**Dougherty Valley HS** **AP Chemistry**

**Thermochemistry: Energy**

**A BLUFFER’S GUIDE**

*Inspired by Paul Groves*

1. The 1st Law of Thermodynamics -
The energy of the universe is constant.
2. Endothermic +qsytem -qsurroundings
Exothermic -qsystem +qsurroundings
3. Specific heat – the amount of energy it takes to raise 1g of a substance by 1°C
Molar heat – the amount of energy it takes to raise 1mol of a substance by 1°C
4. The larger the specific heat, the more energy it takes to raise the temperature. Will heat slower.
5. Q = mC∆T
6. Calorimetry:
Qsubstance 1 = - Qsubstance 2Tfinal substance 1 = Tfinal substance 2

 Temp is in CELSIUS not Kelvins for this topic!

1 kJ = 1000 J 1 calorie = 4.184 J

1. Standard State = the form of the element that has ∆Hf°=0 and ∆Gf° = 0
	* Pure gas at 1atm pressure
	* Pure solid or liquid in most stable at 1atm and temp of interest (usually 25°C)
	* Substances with a 1M solution
2. Formation Reactions – the reaction of elements in their standard state to form one mole of a pure compound
	* Can have fractions as coefficients because making 1mol of the product.
	* C(s, graphite) + ½ O2(g) 🡪 CO(g)
3. Enthalpy change:
∆𝑯° = 𝜮𝒏∆𝑯𝒇°(products) − 𝜮𝒏∆𝑯𝒇°(reactants)

4. Bond Energy:
**ΣH(Bonds Broken) – ΣH(Bonds Formed)**

*“takes to break” and “free to form”
 + -
 endothermic exothermic*
5. Hess’s Law

6. Relationship between modifying the chemical equation and the ∆Hrxn value
	* Multiplying a reaction by a number
	= multiply ∆Hrxn by the same number
	* Reversing a reaction to go backwards
	= flip the algebraic sign on ∆Hrxn
7. Example Hess’s Law Problem:



**R-17**