Things that have to be in your homework notebook when it’s collected on test day...

___ / 10 BAT answers with work shown  ___ / 5 Phase Change Energy wkst #5
___ / 5 Thermochemistry Intro Wkst #1  ___ / 5 Mixed Thermochemistry Practice wkst #6
___ / 5 Specific Heat Wkst #2  ___ / 5 ___________________________ #7
___ / 5 Specific Heat Wkst with sub #3  ___ / 5 ___________________________ #8
___ / 5 States and Energy wkst #4  ___ / 5 ___________________________ #9

Things that you must Be Able To do for your test...

…follow and explain the flow of energy in a situation…
1. Sketch a nighttime campfire with four people and a dog sitting around it. Draw arrows showing where energy is being transferred. If the burning logs are the “system”, what would qualify as “surroundings?”

2. Sketch a situation where a ball of iron (fresh from your snow-covered backyard) is dropped into a glass of water in your 70°F kitchen. Draw arrows showing where energy is being transferred because of the temperature differences.

3. Two containers of lemonade are sitting on your counter at home. One contains 5 mL of lemonade, and the other contains 500 mL of lemonade. If both are allowed to sit out overnight, which has a higher temperature? Which has more internal heat energy?

…use the \( q = mC \Delta T \) equation to solve for any of the missing variables…if given a chart like that on page 508…
4. How much energy is absorbed by a 34-gram glass marble from that starts at room temperature (roughly 25°C) and is placed into a beaker of boiling water at 99.9°C?

5. When a 112-gram metal sample is placed into cold water and allowed to cool to 15°C, it releases 1930 J of energy. If the metal’s specific heat capacity is 0.41 J g\(^{-1}\) °C\(^{-1}\), what was the original temperature of the metal?

6. What is the specific heat capacity of a liquid if 14.0 kJ of energy is able to heat 77.4g of the liquid from 30°C to 97°C?

7. A 100-gram piece of metal is heated in boiling water until the metal reaches a temperature of 100°C. The metal is then quickly placed into 300 grams of water at a temperature of 26°C. If the water then rises in temperature to 27.5°C, what is the specific heat capacity of the liquid? Using the chart on page 508, what is the identity of the metal? (Hint: Use the equation like you did on a lab a while back.)

…use and calculate \( \Delta H \) for a phase change…if given a chart like that on page 522…
8. Look at the diagram to the right for the heating of a sample of H\(_2\)O and use it to answer the questions...

a) If the sample began at A as a solid, what state of matter would exist at C & at E?
b) What process is happening at B? at D?
c) If the water had a mass of 734 grams, how much energy was required to heat it all the way through part C on the graph?
8. (continued)
d) How much energy would be required to take the same 734 grams all the way through the change in region B?
e) Energy is being added all through part B, but the temperature isn’t changing. Why not?

9. Farmers often spray water over their crops if a light freeze is predicted overnight. Explain why using these terms: energy, heat, exothermic or endothermic, solid, and liquid.

10. How much heat energy would be transferred if a 1-pound ice cube were to melt in a swimming pool? (Hint: 1 pound = 16 ounces, and 1 ounce = 29.37 grams.) Is the ice cube absorbing or releasing that much energy?

11. In the back of a refrigerator, Freon™ gas used to be evaporated to cool the food in the refrigerator. What is the ΔH_vap in kJ/mol for Freon™ if it takes 3.7 moles of Freon™ gas to absorb 228.7kJ of energy when it is evaporated?

...use ΔH for a combustion reaction...

12. Propane is used by numerous characters on the show King of the Hill. Hank Hill, the patriarch of the Hill clan, cooks half a dozen hamburgers using a propane flame that combusts 123g propane.
   a) Write the balanced reaction for the complete combustion of propane into two gaseous products.
   b) Using the information as given on page 517, calculate how much energy (in kJ) that propane fire released.

13. If a marshmallow containing 14.3 grams of sucrose is burned completely, how many kJ of energy are released? (Use the chart on page 517.) If that energy all went to heating water, how much hotter could 800 grams of water get?

...distinguish between exothermic and endothermic reactions...

14. Identify each of these as endo- or exothermic for the item underlined.
   light bulb burning  glow stick glowing  a metal flagpole cooling a tongue
   water freezing  ice melting  moth balls subliming

15. Use a complete sentence or two to explain one of your choices for #8. Include an explanation of where energy is flowing, what the system is, and what the surroundings are.

...for old questions, I’ll pick a couple of questions that went badly on the last test...

16. Calculate the percentage yield when 23 grams of sodium hydroxide react with 62.5 grams of iron (II) chlorate and only 15.8 grams of iron (II) hydroxide is collected.