FOAMING FROSTY SNOWMAN

Build snowy critters with baking soda, then dissolve them and watch them bubble away.

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45 minutes | Grades: 4-8

FOAMING FROSTY SNOWMAN

Build snowy critters with baking soda, then dissolve them down and watch them bubble away.

About the Activity

Be a chemist with household items to form mini snow creatures, then fizz them all away into a bubbly goo.

Supplies

- Baking soda
- Vinegar
- Liquid dish soap
- Measuring cup
- Tablespoon and teaspoon measuring spoons
- Two mixing bowls
- Sticky notes
- A pen or pencil
- Small plastic beads for decorating *(optional)*

Grades: 4-8

Topics: Chemistry, STEM

Time: 45 minutes

ACTIVITY STEPS

Even if you don't have snow on the ground, you can follow these steps to create a pair of snowy creatures in your kitchen!

1. Measure one cup of baking soda into each bowl.

Did You Know?

Baking soda, known to scientists as sodium bicarbonate, is a base. **Bases** are substances that, when placed in a watery solution, are slippery to the touch. Bases are often used in cleaning products, like soap and toothpaste.

2. Add three tablespoons of water to each bowl. This will create a baking soda dough that you can form.

3. Pour one teaspoon of dish soap **into just one of the bowls.** Using a sticky note, label the bowl that contains the soap, so you can keep track of it.

4. Mix together the baking soda doughs in each bowl. If they aren't holding together, you may need to add more water. Add just a few drops of water at time, so you don't add too much!

5. Form your dough balls into a figure of your choice: a snowperson, a snow dog, or a snow cat — it's up to you! Then, add some decorations: beads, buttons, or googly eyes! Place your formed figures back into their bowls, keeping track of which figure contains soap.

Activity Steps Continued...

6. Once you've admired your creation (and shared a picture with us using **#4HHomefortheHolidays** on social media), it's time to destroy it!

7. Pour a cup of vinegar over the snow figure **made without soap.** What happens?

8. Now, refill the measuring cup with vinegar and pour it over the snow figure **made with soap.** What happens with this snow figure?

Did You Know?

Vinegar is a type of acid, called an acetic acid. **Acids** are substances that occur all around us — in citrus fruits like lemons and oranges, or even in our bodies!

Fun Fact

Combining baking soda and vinegar creates a chemical reaction: baking soda as the base neutralizes the acid in vinegar. The reaction releases carbon dioxide gas (the same gas that we breathe out of our bodies when we exhale), which makes it bubble and expand.

Bonus Activity

Got any leftover candy canes from the holidays? Using baking soda and vinegar, you can make them dance! Crush your candy canes and put them into a vinegar and water mixture in a tall, clear glass. Add a bit of baking soda and watch the candy canes go! You can experiment with the amount of candy canes, the strength of your vinegar and water mixture, and how much baking soda you add.

TEST YOUR KNOWLEDGE

See how much you've learned about the chemistry of fizzy snowmen!

1. Which ingredient didn't contribute to the fizzy reaction in this activity?
   a) Baking soda
   b) Vinegar
   c) Water

2. Which is an example of an acid you might find in your home?
   a) Water
   b) Lemon juice
   c) Soap

3. What causes the bubbles in the reactions you observed today?
   a) Carbon dioxide
   b) Hydrogen perioxide
   c) Sodium carbonate

4. Which of these pairs might cause a fizzy reaction when combined?
   a) Baking soda and dish soap
   b) Baking soda and lime juice
   c) Baking soda and chewing gum

5. Soap is a base.
   a) True
   b) False

1. Did the two doughs feel similar or different?

2. Did the mixture with the dish soap react differently to the vinegar than the one without? Why do you think it reacted that way?

3. If you have any lumps remaining in your containers, what happens when you pour water over them? If you hold some of the residue in your hand over a bowl and pour more vinegar over it, how does it feel?

INVESTIGATE AND EXPLORE

Acids like vinegar and bases like baking soda are chemical opposites.

They each have different parts that can form water, or H20. In doing so, they release carbon dioxide, which makes the bubbly result you observed. When the dough containing the dish soap produced a foamy result, you witnessed surfactants at work. **Surfactants,** or surface-active agents, lower the surface tension of liquid so that bubbles don't burst as easily as they would if there were no soap. In this activity, when the soap spreads out over the liquid (vinegar), the gas being released from the acid-base chemical reaction becomes trapped as air bubbles and produces foam.

Share It!

If you're going to see some younger family members this holiday season, you could share this activity with them! A younger person could learn a lot from you about science, and they would be excited to do something fun with you.

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CAREER CONNECTIONS

Meet Sarah, a police chemist from South Carolina! She uses her chemistry knowledge to help detectives solve crimes, but before that, she was a youth with a spark for chemistry!

She became interested in chemistry when she was a junior in high school. For the first time, a subject in school clicked with her and made sense. Because of her good grades and enthusiasm, she was selected to take organic chemistry in high school and continued to learn and grow! As her knowledge and her spark grew, she decided to study organic chemistry in college.

She loves that there is always more to discover in the field of chemistry. Whether it is research or new technology, science is constantly changing, and new things are being discovered daily! Maybe you'll make the next big chemistry discovery!