

4.2

ICEBERGS

How can you lift an iceberg with a string?

Activity Time: 45 minutes

Background

Glaciers are formed from precipitation so they are a source of fresh water for populations all over the world. The mountain glaciers are retreating (getting smaller as they melt) and in the future will not provide enough water for many populations. Icebergs that calve (break off) from glaciers in Polar regions are a good fresh water supply but can't successfully be transported. Students will discover how hard it is to take a small ice cube out of water—let alone an enormous iceberg!

Directions

1. Pour water in bowl or cup to 1 inch from top.
2. Put ice cube in water.
3. Use string to lift the ice cube out of the water, without getting fingers in the water.
4. After several attempts, give students a small amount of white substance (salt) to use.
5. Allow students to experiment with using salt as a mystery substance.
6. If students cannot get their ice cube out of the water, tell them to sprinkle the "mystery substance" (salt) on the string and lay it on the ice cube for a minute and then try to lift it out.
7. Ask for guesses to name mystery substance.

Discussion

- Why was it difficult to get the ice cube out of the water? (*The ice cube is continuously melting in the water causing the surface to be very slippery.*)
- Why does ice float? (*Ice is less dense than water, ice's specific gravity is .917 and water is 1.0.*)
- Why was salt used? (*Salt melts ice.*)
- Why does salt melt ice? (*Salt lowers the freezing point of the ice causing it to melt. When the ice does melt, it takes enough heat away from the water on the string to freeze it to the ice cube.*)
- Could you move the ice around with the string in the water?
- How could icebergs be transported?

DEMONSTRATE TO THE CLASS

Place a thermometer in a can with crushed ice. After 2 minutes, record the temperature. Add 1 T. of salt, record the temperature after 2 minutes. Compare the results.

The freezing point of water is lowered by 2 degrees Centigrade with the addition of salt. This is the reason salt is used to melt icy roads and walk ways. If you freeze salt water in a freezer, it takes longer to freeze than water and is often slushy even after being in the freezer for long periods of time.

Assessment

Complete **Assessment 4.2**: *How can you lift an iceberg with a string?* (See **Rubric 4.2** for scoring.)

Extension

Make a slushy treat by pouring ½ cup of fruit juice in a small plastic bag with a zipper. Place this bag inside a larger zip lock bag and put it in a can with a lid. Add 10 ice cubes and ½ cup salt and put the lid on it. Roll the can between partners. Add ice if the juice does not become slushy. Discuss why you added salt to the ice and drink your slush!

Materials

Per Group:

- 1 deep bowl or wide-mouthed cup
- Water for bowl or cup
- 1 12-inch string
- 1 ice cube per student
- Salt in unmarked cup

For Demonstration

- 1 thermometer
- Can of crushed ice

Related Activities

- How do you make ocean water? **[3.6]**

Vocabulary

Bergy bit: naturally occurring water on the Earth's surface found in ice sheets, glaciers, ponds, lakes, rivers, and underground streams.

ALIGNMENT TO NGSS:

Scientific and Engineering Practices

- Asking questions
- Developing and using models
- Planning and carrying out investigations
- Constructing explanations
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Crosscutting Concepts

- Cause and effect
- Systems and models

Disciplinary Core Ideas

- K-5: ESS2.A; ESS2.C; PS1.A; PS2.A
- 6-8: ESS2.A; ESS2.C; ESS3.A; PS1.A; PS2.A