Thermochemistry Formula Sheet:

1st Law of Thermodynamics: Endothermic: $q = +$ Exothermic: $q = -$	**Internal Energy:** $\Delta \boldsymbol{U} = q + W$
Work Done By/On a Gas: Work done by the system: $W = -$ Work done on the system: $W = +$	$\boldsymbol{W} = -P\Delta V$ $1\ L * 1\ atm = 101.3\ Joules$
Specific Heat Capacity: $\boldsymbol{J}/(\boldsymbol{g}\ ℃)$	$\boldsymbol{C_S} = \frac{q}{m\Delta T}$
Molar Heat Capacity: $\boldsymbol{J}/(\boldsymbol{mol}\ ℃)$	$\boldsymbol{C_M} = \frac{q}{n\Delta T}$
Heat Capacity: $\boldsymbol{J}/℃$	$\boldsymbol{C_H} = \frac{q}{\Delta T}$
Calorimetry – Temperature Change:	$\boldsymbol{q} = mc\Delta T$ $C_{H2O} = 4.184 \frac{J}{g\ ℃}$ $C_{Ice} = 2.09 \frac{J}{g\ ℃}$ $C_{Steam} = 2.03 \frac{J}{g\ ℃}$
Calorimetry – Phase Change:	$\boldsymbol{q} = m\Delta H$ $\boldsymbol{q} = n\Delta H$ H2O: $\Delta H_{fus} = 334\ J/g$ $\Delta H_{fus} = 6.01\ kJ/mol$ H2O: $\Delta H_{vap} = 2260\ J/g$ $\Delta H_{vap} = 40.7\ kJ/mol$
Final Temperature of a Mixture: T_A → Initial Temp. of Substance A T_B → Initial Temp. of Substance B	$-q_A = q_B$ $-m_A C_A (T_F - T_A) = m_B C_B (T_F - T_B)$ **Note:** This equation will work if there are no phase changes.
Coffee Cup Calorimeter:	$\Delta \boldsymbol{H^o}_{\boldsymbol{rxn}} = \frac{q_{rxn}}{n}$ $q_{rxn} = -q_{H2O}$
Enthalpy Change:	$\Delta \boldsymbol{H^o}_{\boldsymbol{rxn}} = \sum n\, H^o{}_f(products) - \sum n\, H^o{}_f(reactants)$

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