Dissolving Solids

Strand Matter

Topic Investigating the concept of solids dissolving in water

Primary SOL 1.3 The student will investigate and understand how different common materials interact with water. Key concepts include
b) some solids will dissolve in water, but others will not.

Related SOL 1.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
c) objects or events are classified and arranged according to characteristics or properties;
d) simple tools are used to enhance observations;
f) inferences are made and conclusions are drawn about familiar objects and events;
g) a question is developed from one or more observations;
h) predictions are made based on patterns of observations;
i) observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers;
j) simple investigations and experiments are conducted to answer questions.

Background Information

Mixtures consist of two or more substances that keep their own identities when mixed together. Two different types of mixtures are heterogeneous and homogeneous mixtures. In heterogeneous mixtures, the different substances can still be observed (e.g., trail mix, Italian dressing). In homogeneous mixtures, or solutions, the substances are dispersed evenly throughout, or dissolved, and can no longer be easily observed (e.g., tea, lemonade, powdered drink mix). A common misconception is that when a solid, such as sugar, is dissolved in water, the sugar disappears—that it melts or turns into a liquid.

Materials

- Small plastic action figure
- Package of drink mix
- Dissolving Solids handout (attached)
- Small, clear plastic cups
- Water
- Sugar
- Sand
- Salt
- Flour
- Tablespoon
- Stirrers

- Student science journals

Vocabulary

dissolve, mixture, separate

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Explain that there are substances we use every day that will dissolve in water, while others will not. For example, show a plastic action figure and some powdered drink mix. Ask students to predict what will happen when each is added to a small glass of water. "Do you believe the action figure will dissolve in the water? What will happen when the drink mix is added to the water?"
2. Discuss reasons that some solids will dissolve in water and others will not.

Procedure

Before this activity, prepare small trays with the materials needed for each group: a spoon; 4 small cups half-filled with water and labeled Sugar, Sand, Salt, or Flour; 4 more small cups with the same labeling but each containing a tablespoon of one of these solids.

1. Display a large version of the chart found on the attached Dissolving Solids handout, and review the solids mentioned in the chart. Show an example of each solid for students to gain familiarity with it and its name. (Note: Do not assume that all students know what these solids are, even though they are quite common.)
2. Have each student paste a copy of the attached Dissolving Solids handout on the next blank pages in his/her science journal. Help students read and understand the handout, and then have students write their predictions in the "I predict…" column.
3. Put students in groups of two or three, and give each group a tray of materials, as described above. Have each group work to pour each solid into the appropriate cup of water and stir with the spoon. As they do this, have them make observations and make drawings of what they see happening in the water. Encourage students to share their observations within their groups and also to write any questions in the question box.
4. As students work, monitor each group to make sure they are completing the experiment and that all students are participating. Allow enough time for solids that do not dissolve to separate out. Monitor student vocabulary for the key words such as *dissolve*, *separate, mix,* and *mixture* in conversations for informal assessment of understanding.
5. Conclude the activity by having each group share their findings, questions, and things they learned.

Assessments

- **Questions**
  - What happened to each solid as it was added to the water?
  - Which solids did not disappear—that is, you could still see them in the water?
  - Which solids disappeared? Did they really disappear or go away completely? If not, why could you not see them?

- **Journal/Writing Prompts**
  - Write in your science journal about which of the four solids seemed to dissolve the fastest and which dissolved the slowest. Suggest some reasons for this.
  - Write about another solid that you would like to add to water to see whether it will dissolve quickly, gradually after some time, or not at all. Predict what you think will happen, and tell why.

Extensions and Connections (for all students)

- Use student experience in the kitchen to discuss when they have seen solids dissolved to make food or drinks. Students may have had experience with powdered drink mix, like that used in the introduction to this activity. It is likely that they have added sugar or salt to drinks or soups.
- Give students an easy recipe to complete for snack one day, such as one for pudding or gel snacks. Have students observe and discuss which substances dissolve when added to water or another liquid.
- Have students observe what happens to the mixtures in the cups if left several days. Discuss and record results.

Strategies for Differentiation

- Make a photo journal of the experiment, using pictures from a digital camera or the Internet. These photos can help students with weak motor skills more fully grasp the processes.
- Make labels for substances used, and match them to the packages. Once the experiment is completed, have students match labels to packages to review names.
- Video the experiment as students perform it, and use the video as a review and resource for students needing extra support. Student volunteers might assist with the videoing.
- Have older helpers from a higher grade help students as they carry out the experiment.

Dissolving Solids

Name: _____ Date: _____

Group Members: _____

QUESTIONS: What happens when common solids are added to water? Will they dissolve?

Test each solid to find out!

Solid	I predict…	We found…	Draw what happened.
Sugar			
Sand			

Solid	I predict…	We found…	Draw what happened.
Salt			
Flour			

Our Questions

What We Learned