More Calorie Calculation Practice Name: Period:

For each of the situations below:

* Think about what is happening to the ice/water/steam.
* Decide which equation makes the most sense to use 🡪 write the original equation!
* Identify what each of the numbers means.
* Plug in numbers with units and solve, answer with the correct number of sig figs.
1. How much energy is required to raise 125 g of liquid water from 20.˚C to 100.˚C?
2. Once that liquid water (from #1) is at 100.˚C, how much energy is required to vaporize all of it?
3. If you add 3750. cal of energy to solid ice at 0.0˚C, how many grams (mass) of ice can be melted?
4. Once the ice in #3 is melted (at 0.0˚C), if you add another 3750 cal of energy to it, what temperature will the liquid water be?
5. How many calories are needed to raise 38 g of liquid water by 40.˚C?
6. If you add 4500 cal of energy to liquid water that is already at 100.˚C, how many grams of water can be vaporized?
7. How much energy does it take to melt 1 g of ice at 0˚C? How much energy does it take to vaporize 1 g of water at 100˚C? What is the name of each of those constants (the number you just found)?
8. Propose one reason why the two numbers in #7 are so different from one another. (hint: think about why one phase change might take more energy)
9. If you remove 3200 cal from 58 g of liquid water, how much will the temperature decrease?
10. If the water in #9 started at 95˚C, what temperature will it end at?
11. How much energy needs to be removed to condense (the opposite of vaporize) 85 g of water vapor at 100.˚C?
12. How much energy needs to be removed to freeze (the opposite of melt) 85 g of liquid water at 0.0˚C?
13. How much energy needs to be removed to cool 46 g of liquid water from 75˚C to 25˚C?
14. If you have 57 g of solid ice at 0.0˚C and you want to melt all of it, raise it all to 100.˚C, and then vaporize all of it, how much energy must you add? (hint: think about what is happening to the ice/water/steam)
15. If you have 28 g of water vapor at 100.˚C and you want to condense all of it, cool it all to 0.0˚C, and freeze all of it, how much energy must be removed? (hint: think about what is happening to the ice/water/steam)
16. Find the Physical Constants for Water in your data book. There is a different “c” value (specific heat capacity) for solid water (ice). What is that value? If you have 15 g of solid ice at -14˚C and you want to raise the temperature to 0.0˚C how much energy will you have to add?
17. Challenge ☺: You have 43 g of solid ice at 0.0˚C. You add 4300 cal of energy to it. Describe the status of the ice/water/steam at the end. Is it all the same state? What state is that? What temperature is it?