Potion Commotion

Activity 5

In this activity, kids produce chemical reactions with lots of colorful fizzing and swirling effects. They discover that not all liquids mix together, that some are denser than others, and that gases are even lighter than liquids.

Prepare Ahead

- Try the activity yourself, so you can anticipate where kids may get stuck or need guidance.
- Photocopy the reproducible data sheet on p. 43; one copy per kid.

See p. 43

- Note that the activity calls for baking soda, not baking powder.
- On the day of the activity, set up work areas. Each kid should have four cups, a data sheet, and a pencil. Each work area should have a bottle of oil, a bottle of vinegar, a bottle of water, a bowl (and spoon) with baking soda, a bowl with effervescent tablets broken into quarters, a box of food coloring, and a roll of paper towels for potential spills.

Lead the Activity

1. **Introduce Ruff's challenge.** (5 minutes) Hand out the activity sheets and tell kids that today they'll be doing a chemistry activity that involves predicting, testing, observing, and recording results. They'll write their observations on a data sheet.

2. **Set up the experiment and pour the liquids.** (10 minutes) Have kids follow step 2 of the activity sheet. Emphasize that the mixtures must line up with the labels on the data sheet. Setting up an experiment properly is part of being a scientist.

3. **Pause, observe, and discuss.** (10 minutes) Once kids have added oil, water, and vinegar, ask them:
   - What do you notice about the liquids? *(They've separated into layers.)*
   - Which liquid is on top? *(Oil.)* Explain that some liquids don't mix, like oil and water, or oil and vinegar.
   - Explain that liquids can have different densities, which means some are heavier than others. Which liquid is the lightest, or least dense? How do you know? *(The oil is lightest, because it floats on top).*

Materials

- activity sheet for each kid
- data sheet (1 per kid; see p. 43)
- vegetable oil (1 bottle per work area)
- white vinegar (1 bottle per work area)
- water (1 bottle per work area)
- baking soda (1 bowl per work area)
- plastic spoons
- box of effervescent tablets (like Alka Seltzer®)
- bowls for baking soda and effervescent tablets (1 each per work area)
- boxes of food coloring (1 per work area)
- clear plastic cups (4 per kid)
- pencils (1 per kid)
- paper towels (1 roll per work area)
- chart paper and marker

National Science Education Standards

Grades K–4
Science as Inquiry: abilities necessary to do scientific inquiry; understanding about scientific inquiry

Physical Science: properties of objects and materials

Grades 5–8
Science as Inquiry: abilities necessary to do scientific inquiry

Physical Science: properties and changes of properties in matter

Next, have kids add drops of food coloring without stirring. Then ask:

- What happened? *(After a while, the drops sank down to the vinegar and water layers and mixed in with those liquids.)*
- Did all the liquids change color? *(No. Only the water and the vinegar, not the oil. Little beads of color stayed in some of the oil.)*
- Why did the food coloring mix just with the water and the vinegar? What's the first ingredient listed on the box of food coloring? *(Water—that's why it won't mix with oil.)*

4 Create Chemical Reactions.

(10 minutes) Before having kids add the effervescent tablets and the baking soda, have them predict what will happen. Then have them add the tablets and powder as instructed, and record their observations on the data sheet.

5 Discuss What Happened. (10 minutes)

Gather as a group and draw the data sheet on your chart paper. Fill out the chart paper together using kids' observations. Ask:

- What's bubbling and fizzing a sign of? *(If they've done the* Tempest in a Teacup *chemistry activity (p. 19), they'll know bubbling is a sign of a chemical reaction and that a gas has been produced.)*
- Did every cup produce a chemical reaction? *(No, the oil and water plus baking soda did not.)*
- What can you conclude about those ingredients? *(Water and baking soda don't produce a chemical reaction.)*
- What is lighter (less dense): the liquids in the cups or the gas? *(The gas)* How do you know? *(Because the gas formed bubbles and floated up to the surface, which means the gas is lighter.)*

Data Sheet Answer Key (see p. 43 for a reproducible copy)

Oil and Water & Effervescent Tablet	Oil and Water & Baking Soda	Oil and Vinegar & Effervescent Tablet	Oil and Vinegar & Baking Soda
Fizzing, bubbling, often just in one place; sometimes creates a tornado-like effect	Looks like a little bubbling at first, then nothing—no sign of a chemical reaction. Blob of powder sits at bottom	Fizzing, bubbling, probably a little more than in the case of the oil and water; sometimes creates a tornado-like effect	The most fizzing, bubbling; makes cup cloudy; droplets sprayed on inside of cup; lasts the longest

6 Award Points. (5 minutes).

Time to rack up some points! Review the activity's key ideas by asking the following questions, worth 50 points each.

1. Do you think food coloring is water-soluble (able to mix with water) or oil-soluble (able to mix with oil)? Why? *(It's made with water, so it's water-soluble.)*
2. Did you see anything today that let you know a chemical reaction happened? *(Fizzing and bubbling, which means that a gas is produced.)*
3. Did you see anything today that did not produce a chemical reaction? How do you know? *(The oil and water plus baking soda didn't react—the powder dropped to the bottom and sat there—no fizzing or bubbling occurred.)*
4. Which of these is the most dense, or heaviest—water, oil, or the gas bubbles? *(Water)* Which is the least dense, or lightest? *(Gas bubbles)*
5. When scientists experiment, they make predictions and observations and record what they see. Give an example of when you did each one of those things. *(Answers will vary.)*

7 Clean Up.

Allow extra time to dispose of the liquids—this activity can get messy. The oil can be funneled into bottles and reused with another group.

Safety Tips

Tell kids to keep mixtures away from their clothes, eyes, and mouth. Have them wear protective goggles, if available.