LATENT HEAT

Suppose you place an ice cube with a temperature of −25°C in a glass, and then you place the glass in a room. The ice cube slowly warms, and the temperature of the ice will increase until the ice begins to melt at 0°C. The graph in **Figure 14** and data in **Table 5** show how the temperature of 10.0 g of ice changes as energy is added.

You can see that temperature steadily increases from −25°C to 0°C (segment **A** of the graph). You could use the mass and the specific heat capacity of ice to calculate how much energy is added to the ice during this segment.

At 0°C, the temperature stops increasing. Instead, the ice begins to melt and to change into water (segment **B**). The ice-and-water mixture remains at this temperature until all of the ice melts. Suppose that you now heat the water in a pan on a stovetop. From 0°C to 100°C, the water's temperature steadily increases (segment **C**). At 100°C, however, the temperature stops rising, and the water turns into steam (segment **D**). Once the water has completely vaporized, the temperature of the steam increases (segment **E**).

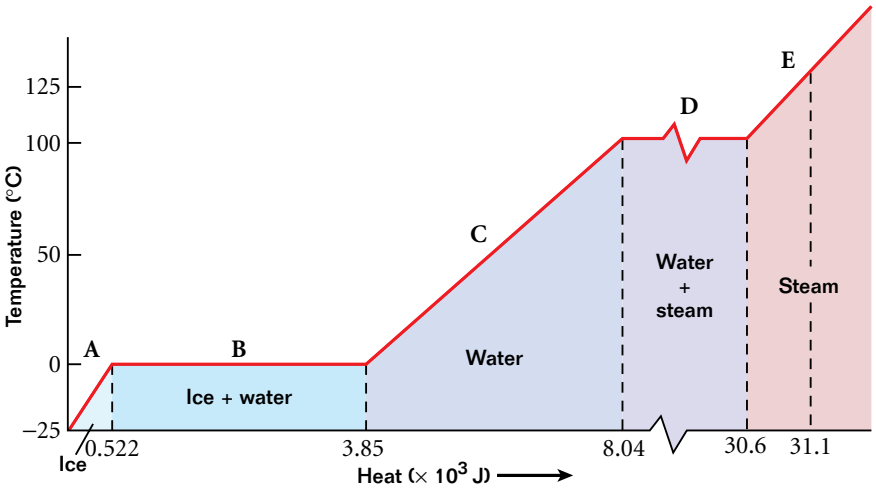

Figure 14
This idealized graph shows the temperature change of 10.0 g of ice as it is heated from −25°C in the ice phase to steam above 125°C at atmospheric pressure. (Note that the horizontal scale of the graph is not uniform.)

Table 5 Changes Occurring During the Heating of 10.0 g of Ice

Segment of graph	Type of change	Amount of energy transferred as heat	Temperature range of segment
A	temperature of ice increases	522 J	−25°C to 0°C
B	ice melts; becomes water	3.33×10^3 J	0°C
C	temperature of water increases	4.19×10^3 J	0°C to 100°C
D	water boils; becomes steam	2.26×10^4 J	100°C
E	temperature of steam increases	500 J	100°C to 125°C