Milli's Magnificent Bubble Solution from Celebrating Chemistry

Soap bubbles are marvelous because there is so much to be learned from them. People of all ages are fascinated with them. Although bubbles have been a favorite among children for hundreds of years, it was not until the early 1900s that bubble solution was actually sold as a toy for children. Before that, it was just soapy dishwater. In this activity, you will test several bubble solutions and see which one makes the most magnificent bubbles.

Materials

- Marking pen
- 4 plastic or foam cups (8 oz.)
- 4 pipe cleaners or bubble wands
- Liquid measuring cup
- Water (distilled or purified is best)
- Measuring spoons
- Liquid dishwashing detergent (Joy and Dawn brands work well)
- Granulated sugar or corn syrup
- Dropper or pipette
- Glycerin (available at most drug stores)
- Watch with second hand
- Cookie sheet or other flat tray (optional)

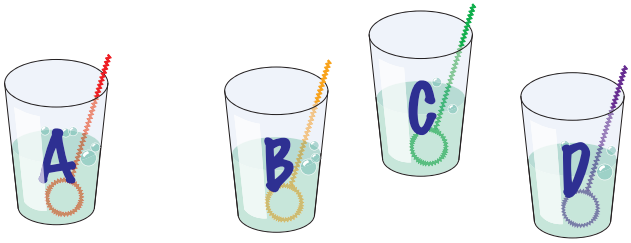
NOTE: It is recommended to cover surfaces with newspaper or to do this activity outside.

SAFETY! *Avoid getting soap in your eyes! If soap gets in your eyes flush with water immediately. Do not blow bubbles directly at anyone! Be sure to follow Milli's Safety Tips and do this activity with an adult! Do not drink any of the materials in this activity!*

To read Milli's Safety Tips click here!

Procedure

1. Use the marking pen to label the four cups "A", "B", "C" and "D".
2. Make bubble wands out of the four pipe cleaners by forming a loop about the size of a quarter at one end.
3. Carefully measure and put 1/4 cup of water into each cup.
4. Add 1 teaspoon liquid dishwashing detergent to cups "B", "C" and "D".
5. Add 1/4 teaspoon sugar to cup "C" and use the dropper to add 10 drops of glycerin to cup "D".
6. Put one bubble wand into each cup and stir very slowly.
7. Try blowing bubbles using the solution and bubble wand in cup "A".
8. Record your results in the "What Did You Observe?" section. Watch the bubbles as you blow them to see how long they last. Look for colors in the bubbles and note how they look before they pop. Also observe their size.
9. Repeat steps 7 and 8 for the other three containers.
10. If you have trouble timing how long the bubbles last, you may put water in a pan or tray and blow a bubble onto the surface of the water in order to more easily observe and time it.
11. Which solution made the longest-lasting bubbles?
12. Thoroughly clean the work area and wash your hands.



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Where's the Chemistry?

It was not possible to blow bubbles with plain water because of water's surface tension. The water molecules stick together and you cannot form a big air space in the middle. The detergent does not let the water stick together as well, so it is possible to form a bubble. Glycerin is a thick liquid which attracts moisture. Adding glycerin to the water and dish detergent helps make the bubbles last by slowing down how quickly the bubbles dry out. Sugar also makes the bubbles last longer by not letting them dry out as quickly. Bubbles reflect light from the outside wall and the inside wall, which results in the shimmery colors. The colors of a soap bubble come from white light, which contains all the colors of the rainbow. When white light reflects from a soap film, some of the colors get brighter, and others disappear. As bubbles lose water to drying, the thickness of the wall changes, which in turn, allows new colors to appear. Just before a bubble pops, the wall is so thin that the bubble appears to be colorless. This lets you predict when the bubble will pop.

Try this...

Try making bubble solutions with more glycerin, by adding salt instead of sugar, or a little salt and sugar. Check with your adult partner before mixing any other bubble solutions.

What Did You Observe?

Cup	A	B	C	D
	Water	Water + Detergent	Water + Detergent + Sugar	Water + Detergent + Glycerin
How long did bubbles last? (in seconds)				
List the colors you see in the bubbles.				
Describe how the bubbles look just before they pop.				

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