Math and Science Fun with Sitting Bubbles

Elementary school-aged kids can learn several important math concepts through bubbles, while having a great time! And many people have never experienced bubbles that stay in one place rather than float in the air, which allows for closer observation and experimentation.

Activities for Library and Home

Spread a thin layer of bubble solution on a table or piece of hard plastic (like plexiglass). Try not to get the solution foamy. Give kids straws, and direct them to dip one end in the bubble solution, then blow into the other end with the soapy end directly on the surface. The bubbles will stay right on the surface! They can also blow bubbles from the air down onto the wet surface; the bubbles will attach and spread out on the surface. Re-wet the surface after a few minutes.

- Science experiment: What Makes Bubbles Pop? Ask kids what makes a bubble pop. Chances are the answer will be something sharp. Walk them through creating a hypothesis, then allow them to figure out ways to test it. This might involve blowing a bubble on the surface as described above and popping it with a pencil point or your fingernail; yes, it pops. But when they try to pop another bubble with something smooth, like soft fabric or a plastic water bottle, the bubble still pops. Pointing to the scientific method, have them revise their hypothesis and try again. (If they need guidance, the answer is that touching something dry will make a bubble pop.)

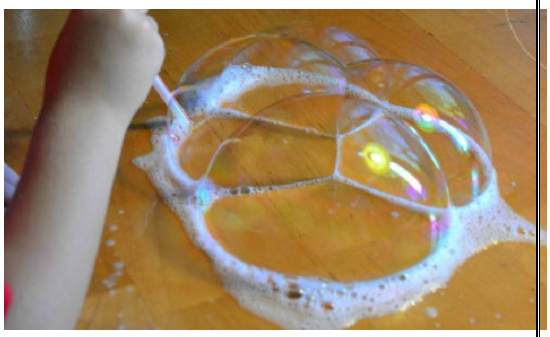
  Related observation: Bubbles also pop when the thickness of the soap skin gets thinner as the water evaporates. Kids can time how long their bubbles last on their hard surface before popping on their own. For an extension, kids can alter the proportions of the bubble solution to test which ingredient(s) makes the bubbles last longer.

- Observation, practice, and fun: Have each of the kids blow a large bubble on their hard surface. Now that the kids know that wet objects won't pop, have them dip a straw into the bubble solution and stick it straight through the large bubble. Then they can blow a bubble inside the bubble! See if anyone can blow a bubble inside a bubble inside a bubble without the bubbles touching. Can anyone enlarge or shrink a bubble already on the surface?

- Math time: Measuring bubbles. Have kids blow a few bubbles of different sizes on the surface. As the kids have learned that wet objects will not pop bubbles, have them dip small

plastic rulers into the bubble solution, and then slide them right into the middle of the bubble, vertically, to measure their bubbles! They can also measure the Discuss the importance of measuring the tallest point of their bubbles for the most accurate height, and the widest point for diameter. Have the kids experiment to see if they can make a bubble that's taller than it is wide, and vice versa. Have a contest to see who can blow the tallest and the widest bubble.

- Science time: Merging bubbles. Have the kids blow several bubbles close together on their hard surface. Ask them what happens when the bubbles touch, and why they think it happens. Once again, it's all in the surface tension. When two bubbles meet, their walls merge to minimize their surface area. If bubbles that are the same size meet, then the wall that separates them will be flat. If bubbles that are different sizes meet, then the smaller bubble will bulge into the large one. Have the kids experiment with merging a tiny bubble with a big one and 4 bubbles the same size, blowing a bubble inside a bubble to merge, and other variations to observe what happens.



- Math time: Measuring angles. When bubbles have merged, it's easy to measure the angles of the walls between them. Have the kids blow 3 bubbles of similar size that merge, and place a plastic protractor and slide it underneath the bubbles. They should arrange it so they can measure the angles. Have the kids blow 3 bubbles of different sizes that merge, and then blow lots of bubbles of any size that merge, and measure the angles at each variation. Do any of the variations cause different angles? No matter the variation, all angles should be 120°. A fourth bubble will always get pushed to the side.

- Science time: Science of colors. Have kids blow some bubbles on their hard surface. Direct them to observe the colors they see in the bubbles (shining a flashlight on the bubbles may help to see the colors better) and ask what colors they see. Are the colors always the same and in the same place? What happens to the colors when the bubbles sit a while? Can you tell when the bubble is just about to pop by its color? The science behind this: The bubble surface swirls with green, blue, magenta, and yellow; while most of the light goes right through the bubble, some of it gets reflected from both the outside and inside of the bubble. The reflections get mixed together in a process called interference, which cases the light waves to change and give off these colors. As the bubble sits, it thins and gets less colorful, as there is less soap skin to reflect light. Bubbles will turn dark just before they pop.

- Chemistry: Breath vs. air. Have kids blow one bubble on their hard surface through a straw, and use a turkey baster or large eyedropper to blow another bubble (these 2 bubbles should not touch). Ask the kids to hypothesize which bubble will last longer and why. Then have them observe which one lasts longer. The science behind it: the bubble blown with the turkey baster should last longer. Both air and breath contain carbon dioxide, oxygen, and nitrogen, but breath has a lot more carbon dioxide than air. Carbon dioxide dissolves more quickly in bubble skin, which is mainly water, which makes the skin less sticky so that its molecules don't hold together as well and makes the bubble pop more quickly.