

LESSON 4:

LAVA LAMPS

SUPPLIES

TEACHER BRINGS

- Baby oil or vegetable oil (90oz)
- Water (if no sink in classroom)
- Mini (8oz) plastic water/soda bottles, emptied (1 per student)

MAIN BIN

- Funnel (3)
- Food coloring
- Alka Seltzer tablets (15)
- Tablecloth (2)

OBJECTIVES

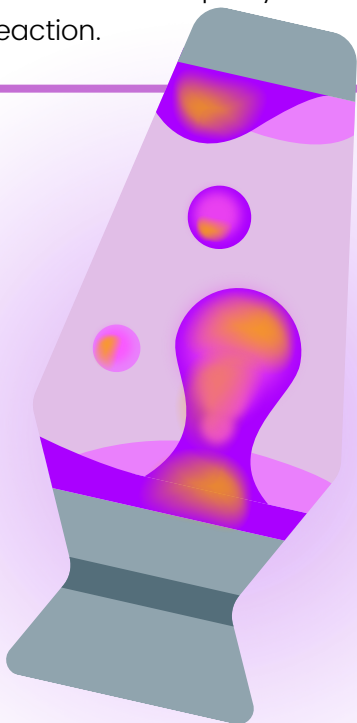
- Understand density & how it makes our lava lamps work
- Identify evidence of a chemical reaction

HOOK

🕒 1-2 min

Ask students if they know what a lava lamp is! Where have they seen one before? Does anyone know how they work or what they are made of?

Tell children that today they will be making their own homemade lava lamps by creating a chemical reaction.



INTRODUCTION

🕒 2 min

A lava lamp is a cool-looking lamp that has colorful blobs floating up and down inside it. It looks like melting lava or goo moving around! A real lava lamp uses a hot lightbulb to melt the materials inside.

Today we will make a take-home lava lamp that uses chemical reactions to create a similar bubbling lava effect!

COLOR FACTOR

In this colorful experiment, we will look at the density difference between water, oil, and food coloring.

- Oil and food coloring are more dense, and sink to the bottom

We then add the Alka Seltzer tablets to start a chemical reaction.

- Carbon dioxide bubbles form and float to the top
- The food coloring will be carried up by the bubbles creating a visual representation of the reaction occurring

SIGNS OF A CHEMICAL REACTION

- color change
- temperature change
- smell change
- production of gas
- production of a solid
- emission of light

LAVA LAMPS

DISCUSSION



5 min



Define density for the students.

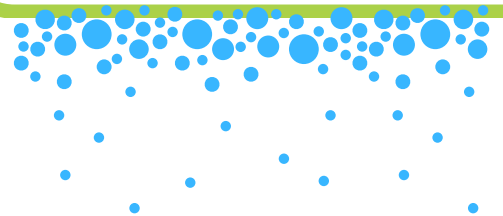
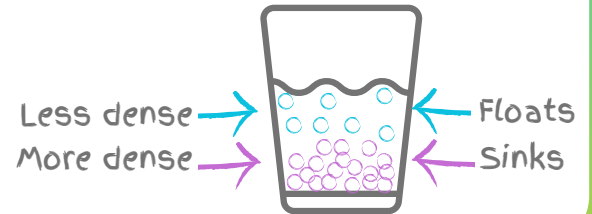
Explain that a lava lamp is a decorative light that has special wax inside it. At the bottom of the lamp, there is a heat source. When the wax heats up, it has a lower density, so it rises to the top of the lamp. As it gets further away from the heat source, its density increases and the wax falls back down to the bottom again. This gives the image of a constantly moving shape through the lamp.

Because we don't have special heat lamps to make lava lamps, we are going to make our own version using water, oil, and a colorful chemical reactions! Review the signs of a chemical reaction (see "Color Factor").

Ask students to predict:

- What will happen when water and oil combine?
- What will happen when water and Alka Seltzer tablets combine?
- How will this reaction look like a lava lamp?

- Density is a measure of how compact the mass in a substance or object is.
- Generally, substances float so long as their density is less than the density of the liquid they are placed in.



ACTIVITY



20-25 min



1. Give each student an empty water bottle. Have them remove the label if it's not already removed.
2. Fill each bottle 2/3 of the way with oil using a funnel. Pour slowly-- too much water and the effect will not work.
3. Top up the rest of the cup with water so that there is about an inch of room left in the cup. Have students observe what has happened with the water and oil. Ask students what they are seeing. Does the oil mix with the water?
4. Walk from student to student and add a few drops of the food coloring to their bottle. **NOTE: make sure to use tablecloths to protect tables from food coloring. Food coloring should be handled by the instructor only.** The experiment works best with only 1 color. Observe what happens!
5. Then, drop in half of an Alka Seltzer tablet and screw the cap onto the bottle. Observe what happens!

OBSERVE & EXPLAIN



10 min

What can we observe about the oil & water?

When we mix oil & water, the oil floats to the top because oil is less dense than water.

What can we observe about the Food Coloring?

When we drop the food coloring into the oil, the food coloring sinks to the bottom because it is more dense than oil. Food coloring and water have similar densities, so they are able to mix. This is why the food coloring dyes the water but not the oil.

What can we observe about the Alka Seltzer?

c Because the colored water is more dense than the oil, it once again sinks to the bottom of the bottle.

So why does it look like a Lava Lamp?

Because the colored bubbles keep rising and falling! It's the gas pushing the water up, and gravity pulling it back down. That's why it looks like lava floating around!

CLEAN UP



Reminder: NEVER pour oil down a sink drain. Please tightly seal all oil in a bottle before disposing of it in a trash can.

Students can take their lava lamps home, but make sure they are tightly sealed. Use a Ziplock bag for extra protection.



Exit Ticket



Ask each student the following question as they walk out the door.

- Q: Do things that are more dense float or sink?
 - A: they sink!
- Q: What chemical does the Alka Seltzer make in our lava lamp?
 - Carbon dioxide

