**Specific Heat Homework**

**DIRECTIONS: Use q = (m) (c) (ΔT) 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 6.75×104 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 H2O = 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 H2O = 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 H2O = 4.184 J/g °C)

 12. 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?

 13. 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 H2O = 4.184 J/g °C)

 14. 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 H2O = 4.184 J/g °C)

 15. 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 H2O = 4.184 J/g °C)

 16. The specific heat of ethanol is 2.46 J/g oC. Find the heat required to raise the temperature of 193 g of ethanol

 from 19oC to 35oC.

 17. When a 120 g sample of aluminum (Al) absorbs 9612 J of energy, its temperature increases from 25oC to 115oC.

 Find the specific heat of aluminum.

1. In an exothermic reaction, is heat gained or lost in the system? Draw a diagram that shows the transfer of heat energy in an endothermic reaction.
2. In an endothermic reaction, is heat gained or lost in the system? Draw a diagram to illustrate the transfer of energy in an exothermic reaction.
3. Is q positive or negative in an exothermic reaction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Is q positive or negative in an endothermic reaction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Predict the sign of q for the burning of a candle. Is this reaction endothermic or exothermic?
6. List three examples of an exothermic reaction. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. List two examples of an endothermic reaction. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_