Name _____

Date _____ Pd ____

Unit 3 Worksheet 4 – Quantitative Energy Problems
Part 2

Show all work on a *separate* sheet of paper so that you may use as much space as you need for each problem.

- Model the problem: for each question sketch a warming/cooling curve to help you decide which constant(s) to use in your analysis. Draw energy bar (LOL) charts to help your analysis as needed.
- Find the desired quantity, showing all work and canceling units.
- Keep a reasonable number of sig figs and **box** in your answers.
- Skip Lines between problems.

Refer to your Energy Constants handout for specific heat capacities and heats of fusion or vaporization.

1. How much energy must be absorbed by a 150. g sample of ice at 0.0 ˚C that melts and then warms to 25.0˚C?

2. Suppose in the Icy Hot lab that the burner transfers 325 kJ of energy to 450. g of liquid water at 20.˚C. What mass of the water would be boiled away?

3. A 12oz can of soft drink (assume m = 340. g) at 25˚C is placed in a freezer where the temperature is –12 ˚C. How much energy must be removed from the soft drink for it to reach this temperature?

4. A beaker containing 225 g of ethanol also at 25˚C is placed in the same freezer (at –12 ˚C). How much energy must be removed from the ethanol for it to reach this temperature? Will the sample of ethanol freeze? Explain why or why not.

5. 65.0 kilojoules of energy are added to 150. g of ice at 0.0˚C. What is the final temperature of the water?

6. 45.0 kilojoules of energy are added to 150. g of silver at 0.0 ^{o}C. Will the sample of silver completely melt? What is the final temperature of the piece of silver? Explain.

7. If 250. kJ of energy are removed from a 4.00 x 10^2 g sample of water at 60.0˚C, will the sample of water completely freeze? Explain.

8. An ice cube tray full of ice (235g) at –7.00˚C is allowed to warm up to room temperature (22.0˚C). How much energy, in kJ must be absorbed by the contents of the tray in order for this to happen?

9. If this same quantity of energy were removed from 40.0 g of water vapor at 100.˚C, what would be the final temperature of the water?

10. A manufacturing process requires molten (liquid) aluminum. How much energy would be required to completely melt a 25.0 g block of aluminum at 23.0 ^{o}C?