

# Lava Lamp

*Contributed by the Chi Epsilon Mu (XEM) Chemistry Club at Austin Peay State University*

## Main Science Idea for Kids

The main idea for kids is the concept of density, in particular, the idea that things that are more dense than a liquid sink and things that are less dense than a liquid float. This activity is interesting because gas is added to and taken away from big drops of water which changes their density and causes them to float or sink in oil. Kids love watching this version of a lava lamp because of the colorful blobs that are moving around. What better way to teach kids about chemistry than to show them something that will captivate them!

## Grade Level

We have done this activity with second through fifth graders.

## How We Introduce this Activity

The way we introduce this activity is to ask the kids if they know what a lava lamp is, and if they do, how it works. We'll also ask them other questions about density, gas, and surface tension. These questions get the kids interested and their minds active. It gets them to think without them knowing that they're doing it because we're making it fun. Once we get some good guesses and answers, we demonstrate the lava lamp along with explanations as each phenomenon occurs.

## Materials

- Alka-Seltzer® or generic effervescent-antacid-and-pain-relieving tablet
- Vegetable oil
- Water
- Tall clear plastic container (1 or 2 liter bottle)
- Food coloring (neon colors work well)

## Procedure

1. Fill the bottle about 2/3 full with oil.
2. Add food coloring for color. You want it to be fairly dark but not too dark.
3. Fill the rest of the bottle with water, but don't fill it to the brim.
4. Add a half or quarter of an Alka-Seltzer tablet to the bottle. Watch what happens!



## The Chemistry Explanation

Before the Alka-Seltzer is dropped in the bottle, the oil floats on the colored water. Oil floats because it is less dense than water. Oil and water don't mix because water molecules are not attracted to oil molecules.

When the Alka-Seltzer tablet is dropped in the oil and water, it sinks to the bottom because it is more dense than oil and more dense than the water. In the water layer, the tablet begins to dissolve and the chemicals in the tablet react with each other creating bubbles of carbon dioxide gas. When enough gas enters an area of water, the water-and-gas combination in this spot becomes less dense than the water around it, so it floats up through the water. If this water-and-gas mixture is less dense than the oil, it floats up through the oil too. Since the water is so attracted to itself and not to the oil, the water-and-gas mixture moves through the oil in a ball-shape. Once a ball of water-and-gas gets to the surface, some bubbles of carbon dioxide gas pop, releasing the gas into the air. When enough bubbles pop, the water-and-remaining gas becomes more dense than the oil. So the ball of water sinks down through the oil and joins the rest of the water.

Changes in density as gas is added to or taken away from water cause it to float up and sink down through the oil. Thus the lava lamp is created!

## Why We Like this Activity

This activity is simple and provides a great demonstration for kids. This experiment allows the kids to see what is happening as you explain what and how it is occurring. The kids understand these concepts easier if they can see what is happening. This provides a great learning experience and makes chemistry fun.



**Chi Epsilon Mu (XEM) Chemistry Club  
Austin Peay State University  
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## About Us

We perform various demonstrations for local elementary school students to get them interested in chemistry. We answer their questions about science and help them understand what is going on. We are restarting a program to help elementary students with their science projects.