

## TASTING, DESCRIBING AND TESTING TOOTHPASTE

Source: Adapted from *Secret Formulas, Great Explorations in Math and Science* by Rebecca Tilley and Carolyn Willard, Lawrence Hall of Science, University of California at Berkeley pages 53-61

**Grade Level:** 1-3

### Objectives:

- To encourage observation and the use of descriptive language
- To have youth practice observing, communicating, and comparing

**Time:** 45 minutes

### Materials:

#### For the Whole Group

- One or two tubes of toothpaste
- 32 flat toothpicks
- Paper towels
- Paper and pencils
- 1 sheet of large white construction paper or poster board
- Stick-on colored dots in yellow, green, blue, and orange
- 1 cup of calcium carbonate or 100 TUMS tablets –regular flavor and color
- 1-2 cups of Ivory Snow laundry soap
- 1 ½ cups of glycerin
- 1 ½ cups of water
- A few extra Ziplock sandwich bags

#### For each group of four children

- 1 cafeteria tray
- 4 color-coded plastic cups (1 yellow, 1 green, 1 blue and 1 orange) – from the Making Paste activity (or make a new set with colored dots)
- 4 extra plastic cups (to set bags in for stability)
- 2 droppers
- 2 small, lightweight plastic spoons
- 2 popsicle sticks
- 4 ziplock sandwich bags
- 1 paper cup (3 oz.)
- 1 container (cottage cheese-type)

## Preparation (before the session):

### *Before the Day of the Activity*

1. It's easiest to buy calcium carbonate powder but you have to order it in advance. However, if you decide to grind up TUMS tablets, you'll need a total of 300 tablets for all three toothpaste activities in this packet. Do all the grinding at one time. You can use a mortar and pestle, coffee grinder or food blender or put the tablets in a ziplock bag, cover with a towel, and crush with a rolling pin or hammer. The finished product should be roughly the consistency of corn meal or coarse ground pepper.

### *On the Day of the Activity*

1. Make a Color Key Chart for the group: Using newsprint or construction paper, make a chart listing the following ingredients next to the corresponding colored dot as indicated below:
  - Orange – calcium carbonate
  - Yellow – soap
  - Green – glycerine
  - Blue – water
2. Make a chart labeled "Ingredient Measurements" for the "Feel Test:"
  - 4 dropper squirts for glycerin
  - 4 dropper squirts for water
  - 1 level spoonful for calcium carbonate, plus 2 dropper squirts of water
  - 1 level spoonful for soap, plus 2 dropper squirts of water
3. Prepare the trays for each team:
  - Fill plastic cups with ingredients as indicated below:
    - Orange dot cup: 2-3 tablespoons of calcium carbonate powder
    - Yellow dot cup: about  $\frac{1}{2}$  cup ivory snow soap (one ounce)
    - Green-dot cup: about  $\frac{1}{4}$  cup glycerin (two ounces)
    - Blue-dot cup: about  $\frac{1}{4}$  cup water (two ounces)
  - Add droppers, spoons, and Popsicle sticks. Put one dropper into the cup of water and the cup of glycerin. Put a plastic spoon and a Popsicle stick into the cup of soap and the cup of calcium carbonate.
  - Color code the ziplock bags: Stick a colored dot on one side of enough bags so that each group will have one bag of each color. Make a stack of four different-colored bags for each group.
  - Prepare containers of water: For each group, fill a container with water and put a three-ounce paper cup in it to serve as a measurer/dipper.

- Add four extra plastic cups to use during the foam activity to help stabilize the bags when children add water.
4. Prepare dabs of commercial toothpaste. Squeeze a small dab (about a quarter inch) of commercial toothpaste onto a paper towel for each group of four children. Have these ready to distribute, along with toothpicks, by not on the trays.

#### Implementation Notes:

- This is the first of a series of three sessions on secret formulas—toothpaste. This activity is the prerequisite for the next two: “Testing More Toothpaste Ingredients” and “Making your Secret Formula for Toothpaste.”
- Save key materials (trays, color coded cups with ingredients, and charts) to use in the next two sessions.

#### Procedure:

1. **(Engage and Connect--5 minutes)** Begin by saying;
- We’re going to get to work on a secret formula – toothpaste!
  - I’ve brought some store-bought toothpaste from home.
  - You’ll taste just a little of it and think about the attributes (or characteristics) of the toothpaste.
  - On another day you’ll use what you’ve learned to make your own personal secret formula for toothpaste.

Ask the following questions:

- Why do people brush their teeth?
  - Why is it important to brush your teeth after meals?
  - When you brush, what does the brush do?
2. **(Tasting Toothpaste of Thinking of Attributes—10 minutes)** Use the following process:
- Explain that each group will get a small dab of toothpaste on a paper towel.
  - Demonstrate how to take a little dab of toothpaste with the toothpick. Pass out the dabs of toothpaste and toothpicks and have the children take a little taste.
  - Encourage them to use their sense of taste, smell, and touch/feel.
  - Ask questions:
    - What do you see? What do you smell?
    - What did it taste like? How did it feel in your mouth?
  - List their responses on a chart. Label it, “Attributes of Toothpaste.” Say something like:
    - We’re making a list of all the attributes of toothpaste. What can you say to describe toothpaste? (white, shiny, gooshy, smells good, tastes minty, etc.)

- Ask:
    - What have you heard about toothpaste in commercials?
    - What is it supposed to do for your teeth? Your gums? Your breath? (gets bacteria off, makes lots of foam, makes teeth sparkle, makes breath fresh)
    - What are some different ways toothpaste might look? (different colors, gels, tubes, pumps, etc.)
  - Record all responses. If no one mentions ingredients, ask:
    - What ingredients do you think are in toothpaste?
    - If you don't know for sure, what do you think might be in it?
  - Collect and throw away the toothpicks and dabs of toothpaste.
3. **(Introducing Toothpaste Ingredients—5 minutes)** Post the Color Key Chart. Using your tray of materials, briefly introduce each of the toothpaste ingredients, referring to their corresponding colors on the chart.
- Say: "Glycerin and calcium carbonate are ingredients used often in toothpaste."
  - Ask the children to look at the two substances (which are probably unfamiliar to them) and give some descriptions. (Calcium carbonate is a powder; glycerin is a liquid that looks like water only thicker.)
  - Explain that these substances are not food and we won't be tasting them.
4. **(The Feel Test—10 minutes)** Explain that they will do two tests to help decide what ingredients to put into a secret formula for toothpaste. The first is a feel test. Ask:
- What does toothpaste feel like when you touch it?
  - Is it squishy or what?
  - What are some of your own words to describe how it feels to you?

Use this process:

- Divide participants into teams of four. You can keep them in the same teams as in the "Making Paste" activity (or they can form different groups).
- Explain how each person will add one of the four test ingredients to a ziplock bag:
  - Each person should take a bag off the tray. This will be your bag to test.
  - Look at the color dot on your bag and check the chart to see what ingredient you'll put in the bag.
  - Ask your partner to hold your bag while you put in the ingredient.
- Post the Ingredient Measurements chart and explain that it shows how much of each ingredient to put in their bag:
  - Glycerin (Green) -- 4 dropper squirts
  - Water (Blue) -- 4 dropper squirts
  - Calcium carbonate (Orange) -- 1 level spoonful, plus 2 dropper squirts of water
  - Soap (Yellow) -- 1 level spoonful, plus 2 dropper squirts of water

- Explain that adding water to the two powders makes it easier to find out what they would feel like.
  - Have the teams begin their feel tests. Give them about 3 minutes to explore and feel all four bags at their table. Then discuss what they noticed:
    - ✓ What did you feel through each of the bags? (Talk about each ingredient.)
    - ✓ What words would describe how they felt?
    - ✓ What differences did you feel when you touched the four bags? Which were more watery? Which were thicker? Slimy?
5. **(The Foam Test—10 minutes)** Introduce the next test—the foam test. Use these procedures:
- Ask:
    - Do you like foamy, bubbly toothpaste? (Thumbs up for yes, thumbs down for no, thumbs sideways if you like it a little foamy.)
    - What do you think you'd have to do to your bags of ingredients to make them foamy and bubbly?
    - What helps toothpaste get foamy when you brush your teeth?
  - Ask everyone to experiment with adding water to their bag. Give the following directions:
    - Unzip your bag and add about a half of cup of water. (Even the children with water in their bags should just add more water.)
    - Place the bag into a cup to make it more stable. Then zip it back up all the way. (Check to make sure the bags are fully zipped before shaking them.)
    - Shake to see what happens.
    - After a good shaking, set all four cups next to each other.
    - Look carefully to see which ingredient made the most foam.
    - Make sure everyone gets to look carefully at the cups.
6. **(Discussion of Results and Reflection—5 minutes)** Tape the Color Key Chart on a wall or the board. Place another blank chart (or sheet of newsprint) next to it and label it "Foam Test." Then ask the teams to discuss which of their ingredients made the most foam. Get an opinion from a spokesperson at each table. Record their opinions on the board by putting a star beside the name of the ingredient every time it gets a vote. Process the entire activity with these questions:
- If you like foamy toothpaste, which ingredients would be good to include?
  - How did each of the ingredients feel before you poured in the water for the foam test?
  - What actually caused the ingredient to get foamy?
  - What happens when you add water to your own toothpaste at home? What else causes the toothpaste to get foamy?
  - What ingredients do you think are in your toothpaste at home?

- How can you find out the ingredients? (Ask the children to do some research and come back tomorrow with some information about ingredients in their toothpaste.)

Explain that they will have a chance to do some more work with toothpaste and make their own secret formula later. Save the trays of ingredient cups, the Color Key Chart, and the Foam Test Results for the next two sessions on toothpaste.

Organize the clean-up process. Assign a different task to each team: a) Empty water containers; b) Discard ziplock bags and paper cups; c) Take the trays to a designated spot for storage (or help dismantle them per your instructions); d) wipe off tables; and so on.

## Secret Identity



This game is a lot like "Sandman" or "Stand-man" except it involves a Hero and Villain!

### How to Play:

1. First have everyone sit in a circle with their eyes closed. Announce that you will now be tapping someone on the head and that person will be the Hero.
2. After you have chosen the Hero, announce that you will now be tapping another person on the head and that person will be the Villain, then select the Villain
3. Before they open their eyes, remind the kids that in order to be successful they must keep their secret identities hidden
4. Now they may all open their eyes, stand up and walk around shaking each other's hands
5. **The Villain** – the Villain will use a finder to discretely tickle the inside of another person's hand when they shake hands.
6. **The Hero** – the Hero will wink at people discretely when shaking hands. They do not have to wink for every person.
7. **The Victims** – the victims are the people whose hands the Villain tickles. If a Victim gets their hand tickled, they must then shake two more people's hands. *If* they shake the Hero's hand and are winked at, then they are rescued. *If* they don't shake the Hero's hand and are winked at, then they are frozen like a statue.
8. If the *Hero* shakes the hand of the Villain, then they shake two more hands then become a statue.
9. Give the kids a time limit of 3-5min. and see who wins, the Hero and the people or the Villain

STEP  
03

### MAKE IT CLICK

#### Let's Talk About It

After 5-10 minutes, bring your students together to share their observations with each other. Is it easy to tell what's what? Have them share their guesses of what is in each container—does every team agree? Write each container number on chart paper or a chalkboard and record their guesses. If they can't tell what a smell is, ask them if it reminds them of anything. Next, tell them what the smells are, but not which containers they are in. Does that change any of their guesses? Finally, share with them what smells are in which container.

STEP  
04

### MAKE IT BETTER

#### Build on What They Talked About

After the discussion, have your students go back to their teams and challenge each other to guess what they smell while blindfolded. Have one student, the "smeller", place a blindfold over their eyes (or simply close their eyes) while the other team members choose a smell and hold it under the smeller's nose. Can they guess what it is? Students should switch roles so everyone has a chance to try.

#### Suggestions

- After the activity, take a class survey of which smells from the activity were the favorites and which were the least favorite.
- Another extension, and one that is great for pairing children up, is to have pairs of unlabeled smelly cups (ex. 2 strawberries, 2 vanillas, etc.), hand them out randomly and ask the class to smell their containers, then find their partners using just their noses.



## Scratch and Sniff Nametags

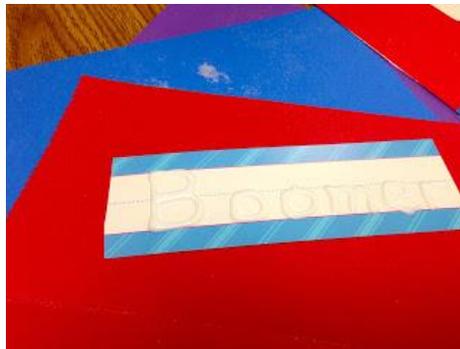


### Materials:

- Lined name cards
- Glue
- Jell-O (at least three different "flavors")
- Small cups
- Spoons

### Procedure:

1. Ask each child to write their name with the white glue on their namecard.



2. Sprinkle Jell-O on top while the glue is still wet.



Since the Jell-o doesn't always look like the color it will turn, I placed a piece of colored construction paper below each cup.



3. Set them aside to dry overnight.

When they are dry (the next day), let the students come up to "Scratch & Sniff" their name.

They can FEEL it, SMELL it, HEAR it, and SEE it.

We just don't taste it. :)

I tape these to the door, low enough so they can Scratch & Sniff their name or their friend's name too.



These are last year's names.  
We left them up all year.

You can also create a "Process Grid" by printing pictures of eyes, ears, noses, mouths, & hands as well as things you can see (like a computer monitor), hear (like an iPod), smell (like flowers), taste (like a spoon of soup), and feel (like a puppy). Then, have the students place the cards on the chart. They may work together to discuss the photos and where they should be placed.



My cards are laminated and attached with rolled masking tape. I placed a square of masking tape on each square of the grid before they attached the card so the rolled masking tape will come off without tearing the grid.

## Recycle Relay



### Objective

To give children/youth/adults an opportunity to practice their knowledge for sorting waste and recycling.

### Things to Consider

- Set up your buckets to represent what you want the group to learn. For example, buckets can represent the 3Rs (reduce, reuse, recycle), or they can represent the three waste streams at home (i.e. recycling, litter, green bin/compost)
- You may want to first ask participants to identify bucket categories, the 3Rs or waste streams at home, and explain what they mean.

### Materials

- About two dozen 3R items (e.g. aluminum cans, plastic bottles, newspaper, tissue, glass bottle, Styrofoam, fabric, egg carton, etc.)
- Three buckets or boxes
- Paper to create a label for each bucket
- Tarp or plastic sheet (optional)

### Directions

1. This activity is a relay race that can be played with two teams of children/youth.
2. In the middle of the room, set up a large pile of items on a tarp or the floor.
3. At one end of the room place the three labeled buckets, side-by-side.

4. At the opposite end of the room, have the participants form two equal straight lines (one behind the other), each line being approximately four meters apart.
5. Instruct the participants that the leaders of each group will race to the pile of waste, pick up one piece, carry it to the buckets, place it in the appropriate category (reduce/reuse/recycle or recycling/litter/compost) and run to the back of their line.
6. The second person in each team then races towards the pile of waste and also carries it to the matching bucket.
7. This task is repeated by all team members until all/most of the items are sorted.
8. Once both teams have finished, take up each bucket with them to see what items they placed in the correct buckets. Pick a few tricky or easy items to discuss with the groups.  
Ask them: Why does it fit into that category? Where else could it go? How can we further reduce the waste in the litter? Can anything be reused? How?