PRACTICE B

Conservation of Energy

1. In the arrangement described in Sample Problem B, how much would the water's internal energy increase if the mass fell 6.69 m?

2. A worker drives a 0.500 kg spike into a rail tie with a 2.50 kg sledgehammer. The hammer hits the spike with a speed of 65.0 m/s. If one-third of the hammer's kinetic energy is converted to the internal energy of the hammer and spike, how much does the total internal energy increase?

3. A 3.0×10^{-3} kg copper penny drops a distance of 50.0 m to the ground. If 65 percent of the initial potential energy goes into increasing the internal energy of the penny, determine the magnitude of that increase.

4. The amount of internal energy needed to raise the temperature of 0.25 kg of water by 0.2°C is 209.3 J. How fast must a 0.25 kg baseball travel in order for its kinetic energy to equal this internal energy?

SECTION REVIEW

1. Use the microscopic interpretations of temperature and heat to explain how you can blow on your hands to warm them and also blow on a bowl of hot soup to cool it.

2. If a bottle of water is shaken vigorously, will the internal energy of the water change? Why or why not?

3. At Niagara Falls, if 505 kg of water fall a distance of 50.0 m, what is the increase in the internal energy of the water at the bottom of the falls? Assume that all of the initial potential energy goes into increasing the water's internal energy and that the final kinetic energy is zero.

4. **Critical Thinking** A bottle of water at room temperature is placed in a freezer for a short time. An identical bottle of water that has been lying in the sunlight is placed in a refrigerator for the same amount of time. What must you know to determine which situation involves more energy transfer?

5. **Critical Thinking** On a camping trip, your friend tells you that fluffing up a down sleeping bag before you go to bed will keep you warmer than sleeping in the same bag when it is still crushed from being in its storage sack. Explain why this happens.