

Section

10-3

HOLT PHYSICS

Graph Skills*Changes in Temperature and Phase*

A 20.0 kg ice block is removed from a freezer whose temperature is -25.0°C and placed in an ice box with freshly caught fish. After a few hours, all the ice was melted. The final temperature of the water and the fish was 5°C .

The melting point of ice is 0.00°C . The heat capacities and latent heats are given as $c_p(\text{ice}) = 2.09 \times 10^3 \text{ J/kg}\cdot^{\circ}\text{C}$; $L_f(\text{ice}) = 3.33 \times 10^5 \text{ J/kg}$; $c_p(\text{water}) = 4.19 \times 10^3 \text{ J/kg}\cdot^{\circ}\text{C}$. Use this information to answer the questions below.

1. How much energy did the solid ice absorb to reach its melting point and remain solid?

2. How much energy was absorbed to turn the ice into water?

3. How much energy was absorbed to bring the temperature of that water to 5°C ?

4. Draw a graph showing all of the process. (Let each box on the grid represent $0.4 \times 10^6 \text{ J}$ or $0.5 \times 10^6 \text{ J}$.)

