STUDY GUIDE   Chapter 6
Measuring Thermal Energy

In the blank, write the term that best completes each statement.

1. The amount of energy it takes to raise the temperature of 1 kilogram of a material 1 Celsius degree is called

   _____

2. Another term used for specific heat is _____

3. Specific heat is measured in _____ per kilogram per degree Celsius.

4. Specific heat can be used to measure changes in _____

5. Thermal energy is the _____ energy of the particles that make up a material.

6. In the equation Q = m ×ΔT × C$_p$, the symbol Δ means _____

7. A measure of the average kinetic energy of the particles in a sample of matter determines the matter's

   _____

8. The transfer of energy from something at a higher temperature to something at a lower temperature is called

   _____

9. In the equation Q = m ×ΔT × C$_p$, the change in thermal energy is shown by

10. When calculating changes in thermal energy, the change in temperature and the change in thermal energy are always _____ numbers.

11. Heat always flows from _____ temperatures.

12. Work and heat both involve _____ of energy.

REINFORCEMENT   Chapter 6
Measuring Thermal Energy

Answer the following questions about specific heat and thermal energy on the lines provided.

1. Change in thermal energy can be calculated using the equation $Q = m \times \Delta T \times C_p$

   a. In this equation, what does Q represent?

   b. What does *m* represent?_____

   c. What does ΔT represent?_____

   d. What does C_p, represent?_____

   e. What does the symbol Δ mean? _____

   f. Why is the symbol Δ used with T but not Q?_____

   g. What is always true about both Q and T?_____

   h. In what units is T measured?_____

   i. In what units is specific heat measured?_____

   j. In what unit is *m* measured?_____

2. When the temperature of an object decreases, what formula is used to calculate ΔT?

3. When the temperature of an object increases, what formula is used to calculate ΔT?

4. Suppose that the temperature of 0.5kg of water changes from 25^0C to 34^0C over a period of two hours. How would you calculate the temperature change of the water?

5. Calculate the quantity of heat that must be transferred to 0.2kg of water to raise its temperature from 15^0C to 17^0C. Water has a specific heat of $4190J/kg^0C$.

ENRICHMENT   Chapter 6
Measuring Thermal Energy
USING SPECIFIC HEAT

   Pam has two pieces of metal. Both are silvery solids. For each metal Pam determined its volume and mass. Then she heated each metal to 100.0 ^{0}C, placed it in 10.0 mL of water at 21.0 ^{0}C, and measured the final temperature of the water and metal system. Pam recorded her data in the following data table.

	Volume (cm^3)	Mass (g)	Temperature of metal (^{0}C)	Volume of water (cm^3)	Beginning temperature of water (^{0}C)	Ending temperature of metal (^{0}C)
Metal A	1.50	3.99	100.0	10.0	21.0	27.3
Metal B	1.50	10.92	100.0	10.0	21.0	25.3

Using her data and the information in the following table, what are Pam's metals? Explain your answers.

Metal	C$_p$(J/g^{0}C)	Density (g/cm^3)	Description
aluminum	0.900	2.7	silvery solid
barium	0.285	3.5	silvery solid
bismuth	0.122	9.75	silvery solid
cobalt	0.442	8.9	silvery solid
copper	0.386	8.96	reddish solid
iron	0.448	7.87	silvery solid
manganese	0.481	7.3	silvery solid
mercury	0.139	13.5	silvery liquid
nickel	0.444	8.9	silvery solid
potassium	0.724	0.862	silvery solid
tin	0.222	7.31	silvery solid
zinc	0.388	7.13	silvery solid