Please mute your microphones.
You may keep your video on if you wish.
We will begin shortly.

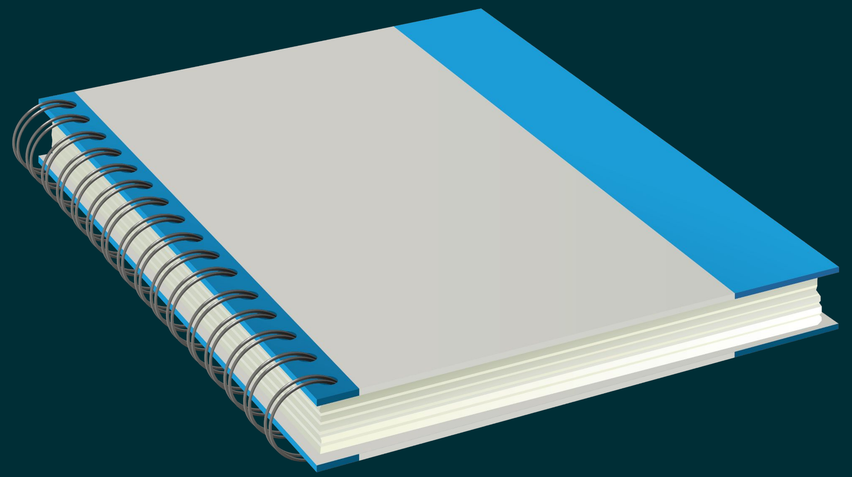
**Thank you.**

FYS

# Lava Lamp

*Chemistry*

*One day, you find a mysterious notebook in your mailbox. This note contains some information and a clue. Since it's summer break and your best friend is on vacation, you're bored and decide to see what it's about.*



# Materials

- 1 clean, plastic soda bottle with cap
- Vegetable oil
- 1 Alka-Seltzer tablet for a 16 oz soda bottle or 2 tablets for per liter bottle
- Food coloring
- Water

Welcome back! For today's adventure, let's think:

What are some mixtures that you can think of?

# Examples!


# Homogeneous Mixtures

- **Homogenous** mixtures are mixtures in which every compound inside of it are spread **uniformly.**
- Everything inside is dissolved or blended properly!
- This means that you can’t separate the original parts that were mixed together

# Puzzle #1:

Can you name 3 examples of homogeneous mixtures?

# Heterogeneous Mixtures

- **Heterogenous** mixtures are mixtures in which every compound inside of it are **NOT spread uniformly**.
- This means that everything inside the mixture can be separated into its original parts. This means that it is NOT dissolved or blended properly.
- It’s usually pretty clear!

# Puzzle #2:

Can you name 3 examples of heterogeneous mixtures?

# Puzzle #3:

Let's take our examples from earlier and classify them!

homogeneous


homogeneous

heterogeneous

heterogeneous

homogeneous

heterogeneous

*Now we're on to the last part that we need to learn before starting the experiment!*

**When you mix oil and water together, what happens?**

They **do not** combine! From earlier, what type of mixture (heterogeneous or homogeneous) would this be classified as?

Correct, heterogeneous!

**Puzzle #4:**

Now, why do they not combine?

# Hydrophobic vs. Hydrophilic

- Water is made up of **hydrophilic** (or "water loving") compounds, which is why drops of water stick to each other.
- Oil, however, is made up of lots of carbon atoms that are **hydrophobic** ("scared of water").
- Because oil is chemically “afraid of water”, it will not combine with the water!
- However, oil and water is still a heterogeneous mixture, because of all of the properties we described earlier.

# Why is the oil on top?

- Oil is **lighter** than water, which means it's not as heavy. It's like a feather that likes to float in the air. When you pour oil into water, they will form a layer on top because they're not as heavy as the water molecules.
- Water, on the other hand, is **heavier (or denser)** and likes to stay at the bottom. So, when you pour oil and water together, they separate because they have different weights.

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Now that we've learned all of that, we've unlocked the steps to the first part of our experiment!

# Materials

- 1 clean, plastic soda bottle with cap
- Vegetable oil
- 1 Alka-Seltzer tablet for a 16 oz soda bottle or 2 tablets for per liter bottle
- Food coloring
- Water

# First part of our procedure:

1. Fill the plastic bottle ½ full with vegetable oil.
2. Add water to make the amount of liquid be ¾ of the bottle, leaving a little space between the water line and the top of the container. (You can always add more water at a later time.)
3. Decide on a color for your ‘lava lamp’ bottle. Select the food coloring accordingly.
4. Add 3-4 or more drops of food coloring to the bottle until a rich color is seen.
5. Put the lid back on the bottle!

Let’s make some observations! What do you see?

Shake the bottle a little bit and see what happens!

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Great job! Let’s complete a few more puzzles so we can make our lava lamp even cooler!

Have you ever tasted something **sour** like lemon juice? Or, when taking a shower, have you ever gotten **bitter** soap in your mouth?

**Puzzle #5:**

What do you think makes them taste that way?

# Acids

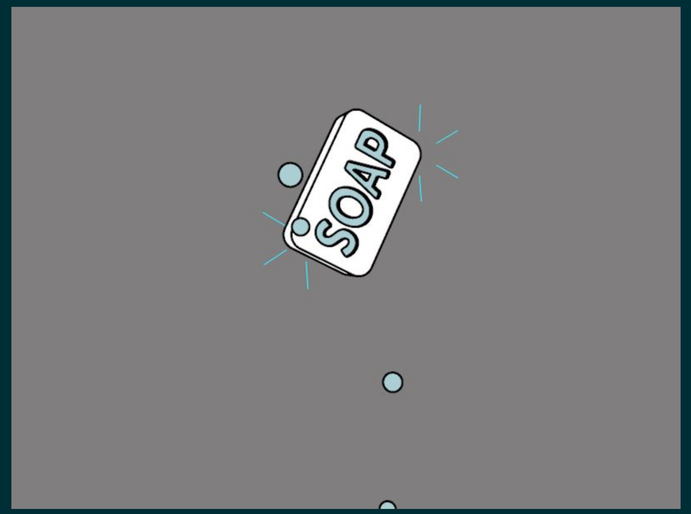
- Acids and bases are two types of chemical substances with certain properties.
- **Acids** tend to be **sour** (think of a lemon).
- We have acids in our stomach too. These acids are very strong and break down the food that we eat.

## Puzzle #6:

What are some other examples of acids? Think of things that are sour or have "acid in the name.

# Bases

- **Bases** tend to be bitter and slippery (think of a soap bar).
- When we clean our clothes, we use laundry detergent and sometimes bleach. These are two examples of bases as well!



# Alka-Seltzer

- Alka-Seltzer is technically both acidic and basic. The tablets contain sodium bicarbonate (a base) and citric acid (an acid) which, when mixed with water, react with each other and produce carbon dioxide!
- So… what do you think will happen when we put in these tablets?

# Second part of our procedure:

6. Open the bottle again, but make sure to not lose the cap because we need that for later. Open the alka seltzer tablet.

7. Break the Alka-Seltzer tablet into smaller pieces (6 to 8). Add one piece at a time observing each reaction.

8. When the bubbling stops replace the bottle cap.

9. Tip the bottle back and forth and observe the reaction. Tip, twist, and shake the bottle in different directions.

Let’s make some observations again! What do you see?

What happens when you add the Alka-Seltzer to the bottle? Why do you think this occurs?

Before we move on to our reflection questions, here are some fun things you can try with your lava lamp!

# Lava Lamp Fun Ideas

- *You can add:*
  - *Charms*
  - *Glitter*
  - *Stickers*
  - *Anything else to personalize it!*
- *You can also put a light source underneath it (like a phone flashlight) and check out how cool it looks!*

# Reflection Questions

1. What experiments did you perform on the closed soda bottle (twisting, shaking, etc.)? What did you notice during each trial?
2. What happens if you did not crush the Alka-Seltzer?
3. Did anything surprise you about the lava lamp experiment? If so, what surprised you and why?
4. Can you think of any real-world examples or things that the lava lamp reminded you of?
5. What was your favorite part of this experiment?

*...but wait, what about the person in the park? After making your lava lamp, you check the window again and notice that the person left the park.*

*Curious, you decide to go check it out. Drawn in the dirt, you see a little note:*

*See you next time!*

*C.C.*

**See you all next week!**

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If you have any photos from this week, please share these with us by email (futureforyoungscientists@gmail.com) or Facebook, as we would like to be able to share everyone's experience.