June 5 - Bubbles

Just in time for warm weather (hopefully) and Spectrum Festival! Let's make bubble solution and learn about the science behind blowing bubbles.

***Remember to ask an adult before doing these experiments.**

Materials

Dish Soap (Blue Ultra Dawn works the best)
Glycerine (this is optional if you can't find it)
Water
Container
Bubble wands (ones from the store or experiment with making your own with straws or pipe cleaners)

Procedure

Measure 2 tablespoons of glycerine and pour into your container
Measure ¾ cup of soap and pour into the container with the glycerine
Measure 3 cups of water and gently pour into the container
Stir the mixture up gently with your hands (you don't want to make a bunch of suds in the bucket as this causes the bubbles to break)
Use your bubble makers to blow some bubbles!

Explanation

A soap bubble is a very thin film of soapy water surrounding a volume of air.
Have you ever tried blowing a bubble with plain water? It's quite difficult.
The reason for this is that the surface tension in water is too strong for bubbles to last for any length of time. Another problem with pure water bubbles is evaporation. The surface of the bubble quickly becomes thin due to evaporation and this causes the bubbles to pop.
These two reasons are why we add soap to our solution in order to blow such nice bubbles. Soap decreases the pull of surface tension which stabilizes the bubbles. Also, soap decreases the rate of evaporation so the bubbles last longer.

Additional Experiments

3 or 4 colours of Tempera paint
Light colour construction paper
Small bowls – one for each colour of paint
Friend

Take about 1 cup of the bubble solution and put it into a small bowl
Add about a teaspoon of paint to the bubble mixture
Repeat steps one and two for each paint colour you have
Blow bubbles with the new bubble mixture and have your friend catch the bubbles on the paper and let them pop
See what kinds of pictures you can make with your bubbles!

Have fun and come see us this weekend at Spectrum for more science experiments!

Alannah Maurer, PhD
Regional Executive Director
Praxis – The Science & Technology Hotline

June 12 - Sense of Taste

Do you like foods that are really sweet? What about foods which are extremely salty? How do we tell the difference between flavours? Taste buds on our tongue are what allow us to do this! Today we are going to map where the taste buds that detect sweet, sour, salty and bitter flavours are on our own tongues.

***Remember to ask an adult before doing these experiments.**

Materials

Water
Sugar
Salt
Lemon juice or vinegar
Coffee granules
5 cotton swabs or flat toothpicks
A notebook and pen

Procedure

To test your sweet taste buds: dip a cotton swab or toothpick into the water and then into the sugar. Dot different parts of your tongue and make a note of where you get a reaction.
Rinse your mouth out with water and discard the swab.
To test your salty taste buds: dip a cotton swab or toothpick into the water and then into the salt. Dot different parts of your tongue and make a note.
Rinse and discard.
To test your sour taste buds: dip a cotton swab or toothpick into the water and then into the lemon juice or vinegar. Dot different parts of your tongue and make a note.
Rinse and discard.
To test your bitter taste buds: dip a cotton swab or toothpick into the water and then into the salt. Dot different parts of your tongue and make a note.
Rinse and discard.

Results

What does the map of taste buds on your tongue look like? Did you find any areas where the taste divisions overlapped?

Explanation

Take a look at your tongue. There are bumps all over the surface called papillae. Each one of these contains lots of taste buds. These detect whether something we eat is sweet, sour, salty, bitter or savoury.
When food is dissolved in the saliva in our mouths, it comes into contact with taste receptors in our taste buds. A chemical signal is sent to our brain informing us which flavours are in a bite of food.
Taste buds can actually detect all flavours, but some are more sensitive than others to specific flavours. That's why you may have tasted one flavour more intensely in one area on your tongue.

Additional Experiments

Conduct this experiment with a friend or family member and compare the two maps.
*** Do not conduct the next experiment if you have allergies to potatoes, onions or apples**
Find out how much of taste is related to the sense of smell.
Cut small pieces of raw potato, raw apple and raw onion.
Hold your nose and eat a tiny bit of each.
Can you taste the difference?

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June 19 – Learn about Metals

This week we will use pennies, nails, and a few simple household ingredients to explore some of the properties of metals. This is similar to an experiment we've done before, but with a few new twists!

***Remember to ask an adult before doing these experiments.**

Materials

- 10-20 dull pennies
- 1/4 cup white vinegar
- 1 teaspoon salt
- 1 shallow, clear glass or plastic bowl (not metal)
- 1-2 clean steel screws or nails
- water
- measuring spoons
- paper towels

Experiment #1: Shiny Clean Pennies

1. Pour the salt and vinegar into the bowl.
2. Stir until the salt dissolves.
3. Dip a penny halfway into the liquid and hold it there for 10-20 seconds. Remove the penny from the liquid. What do you see?
4. Dump the rest of the pennies into the liquid. The cleaning action will be visible for several seconds. Leave the pennies in the liquid for 5 minutes.
   NOTE: You want to keep the liquid you used to clean the pennies, so don't dump it down the drain!
5. After the 5 minutes, take half of the pennies out of the liquid and place them on a paper towel to dry.

6. Remove the rest of the pennies and rinse them well under running water. Place these pennies on a second paper towel to dry. Write labels on your paper towels so you will know which towel has the rinsed pennies.
7. Allow about an hour to pass and take a look at the pennies you have placed on the paper towels.

Experiment #2: Copper Plated Nails

1. Place a nail or screw so that it is half in and half out of the solution you used to clean the pennies. If you have a second nail/screw, you can let it sit completely immersed in the solution. Do you see bubbles rising from the nail or the threads of the screw?
2. Allow 10 minutes to pass and then take a look at the nail/screw. Is it two different colors? If not, return the nail to its position and check it again after an hour.

Explanation

Pennies get dull over time because the copper in the pennies slowly reacts with air to form copper oxide. Pure copper metal is bright and shiny, but the oxide is dull and greenish. When you place the pennies in the salt and vinegar solution, the acetic acid from the vinegar dissolves the copper oxide, leaving behind shiny clean pennies. The copper from the copper oxide stays in the liquid.

Rinsing the pennies with water stops the reaction between the salt/vinegar and the pennies. They will slowly turn dull again over time, but not quickly enough for you to watch! On the other hand, the salt/vinegar residue on the unrinsed pennies promotes a reaction between the copper and the oxygen in the air resulting in a blue-green copper oxide.

The copper that coats the nail/screw comes from the pennies. Nails and screws are made of steel which is an alloy primarily composed of iron. The salt/vinegar solution dissolves some of the iron and a copper coating forms on the nail. Some hydrogen gas is also produced and bubbles up from the site of the reaction - the surface of the nail or screw.

If you're in Bow Island on Sunday June 20 for the Bow Island Children's Festival, don't forget to stop by the Praxis booth for more hands-on science fun!

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June 26 – Dancing Raisins

With all the rain lately I'm sure lots of us have been stuck inside too much!
Here's a fun, easy experiment that can be done on one of those rainy days.

***Remember to ask an adult before doing these experiments.**

Materials
Carbonated Water (or clear pop)
Raisins
Clear glass or bottle

Procedure
Fill the glass or bottle about half full with your carbonated liquid.
Put 3 or 4 raisins in
Wait and watch the show.

Results
The raisins should soon begin to dance in the glass or bottle.

Explanation
Carbonated water is produced by adding carbon dioxide gas to water under pressure. The gas makes the water bubble and fizz.The carbonated water has a lot of dissolved carbon-dioxide, which forms bubbles more easily on surfaces such as the glass and the raisins. The bubbles will stick to the raisin and begin to grow. The bubbles float and they eventually overcome the raisin's weight and cause it floats upwards. Once the raisin reaches the surface some of the bubbles pop and the raisin sinks down again.

Additional Experiments/Questions
What other things can you think of that might dance in carbonated water just like the raisins? Here are some other food items to try: chocolate chips, popcorn kernels, dried beans, sunflower seeds or uncooked macaroni (try different shapes and see which dances the best).
Now try to come up with some of your own!

Happy experimenting!

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