

MELT DOWN (MODIFIED FOR ADEED)

INSTRUCTIONS



Science Concept:

Frozen saltwater melts faster than ice made with fresh water.

Objectives:

The student will:

- use a model to demonstrate phase change from solid to liquid;
- develop a testable question; and
- describe his or her observations.

GLEs Addressed:

Science

- [6] SB1.1 The student demonstrates an understanding of the structure and properties of matter by using models to represent matter as it changes from one state to another.
- [6] SA3.1 The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by gathering data to build a knowledge base that contributes to the development of questions about the local environment (e.g., moose browsing, trail usage, river erosion).

Writing

- [6] W2.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptions, observations, or report writing).

Vocabulary:

phase change - a change in the form (phase) in which matter is present

salinity - a measure of the concentration of dissolved salts in water, normally expressed as parts per thousand (%)

melting point - the temperature at which a given solid will melt

property - attribute or characteristic

Materials:

- Kosher salt
- Water
- Fresh water ice cubes
- Ice cube trays
- Stop watches (one per group)
- Clear plastic cup
- Thread
- Science journals

Activity Preparation:

Add 25 grams of kosher salt to one liter of water and mix well. Pour into ice cube trays and freeze.

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, communicating, and describing*

1. Fill a clear plastic cup with cold water. Place a fresh water ice cube in the cup. Show students the piece of thread and the salt and ask: "Without getting under the ice cube, how can I lift the ice cube out of the cup of water?"
2. Lay a piece of thread across the ice cube and sprinkle salt on it, making sure the salt is close to the thread. After a minute, lift the thread, carefully checking to see if the water has frozen. If the frozen water secures the thread, lift both ends of the thread and lift the ice cube out of the cup.

Explore

Process Skills: *observing, collecting data, describing, questioning, and investigating*

3. Explain that students will observe phase change from solid to liquid. Show students a freshwater ice cube and a salt water ice cube. Explain that one ice cube contains salt and the other does not. Ask students to predict which will melt first and to record their predictions.
4. Divide students into groups. Distribute to each group a plastic cup containing a saltwater ice cube, a plastic cup containing a freshwater ice cube, and a stopwatch. Instruct students to record an observation in writing and/or drawing after one minute has passed, and at each one-minute interval, until the ice cube has completed its phase change. Instruct students to record the total time it took for each ice cube to melt.

Teacher's Note: If ice melts too fast for students to make observations, distribute a full cup of each type of ice.

Generalize

Process Skills: *inferring, communicating, and describing*

5. Ask students the following questions and discuss as a class.
 - a. Which ice cube melted faster? Why?
 - b. Does the thickness of the ice determine how fast the ice cubes melt?
 - c. What factors affect the melting of the ice cubes?
 - d. How could the data being collected aid you in present day life?
 - e. How would increased salinity affect the melting point of an ice cube?
 - f. How would increased salinity affect the melting point of other substances? (e.g., chocolate)

Apply

Process Skills: *communicating, questioning, and describing*

6. In the winter, why does the Department of Transportation put salt on the roads and/or store owners put salt on the sidewalks in front of their stores?

MELT DOWN

Assessment Task

In their science journals, ask students to write what they know about frozen ocean water and frozen fresh water. Develop a testable question about the local environment based on the Explore, and answer the following questions:

- a. What did you observe from your experience with the models about phase change?
- b. How might phase change affect your spring travel choices?

RUBRIC

Rubric

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student develops a testable question.	[6] SA3.1	The student does not develop a testable question about the local environment.	The student develops a testable question about the local environment.	The student develops two or more testable questions about the local environment.
The student uses a model to demonstrate phase change from solid to liquid.	[6] SB1.1	The student does not use a model to demonstrate phase change from solid to liquid.	The student uses a model to demonstrate phase change from solid to liquid.	The student uses a model to demonstrate phase change from solid to liquid and provides a real world example.
The student describes observations.	[6] W2.2.2	The student does not describe his or her observations.	The student describes his or her observations.	The student describes his or her observations in detail.