

Kitchen Lava Lamp

Overview: Make a homemade lava lamp to learn about the properties of water and how emulsions work.

Subject area: Kitchen Chemistry

Grade level: 3rd-7th

Oregon benchmarks/Common Core Standards:

- *5-PS1 Matter and Its Interactions*
5-PS1-3: Make observations and measurements to identify materials based on their properties
- *MS-PS1 Matter and Its Interactions*
MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures

Objectives: Children will learn some basic properties of water and the concept of hydrophobic and hydrophilic substances. They will also learn about emulsifiers.

Prep time: 5 minutes

Lesson time: 15-20 minutes

Materials needed:

- 1 empty 2 liter bottle with label removed
- Inexpensive cooking oil to fill bottle approx. $\frac{3}{4}$ full
- Food coloring
- Water
- Tall, clear mason jar w/lid
- Small wire whisk that fits in the mason jar (optional)
- Olive oil
- Vinegar
- Mustard

Space needed: Table or demo station

Staff needed: 1

Presentation steps:

1. Start a conversation asking children, "Do you know that water is sticky?" Demonstrate how water is sticky (dip your finger in a dish of water and show them how the drop sticks) and explain how the water molecules are attracted to each other (this is called *hydrophilic*).

2. Explain how some substances, like fat, don't like water. Fat molecules bunch up to try to get away from the water molecules (this is called *hydrophobic*).
3. Make your lava lamp:
 - a. Fill bottle $\frac{3}{4}$ of the way full with oil
 - b. Add water to fill and several drops of food coloring
 - c. Screw lid on tightly and shake it up
 - d. Let the participants observe how the water and fat separate
4. Now talk about emulsifiers. They help *hydrophobic* and *hydrophilic* solutions mix together. Examples in the kitchen include eggs and mustard. Shaking and heat also act as emulsifiers.
5. Demonstrate this concept by making a salad dressing. Combine vinegar and oil in the Mason jar so children can see it. Ask children to tell you which one likes water and which one doesn't. Add mustard and whisk together (or shake the jar with the lid on). Give some examples of other common foods (sauces, dressings, homemade puddings) and recipes that use emulsifiers.
 - a. [Healthier Homemade Honey Mustard](#)
 - b. [Broccoli Salad](#)
 - c. [Kale Caesar](#)

Variations: Each child could make a small lava lamp of their own using 20 oz. bottles.