**Honors Chemistry**

**Semester #1 Learning Targets**

**Scientific Method and Math**

* 1. I can design and carry out a lab experiment        
     (1.02) I can differentiate between a scientific theory and a scientific law and explain the differences between the two types  
     (1.03) I can accurately use a variety of lab equipment to take measurements   
     (1.04) I can relate the precision of a measurement to the quality of the measuring tool         
     (1.05) I can use the different metric prefixes to both express numbers and convert between different metric units  
     (1.06) I can use D=m/v to determine the mass, density, and/or volume of a substance  
     (1.07) I can explain the difference between accurate and precise lab data  
     (1.08) I can explain the difference between exact and inexact numbers  
     (1.09) I can identify and differentiate between exact and inexact numbers  
     (1.10) I can determine the significant digits present in a provided number  
     (1.11) I can accurately complete calculations and express my answer with the appropriate number of significant digits

(1.12) I can use dimensional analysis to convert between metric units  
(1.13) I can use dimensional analysis to convert between English units  
(1.14) I can use dimensional analysis to convert between English and metric units  
(1.15) I can use dimensional analysis to complete one-dimensional (1D), 2D, and 3D conversions  
(1.16) Know basic prefixes of the metric system and be able to convert between metric and English units of measurement.  
(1.17) Properly use scientific notation to express extremely large and small quantities.  
(1.18) Apply the rules of significant digits in expressing calculated values.  
Perform calculations by using dimensional analysis.

**Concepts of Matter**

(2.01) Define these classifications and distinguish between: elements, compounds, mixtures, pure substances and solutions.  
(2.02) Represent elements, compounds, physical and chemical changes using particle diagrams.  
(2.03) Apply the Law of Conservation of Mass.  
(2.04) Distinguish between physical and chemical properties and changes.  
(2.05) Represent and compare solid, liquid and gas particles in terms of motion, arrangement and attraction.

**Atoms, Molecules, and Ions**

(3.01) Discuss some historical events that lead to Dalton’s proposal of his atomic theory.  
(3.02) Describe the basic postulates of Dalton’s Atomic Theory.  
(3.03) Describe the key historical discoveries of J.J. Thomson, Millikan, Rutherford, and Chadwick that led to the discovery of the structure of the atom.  
(3.04) Describe the structure of the atom in terms of protons, neutrons, and electrons and list the relative charge, mass, and location of these particles.  
(3.05) Calculate average atomic mass from natural abundance of isotopes and masses of individual atoms.  
(3.06) Explain how ions are formed, determine the number of electrons gained or lost based on ionic charge and use the periodic table to predict charges of ions.  
(3.07) Identify, name and write formulas for ionic compounds.  
(3.08) Identify, name, and write formulas for molecular compounds.  
(3.09) Identify, name, and write formulas for acids.  
(3.10) Describe how elements are organized in the periodic table in periods and groups and be able to name several groups.  
(3.11) Identify the location of metals, nonmetals, and metalloids.

**Chemical Reactions**

(4.01) Know basic parts of a chemical equation and symbols that may appear in it.  
(4.02) Balance chemical equations and explain its significance.

(4.03) Classify and write equations for synthesis, decomposition, single and double replacement and combustion reactions.  
(4.04) Predict products for basic chemical reactions.

**Moles and Stoichiometry**

(5.01) Calculate percent composition given a chemical formula.  
(5.02) Calculate formula mass and molar mass of compounds.  
(5.03) Convert between the mass, moles, and number of particles of a substance.  
(5.04) Calculate empirical and molecular formulas.

(6.01) Define molarity and calculate moles, volume, or grams of a substance using molarity.  
(6.02) Use a dilution calculation to achieve a desired solution concentration.  
(6.03) Describe how to prepare a solution with a known concentration.  
(6.04) Use a balanced equation to calculate amounts of reactants and products for a reaction.  
(6.05) Identify a limiting reactant and determine the theoretical yield of the reaction.  
​(6.06) Calculate the percent yield of a reaction.