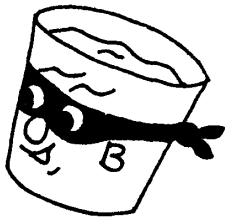

POOF! IT'S GONE

BENCHMARK and TASK

SC.A.1.2.4 The student knows that different materials are made by physically combining substances and that different objects can be made by combining different materials.

- The student separates a mixture by sorting, sifting, filtering, and evaporating**.**

KEY QUESTION

How can mixtures be separated? (evaporation)

BACKGROUND INFORMATION

An **element** is the simplest form of matter. All matter is made up of **atoms.** Each **element** is made of atoms of the same type. Two or more elements that have combined chemically are called a **compound.** A compound can be separated only by chemical means. Table salt is an example of a compound.

A **mixture** is a combination of two or more substances that have not combined chemically. A mixture can contain elements, compounds, or both, and in any amounts. Because the substances in a mixture are not combined chemically, they keep their unique properties and can be separated by physical means. Mixtures can be separated using processes that depend on their different properties:
Sorting: To separate by arranging according to class, kind, or size
Evaporation: To convert or change into a vapor, usually leaving only the dry, solid portion of the mixture
Sifting: To separate fine particles from coarse particles
Filtering: To separate suspended matter in a liquid or gas

A **solution** is a type of mixture that looks like a single substance and has the same properties throughout. Within a solution, one substance is dissolved in another substance. The substance that dissolves is called a solute. The substance into which a solute dissolves is called a solvent. In the example of salt water, the salt is the solute and the water is the solvent.

MATERIALS

Teacher

1 jar Mystery Mixture labeled A (1 cup Kosher salt mixed with 1 quart hot water)
1 jar Mystery Mixture labeled B (plain water)

Per group

2 clear, plastic cups labeled A and B
hand lenses (1 per student)
2 medicine cups labeled A and B
2 droppers
1 tray

cotton swabs (2 per student)
1 paper bag taped to the desk for disposal of used cotton swabs

TEACHING TIPS

1. Prepare a solution of hot water and 1 cup of Kosher salt. Stir to dissolve. Cool the solution and pour into the jar labeled A. (The use of Kosher salt will ensure a clear solution.) Fill the jar labeled B with plain water.
2. This lesson may need to take place over a two-day period to provide time for evaporation to occur.

ENGAGE

1. Show the class the jars labeled A and B. Create a Double Bubble Map as students observe how the substances are alike and how they are different.
2. Review students' learning about mixtures.
3. Ask students if they think the jars contain mixtures. Ask, *How can you be sure if these are mixtures?* Tell students they will find out during the activity.

EXPLORE

1. Distribute materials to each group, withholding the cotton swab until it is needed.
2. Ask one student from each group to take the tray with 2 medicine cups and 2 droppers to a designated station to pick up the mixtures.
3. Show students how to use the droppers to place 5 mL of mixture A into medicine cup A and 5 mL of mixture B into medicine cup B. Be sure students use a clean dropper for each solution.
4. After the tray is taken back to the group, students should observe and discuss the properties of each mixture. (The mixtures should look the same.) There should be no tasting at this time!
5. Have students turn the plastic cups labeled A and B upside down on the tray.
6. Have students carefully pour the measured solution A out of the medicine cup onto the inverted bottom of cup A. Have students pour measured solution B onto the inverted bottom of cup B. Ask students to make predictions about what will happen to the solutions over the next 24 hours.
7. Students should check the cups periodically until evaporation has occurred. Caution them not to turn the glasses upright even if the water is gone.
8. After evaporation has occurred, students should use hand lenses to observe the bottoms of the drinking glasses.

EXPLAIN

1. Ask:
   What do you see on the bottom of Cup A and Cup B?
   What has happened to the liquid?
   Do both cups look the same?
2. Ask students to draw what they see on the bottom of each cup and to label the drawings- Cup A and Cup B.
3. Have students tape a paper bag to the desk for the disposal of used cotton swabs. Give each student two, clean cotton swabs. Let each student dip a clean cotton swab in water, touch the

bottom of Cup A, and taste the residue. Throw the swab away! Use a clean swab to taste the residue on the bottom of Cup B. Throw the swab away! Ask: *What did you taste?*
Can you guess what was in each jar?
Were there mixtures in both jars?

4. Discuss evaporation as a means of separating a mixture. Ask: *When might this method of separating mixtures be used?*

EXTEND/APPLY

Discuss:
With fresh water becoming scarce in Florida, scientists must find ways to get more fresh water.
What is the main source of water on earth?
Based on our experiment, can you think of a way to get fresh water from salt-water oceans?
Suppose you have a mixture of water and salt, and you use evaporation to separate the water from the salt. Where does the water go?

ASSESSMENT

Ask students what method they would use to separate a mixture of:
A. iron and sand (sorting with a magnet)
B. sand, salt and baking soda (sifting)
C. salt and water (evaporation)
D. marbles and golf balls (sorting by hand)