**ACP - Unit 2 – Chemical Reactions and Quantities – Learning Objectives**

**Unit Essential Questions**

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| * What do we call the tiny particles?
* How do we count up the tiny particles in the stuff?
* What happens to the tiny particles when stuff becomes other stuff?
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**Unit Spirals**

Compounds used in spiral over the unit to teach the essential questions.

H2O NH4 CH4 NaCl

Reactions used in spiral over the unit to teach the essential questions.

Candle Lab Reaction

C25H52(s) + 38 O2 (g)  26 H2O (g) + 25 CO2 (g)

Crystal Lab Reaction

KAl(SO4)212H2O (s)  K+ (aq) + Al3+ (aq) + SO42- (aq) + 12 H2O (l)

**Part 1**

Chapter 2.2 – Chemical and Physical Changes

* Students will be able to identify chemical and physical properties as well as distinguish between chemical and physical changes by description, observation and chemical equation.

Chapter 15.1 and 15.2 – Solutions

* Students will understand the process of dissolution and crystallization as a physical change.
* Students will understand the differences between an unsaturated, saturated and supersaturated solution.

Chapter 4 - Nomenclature

* Students will be able to identify molecular compounds, ionic compounds and acids.
* Students will be able to name and write the formula for ionic compounds, molecular compounds and acids.

Chapter 7 – Chemical Equations

* Students will be able to balance chemical equations and relate balanced equations to the law of conservation of mass.

**Part 2**

Chapter 6 – Chemical Quantities

* Students will be able to calculate and explain the concept of average atomic mass.
* Students will understand the concept of the chemical quantity “the mole”.
* Students will be able to relate and convert chemical quantities from the mole to the mass in grams and to the number of particles using single step and two step problems.
* Students will understand and be able to explain the concept of percent composition.
* Students will be able to use percent composition as a conversion factor to relate the quantity of atoms in a compound.
* Students will understand the difference between an empirical and molecular formula.
* Students will be able to calculate the empirical formula from given data and or the percent composition of elements in a compound.

Chapter 9 – Stoichiometry

* Students will be able to relate the amount of each reactant and product in a chemical equation to each other.
* Students will be able to perform mole-to-mole, mole to mass and mass-to-mass calculations related to a balanced equation.
* Students will understand and be able to explain the concept of limiting reactant, excess reactant, theoretical yield, actual yield and percent yield.
* Students will be able to calculate and solve problems for limiting reactant, excess reactant, theoretical yield, actual yield and percent yield.