

What Is a Solution?

Estimated Time:

Prep: 10 min.

Activity: 20 min.

Introduction

Overview

Experiment: Students mix salt into three different **liquids**—tea, water, and oil.

Key Concepts: Students will understand that a **solution** forms when a **solute** is mixed with a **solvent**. They will also learn that salt does not **dissolve** in all liquids.

Lead-In

Show students examples of two **solids**—powdered beverage crystals and sand. Have students predict which solid will dissolve in water. Then combine each solid with water. Explain that each combination is a **mixture**, but only one is considered a solution. With the class, define mixture and **solution**. Explain that students will be combining salt with three different liquids—tea, water, and oil. Have children make a hypothesis about which combinations will be solutions.

Teacher Preparation

Lead-In Materials:

- Powdered beverage crystals
- Sand*
- Water

Teacher-Provided Experiment Materials:

- Salt
- Water
- Tea
- Cooking oil

Try This! Materials:

- Cooking oil
- A variety of solids (sand, instant coffee granules, sugar, soil, etc.)
- Strainer
- Water

Prepare:

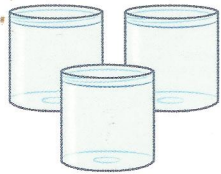
- Make copies of the Experiment Sheet.
- Prepare tea and allow it to cool to room temperature.

**included in kit*

Vocabulary

- ◆ **dissolve** to mix with a liquid and become part of it
- ◆ **liquid** a type of matter that flows and takes the shape of its container
- ◆ **mixture** a combination of two or more substances; each substance of a mixture retains its own properties
- ◆ **solid** a type of matter that has a definite shape
- ◆ **solute** a substance that has been dissolved
- ◆ **solution** a mixture of two or more substances that cannot be separated
- ◆ **solvent** a liquid substance used to dissolve another substance

You Will Need



3 clear plastic containers



teaspoon



write & wipe marker

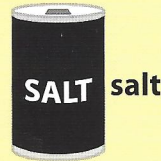


magnifier

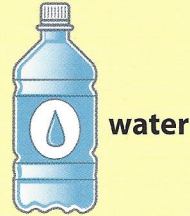


plastic dish

Teacher-Provided Materials



cooking oil



water



tea

Experiment 9: Mixtures and Solutions

Name _____

What Is a Solution?

Characteristics of Salt: (color, texture, size)

Mixture	Hypothesis: (solution or mixture?)	Observations	Is it a solution? How do you know?	
			Yes	No
Salt and Water				
Salt and Tea			Yes	No
Salt and Oil			Yes	No

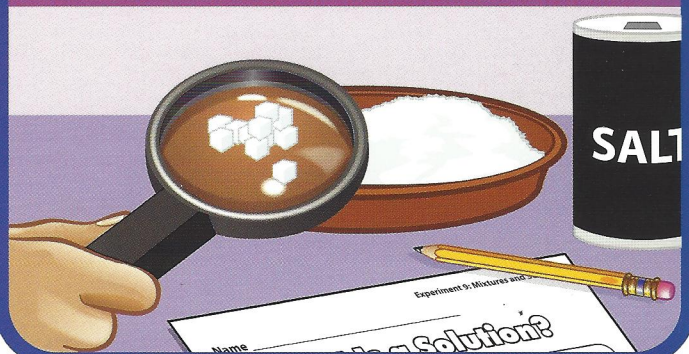
Experiment Sheet

Procedure

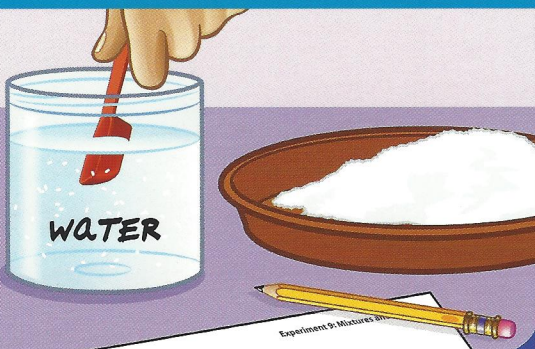
- Label one container *Water*, another *Tea*, and the third *Oil*. Fill each container with the correct liquid.



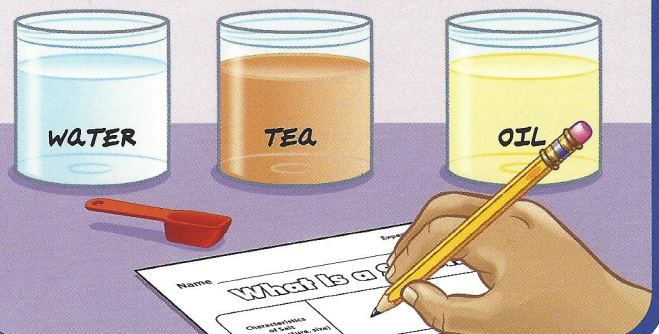
- Pour salt onto the plastic dish. Use the magnifier to look at the salt. Describe its color, structure, size, and other characteristics.



- Read steps 3 and 4, then write your hypothesis for each container. Combine one teaspoon of salt with the water. Record the results.



- Add one teaspoon of salt each to the tea and the oil. Record the results.



Name _____

What Is a Solution?

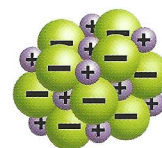
<p>Characteristics of Salt (color, structure, size)</p>	
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Mixture	Hypothesis (solution or mixture?)	Observations	Is it a solution? How do you know?
Salt and Water			Yes No
Salt and Tea			Yes No
Salt and Oil			Yes No

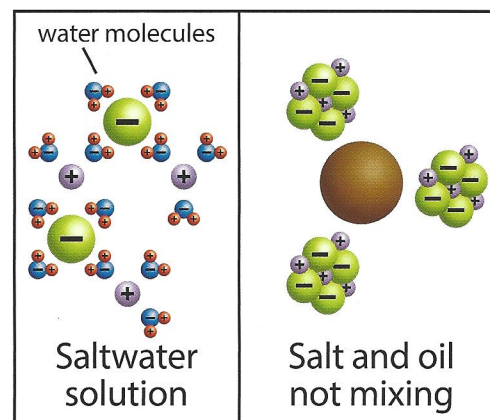


Why?

When a solid dissolves in a liquid, it breaks into individual molecules or ions and mixes with the liquid's molecules. For a solid to dissolve in a liquid, the two substances must have molecules that interact in a certain way. Water molecules are able to break salt molecules into individual ions, or charged particles, because different parts of the water molecules attract the different ions. Oil molecules do not have the same properties as water. They cannot break salt molecules into individual ions. That is why salt dissolves in water, but not in oil!



salt molecules



Discussion Prompts & Questions

- What is a solution?
- What is a mixture?
- What liquids did the salt dissolve in?
- What other liquids do you think salt dissolves in?
- How could you reverse the oil and salt mixture?



Sentence Frames

- I predict that the _____ and the _____ will be a mixture.
- I predict that the _____ and the _____ will be a solution.
- I made a solution when I combined _____ and _____.
- _____ and _____ did not make a solution, because _____.



Try This!

Have students mix a variety of solids—sand, instant coffee granules, sugar, and soil—in oil and water. Provide them with a strainer or similar tool to test if they can reverse any of the mixtures they made. Which substances created a solution? Can they reverse any of the mixtures?