

LEARNING ACTIVITY:

## A Paste With a Taste

**Grade Level: 6-12**

### Materials

- ♦ Calcium carbonate (finely powdered unflavored TUMS™ will work)
- ♦ Sodium bicarbonate (baking soda)
- ♦ Small plastic cups (1 for each student)
- ♦ Popsicle sticks for stirring (1 for each student)
- ♦ Eye droppers (1 for each group)
- ♦ Plastic spoons (1 for each group)
- ♦ Water
- ♦ Assorted food colors and flavorings (sugar, mint extract, etc.)
- ♦ Computer with internet access

Produce a “marketable” product made from minerals that are used by most people every day. Both the abrasive and cleansing compounds found in toothpaste, calcium carbonate and sodium bicarbonate, are minerals.

Use this activity in conjunction with the “Toothpaste Game” also in the Earth Science Week 2017 Toolkit.

### Procedure (for teacher)

1. With students, prepare a basic recipe for toothpaste: Mix  $\frac{1}{2}$  teaspoon calcium carbonate,  $\frac{1}{4}$  teaspoon sodium bicarbonate in a small plastic cup, and add just enough water (with eye dropper) to make a paste. (If possible, also have some commercial toothpaste samples available.)
2. Have the students taste the basic recipe and discuss possible improvements.
3. Divide the class into small groups and let them come up with some solutions to make the basic recipe more appealing to other children. Remember, the purpose is to produce the most “marketable” toothpaste. Each group is responsible for one recipe. (As the samples are quite small, only small amounts of color and flavoring are needed.)
4. Each group will have to keep a record of their recipe (what they added and how much) using the accompanying worksheet ([www.earthsciweek.org/content/toothpaste-worksheet](http://www.earthsciweek.org/content/toothpaste-worksheet)), and submit it with the sample for judging. A panel of judges, which can be another class, parents, etc., will determine the winner. Have a prize for the winning sample.
5. Discuss: How did the homemade toothpaste compare to commercial products? What other mineral is added to toothpaste to fight cavities? How many of the commercial toothpastes had minerals in them?



6. Have the students compare the prices of commercial toothpaste in relation to the number of mineral ingredients. Which were more expensive, the ones with more or fewer mineral ingredients?
7. Finally, have the groups develop an advertising campaign (for example, a 15 second radio ad) for their toothpaste.

### Extensions

- ♦ The minerals you used in this activity are common. Have you ever used sodium bicarbonate before? What did you use it for?
- ♦ Invite an industrial geologist to discuss what nonmetallic minerals are used for commercial purposes.
- ♦ When you get home, look at your shampoo, soap, and other cosmetics and cleaning supplies. What minerals do you notice on the ingredients list?

### NGSS 3-D Learning

- ♦ Science and Engineering Practices—Planning and Carrying Out Investigations
- ♦ Disciplinary Core Ideas—Earth and Human Activity
- ♦ Crosscutting Concepts—Structure and Function