National Chemistry Week 2025

“The Hidden Life of Spices”

A Lava Lamp Adventure

Materials

1. Clear plastic or glass bottle/jar *(1 per group)*
2. Water *(fill about ¼ of the bottle)*
3. Vegetable oil *(to fill the rest of the bottle)*
4. Food coloring *(2 different colors to choose from)*
5. Alka-Seltzer tablets *(break into smaller pieces; ~2 pieces per group)*
6. Spoon for stirring

Goal of the experiment:
To explore how density and chemical reactions create movement in liquids and to observe how gases can carry colored water through oil, forming a “lava lamp” effect.

Brief overview:
Students will build a mini “lava lamp” using oil, water, and fizzing tablets. When the tablet reacts with water, bubbles of gas form and rise through the oil, carrying colored water along.

Start here.
Demonstrator:
Hello, scientists! Have you ever seen a *lava lamp* — those glowing lights with colorful bubbles moving up and down inside?
Wait for responses.

Demonstrator:
Today, we’re going to make our *own* lava lamp, but with a spicy twist! We’ll call it our Bubbling Spice Volcano, because when we add the secret ingredient, it’s going to bubble, swirl, and move like flowing lava!

Demonstrator:
Let’s start by pouring some water into our bottle, about one-quarter full.
(Show and wait while everyone does this.)
Now, add **3–5 drops of food coloring** to your water.
(Stir gently with your spoon.)
See how the color mixes with the water? The colored part will be our “lava.”

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Demonstrator:
Next, we'll carefully pour in vegetable oil until the bottle is almost full, leaving just a little space at the top.
Watch what happens — do the oil and water mix together?
Wait for responses.
That's right, they don't mix! The oil floats on top because it's *less dense* than water.

Demonstrator:
Now for the exciting part, time to make it bubble!
Take one Alka-Seltzer tablet, break it into smaller pieces, and drop one piece into your bottle.
Watch closely, what happens?
(Observe as bubbles rise through the oil carrying the colored water.)
Whoa! Look at the bubbles dancing!
What do you see happening?
Wait for responses.

Demonstrator:
When the tablet hits the water, it reacts to make carbon dioxide gas, tiny bubbles that stick to the colored water and carry it upward through the oil.
When the bubbles reach the top, they pop, and the colored drops sink back down — just like real lava flowing in a volcano!
If the bubbling stops, try adding another small piece of tablet to keep your lava lamp going.

Demonstrator (explanation time):
Let's break down what we just saw:
- Oil and water don't mix because oil is *hydrophobic* — it doesn't like water!
- The food coloring mixes only with the water layer, not with the oil.
- The fizzing tablet releases gas, which lifts the water droplets through the oil.

Bonus Chemistry Facts!
This experiment shows how *density*, *solubility*, and *chemical reactions* can work together to make something that looks magical — but is really *pure chemistry*!

Demonstrator (closing):
Wasn't that amazing? You just made a bubbling volcano powered by chemistry! Next time you cook with spices or see a lava lamp, remember, it's all about how molecules mix, move, and react.

The Magic Lake: Moana and the Floating Pepper

Materials:

1. Paper cups (1 per group)
2. Water (~ 100 ml per group)
3. Black pepper sachet (1 or 2 per group)
4. Dishwashing liquid(1 vial per group)
5. Cotton swabs or droppers (4 per group)

Divide the class into groups of 4 students each.

Goal of the experiment:
To observe how soap affects the *surface tension* of water and to understand why the pepper scatters when soap touches the surface.

Brief overview:
We'll sprinkle pepper over a calm bowl of water to represent Moana's peaceful ocean. When we touch the water with soap, the pepper suddenly rushes away — just like the ocean moving when Moana reaches out her hand!
Students will then learn that soap breaks the surface tension of water, causing the pepper to "run away."

Start here.
Demonstrator:
Hello, class! Have you seen the movie *Moana*?
Wait for responses.

Demonstrator:
Remember how the ocean seemed alive — it could *move away* or *come close* to Moana whenever she touched it?
Today, we are going to see something just like that — a bit of "Moana magic," powered by **Chemistry!**

We'll make our very own *mini-ocean* and see how it reacts when touched by a "magic potion."

Demonstrator:
First, let's fill our bowl with clean water — this is our calm ocean.
(Pour water into the bowl.)

Now, sprinkle a little black pepper on top. Do you see how the pepper floats and spreads?
Wait for observations.

That's because of something called **surface tension** — the water molecules are holding hands tightly at the top, forming a kind of invisible skin.

Demonstrator:
Now imagine Moana coming to touch the ocean with her hand — but instead of her hand, we'll use a little drop of **soap!**
(Dip a cotton swab into dishwashing liquid.)

Ready? Watch carefully. I'll touch the surface right in the middle of the bowl.
(Touch the water with the soapy swab — the pepper scatters.)
Whoa! Did you see that? The pepper *ran away!*

Wait for reactions and laughter.

Demonstrator:
Do you think the pepper got scared? Or did something else happen?

Wait for responses.

That's a great thought! What really happened is that **soap breaks the surface tension** — it makes the water molecules stop holding hands so tightly. When that happens, the water pulls away from the soap spot, and the pepper rides along with it.

So, it's not magic — it's *molecular teamwork!*

Demonstrator:
Let's think: why do we use soap to wash dishes or hands?

Wait for responses.

Exactly! Soap breaks up grease and dirt in the same way — by breaking the surface tension so that water can reach and clean everything.

Demonstrator:
Wasn't that fun? You just made the ocean move — just like Moana!
So next time you wash your hands and see bubbles, remember: that's Chemistry in action!

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Color Painting with Turmeric

Materials *(for demonstrator, and group of five students)*
1. Paper coated with turmeric
2. Vial containing baking soda (magic color A)
3. Vial containing vinegar (magic color B)
4. Cotton swabs.

Goal of the Experiment:
Recognize that chemicals we use in the lab can have different pHs and regular kitchen ingredients like turmeric can be used to detect the changes in pH

Preparation Instructions for Demonstrator.
Lay out a piece of paper coated with turmeric.

Demonstrator:
Safety instructions

Demonstrator:
Hey everyone! Today we are here to show you some magic with spices. Do you see the yellow-color on these papers? (pull up the piece of paper). We have used a spice to paint this paper yellow; do you know which spice this is? (pause)

Students:
Wait for some conversation.

Demonstrator:
(Some brief explanation about turmeric.)

Now it’s time for some magic. We have some magic paint with us. Now, let us use these magical colors for our painting. Dip a cotton swab in the vial containing the baking soda solution and give it to the students. Okay!
So here is your magic paint. Now, let us draw shapes on these papers. (Ask the kids to draw a shape)
Wait for 2-3 mins. The color of the circle/shape drawn should be red.

Whoa! Look at the magic.

Students:
Some brief conversation.

Demonstrator:
So now it is time to use another magical paint. (Distribute some cotton swabs and a vial full of vinegar.)
So let us paint on these circles. Students will paint on the red shape using vinegar.

Oh! That's great.

Demonstrator:
So, we just made our paintings on these yellow papers using our magical colors. But how does this work?
(Briefly explain about turmeric as a pH indicator).
Turmeric is a spice commonly used in kitchens worldwide. However, this spice exhibits a unique behavior due to its interaction with special chemicals known as acids and bases. The magic colour 1 is baking soda, which is a base, and the magic colour 2 is vinegar, which is an acid. When these different chemicals are mixed with turmeric, two distinct colors are observed. This is how we used turmeric to make our magical painting.