Curiosity Guide #410
Matter

Accompanies Curious Crew, Season 4, Episode 10 (#410)

Making Sculpting Putty

STEM Challenge

Description

This is a fun way to combine forms of matter into something new!

Materials

- Bowl
- Baking soda
- Baking powder
- Dish soap
- Measuring cup
- Spoon
- Tray
- Wax paper
- Smocks or old shirts
- Wet paper towels

Procedure

1. This investigation can be messy. Wear a smock or old shirt.
2. In a large mixing bowl, combine one cup baking soda with one-half cup baking powder.
3. Add one-half cup liquid soap and mix thoroughly with a spoon.
4. You may need to sprinkle in additional baking powder to improve the fluffy consistency.
5. The color from the soap should spread throughout the putty mixture.

6. Cover a tray with wax paper.
7. Remove the putty from the bowl. Knead the putty on the waxed paper tray, adding sprinkles of baking powder as necessary.
8. Feel the texture of the putty. Can you sculpt with it? Does the putty hold its shape? How would you describe the material? Is the putty a solid or a liquid?
9. When done, be sure to store the putty in sealable plastic bag or container.
10. How would varying the recipe alter the outcome?

My Results

Explanation

When the soap is added to the dry ingredients, the baking powder reacts. This is because baking powder is made from baking soda, which is a base, and cream of tartar, which is an acid. When combined with the liquid soap, the baking powder reacts and gives off carbon dioxide gas. You will notice that when you first begin to stir, the mixture gets really fluffy from the gas and requires additional baking powder to get the right consistency. Even though the putty has solid ingredients (baking soda and baking powder), as well as a liquid ingredient (liquid soap), the putty behaves more like a solid.

The liquid detergent properties in the putty, however, can cause the putty to slowly lose its shape. If you choose to store the putty in a plastic bag, be aware that the putty will continue to emit gas for a while, so you may need to leave a small opening in the bag or release the pressure periodically.

Think about this: Some matter is harder to classify than others. Take smoke for example. What is smoke? Believe it or not, smoke is a combination of both a solid and a gas. The small, solid particles from the fire get suspended in the gas. The suspended particles make us able to see the smoke. Shaving cream is another fun example where different matter gets combined. The gas particles get mixed into the liquid shaving cream, making the cream all foamy. In both cases, the small particles are all mixed together. We call these substances colloids, and their properties are really interesting to describe and manipulate. Slime, anyone?

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