

A PASTE WITH A TASTE

Grades 4-5 NMA Activities, Nevada State Science Education Standard Correlation. Referencing Science Standards 2005 http://www.doe.nv.gov/standards/standscience.html						
	N.5.A.5	N.5.A.6	N.5.B.1	N.5.B.3	P.5.A.1	P.5.A.4
Paste with a Taste	X	X	X	X	X	X

A PASTE WITH A TASTE

Revised and Distributed by Women in Mining Education Foundation - This Version Revised by Bill Durbin - Nevada Division of Minerals - Sept. 2003

PURPOSE:

To allow students to produce and advertise a “marketable” product used by most people every day that is made from minerals. Fluoride, which coats and strengthens tooth enamel comes from the mineral, fluorite. Both the abrasive and cleansing compounds, calcium carbonate and sodium bicarbonate found in toothpaste, are minerals. The coloring used in white toothpaste may come from the minerals barite or rutile.

BACKGROUND:

Minerals play a very important role in dental hygiene. The daily use of toothpaste is an essential part of keeping teeth clean and free from damaging plaque and bacteria. The active ingredients in toothpaste, especially the fluoride compounds, polishing agents, and some colorants, come from minerals (**fluorite, diatomite, calcite, quartz, barite, rutile**). The hygienist helps to maintain good dental care through periodic cleanings. The picks and cleaning tools used by the hygienist are made from durable tungsten steel which is made from the minerals **magnetite** and **scheelite**. The X-rays taken by the dental technician to view the internal health of teeth are made possible by the use of **thorium** and **uranium**; **silver** is used in the manufacture of black and white film, a lead shield (**galena**) is used to protect the patient from overexposure to the X-rays. Improper brushing may lead to the development of cavities which must be repaired by a dentist. His drill employs a bit made of tungsten carbide and he fills the cavity with **gold**, silver or porcelain (made from the minerals **calcite, clay, and quartz**). A wide variety of minerals play a significant role in good dental health. Think about the many other facets of daily life and how minerals play a role in these activities. Do they?? You bet they do!!

MATERIALS NEEDED (for 8 groups of 4):

- Calcium carbonate powder or calcium carbonate tablets (crush or grind to fine powder in a home blender) - can be purchased from most drug stores or health food stores
- Sodium bicarbonate (baking soda)
- Sweet-n-Low™ or Equal™ packets (artificial sweeteners are used in commercial toothpaste and have a mineral base) - can also be purchased in bulk packages
- 32 small plastic cups
- 32 popsicle sticks for stirring
- 8 eyedroppers
- 8 plastic spoons
- Water
- Measuring spoons
- Assorted food colors and flavorings
- Have some commercial toothpaste samples available with the actual retail price marked on them.
- “A Paste With a Taste” information record sheet
- Optional: Samples of fluorite, calcite, quartz, barite, rutile, minerals used in manufacture of toothpaste.

INSTRUCTIONS:

The basic recipe for toothpaste is:

Combine $\frac{1}{2}$ teaspoon calcium carbonate and $\frac{1}{4}$ teaspoon sodium bicarbonate in a small plastic cup, add just enough water (with eye dropper) to make a paste (12-14 drops is usually about right). Add $\frac{1}{4}$ packet of artificial sweetener (about $\frac{1}{8}$ of a teaspoon).

Have students taste the basic recipe and discuss possible improvements. Divide the class into groups of 4 and let them come up with some color/flavor solutions to make the basic recipe more appealing to other children. Remember, the purpose is to produce the most "marketable" toothpaste. Each group can decide on 4 samples with each member of the group responsible for one, or it can be done as a group project with one sample per group. Students will be given information as to the choices of colorings and flavorings that are available and will individually or as a group, decide what combination(s) they would like. More than one color and flavor can be used.

Since the samples are quite small, only small amounts of coloring and flavoring are needed. Have adults distribute the colorings and flavorings (use eye droppers for the flavorings, the colorings usually have dropper caps) as requested by individuals or group members. Using the information record sheet, have the individuals or a designated group leader record the number of drops of each color and flavor they used to enhance their basic toothpaste recipe.

Have the students return to their seats or groups, stir the colorings and flavorings into the basic recipe and using popsicle sticks, test each of the finished products. Have the individuals or groups come up with a brand name for their toothpaste and record it on the information record sheet. Each individual or group will be responsible for submitting one sample plus the completed information record sheet to a panel of judges, which might be another class, parents, etc., who will taste test the samples (using popsicle sticks) and determine the best, most "marketable" product. Award a prize (trial-size toothpaste samples, for example) for the winning sample and have the class develop an advertising campaign for the winning toothpaste using the "Paste With a Taste Information Record Sheet".

OPTIONAL ACTIVITY : Have each individual or group develop a marketing approach for selling their product. Have students or groups devise a marketing campaign and develop a slogan, poem, song, dance routine, or commercial aimed at "selling" their product. Give students a time period to think and write out their ideas on the "Information Record Sheet" then have them act out their "sales pitch". (Teachers: This is fun!! You will be amazed at some of the things kids come up with!!)

REVIEW:

How did the home made toothpaste compare to commercial products? What other mineral is added to toothpaste to fight cavities (fluoride)? Checking labels on the commercial samples, how many toothpastes had minerals in them? Have the students compare prices of commercial toothpaste in relation to the number of mineral ingredients. Which were more expensive? Have students discuss various TV commercials for toothpaste they have seen.

