Name _____

Date _____ Pd ____

Unit 3 Worksheet 3 – Quantitative Energy Problems

Energy constants (H_2O)

334 J/g	Heat of fusion (melting or freezing) H_f
2260 J/g	Heat of vaporization (evaporating or condensing) H_V
2.1 J/g˚C	Heat capacity (c) of solid water
4.18 J/g˚C	Heat capacity (c) of liquid water

For each of the problems sketch a warming or cooling curve to help you decide which equation(s) to use to solve the problem. Keep a reasonable number of sig figs in your answers.

1. A cup of coffee (140 g) cools from 75˚C down to comfortable room temperature 20.˚C. How much energy does it release to the surroundings?

2. Suppose during volleyball practice, you lost 2.0 lbs of water due to sweating. If all of this water evaporated, how much energy did the water absorb from your body? Express your answer in kJ. 2.2 lbs = 1.0 kg

3. Suppose that during the Icy Hot lab that 65 kJ of energy were transferred to 450 g of water at 20˚C. What would have been the final temperature of the water?

4. The heat capacity of solid iron is 0.447 J/g˚C. If the same quantity of energy as in #3 were transferred to a 450 g chunk of iron at 20.˚C, what would be the final temperature?

5. Suppose a bag full of ice (450 g) at 0.0 ˚C sits on the counter and begins to melt to liquid water. How much energy must be absorbed by the ice if 2/3 of it melted?

6. A serving of Cheez-Its releases 130 kcal (1 kcal = 4.18 kJ) when digested by your body. If this same amount of energy were transferred to 2.5 kg of water at 27˚C, what would the final temperature be?

7. If this same quantity of energy were transferred to 2.5 kg of water at its boiling pt, what fraction of the water would be vaporized?