

Conceptual Questions

16. If water in a sealed, insulated container is stirred, is its temperature likely to increase slightly, decrease slightly, or stay the same? Explain your answer.
17. Given your answer to item 16, why does stirring a hot cup of coffee cool it down?
18. Given any two bodies, the one with the higher temperature contains more heat. What is wrong with this statement?
19. Explain how conduction causes water on the surface of a bridge to freeze sooner than water on the road surface on either side of the bridge.
20. A tile floor may feel uncomfortably cold to your bare feet, but a carpeted floor in an adjoining room at the same temperature feels warm. Why?
21. Why is it recommended that several items of clothing be worn in layers on cold days?
22. Why does a fan make you feel cooler on a hot day?
23. A paper cup is filled with water and then placed over an open flame, as shown at right. Explain why the cup does not catch fire and burn.



Practice Problems

For problems 24–25, see Sample Problem B.

24. A force of 315 N is applied horizontally to a crate in order to displace the crate 35.0 m across a level floor at a constant velocity. As a result of this work, the crate's internal energy is increased by an amount equal to 14 percent of the crate's initial internal energy. Calculate the initial internal energy of the crate. (Disregard the work done on the floor, and assume that all work goes into the crate.)
25. A 0.75 kg spike is hammered into a railroad tie. The initial speed of the spike is equal to 3.0 m/s.
- If the tie and spike together absorb 85 percent of the spike's initial kinetic energy as internal energy, calculate the increase in internal energy of the tie and spike.
 - What happens to the remaining energy?

CHANGES IN TEMPERATURE AND PHASE

Review Questions

26. What principle permits calorimetry to be used to determine the specific heat capacity of a substance? Explain.
27. Why does the temperature of melting ice not change even though energy is being transferred as heat to the ice?

Conceptual Questions

28. Why does the evaporation of water cool the air near the water's surface?
29. Until refrigerators were invented, many people stored fruits and vegetables in underground cellars. Why was this more effective than keeping them in the open air?
30. During the winter, the people mentioned in item 29 would often place an open barrel of water in the cellar alongside their produce. Explain why this was done and why it would be effective.

Practice Problems

For problems 31–32, see Sample Problem C.

31. A 25.5 g silver ring ($c_p = 234 \text{ J/kg} \cdot ^\circ\text{C}$) is heated to a temperature of 84.0°C and then placed in a calorimeter containing $5.00 \times 10^{-2} \text{ kg}$ of water at 24.0°C . The calorimeter is not perfectly insulated, however, and 0.140 kJ of energy is transferred to the surroundings before a final temperature is reached. What is the final temperature?