

How Low Can You Go?

In this experiment, you will first use a temperature probe to find the normal melting temperature of ice. Then by adding salt to melting ice, you will see the effect of salt on the melting temperature of ice. You will next make and test a plan for reaching the coldest temperature using water, ice, and salt. Finally, you will have a contest to see which group can make their mixture reach the lowest temperature.

OBJECTIVES

In this experiment, you will

- Use a computer to measure temperature.
- Find the normal melting temperature of ice.
- See the effect of adding salt on ice's melting temperature.
- Plan and test an experiment to find the salt and ice combination that will make the coldest temperature.
- Compete with other groups trying to reach the coldest temperature.
- Apply the results of the experiment.

MATERIALS

computer
Logger Lite software
Temperature Probe
250 mL beaker

crushed ice
salt



Figure 1

How Low Can You Go?

PROCEDURE

Part I The Melting Temperature of Ice

1. Connect the Temperature Probe. Open Logger Lite software.
2. Put 100 mL of crushed ice into a 250 mL beaker.
3. Place the Temperature Probe into the ice, then click to begin data collection.
4. Hold the beaker in one hand and the Temperature Probe with your other hand. Stir the ice until a steady temperature is reached. Record this temperature. It is the normal melting temperature of ice.

Part II The Effect of Salt on Ice's Melting Temperature

5. Add 5 scoops of salt to the ice water and stir. Continue stirring until the temperature stops dropping.
6. Record the lowest temperature reached. Then click to end data collection.

Part III Finding the "Coldest" Mixture

7. Make and test a plan for finding the coldest possible temperature using 5.0 scoops of salt, ice, and water.
Briefly describe your plan:

Part IV The Coldest-Temperature Contest

8. Set up the equipment as in Part I.
9. Put the amounts of water and ice you found to be best in Step 7 into the 250 mL beaker.
10. Get 5 scoops of salt. Add this salt to the water and ice. Place the Temperature Probe into the water, ice, and salt mixture and then click to begin data collection.
11. Stir until your coldest temperature is reached. Then to end data collection.

DATA

Normal melting temperature of ice	°C
Coldest salt and ice-water temperature (Part II)	°C

PROCESSING THE DATA

1. How does the melting temperature of water (ice) compare with its freezing temperature?
2. What is the effect of adding salt on ice's melting temperature?
3. List some uses for the ideas studied in this experiment.