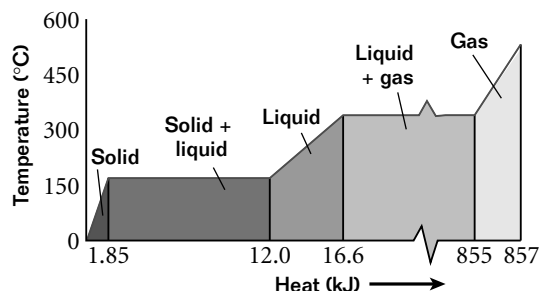*Use the heating curve below to answer questions 8–10. The graph shows the change in temperature of a 23 g sample of a substance as energy is added to the substance as heat.*

8. What is the specific heat capacity of the liquid?
- **F.** 4.4×10^5 J/kg•°C
- **G.** 4.0×10^2 J/kg•°C
- **H.** 5.0×10^2 J/kg•°C
- **J.** 1.1×10^3 J/kg•°C

9. What is the latent heat of fusion?
- **A.** 4.4×10^5 J/kg
- **B.** 4.0×10^2 J/kg•°C
- **C.** 10.15×10^3 J
- **D.** 3.6×10^7 J/kg

10. What is the specific heat capacity of the solid?
- **F.** 1.85×10^3 J/kg•°C
- **G.** 4.0×10^2 J/kg•°C
- **H.** 5.0×10^2 J/kg•°C
- **J.** 1.1×10^3 J/kg•°C

SHORT RESPONSE

Base your answers to questions 11–12 on the information below.

The largest of the Great Lakes, Lake Superior, contains 1.20×10^{16} kg of fresh water, which has a specific heat capacity of 4186 J/kg•°C and a latent heat of fusion of 3.33×10^5 J/kg.

11. How much energy would be needed to increase the temperature of Lake Superior by 1.0°C?

12. If Lake Superior were still liquid at 0°C, how much energy would need to be removed from the lake for it to become completely frozen?

13. Ethyl alcohol has about one-half the specific heat capacity of water. If equal masses of alcohol and water in separate beakers at the same temperature are supplied with the same amount of energy, which will have the higher final temperature?

14. A 0.200 kg glass holds 0.300 kg of hot water, as shown below. The glass and water are set on a table to cool. After the temperature has decreased by 2.0°C, how much energy has been removed from the water and glass? (The specific heat capacity of glass is 837 J/kg•°C, and that of water is 4186 J/kg•°C.)

Energy transferred as heat
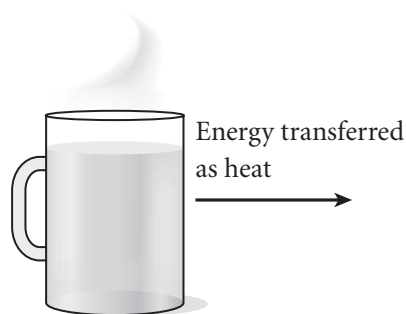
EXTENDED RESPONSE

15. How is thermal energy transferred by the process of convection?

16. Show that the temperature −40.0° is unique in that it has the same numerical value on the Celsius and Fahrenheit scales. Show all of your work.

Test TIP Use dimensional analysis to check your work when solving mathematical problems. Include units in each step of your calculation. If you do not end up with the correct unit in your answer, check each step of your calculation for errors.