

Melting Ice

Problem

How does the temperature of the surroundings affect the rate at which ice melts?


Skills Focus

predicting, interpreting data, inferring

Materials

- stopwatch or timer
- thermometer or temperature probe
- 2 plastic cups, about 200 mL each
- 2 stirring rods, preferably plastic
- ice cubes, about 2 cm on each side
- warm water, about 40°C–45°C
- water at room temperature, about 20°C–25°C

Procedure

1. Read Steps 1–8. Based on your own experience, predict which ice cube will melt faster.
2. In your notebook, make a data table like the one below.
3. Fill a cup halfway with warm water (about 40°C to 45°C). Fill a second cup to the same depth with water at room temperature.
4.  Record the exact temperature of the water in each cup. If you are using a temperature probe, see your teacher for instructions.
5. Obtain two ice cubes that are as close to the same size as possible.

Cup	Beginning Temperature (°C)	Time to Melt (s)	Final Temperature (°C)
1			
2			



6. Place one ice cube in each cup. Begin timing with a stopwatch. Gently stir each cup with a stirring rod until the ice has completely melted.
7. Observe both ice cubes carefully. At the moment one of the ice cubes is completely melted, record the time and the temperature of the water in the cup.
8. Wait for the second ice cube to melt. Record its melting time and the water temperature.

Analyze and Conclude

1. **Predicting** Was your prediction in Step 1 supported by the results of the experiment? Explain why or why not.
2. **Interpreting Data** In which cup did the water temperature change the most? Explain.
3. **Inferring** When the ice melted, its molecules gained enough energy to overcome the forces holding them together as solid ice. What is the source of that energy?
4. **Communicating** Write a paragraph describing how errors in measurement could have affected your conclusions in this experiment. Tell what you would do differently if you repeated the procedure. (*Hint: How well were you able to time the exact moment that each ice cube completely melted?*)

Design an Experiment

When a lake freezes in winter, only the top turns to ice. Design an experiment to model the melting of a frozen lake during the spring. *Obtain your teacher's permission before carrying out your investigation.* Be prepared to share your results with the class.