Honors Chemistry I **Name: _____**
Lincoln High School
Mrs. Cameron **Period____**

Unit 7 - Energy and Energy Changes: Physical and Chemical Change

NGSS Standards Addressed:

HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields

LHS Core Values:
~Students will be thoughtful communicators who read, write, listen and speak effectively in preparation for careers and/or post-secondary education
~Students will be creative and practical problem solvers
~Students will be responsible users of technology and media
~Students will demonstrate continuous effort towards proficiency in all requirements for graduation

Objectives:
The student will:

1. Give examples of different forms of energy.
2. List the important units in which energy is expressed and convert from one to another.
3. Define and use the concepts of thermal equilibrium, internal energy and molecular kinetic energy.
4. Describe how the change in internal energy of a system is related to the exchanges of heat (q) and work (w) between the system and its surroundings.
5. Distinguish between open, closed and isolated systems.
6. To understand how bond breaking and bond making affect a system's potential energy.
7. Define the first law of thermodynamics both verbally and by means of an equation.
8. Describe the term *state function* and describe its importance in thermochemistry.
9. Give examples of state functions.
10. To utilize algebraic sign conventions that describe whether heat and work are flowing in or out of a system.
11. Describe energy changes as endothermic or exothermic.
12. Define enthalpy, and relate enthalpy change (ΔH) in a process occurring at a constant pressure of heat added to or lost by the system during the process.
13. Calculate the quantity of heat involved in a reaction at constant pressure given the quantity of reactants and the enthalpy change for the reaction on a mole basis.
14. State Hess's law and apply it to calculate the enthalpy change in a process that could be combined to yield the reaction of interest.
15. Define the terms *heat capacity* and *specific heat.*
21. Calculate any of the following quantities given the other three: heat, quantity of material, temperature change and specific heat.
22. Interpret "Energy vs. Reaction Progress" graphs including activation energy and relate the shape of the diagrams to whether the reaction is exothermic or endothermic.