Specific Heat Worksheet

1. How many kiloJoules of energy are needed to raise the temperature of 1.50dm^3 of water from 20.0°C to 37.0°C?

2. Mercury has a density of 13.546 g/cm3 and a specific heat of 0.139 J/g.°C. How much energy in Joules is released from 25.00 cm3 of Hg when it cools from the boiling point of Hg (357°C) to its freezing point (-39°C)?

3. What (minimum) mass of glass (Cp= 0.749 J/g.°C) at 26.0°C is needed to absorb 5.00×10^4 Joules of heat energy if its final temperature can not exceed 275°C?

4. What final temperature will 120.0 grams of benzene (Cp= 1.74 J/g.°C) at 7.0°C have after it absorbed 2.2kJ of heat?

5. 3.0 kg of Osmium metal (Cp= 0.130 J/g.°C) at 241 K is heated to 394 K. How much energy is needed for this?

6. 14.22 g of a substance absorbs 1.77 kJ of heat and undergoes a temperature change from –23.0°C to 31.0°C. What is the specific heat of the metal?

7. Calculate the amount of heat in kJ that was absorbed by a Sn (Cp= 0.220 J/g.°C, D= 7.31 g/cm3) roof that measures 32 feet by 20. feet if the sample is 0.0104 feet thick when the roof under goes a 15.0°C temperature change.

8. The density of gold is 19.3 g/cm3. What volume of gold can absorb 2.3 kJ of heat when undergoing a 5.0°C ΔT. It requires 0.128 J of heat to raise the temperature of 1g of Au 1°C.

9. Calculate the final temperature of a sample of Te (Cp= 0.201 J/g.°C) when a 82.500g sample at 12.0°C releases 2.00×10^3 J of heat energy.

10. A sample of food with a mass of 3.440g is combusted (burned) in a calorimeter. The calorimeter contains 165g of water at 24.1°C. The final temperature of the calorimeter (after combustion of the food) is 67.2°C.

    a.) Calculate the amount of heat in kJ released by the combustion of food.
    b.) Determine the number of kJ/g of food.
    c.) If 1 calorie is equal to 4.2 J, convert this amount of energy per gram to calorie.
    d.) A food Calorie is 1000 calories. Convert calorie to food Calories per gram.

12 What would the initial temperature be if a 1.5 mole sample of iron had a final temperature of 55°C and required 1111J of heat?

13 What would the change in temperature (ΔT) be if an 89g sample of copper required 678 calories of heat?