

STEM Experiment #2

The Beauty of Bath Fizzies



Background Information

Research Activity

Great scientists like to know as much information as they can about their topic before they start their experiments. Use the questions below to guide your research on how Bath Fizzies create fizz. This will help you to understand the science behind your product. You can use sources such as trusted websites on the Internet (with your teacher's permission, of course) or books from the library.

? **Question 1:** Explain what a "Bath Fizzy" does to enhance the bath.

? **Question 2:** What is a chemical reaction? Give two examples.

? **Question 3:** What is the pH scale?

Pre-Lab Activity: Reading a pH Scale

The pH scale is a scale from 1 - 14 that helps scientists to determine how acidic or basic something is. When acids and bases are combined, chemical reactions can occur and can sometimes be dangerous. Scientists test the pH before working with certain chemicals in order to determine the acidity level. A chemical with a pH of below 7, such as lemon juice or vinegar, is an **acid**. A chemical with a pH above 7, such as baking soda or bleach, is a **base**. A neutral pH is about 7, which is typically the pH of water.



☑ **Apply:** Sort the chemicals below into **ACID** or **BASE** groups according to their rating on the pH scale.

lime juice (pH 2)
coffee (pH 5)
bleach (pH 9)

vinegar (pH 3)
rain water (pH 5.5)
baking soda (pH 8)

dishwasher detergent (pH 12)
citric acid (pH 2.2)
cornstarch (pH 5)

ACIDS (pH < 7)	BASES (pH > 7)

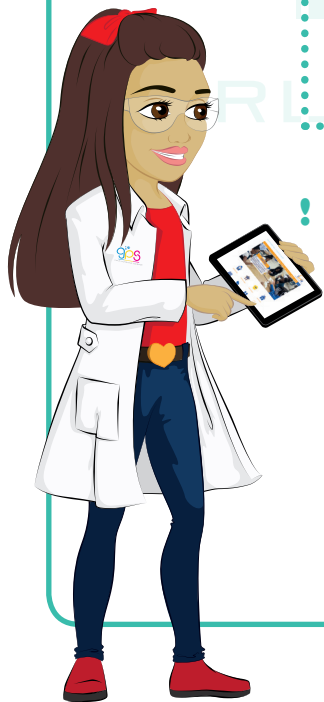
Hypothesis

A **hypothesis** is a prediction that scientists make based on their research and prior knowledge. Based on the background information and research you have completed, write a hypothesis about what might happen when you combine an acid and a base.

! To write like a GPS scientist, use the following format to guide you:

If (I do something), then (what will happen) because (explain how you know).

! **Hypothesize:** Write your own hypothesis for combining an acid and a base together.

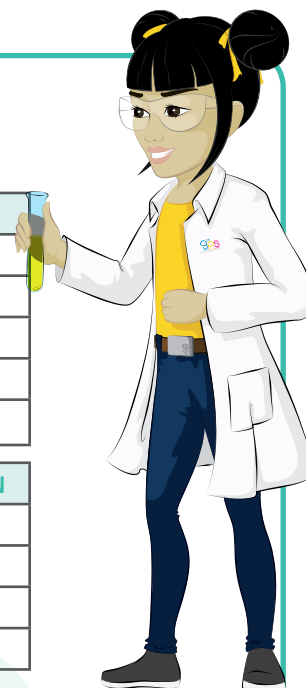


Let's Make Bath Fizzies!

Materials

EQUIPMENT IN YOUR KIT	QUANTITY	CLASSROOM EQUIPMENT	QUANTITY
Safety Glasses	1	GPS Lab Jacket	1
Pipette	1	Measuring Spoons or Scale	As needed
Stirrer	1	Paper Towels	As needed
1.5 oz Portion Cups	3	Small Bowls	2
		Large Container	1

INGREDIENTS IN YOUR KIT	FORMULATION	CLASSROOM INGREDIENTS	FORMULATION
Sodium Bicarbonate	3 oz	Distilled Water	$\frac{1}{8}$ tsp
Citric Acid	1.5 oz		
Fragrance Oil	1% - 4%		
Colorant	1% - 4%		



NOTE!

The materials list and formulation is for each person. If you are working in a group, multiply the quantity by the number of girls in your group!

Procedure

In this experiment, you will make three Bath Fizzies. The Bath Fizzies will be used to demonstrate a chemical reaction taking place between the different ingredients within the Bath Fizzy. Two of the Bath Fizzies will be used to test the formulation. Take the third Bath Fizzy home and use it in your bath water!

NOTE!

Use caution when using the ingredients in your kit.

DO NOT INGEST ANY OF THE INGREDIENTS!

Step 1: Read the entire procedure **before** you begin.

Step 2: Clean off your work surface and put on your safety glasses and your GPS Lab Jacket to protect your face and clothing.

Step 3: Gather all of your **ingredients** and **materials** (see list above) and arrange them in the order that they will be used.

NOTE!

Do not start making your product before you have all ingredients, supplies, and equipment in front of you!



Step 4: In one small bowl, combine the dry ingredients (sodium bicarbonate and citric acid) and stir together with your stirrer.

Step 5: In the second bowl, combine the wet ingredients (fragrance oil, colorant and distilled water) and stir until well mixed.

NOTE!

Before reusing your pipettes, wash in warm soapy water to clean and remove the oils from them.

Step 6: Use your pipette to gradually add a few drops of the wet mixture to the dry mixture. (You will record your observations in the data chart on the next page).

Step 7: If your mixture began to fizz, quickly stir the mixture. This should stop the fizziness. Continue to stir the mixture with your stirrer or use your fingers (with gloves on) to press out the clumps. As you add the wet mixture, stir, stir, and stir. Continue to stir the mixture until all the clumps are out.

Step 8: To test the consistency of your mixture, take a small amount in between two fingers and squeeze it together. It should stick together in one chunk. If it is still too powdery to hold together, just add a drop of the wet mixture and mix until it does hold together in one chunk.

Step 9: Fill the portion cups with the bath fizzy mixture. Use the back of a spoon or your thumb (with gloves) to pack the mixture into the portion cups. Pack the mixture as you pour it in the portion cups. Pack the cups as tightly as you can.

NOTE!

The challenge to making Bath Fizzies occurs when the wet and dry ingredients are combined. If your fizzy mixture appears to be expanding after you fill your portion cup or appears puffy, you have added too much water to the wet mixture. If so, we have included enough of each ingredient to start another batch. Start with Step 4 and use less water in your formula.

Step 10: Set the compacted portion cup to the side in a dry area at normal room temperature. Let it sit for about an hour to dry and harden.

NOTE!

If your fizzy is very crumbly, your recipe may not have had enough water. To fix this, remake the fizzy and use a little more water.

Step 11: After letting the Bath Fizzy harden, remove the fizzy from the cup by turning the cup upside down on a flat surface and pressing the bottom of the cup with your thumb. The Bath Fizzy should pop out.

NOTE!

When you make additional fizzies, you may store them separately in plastic baggies or airtight containers. Another great idea is to place them in your bathroom, away from the water flow. It's convenient for when you are ready to take a bath. They also make great air fresheners. If you decide to make them as gifts or to sell, wrap them in cellophane or tissue paper.

DONE!



Analysis and Conclusion

After completing an experiment, scientists ask themselves questions in order to see what they have learned about their topic. Answer the following questions about your experiment when creating your own Bath Fizzy.

? **Question 1:** *When creating your Bath Fizzy, you created a chemical reaction. Describe the reaction and explain what caused it.*

? **Question 2:** *Test one of your Bath Fizzies by dropping it in an 8 to 10 oz container of cold water. Test the second Bath Fizzy by dropping it in an 8 to 10 oz. container of hot water. Write a hypothesis about the effect of water temperature on the fizziness of your Bath Fizzy.*

? **Question 3:** *Why is it important for scientists to follow procedures in the correct order? Explain the possible errors that could occur if they do not follow the procedures in the correct order.*

Data Collection

While performing experiments, scientists collect data along the way. They do this in order to go back and understand what the data is telling them about the lab. During your lab experiment, be sure to collect data when prompted.

PROCEDURE STEP/QUESTION	OBSERVATION
Analysis Question 1: What happened when you added drops of the wet mixture to the dry mixture?	
Analysis Question 2: What happened when you dropped the fizzy in cold water?	
Analysis Question 3: What happened when you dropped the fizzy in hot water?	

