Specific Heat Problem Set

DIRECTIONS: Use $q = (m)(C)(\Delta T)$ **to solve the following problems. Show all work and units. Check your sig figs.**

q= the energy that transfers from one object to another because of a temperature difference between them

C = the specific heat of the substance = the amount of heat it takes to raise the temperature of 1 g of the substance 1 degree Celsius

m = mass of the substance

Delta T = the change in temperature

Specific Heat may be expressed in terms of joules or calories so the unuts are either:

$$\left(J/g \cdot {}^{\circ}C \right) \quad or \quad \left(cal/g \cdot {}^{\circ}C \right)$$

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

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

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

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

5) 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?

6) 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. (C_p of H_2O = 4.184 J/g °C)

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

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

9) 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.

10) 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.