

DISAPPEARING ACTS: WHICH SUBSTANCES DISSOLVE IN WATER?

(MODIFIED FOR ADEED)

Overview:

In this lesson, students learn, through a hands-on activity, how substances may change their shape by dissolving.

Objectives:

The student will:

- describe how substances change shape;
- classify substances; and
- organize and record data.

GLEs Addressed:

Science

[3] SB1.1 The student demonstrates an understanding of the structure and properties of matter by classifying matter according to physical properties (i.e., color, size, shape, weight, texture, flexibility).

[3] SA1.1 The student demonstrates an understanding of the process of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring and communicating.

Math

[1] Math S&P-2 The student demonstrates an ability to classify and organize data by collecting and recording data. (M61.1)

Vocabulary:

solid – one of the three basic forms of matter; solids have both a set volume and a set shape

liquid – one of the three basic forms of matter; Unlike solids, liquids do not have a set shape and take on the shape of the container they are in

dissolve – to mix with another substance so that the two substances form a solution

mixture – a combination of two substances in which the atoms or molecules of the two substances are spread around in a single mass but do not join up with one another

solution – a mixture in which atoms or molecules of one substance, called the solute, are spread out evenly among the atoms or molecules of another substance, called the solvent

solvent – a substance that can dissolve another substance to form a solution

substance – physical matter or material

Materials:

- 2-quart pitcher of water
- 8-ounce clear cup
- Water
- ½ cup of sugar
- Small packet of flavored drink mix to make 2 quarts of liquid
- Science journal (1 per student)
- 8-ounce clear cups (3 per group)
- Small spoon (1 per group)
- Hand lens (1 per group)

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INSTRUCTIONS



Enough of the following materials for student groups to choose from:

- Powdered laundry soap
- Maple syrup
- Milk
- Hot cocoa mix
- Bouillon granules or cube
- Sand
- Tissue paper
- Glitter
- Wooden or plastic blocks

For Assessment Task:

- 8-ounce cups
- Small spoons
- Salt
- Gummi bears
- Small hard candies
- Crackers
- Vegetable oil
- Soil
- Sugar
- STUDENT WORKSHEET: "Will It Dissolve?"

Activity Preparation:

1. Fill the pitcher with water.
2. Prepare three cups of water containing six ounces of water for each group.

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear Up

Process Skills: observing and predicting

1. Show students a cup of water and $\frac{1}{2}$ cup of sugar. Ask students to predict what they think will happen when the sugar is added to the water and record responses on the board. Pour the sugar into water and stir. Ask students to share their observations as a class. Ask students to define the word "dissolve." If needed, explain that the sugar changed shape by changing from a solid to a liquid when it mixed with the water to make a "solution." Review the other listed vocabulary words.
2. Ask the students what will happen when the flavored drink mix is added to the pitcher of water. Record student responses on the board. Students will observe the powder mixing in the water and discuss their observations as a class.

Explore

Process Skills: observing, classifying and describing

3. Tell students they will be investigating different substances to see if they will dissolve in water or not. Show students the materials they will be using and have them help sort them as a liquid or solid.
4. Students will work in small groups and be given three cups of water and a hand lens. Each group should choose three of the materials to investigate. Ask students to observe the substances with a hand lens and observe how they are the same or different. Students should then add a different

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material to each cup of water and stir gently. Tell them to only stir for about a minute and not to stir again. Have students observe the cup and substances for 30 minutes. Each student should record observations about the investigation in their science journals.

Generalize

Process Skills: communicating and describing

5. Bring the students back together as a group and ask the following questions:
 - What happened to the solids when they were added to water?
 - How did the solids change shape?
 - What happened to the liquids that were added to water?
 - How did the liquids change shape?
 - How did a solution look when a substance dissolved?
 - Why did some of the substances dissolve and others did not?
 - What other materials in our classroom could we try to dissolve?

Apply

Process Skills: observing, describing and predicting

5. Bring the students back together as a group and ask the following questions:
 - What happened to the solids when they were added to water?
 - How did the solids change shape?
 - What happened to the liquids that were added to water?
 - How did the liquids change shape?
 - How did a solution look when a substance dissolved?
 - Why did some of the substances dissolve and others did not?
 - What other materials in our classroom could we try to dissolve?

Assessment Task:

Each student will choose at least 4 substances to observe. The student will follow the directions and complete the STUDENT WORKSHEET: "Will It Dissolve?"

Rubric:

| Objective | GLE | Below Proficient | Proficient | Above Proficient |
|--------------------------------------|-----------|---|--|---|
| Describe how substances change shape | [3] SB1.1 | Student will describe how three or fewer substances may or may not change dissolve. | Student will describe how four substances may or may not dissolve. | Student will describe how five or more substances may or may not dissolve |
| Classify substances | [3] SA1.1 | Student will classify three or fewer substances. | Student will classify four substances. | Student will classify five or more substances. |
| Organize and record data | [1] S&P-2 | Student will record three or fewer substance examples. | Student will record four substance examples. | Student will record five or more substance examples. |

NAME: _____

WILL IT DISSOLVE?

Directions: Choose four or more substances to observe.

1. Put each of your substances in a cup of warm water and gently stir.
2. Observe each cup for 15 minutes to see if it will or will not dissolve.
3. Make an X on the chart to classify the substances.
4. Write or draw what you saw happening. Remember to use the words: solid, liquid and dissolve. (NOTE: You can use the opposite side of this worksheet for your drawings.)

| Substance | Did Dissolve | Did Not Dissolve | What Happened? |
|---|--------------|------------------|----------------|
|  gummi | | | |
|  cracker | | | |
|  oil | | | |
|  salt | | | |
|  sugar | | | |
|  candy | | | |
|  soil | | | |