Specific Heat

DIRECTIONS: Use q = (m)(ΔT)(Cp) to solve the following problems. Show all work and units.

1. A 15.75-g piece of iron absorbs 1086.75 joules of heat energy, and its temperature changes from 25°C to 175°C. Calculate the specific heat capacity of iron.

2. How many joules of heat are needed to raise the temperature of 10.0 g of aluminum from 22°C to 55°C, if the specific heat of aluminum is 0.90 J/g°C?

3. To what temperature will a 50.0 g piece of glass raise if it absorbs 5275 joules of heat and its specific heat capacity is 0.50 J/g°C? The initial temperature of the glass is 20.0°C.

4. Calculate the heat capacity of a piece of wood if 1500.0 g of the wood absorbs 6.75×10^4 joules of heat, and its temperature changes from 32°C to 57°C.

5. 100.0 mL of 4.0°C water is heated until its temperature is 37°C. If the specific heat of water is 4.18 J/g°C, calculate the amount of heat energy needed to cause this rise in temperature.

6. 25.0 g of mercury is heated from 25°C to 155°C, and absorbs 455 joules of heat in the process. Calculate the specific heat capacity of mercury.

7. What is the specific heat capacity of silver metal if 55.00 g of the metal absorbs 47.3 **calories** of heat and the temperature rises 15.0°C?

8. If a sample of chloroform is initially at 25°C, what is its final temperature if 150.0 g of chloroform absorbs 1.0 **kilojoules** of heat, and the specific heat of chloroform is 0.96 J/g°C?

9. How much energy must be absorbed by 20.0 g of water to increase its temperature from 283.0 °C to 303.0 °C? (Cp of H_2O = 4.184 J/g °C)

10. When 15.0 g of steam drops in temperature from 275.0 °C to 250.0 °C, how much heat energy is released? (Cp of H_2O = 4.184 J/g °C)

11. How much energy is required to heat 120.0 g of water from 2.0 °C to 24.0 °C? (Cp of H_2O = 4.184 J/g °C)

12. How much heat (in J) is given out when 85.0 g of lead cools from 200.0 °C to 10.0 °C? (Cp of Pb = 0.129 J/g °C)

13. If it takes 41.72 joules to heat a piece of gold weighing 18.69 g from 10.0 °C to 27.0 °C, what is the specific heat of the gold?

14. A certain mass of water was heated with 41,840 Joules, raising its temperature from 22.0 °C to 28.5 °C. Find the mass of the water, in grams. (Cp of H_2O = 4.184 J/g °C)

15. How many joules of heat are needed to change 50.0 grams of ice at -15.0 °C to steam at 120.0 °C? (Cp of H_2O = 4.184 J/g °C)

16. Calculate the number of joules given off when 32.0 grams of steam cools from 110.0 °C to ice at -40.0 °C. (Cp of H_2O = 4.184 J/g °C)

17. The specific heat of ethanol is 2.46 J/g °C. Find the heat required to raise the temperature of 193 g of ethanol from 19°C to 35°C.

18. When a 120 g sample of aluminum (Al) absorbs 9612 J of energy, its temperature increases from 25°C to 115°C. Find the specific heat of aluminum.

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