

Mixtures and Solutions

Lesson Concept	Another physical change can result in a mixture and/or a solution. Mixtures are the over arching category, and solutions are specialized mixtures. A solution is evenly mixed.
Link	Students know that matter can change. They know that a change in state is a physical change.
Time	110 minutes
Materials	<u>Whole class</u> Overhead/ document camera 5 cans of pineapple chunks 5 cans of cherries 5 cans of sliced peaches 5 bananas pre sliced 2 bunches of grapes One large bowl, preferably clear 30 small plates 1 clear plastic cup 2 tablespoons of powdered sugar Enough water to make a syrup 3 drops of food coloring in water 1 bottle of regular water 1 bottle of sparkling water Magnet 1 jar of sand and water (for evaluation) <u>Per Group (groups of 4)</u> 9 sealed jars filled with the following: A: tea B: salt water C: sugar water D: powdered drink (i.e., crystal light) and water

E: trail mix
F: mixed beans
G: sand and Iron filings
H: sand and salt
J: oil and water

Individual

Science notebooks
Data Sheet

**Advance
Preparation**

1. Gather all materials. Make a copy of the Data Sheet
2. Fill all station jars with mixtures.
3. Label each jar with contents and appropriate the letter.
4. Open all canned foods.

Procedure:

Engage *(10 minutes) Another physical change can result in a mixture or a solution.*

1. Remind students about their experience with physical change. Ask students to share a few real life examples of physical change i.e., torn paper, pencil shavings, broken glass.
2. Explain to students, “We know that the physical properties of a substance can change by breaking objects apart, but can we make other changes by combining different things?”
3. Ask students to think, pair, and share out any predictions.
4. Explain to students that they will observe two other types of physical changes.
5. In a large bowl, combine all of the fruit and mix thoroughly.
6. Ask students to discuss what changes they see.
7. In a clear plastic cup, combine water and 1 tablespoons of powdered sugar and mix until sugar is completely dissolved.
8. Ask students to discuss what they have seen and the difference between this and the other bowl.

Explore/Explain *(55 minutes) Mixtures are the overarching category, and solutions are specialized mixtures. A solution is evenly mixed. Mixtures and solutions can be separated back into its original parts.*

9. Help students construct a definition of mixture. For example: “Mixtures: a physical combination of two or more substances that each keep their identity. For example: fruit salad, trail mix, pasta, etc.” Have students jot down their definition of mixture in their science notebook.

10. Ask for additional student-generated examples.
11. Help students construct a definition of solution. For example: "Solutions: A specific type of mixture in which parts are evenly distributed and not easily separated. For example: sugar and water, hot coco and water, iced tea and sugar." Have students jot down their definition of solution in their science notebook.
12. Ask for additional student-generated examples.
13. Discuss ideas regarding simplicity or difficulty of separating solutions and mixtures. What generalizations can be made about separating mixtures and solutions?
14. Explain to students that they will now explore 9 different mixtures and solutions. In small groups the students will be responsible for recording: the substances, identifying whether it is a mixture or solution, and how they could separate it.
15. Distribute the Data Sheet. Have students rotate through the stations every 3-5 min.
16. Return to whole group and ask students to share their findings.
17. Discuss and try separation techniques i.e., pick it apart, evaporation, use a magnet, etc.

Extend **(20 minutes) Different mixtures need to be separated using different methods**

18. Pose a new idea: demonstrate opening a bottle of regular water and then a bottle of seltzer water. Ask students to record the differences they observe in their notebooks.
19. Ask, "Are either of these a solution?" Student response, "Yes, seltzer water is a solution of carbon dioxide and water."
20. Explain that it is a solution, because the carbon dioxide is dissolved into the water and you cannot see it.
21. Ask, "How could we separate this solution?" Student response, "Open the bottle and the bubbles will come out."
22. Explain that the carbon dioxide is escaping leaving the plain water behind, i.e., flat soda.

Evaluate **(5 minutes) Another physical change can result in a mixture or a solution. Mixtures are the overarching category, and solutions are specialized mixtures. A solution is evenly mixed. Mixtures and solutions can be separated back into its original parts. Different mixtures need to be separated using different methods.**

23. Use exit cards for individual assessment.
24. Show students one more example of a mixture with water and sand in a jar. Ask the following questions to be answered on 3x5 exit card.
25. Questions: Is this a mixture or a solution? List two ways you can separate it.

Name: _____

Data: Mixtures and Solutions

Jar	Material	Just a mixture	Also a solution	How can you separate?
A				
B				
C				
D				
E				
F				
G				
H				
I				