Floating Ice Volume

materials

Per group:

- Frozen Ice Block (Rectangular bowl or pan)
- Food coloring
- Water
- Marker
- Aquarium or clear rectangular container

background

Sea ice floats because as water freezes, the molecules expand and become less dense than the sea water. Less dense objects float. With icebergs, the density is not a lot less, however, as 80-90% of icebergs are under water. Ice has a density of 0.92 g/mL and water has a density of 1.0g/mL. Students will discover how much ice floats above water and calculate its volume.

activity time:
30 minutes

directions

1. Freeze a rectangular or square pan with 2 or more inches of colored water.
2. After the water has frozen (it's an iceberg!), remove it from the pan and measure its height, length and width.
3. Pour cold water in the container to about 2 inches from the top.
4. Put the frozen iceberg in the container.
5. Mark and measure the height of the ice above the water.
6. Mark and measure the height of the ice below the water.
7. Use the measurements to calculate the total volume of the ice, the volume of the ice above water and the volume of ice below the water.
8. Calculate the percentage of ice that is above and below water.
10. Compare class results.

discussion

- What was the volume of your iceberg? How did you calculate it? (Height x length x width)
- What was the volume of the iceberg above water and below water?
- How did you calculate the percentage above and below?
- In looking at the class results, calculate the average percentage of ice above and below the water for the whole class. How does it compare to 10-20% of icebergs are above water?
- How would you calculate the area of a disc of ice?

vocabulary

Iceberg - mass of freshwater ice that is calved, or broken off, from a glacier or an ice shelf (a huge slab of permanent ice that floats on water)
Volume - in mathematics, the amount of space occupied by a three-dimensional solid body.

related activities

"Rotating Icebergs", The Teaching Tank Discovery Book Two, Gordon Corbett and David Burgess, Captivation Press, 1998, p.60. http:www.TeachingTank.com

alignment to national science standards

Unifying Concepts and Processes, Standards A, B, E

alignment to kansas science standards

Science as Inquiry: K-2: 1.1.1, 1.1.3, 1.1.4, 1.1.5; 3-4: 1.1.1,1.1.3, 1.1.3b, 1.1.4; 5-7: 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.3.1
Physical Science: K-2: 2.1.1, 2.1.3; 3-4: 2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.2.2; 5-7: 2.1.1, 2.3.1
Science and Technology: K-2: 5.1.2, 3-4: 5.1.1, 5.1.3
History and Nature of Science: K-2: 7.1.1; 3-4: 7.1.1