deSTEMber
SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH
PRESENTED BY: girlstart

Chemistry of Soap

Lather up using your own custom soap! Mix up the ingredients and add colors and scents to create the perfect soap for you. Washing your hands has never been so fun!

TEKS:

SCI 3.5 C: The student is expected to predict, observe, and record changes in the state of matter caused by heating or cooling such as ice becoming liquid water, condensation forming on the outside of a glass of ice water, or liquid water being heated to the point of becoming water vapor.
SCI 3.5 D: The student is expected to explore and recognize that a mixture is created when two materials are combined such as gravel and sand or metal and plastic paperclips.
SCI 5.5 B: The student is expected to demonstrate that some mixtures maintain physical properties of their ingredients such as iron filings and sand and water.
SCI 5.5 C: The student is expected to identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving salt in water or adding lemon juice to water.

Materials:

- 3-5 ounces glycerin soap
- 1 knife
- Microwave
- Microwave safe measuring cup
- 1 paper plate
- 1 craft stick
- 1 silicone soap mold
- Spray bottle of rubbing alcohol
- *For soap decorations:*
    - Beads
    - Food coloring
    - Glitter
    - Essential oils/scents

How To:

1. Cut glycerin into 1-2-inch cubes to speed up the microwaving process. Microwave the glycerin in a microwave safe measuring cup in 30-second increments until it is completely liquid. **Safety: An adult should assist when using a knife to cut glycerin.**
2. Spray the inside of the silicone mold with rubbing alcohol to prevent sticking.
3. Place the mold on a paper plate and fill the mold ¾ of the way with the melted glycerin.
4. Now it's time to customize your soap! Add any decorations you would like in your soap, such as beads, glitter, food coloring, and essential oils/scents. Use a popsicle stick to stir everything together.
5. Once the glycerin starts to harden, stop stirring the soap to avoid clumping.
6. Lightly spray the top of the soap with rubbing alcohol to set the soap and remove air bubbles.
7. Leave the soap for about an hour to harden.
8. Once the soap has completely hardened, pop your soap out of the silicone mold. Go wash your hands with your new soap and enjoy!

STEM Explanation:

Soap is a type of salt, but not the kind you add to food. Salts are made from a unique reaction between an acid and a base. Acids are positively charged and are sour tasting, like lemon juice. Bases are negatively charged and taste bitter, like baking soda. The pH scale is what scientists use to measure the strength of acids and bases. Substances that have a pH lower than 7 are acidic, and those that have a pH higher than 7 are basic. When acids are combined with bases, they create neutral compounds that are referred to as salts, like soap! Soap is a special molecule because one side of it is attracted to water, while the other side is attracted to oil. This helps soap form a pocket around oil molecules, which makes cleaning oily surfaces possible!

Career Connection:

Chemists study the properties of matter. They may specialize in a specific area of chemistry such as organic or physical chemistry. These scientists must understand the structure, properties, and compositions of various substances. They study the dynamics of systems and processes at a molecular level.

Resources:

https://www.youtube.com/watch?v=XntinCBEC9U
https://www.giftofcuriosity.com/how-to-make-glycerin-soap-with-kids/
https://www.ducksters.com/science/chemistry/soaps_and_salts.php
https://www.teachengineering.org/activities/view/cub_air_lesson06_activity1
https://www.newlifeonahomestead.com/how-they-made-all-purpose-soap-in-the-old-days/