

Lava Lamp Experiment

Florida State Standard:

- SC.4.P.8.1: Observe and describe the properties of matter, including mass, volume, and density.
- SC.5.P.8.2: Identify the effects of forces on the motion of objects, including gravity, friction, and buoyancy.

Florida State Benchmark:

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A. TEACHER:

B. GRADE LEVEL: 4-8 (Can be adapted for other grades)

C. SUBJECT: STEM/Science

D. DATE:

E. DURATION: 45-60 minutes

F. LESSON FOCUS: Exploring Density and Chemical Reactions

G. MATERIALS:

- Vegetable Oil (160 mL per group)
- Vinegar (80 mL per group)
- Food Coloring
- Baking Soda (15 g per group)
- Water (60 mL per group)
- Spoon
- Clear Cup or Glass
- Small Bowl or Cup

H. LESSON OBJECTIVES:

By the end of the lesson, students should be able to:

1. Understand and explain density and its role in the layering of liquids.
2. Describe the chemical reaction between baking soda and vinegar.
3. Demonstrate the experiment and explain their observations.

I. PROCEDURES:

1. INTRODUCTION (10 minutes):

- Ask students if they have seen a lava lamp before and discuss how it works.
- Show a video or image of a lava lamp.
- Introduce the experiment and explain its relation to density and chemical reactions.
- Review key vocabulary: density, chemical reaction, gas (carbon dioxide), acid (vinegar), base (baking soda).

2. EXPERIMENT (25-30 minutes):

- Step 1: Fill the clear cup two-thirds full of vegetable oil.
- Step 2: Mix vinegar and water in a small bowl and pour it slowly into the oil.
- Step 3: Add a few drops of food coloring and observe how it behaves.
- Step 4: Add the baking soda paste to the mixture and observe the reaction.

3. OBSERVATION (5-10 minutes):

- Students will observe bubbles rising to the top and discuss why this happens.
- Explain that carbon dioxide gas is produced, which makes the bubbles rise through the oil.
- Discuss how density plays a role in the layering of liquids.

4. GENERALIZATION:

- Lead a discussion to help students generalize their findings regarding density, chemical reactions, and gas production.
- Discuss real-life applications of these concepts, such as how lava lamps function.

5. ASSESSMENT:

5.1 Comprehension Questions:

1. What are the two main liquids used in this experiment? Which is denser?
 2. What gas is produced in the reaction?
 3. How does the food coloring behave in the oil and water? Why?
 4. What happens to the bubbles after they reach the top, and why?
 5. How does this experiment demonstrate density and chemical reactions?
- Optional: Have students complete an observation report summarizing their experiment, findings, and any conclusions they reached.

Note 1 (Safety):

Always remind students to wear safety goggles and aprons during the experiment. Handle vinegar and baking soda with care, as it can create a foamy reaction. Keep the work area clean and avoid spilling liquids. Supervise students closely, particularly when handling materials like food coloring to avoid stains.

Note 2 (Accommodations for ELL, ESE, etc.):

For ELL students, provide visual aids such as pictures of the materials and a video of a lava lamp to help them understand the concepts. Allow for peer support, pairing them with a bilingual student or providing a simplified version of the instructions in their native language. For ESE students, offer extra time for the experiment and use tactile materials to engage them.