Do Oil and Water Mix?

Estimated Time:
Prep: 10 min.
Activity: 20–30 min.

Introduction

Overview

Experiment: Students combine food coloring, oil, and water.

Key Concepts: Students will develop their understanding of **density**. They will recognize that oil and water have different densities, which causes them to separate when mixed.

Lead-In

To explore the concept of density, show the class a foam packing peanut and a rock that is about the same size. Which one is heavier? As students feel both objects, explain that even though the objects are roughly the same size, their densities are different. Explain that all **matter**, including **liquids**, has density—some more than others. Like the foam packing peanut and the rock, oil and water have different densities. Talk with children about what they think would happen if oil, water, and food coloring were combined.

Teacher Preparation

Lead-In Materials:
- Foam packing peanut
- Rock of a similar size

Teacher-Provided Experiment Materials:
- Cooking oil
- Water

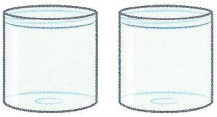
Try This! Materials:
- Cooking oil
- Water
- Dish soap

Prepare:
- Make copies of the Experiment Sheet.

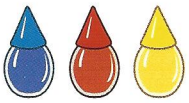
Vocabulary

- **density** how close together an object's molecules are
- **liquid** a type of matter that flows and takes the shape of its container
- **matter** anything—a solid, liquid, or gas—that occupies space and has mass

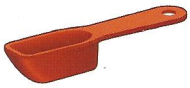
You Will Need



2 clear plastic containers



blue, red, and yellow food coloring



tablespoon

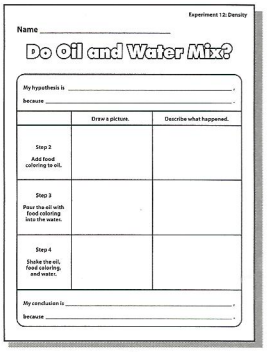
plastic container lid

plastic spoon

Teacher-Provided Materials

cooking oil

water

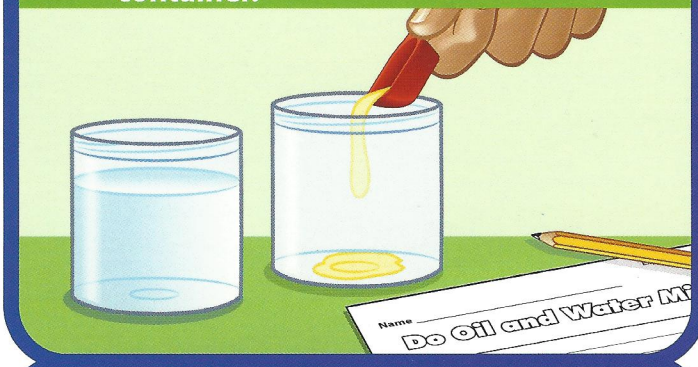


Experiment Sheet

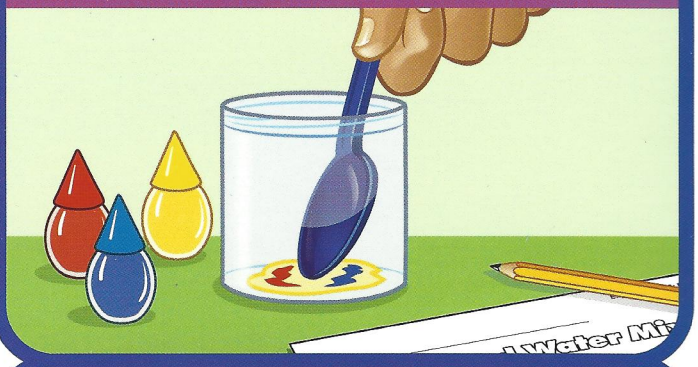
Procedure

1 Read steps 1–4 and make your hypothesis.

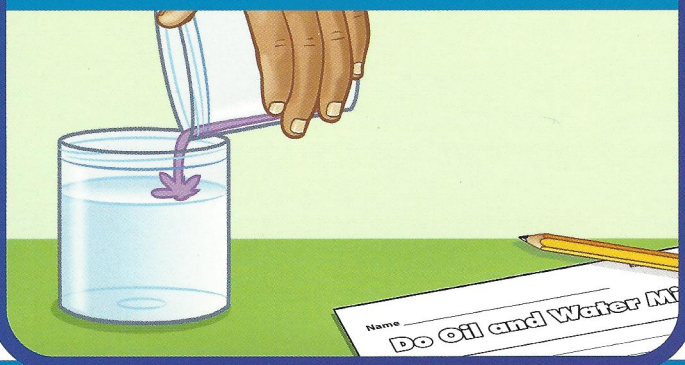
Fill one container with water. Pour two tablespoons of oil into the other container.



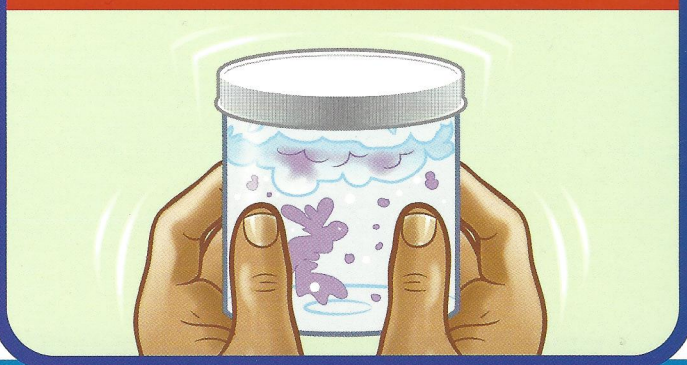
2 Put five drops each of red, blue, and yellow food coloring into the oil. Stir to mix the oil and food coloring together. Record your observations.



3 Pour the oil into the container of water. Record your observations.



4 Place the lid tightly onto the container. Shake it. Record the results and your conclusion.



Name _____

Do Oil and Water Mix?

My hypothesis is _____,

because _____.

	Draw a picture.	Describe what happened.
Step 2 **Add food coloring to oil.**		
Step 3 **Pour the oil with food coloring into the water.**		
Step 4 **Shake the oil, food coloring, and water.**		

My conclusion is _____,

because _____.

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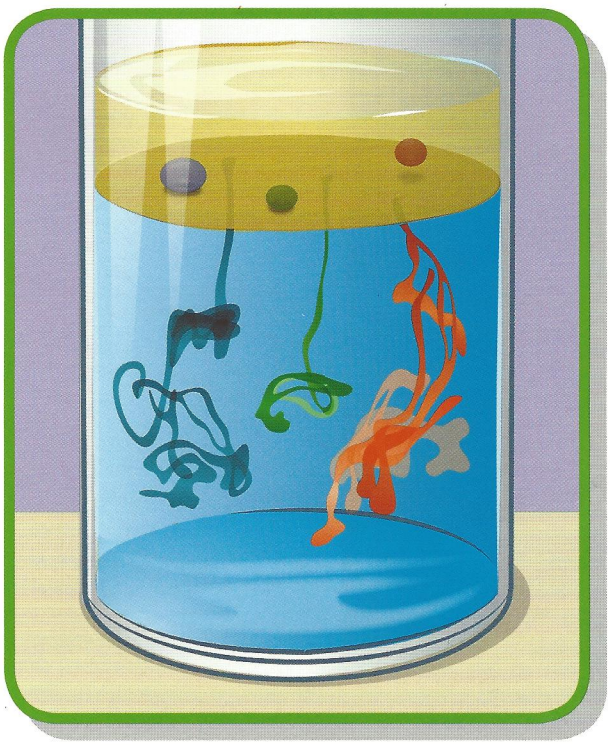
Why?

The density of an object determines whether or not it can float. Objects float on liquids that are denser than they are and sink in liquids that are less dense than they are. Oil floats on water because it is less dense than water. Since food coloring is mostly composed of water, it never completely mixed with the oil. Students should have noticed that the food coloring formed little drops that were suspended in the oil. Eventually, the food coloring sank toward the bottom and combined with the water because it is more dense than oil.



Discussion Prompts & Questions

- What did the food coloring look like in the oil?
- What did the food coloring look like in the water?
- Why did the oil float on top of the water?
- Is the density of food coloring more like that of oil or water? Why?

Sentence Frames

- I observed that oil and water _____.
- At first, the food coloring _____. Later, the food coloring _____.
- The food coloring and water mixed together because _____.
- Other objects that might float on water are _____.

Try This!

Have students combine oil, water, and dish soap. Explain that the soap binds to both the oil and the water to create a more stable mixture. The soap helps keep the oil and water from separating.