

# LIQUID

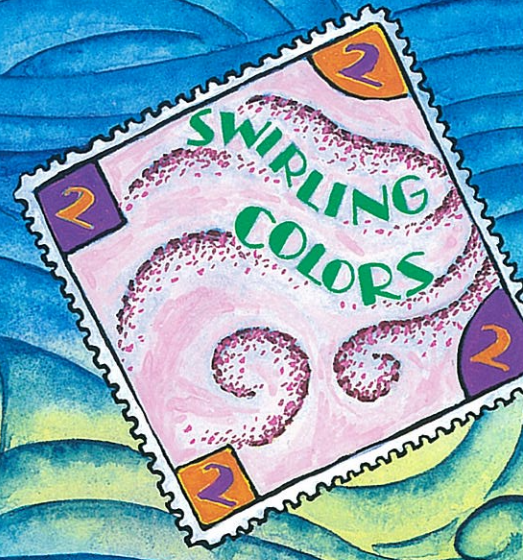
## EXPLORATIONS



LHS GEMS

### Teacher's Guide

Lawrence Hall of Science University of California at Berkeley



# Activity 1

## What You Need

- 10–20 clear, 2–6 ounce jars with water-tight lids, preferably of the same size and shape. Small juice bottles, baby food, spice or taco sauce jars are all appropriate.
- 5–15 liquids of different colors and thicknesses, such as: shampoo, baby oil, cooking oil, liquid starch, corn syrup, water, tempera paint, liquid glue, hair conditioner, glycerine, rubbing alcohol, soy sauce, molasses, dishwashing liquid, salad dressing, etc.
- one or more colors of food coloring
- a box for storing the containers upright
- a section of the chalkboard or a large piece of paper
- a small funnel for filling the bottles (optional)
- 1 piece of white posterboard or paper at least 8½" × 11" to serve as a background (optional)

# Activity 2

## What You Need

### For the class:

- 1 pitcher, 2–4 quart capacity (2–4 liters)
- 1 clear wide-mouthed container, 2–4 quart capacity (2–4 liters). A large glass jar or the bottom cut from a 2-liter clear, plastic, colorless soda bottle will work.
- 3 quart or liter bottles of salt-free seltzer water
- 2 lemons
- 1 knife (for cutting lemons)
- ¾ cup sugar
- container to hold sugar
- 1 tablespoon
- 1 plastic stir stick (coffee stirrers or popsicle sticks work well)
- 1 long-handled spoon
- 1 squeeze bottle of red food coloring
- 1 squeeze bottle of blue food coloring
- 1 blank piece of paper
- 1 bucket, or access to a sink
- paper towels or sponges
- a chalkboard or a large piece of paper

**For each pair of students:**

- 3 tall, clear plastic cups, 10-ounces (the taller the cup, the better the opportunity to see the downward pattern of the swirls)
- 2 small paper cups
- 1 container for salt, such as a margarine tub or other wide-mouthed, squat container
- 5 teaspoons kosher or pickling salt (kosher or pickling salt are preferable because when dissolved they leave no visible trace. The additives in most other varieties of table salt cause water to look cloudy. If additive-free salt is unavailable, any table salt will work.)
- 1 plastic stir stick
- 1 teaspoon-sized spoon
- 2 crayons
- 2 pencils
- 2 "Swirling Colors" data sheets, master included, page 23

## Activity 3

### What You Need

**For the class:**

- newspaper (enough to cover the tables and some extra)
- a water bucket, or access to a sink
- 1 pitcher, 1–2 quart capacity (1–2 liters)
- 1 clear, 8–10 ounce cup
- 1 cup of cooking, salad, or baby oil
- 1 tray
- several extra paper plates
- approximately 7 yards of waxed paper
- a chalkboard or 2 large pieces of paper
- dishwashing soap, sponges, and paper towels for cleanup

**For each pair of students:**

- 1 4–10 ounce container for holding water, such as a paper cup, or a cottage cheese container
- 1 high-rimmed bottle cap, such as those from vinegar jugs or screw top bottles
- 2 drinking straws (clear straws are preferable but not essential)
- 2 9-inch paper plates

## Activity 4

### What You Need

- 3 clear, 8–10 ounce cups
- 1 squeeze bottle of blue food coloring
- 1 pint of water
- 1 pint of mineral oil, baby oil, or paraffin oil
- 1 clear, colorless tall bottle with a tight-fitting lid, such as tall baby food or juice jar, etc. Get more than one bottle if you'd like to make more than one ocean in a bottle. A 1-liter seltzer bottle, such as the one obtained for Activity 2, would also work well.
- 1 funnel if the bottles are narrow-mouthed
- a ziplock storage bag or other plastic bag large enough for each bottle you use
- 1 tray
- 1 large piece of white posterboard or paper (optional)

## Activity 5

### What You Need

#### For the class:

- ½ gallon of salad oil
- 1 quart of cider or wine vinegar
- 1 clear, wide-mouthed container, 2–4 quart capacity (2–4 liters) A large glass jar, pitcher, or the bottom of a 2-liter clear, colorless soda bottle will work.
- 1 long-handled spoon
- 15 bowls or dishes, such as paper ice cream cups, margarine tubs, or cottage cheese containers
- 5 sheets of construction paper in 5 different colors
- approximately ½ cup (½ ounce) each of: oregano, sage, rosemary. If possible, obtain fresh herbs.
- approximately ½ cup (2 ounces) of pepper (coarsely ground)
- approximately ½ cup of salt
- 1 tray
- 1 roll of masking tape
- 1 pair of scissors
- newspaper to cover the tables
- a blank piece of paper, large enough to cover the label of the vinegar bottle
- a bucket if there is no access to a sink in your classroom
- dishwashing soap, sponges, and paper towels for cleanup

#### For each student:

- 1 4–8 ounce jar with a tight-fitting lid, such as a baby food or jam jar.
- 1 “Secret Salad Dressing” recipe sheet, master included, page 49
- 1 ziplock plastic bag, large enough to hold a 4–8 ounce jar
- crayons to match the colors of construction paper
- a pencil