Chapter 16 Objectives (section 1 only)

- Students will be able to define temperature.
- Students will be able to define heat.
- Students will be able to define calorimeter.
- Students will be able to calculate energy, mass, specific heat or temperature using the specific heat equation.
- Students will be able to explain energy (heat) flow between substances.
- Given a scenario, students will be able to explain whether the substance is undergoing an exothermic or endothermic process.
- Given a chemical equation with energy added, students will be able to classify the reaction as endothermic or exothermic.
- Students will be able to define enthalpy (ΔH).
- Students will be able to label physical changes as either exothermic or endothermic.
- Students will be able to define and calculate heat of fusion and heat of vaporization.
- Given a graph of phase changes, students will be able to calculate the amount of energy absorbed or released using specific heat and heat of fusion calculations.
- Given a thermochemical equation and the mass of one of the reactants, students will be able to calculate the amount of energy released or absorbed using stoichiometry.

Chapter 17 Objectives

- Students will be able to state the two necessary characteristics of collisions for a chemical reaction to occur: collisions must happen in an effective orientation with an appropriate amount of force.
- Students will be able to express the reaction rate in appropriate units.
- Given a balanced chemical reaction, students will be able to identify if increasing or decreasing the temperature, pressure or concentrations will speed up the rate of reaction.
- Students will be able to explain the effects of adding a catalyst to a chemical reaction, not only on the reaction rate, but on the activation energy.
- Students will be able to explain the effects of adding an inhibitor to a chemical reaction.
- Students will be able to define activation energy.
- Students will be able to compare and contrast the activated complex to the reactants and products.
- Students will be able to draw the appropriate endothermic or exothermic energy profile curve for a chemical reaction.
- Students will be able to label the following parts of the energy profile curve: activation energy, activated complex, heat of reaction, the energy axis, the reaction progress, the energy of the reactants, the energy of the products, and the result of adding catalyst.

- Given an energy profile curve, students will be able to determine the all the energies for the chemical reaction. (forward, reverse, activation energy, reverse activation energy, etc.)
- Students will be able to write a rate law for a chemical reaction given the order of each reactant.
- Students will be able to determine the order of a reactant from a chemical reaction.
- Students will be able to determine the order of a chemical reaction from a single step mechanism, a rate determining step or using experimental data.
- Students will be able to derive the rate law constant units and calculate its value.

Chapter 18 Objectives

- Given a balanced chemical reaction, students will determine the direction in the shift in equilibrium due to the stress of:
    - Increasing or decreasing the concentrations of either a reactant or product
    - Adding or removing heat from either an endothermic or exothermic reaction
    - Changing the pressure
    - Adding an inhibitor or a catalyst. (hint….no shift)
- Students will be able to explain in writing what it means for a chemical reaction to be at equilibrium
- Given a balanced chemical reaction and the molar concentrations of the reactants and products, students will be able to calculate the equilibrium constant for the equation.
- From the equilibrium constant calculated for the chemical reaction, students will be able to determine if the reaction favors the reactants or the products.
- Using the equilibrium constant, students will be able to calculate the concentration of one reactant or product when given the concentrations of the other reactants and products.