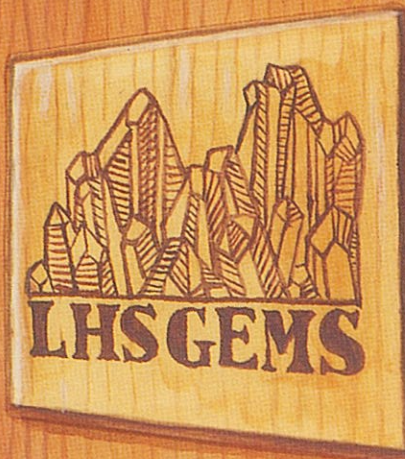


# SECRET FORMULAS



TEACHER'S

GUIDE



## Session 1

### What You Need

#### For the class:

- 3 pieces of large white construction paper for class color key and graph (butcher paper or newsprint would also work)
- 4 wide-tipped felt markers in blue, yellow, green, and orange (four of the same colors as the stick-on dots)
- two colored dots each: red, blue, yellow, green, orange
- 2 boxes (about 16 oz.) of each: baking soda, table salt, cornstarch
- 2 lbs. white flour
- 1 stack of newspapers to cover table surfaces
- 2 sponges
- scissors or a paper cutter

#### For each group of four students:

- 1 cafeteria tray
- 1 set of 6 color-dot cups: red (2), blue, yellow, green, orange
- 4 small, lightweight plastic spoons
- 4 half-straws for droppers
- 8 popsicle sticks (4 to level, 4 to mix pastes)
- 8 small, sturdy paper cups, 3 oz. "bathroom refill" type (not the type with pleated sides); have a few extras on hand in case some tear during paste mixing
- 4 small pieces of white scratch paper or 3" x 5" cards
- 4 dried beans, uncooked, small, uniform size (black beans are fine)
- 4 1"-square scraps of construction paper
- 4 pencils
- 4 ziplock bags for students to take paste home
- a few damp paper towels for wiping sticky fingers

## Session 2

### What You Need

#### For the class:

- 3 12-oz. cans of cold, unopened cola (all the same brand)
- 1 paper cup (3 oz.)
- a clean, clear, plastic cup for each student (approximately 8 to 10 oz.) (These are the "personal cups" and should be the same kind as the cups with the colored dots used in Session 1.)
- a dump bucket (if no sink is available)
- 1 wide-tipped, black permanent felt marker
- writing paper
- pencils
- a chalkboard or a large piece of butcher paper to list attributes
- (optional) crayons (for students to draw images of attributes with their riddles)

## Session 3

### What You Need

#### For the class:

- 1 pitcher, 2-qt. capacity
- a 1-tsp. measuring spoon
- 1 measuring cup
- all personal cups from Session 2, rinsed
- about 5 lbs. white, granulated sugar
- extra paper towels and sponge(s)
- 1 black permanent felt marker
- 3 unlabeled plastic cups
- 1 small, lightweight plastic spoon
- 1 plastic stirrer
- 1 popsicle stick
- a stack of newspapers to cover the desks

#### For each group of four students:

- 1 cafeteria tray
- all the plastic cups with colored dots from Session 1, washed
- 4 paper cups (3 oz.)
- 4 small, lightweight plastic spoons
- 4 plastic stirrers
- 4 popsicle sticks
- 1 dump container (cottage cheese-type is fine)
- 4 pieces scratch paper
- 4 pencils
- a few paper towels

## Session 4

### What You Need

#### For the class:

- 1 piece of large white construction paper to make class color key
- the list of cola attributes from Session 2
- the class graph of sugar amounts from Session 3
- a few colored dots in the colors used previously
- 1 wide-tipped, felt black marker
- 1 bag ice cubes (at least 1 cube per student)
- 1 teaspoon red food coloring
- 1/2 teaspoon green food coloring
- 2 bottles lime juice (8 oz. each)
- 2 bottles vanilla extract (8 oz. each—imitation vanilla is fine)
- 1 small container ground cinnamon (containers usually have about an ounce or a little less)
- 1 lb. sugar
  
- 3 or 4 cans club soda or salt-free, flavorless seltzer water\* for demonstration and as extra for class
- 2 plastic cups (one with teacher's initials on it)
- 1 dump bucket (if no sink is available)
- the students' personal plastic cups
- (optional) 1 cooler for the ice cubes
- (optional) 1 roll of plastic wrap (to cover vanilla extract if you need to pour it ahead of time)

**For each group of four students:**

- 1 cafeteria tray
- 2 red-dot cups of sugar with spoons, popsicle sticks, and stirrers (from Session 3)
- 3 color-coded plastic cups emptied and rinsed from previous activities (one each of blue, green, and yellow)
- 2 flat toothpicks for cinnamon scoops
- 32 half-straws for droppers
- 1 can club soda or salt-free, flavorless seltzer water \*
- 4 Cola data sheets (master on page 51)
- 4 pencils
- tally sheet from Session 3
- 1 container (cottage cheese-type) for ice
- (*optional*) crayons or markers (4 sets of red, blue, yellow, and green)

## Session 5

### What You Need

**For the class:**

- one small tube of toothpaste, any common brand (something not too strong tasting, not one students might think "stings," and not one made with baking soda)
- 32 flat toothpicks
- paper towels
- writing paper
- pencils
- a chalkboard or butcher paper
- 1 piece of large white construction paper
- about 8 extra stick-on dots in each of these colors: yellow, green, blue, and orange
- about 100 TUMS tablets—regular flavor and color, *or* about 12 teaspoons (close to one cup) of food grade calcium carbonate powder (about half is needed for the tests in this session, and the other half for the cleaning test in Session 6)
- 1 to 2 cups Ivory Snow laundry soap
- 1 1/2 cups glycerin
- 1 1/2 cups water
- a few extra ziplock sandwich bags to replace ones that leak

**For each group of four students:**

- 1 cafeteria tray
- 4 color-dot plastic cups from previous sessions: yellow, green, blue, and orange
- 4 extra plastic cups (to set bags in for stability). You can use students' personal cups or any extra cups.
- 2 droppers
- 2 small, lightweight plastic spoons
- 2 popsicle sticks
- 4 ziplock sandwich bags
- 1 paper cup (3 oz.)
- 1 container (cottage cheese-type)

## Session 6

### What You Need

#### For the class:

- 1 pair of scissors
- 1 ceramic tile for your demonstration
- a stack of paper towels
- 1 tablespoon of bleach
- 4 permanent markers (one each: yellow, green, blue, and orange)
- 1 small can blueberries\*
- 1 spoon for blueberries
- 1 rinse tub (a bucket or dishpan big enough to hold 32 tiles)

#### For each group of four students:

- tray with cups of ingredients, and droppers, spoons, and popsicle sticks from Session 5
- 4 ceramic tiles, about 4" x 4" (The backs of the tiles are used for the activity, and need to be porous and white. The color on the front of the tiles doesn't matter.)
- 1 paper cup (any size—for blueberries)
- 2 cotton swabs
- 4 paper towels
- 1 sponge (to be cut in four pieces for scrubbing. See #2 below.)

## Session 7

#### For the class:

- 16 oz. each: vanilla and mint extracts, and lemon juice
- 1 black permanent felt marker
- 1 large piece of white construction paper to extend the color key of ingredients begun in previous toothpaste sessions
- about 12 colored dots in two colors, preferably 6 yellow and 6 green (to label a few more cups)
- 1 pair of scissors
- 1 roll of plastic wrap
- 200 TUMS tablets *or* about 72 teaspoons (close to 2 cups) of powdered calcium carbonate
- 2 or more sponges

#### For each group of four students:

- 1 cafeteria tray
- orange, yellow, green, and blue-dot cups of ingredients with droppers, spoons, and popsicle sticks from previous toothpaste sessions
- 1 red-dot cup
- 2 new 8 to 10 oz. plastic cups
- 1 flat toothpick
- 3 more droppers
- students' personal cups
- 4 ziplock sandwich bags
- 4 Toothpaste data sheets (master on page 77)
- 4 pencils
- (*optional*) crayons in red, blue, yellow, green, and orange

# Session 8

## What You Need

### For the class:

- 1 bag of ice cubes or crushed ice, about 5 lbs.
- access to a nearby freezer or a cooler to store ice
- 3 lbs. rock salt (about 4 cups)
- 1 black permanent felt marker
- 1 ziplock sandwich bag
- your own personal cup from earlier sessions
- 3 color-coded plastic cups (one each: blue dot, green dot, orange dot)
- 3 oz. regular milk
- $\frac{1}{2}$  cup white sugar
- $\frac{1}{8}$  cup vanilla extract (about 1 oz.)
- $\frac{1}{8}$  cup strawberry extract (about 1 oz.)
- 1 roll of plastic wrap
- 1 small, lightweight plastic spoon
- 1 popsicle stick
- 1 plastic stirrer
- 2 droppers
- 3 squeeze bottles of food coloring (red, yellow, blue)
- 1 piece of 8  $\frac{1}{2}$ " x 11" white construction paper
- 3 dots (blue, green, orange) for the color key
- 1 dump bucket or access to a sink
- 1 piece of butcher paper or chalkboard

### For each group of four students:

- 1 cafeteria tray
- 3 plastic cups (1 red dot, 1 yellow dot, 1 green half-dot)
- 1 small, lightweight plastic spoon
- 1 popsicle stick
- 2 ziplock sandwich bags

## Session 9

### What You Need

#### For the class:

- access to a nearby freezer or cooler
- 1 gallon regular milk (allow about a quart per 10 students, plus a quart extra)
- 3 lbs. of white sugar (about 6 cups)
- 3 5-lb. bags of crushed ice (or ice cubes)
- 3 lbs. rock salt (about 4 cups)
- 6 small squeeze bottles of food coloring (two bottles each: red, blue, yellow)
- students' personal cups
- 16 oz. vanilla extract
- 16 oz. strawberry extract
- 1 roll or stack of paper towels
- 32 clean plastic spoons (for eating ice cream)
- a dozen extra ziplock sandwich bags
- a few extra ziplock gallon-size freezer bags
- 2 rinse buckets
- 1 black permanent felt marker
- stack of newspapers for spills
- sponges
- (optional) mop and bucket

#### For each group of four students:

- 1 cafeteria tray
- 3 color-coded plastic cups (blue, green, orange)
- 2 small, lightweight plastic spoons
- 2 droppers
- 2 popsicle sticks
- 4 plastic stirrers
- 1 red-dot cup with rock salt from Session 8
- 1 gallon-size ziplock freezer bag\*
- 4 ziplock sandwich bags
- 1 T-shirt (adult-sized)
- 4 Ice Cream data sheets (master on page 97)
- pencils
- (optional) crayons or markers in blue, green, and orange

\*We recommend using the more expensive, sturdier freezer bags, because regular gallon-size ziplock bags sometimes leak. It is also possible to rinse and re-use these stronger freezer bags. We know that the Glad brand of these freezer bags works well.