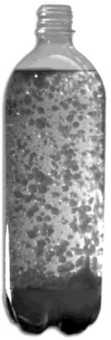
A STEM in the Park Take Home Activity

STEM in the PARK™

Science, Technology, Engineering, and Mathematics

# Lava Lamp in a Bottle



### *What You Need*

- Clean plastic soda or water bottle
- Soda or water bottle cap
- Vegetable oil
- Alka-Seltzer tablet
- Water
- Food coloring

### *What To Do*

1. Fill the bottle 1/2 full with vegetable oil.
2. Fill the rest of the bottle with water (almost to the top but not overflowing).
3. Add about 10 drops of food coloring. Be sure to make the water fairly dark in color. Notice that the food coloring only colors the water and not the oil. Hmmm...
4. Divide the Alka-Seltzer tablet into 8 pieces.
5. Drop one of the tiny pieces of Alka-Seltzer into the oil and water mixture. Watch what happens. When the bubbling stops, add another piece of Alka-Seltzer. It's just like a lava lamp!
6. When you have used up all of the Alka-Seltzer tablet and the bubbling has completely stopped, screw on the bottle cap. Tip the bottle back and forth and watch a wave appear. The tiny droplets of liquid join together to make one big lava-like blob.

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## *Observe...*

Predict what adding the Alka-Seltzer tablet will do to the oil and water in the bottle and watch how it happens. The molecules of water do not like to mix with the molecules of oil. Even if you try to shake up the bottle, the oil breaks up into small little drops, but the oil doesn't mix with the water. Also, food coloring only mixes with water. It does not color the oil. When you pour the water into the bottle with the oil, the water sinks to the bottom and the oil floats to the top. The oil floats on top of the water. Oil floats on the surface because water is heavier than oil. This means that water is denser than the oil. The Alka-Seltzer tablet reacts with the water to make tiny bubbles of carbon dioxide gas. These bubbles attach themselves to the blobs of colored water and cause them to float to the surface. When the bubbles pop, the color blobs sink back to the bottom of the bottle. Now that's a burst of color.

## *Learn...*

Oil and water do not mix because of the different densities of water and oil. Density is defined as how many "particles" you can pack into the same amount of space. The oil floats on top of the water because there are fewer "particles" in the oil compared to the water, making the water heavier so it sinks to the bottom. The density of carbon dioxide is also different from water and oil. This causes the water particles to float in the oil even though the water is denser. The water can float because it hitches a ride on the carbon dioxide which is a gas and is less dense than both water and oil because the particles are very far apart.

## *Investigate...*

What do you think would happen if you make a lava lamp with different proportions of water and oil, such as ¾ oil or ¼ oil? Try it to see what happens. Does the lava lamp react the same way with the different proportions? Are the bubbles any different? Does it take longer to react? Finally take a flashlight and put it underneath your lava lamp and see what happens.

***This activity is brought to you by the Science and Math Education in Action program at BGSU.***

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