



Making a lava lamp: How
important is oil to create a
density differential?

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Testable Question: Is the addition of oil necessary for building a lava lamp?

Prediction: I predict that adding oil will be essential in the making of a lava lamp because it will create a density differential.

Procedure

- 1- Prepare the reagents necessary.
- 2- Fill the bottle $\frac{2}{3}$ with oil. (one of the bottles was only filled with water).
- 3- Add food coloring for effect.
- 4- Fill the remaining of the bottles with water. (the bottles were filled with the same total volume).
- 5- Add the alka-seltzer to add bubbles of carbon dioxide gas.
- 6- Watch the bubbles go up and down!

Background

- I chose this project because it is not common to make a lava lamp, and I feel like there is no point (or science) of doing something easy. You only learn if what you do pushes your brain!
- In my research I found that oil is absolutely necessary for building a lava lamp because only water did not produce any results.
- This project is important because density allows us to determine what substances will float and what substances will sink when placed in a liquid.

Constant Conditions

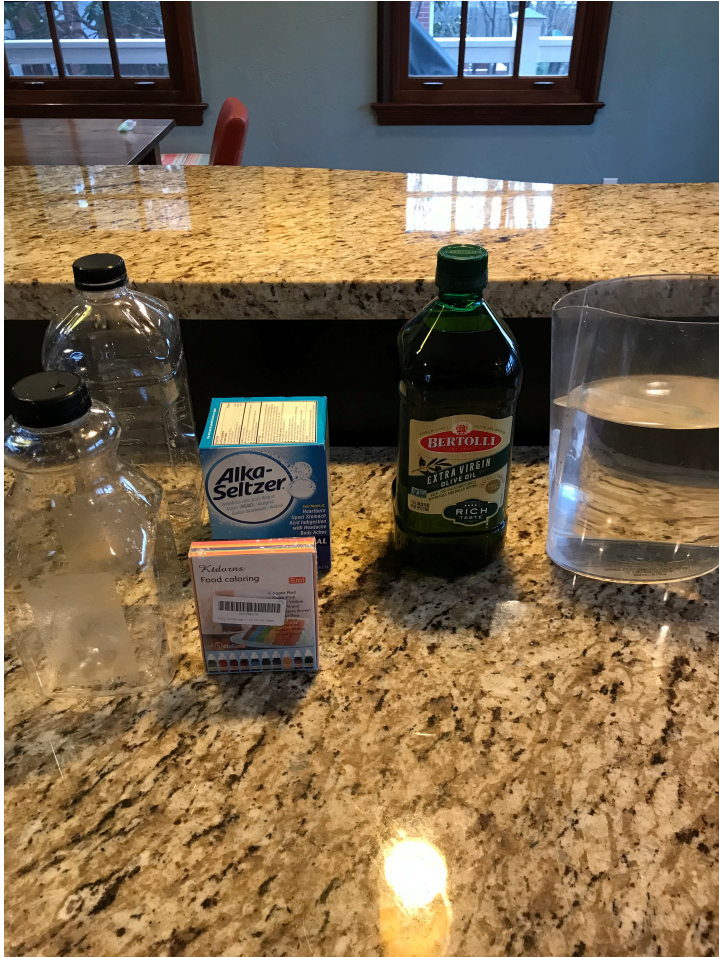
Independent variable: water, Alka-Seltzer, Food coloring.

Dependent variable: oil.

Constant conditions:

- 1- Same volume
- 2- Same amount of alka-seltzer.
- 3- Same temperature.

Data and Trials



Reagents and utensils needed

- 2 plastic bottles
- Food coloring
- Alka-Seltzer
- Vegetable oil
- water

Data and Trials



Step 1: Fill the bottles with oil or water to 2/3

Data and Trials



Step 2: Add 8 to 10 droplets of food coloring.

Data and Trials



Step 3: Fill the rest of the bottle with water.

Data and Trials



Step 4: Add half of a tablet of Alka-Seltzer in each bottle.

Data and Trials



Step 5: Watch the bubbles!

Conclusion and reflection

- I found that not adding oil prevents it from working. This happens because once the tablet hits the water it begins to dissolve, creating bubbles of carbon dioxide mixed with water. These bubbles are less dense than the water itself and the oil, so they float up. Once these bubbles hit the surface they pop, releasing the gas (carbon dioxide) and water. When enough bubbles pop the water and remaining gas becomes denser than the oil. Then the ball of water sinks through the oil and joins the water at the bottom of the bottle.
- Changes in density as gas is added or escapes from water causes it to float up and sink down through the oil. This creates the lava lamp effect!
- Oil is therefore essential, as it creates a density differential!!