer: once again, the soap film took the shape with the smallest surface area. To continue to test the idea, carefully pop one side or the bubble in the middle and watch what happens!



- Science experiment: Surface tension and pennies. Ask for 2 volunteers. Have one use an eyedropper to drop drops of water on a penny and count how many she can get on it. Have the other volunteer use an eyedropper to drop drops of bubble solution on a penny and count how many he can get on it. Ask the students why there's such a big difference, recalling what they've learned about surface tension.