



Lava Sensory Bottle

Gather

- Empty clear drink bottle with lid
- Waterproof glue (hot glue or epoxy)
- Water
- Food coloring
- Oil (vegetable or mineral/baby oil)
- Mix-ins: beads, buttons, bit of foil, glitter, small seashells, etc.

Let's Experiment!

1. Fill the bottle about half-way full with water.
2. Add a few drops of food coloring and gently swirl the bottle to mix.
3. Carefully add the oil without spilling any on the outer edge of the bottle's top. Wipe down opening when done to be sure there's no leftover oil.
4. Add your mix-ins. Use a variety of some that sink and some that float!
5. For a permanent seal, apply glue to the threads on the inside of the bottle's lid and screw the lid onto the bottle tightly. Wait a few minutes for the glue to dry.
6. Tilt and shake the bottle, and observe how the objects move through the liquids.
7. Try holding the bottle up to a light as you examine its contents!

How Does it Work?

Oil and water do not want to mix together. By shaking your bottle vigorously, you create an emulsion - a temporary mixture of two liquids that do not combine. If you let your bottle sit still, you will see the water and oil separate from each other again. Watching and listening to the bottle as it settles is a great way to calm down and "settle" your senses!

Take it Further!

We've explored why it's important to [wash your hands with soap](#). How do you think soap might affect the mixing of your lava lamp bottle? Experiment by making a second lava lamp bottle and find out more information at:

<https://www.scientificamerican.com/article/mix-it-up-with-oil-and-water/>



Rainbow-in-a-Jar

Gather

- 1/3 cup corn syrup
- 1/3 cup Dawn dish soap
- 1/3 cup water
- 1/3 cup corn or cooking oil
- 1/3 cup rubbing alcohol
- Food coloring
- Clear jar or plastic bottle (at least 16 oz.)
- Spoon
- Small cup or bowl for mixing

Let's Experiment!

Start with a clear vase or jar pour in one layer at a time:

1. First, mix 4-5 drops of purple food coloring into corn syrup, then pour into jar.
2. Next, carefully pour in Dawn dish soap - it should already be blue!
3. Next, mix 4-5 drops of green food coloring with water, then carefully pour into jar.
4. Next, carefully pour in corn oil - it's already yellow!
5. Finally, mix 4-5 drops of red food coloring with rubbing alcohol, then carefully pour into jar.

How Does it Work?

You should have produced a beautifully layered rainbow in a jar with distinct lines that separate each layer of liquid. So what keeps all these layers separated from each other? It's how **dense**, or heavy, each liquid is. The corn syrup is heaviest, and sits nicely on the bottom. The dishwashing soap is not quite as heavy as the corn syrup, but it's heavier than the corn oil, and so on. Layering them from heaviest to lightest from the bottom up ensures that the rainbow maintains its distinct lines.

Take it Further!

Try adding some solid pieces to your jar - maybe a small piece of eraser, a paper clip, or a chunk of ice. Where do these solid pieces settle in the liquids? What does this tell you about their **density**? Did you know that density has an impact on the currents in ocean water, weather and climate, and the movement of the earth's crust, too?!? For more information, visit:

<https://www.scientificamerican.com/article/stacking-liquids/>

https://www.ducksters.com/science/earth_science/ocean_waves_and_currents.php

<https://www.nationalgeographic.org/encyclopedia/crust/>

<https://scienceexplorers.com/how-to-teach-kids-about-air-pressure/>