Lava First Sight – Make your own lava lamp

Do you have a lava for science? This activity, provided by the Shell Summer Intern Program, will explore the science behind lava lamps with simple kitchen and drugstore ingredients.

Materials Needed

- 16 oz Mason jar
- 4 oz Water
- 1 Packet of effervescent tablets (Alka Seltzer or similar)
- 12 oz Vegetable oil
- Food coloring
- Glitter (optional)

Procedure

1. Fill two-thirds of the jar with oil and fill one third of the jar with water.
2. Add several drops of food coloring. Add glitter if you're feeling fancy.
3. Break two effervescent tablets into several small pieces. Add a piece to the water/oil mixture. Continue adding small pieces of the tablets little by little.
4. The lava lamp should begin to "erupt." As the eruption slows down, continue adding small pieces of the tablets.

How Does it Work?

Oil, water, and carbon dioxide are all part of this experiment. You've probably heard the phrase "oil and water don't mix," and you've confirmed it through this activity. Even if you put the lid on your jar and shake it well, the oil and water will separate back out. They act like opposites because of a property called polarity. Water is a polar molecule. Like a magnet, its molecule on the top has a different charge than on the bottom. The vegetable oil is nonpolar. Its charge is evenly spread out in the molecule, so the top of the molecule is the same as the bottom. Polar objects are attracted to other polar objects. Nonpolar objects are attracted to nonpolar objects. Since oil is nonpolar and water is polar, they don't want to mix together. This is also why the food coloring only mixes with the water – food coloring is polar, like the water.

The oil also has less density than the water. When you pour the two together, oil will always sit on top of the water. When you add the tiny pieces of effervescent tablets, they react with the water and make bubbles of carbon dioxide. These little bubbles attach to the colored water in little blobs. The carbon dioxide bubbles are even less dense than the oil, so as they float to the top, they bring little blobs of colored water along for the ride. When they reach the top, they pop and the colored water blob will sink back down to the bottom with the rest of the water. The effervescent tablets power your lava lamp until all of the tablets have reacted with the water. Once the bubbling stops, the colors in your lava lamp will stop rising and sinking.

Going Forward!

- Try experimenting with the amounts of oil and water in your jar. What will happen to the movement of the lamp?
- Add more than two effervescent tablets (be careful not to add too much to quickly). Does the lava move more?
- Explore using different sizes and shapes of jars. How does the size and shape of the container impact the movement of the lava?
- Try experimenting with different types of oil.
- Try adding other decorations. What items are like glitter and can be added to make your lava lamp look cooler?
- Add a flashlight to the activity. Hold it under the jar. Turn out the lights and get into the groove!

Content:
- Physical/chemical changes
- Polarity
- Density

Questions:
- Why don't oil and water mix?
- What happens when oil, water, and carbon dioxide are put together?

Grades:
3-5 and fun for older students, too!

Time:
30-45 minutes

Safety Notes:
- Do not eat this science experiment.
- Wash your hands after the activity.