

# 4.1

## ICEBERGS

# How much of an iceberg floats above the surface?

Activity Time: 20 minutes

### Background

Icebergs in the Antarctic are often tabular (shaped like a table top) and can be several miles long but are generally around 600 feet. In the Antarctic, the icebergs are larger and more numerous than in the Arctic. Icebergs the size of a small house are called bergy bits. Smaller icebergs with little ice above water are called growlers. Icebergs float because as water freezes, it expands and becomes less dense than the water it sits in. Only one tenth of an iceberg is above the surface, depending on the age of the iceberg. As icebergs melt, the trapped air bubbles pop and make a fizzing sound called "Bergie Seltzer."

### Directions

1. Add a few drops of blue food coloring to tap water for freezing.
2. Freeze ice in rectangular shaped containers, 2 inches or more deep.
3. Begin the investigation by showing students pictures of icebergs found on: <http://triggerpit.com/2011/02/07/incredible-icebergs-37-pics/>
4. Fill a container three-fourths full with cold water.
5. Add salt to the container and stir. (3.5 teaspoons to 1000 ml [4 cups] of water.)
6. Remove the ice block from the freezer and place in container of water.
7. Use a metric ruler to measure the iceberg above and below the surface.

### Discussion

- Why did we put salt in the water? (*We are simulating sea water-35 grams of salt in 1000 grams of sea water*)
- Why does the ice float? (*It's less dense- ice .92, water 1.0*)
- Where do you find icebergs? (*The largest and highest number in Antarctica*)
- Is more of the ice above or below the surface? (*8/10-9/10 below surface*)

### Extension

Design an experiment that shows a different shape of a floating iceberg. Predict the height that will be above the water's surface. Try it!

### Assessment

Complete **Assessment 4.1**: *How much of an iceberg floats above the surface?* (See **Rubric 4.1** for scoring.)

### Related Activities

- How do you calculate the volume of an iceberg? **(4.3)**

### Materials

*Per Group:*

- Frozen ice block (rectangular container to freeze ice chunk)
- Cold tap water
- Salt
- Teaspoon
- Clear container (large enough to hold ice block and water for it to float without touching sides of container)
- Blue food coloring

### Vocabulary

**Bergy bit:** a term for iceberg size, that is a smaller iceberg about the size of a small house.

**Growler:** a term for size of an iceberg about the size of a piano.

**Iceberg:** a large piece of ice that has broken off from a glacier or ice shelf that floats in the sea, with a greater part of its bulk underwater.

### ALIGNMENT TO NGSS:

*Scientific and Engineering Practices*

- Asking questions
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

*Crosscutting Concepts*

- Cause and effect
- Scale, proportion and quantity
- Stability and change

*Disciplinary Core Ideas*

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