**Honors Chemistry: Acids and Bases Unit Objectives**

**By the end of the unit, students should be able to:**

* Introduction to acids and bases
	+ List the properties of acids and bases
	+ Classify a substance as an acid or base based on its chemical formula
		- Always refer to Reference Tables K and L
		- Know the exceptions: Compounds that contain –OH but are NOT bases
			* Alcohols: compounds with ONLY C, H, and then an OH, such as CH3OH
			* Organic Acids: end in –COOH, but are ACIDS, NOT BASES, such as ethanoic acid: CH3COOH (on Table K)
* Acid and Base theories
	+ Explain how Arrhenius defined acids and bases according to the specific types of ions they produce in solution
	+ Explain how Bronsted and defined acids and bases (BAAD)
		- Identify the acids and bases in a chemical equation
		- Identify conjugate pairs in a reaction
		- Define amphoteric substance and give an example.
	+ Know the difference between Lewis acids and bases in terms of electron pair transfer and be able to identify if a substance acts like a Lewis acid or base
* Anhydrides
	+ Identify acidic and basic anhydrides
	+ Determine the formula of the acid or base that forms when an anhydride dissolves in water.
* Acid and Base strength
	+ Memorize the rules for identifying strong and weak acids and bases from their formulas
	+ Know the difference between strong and weak acids in terms of ionization
	+ Write the equations for ionization of an acid or base in water
	+ Perform calculations with ionization constants (Ka or Kb)
	+ Know the relationship between the value of Ka and the strength of an acid
	+ Calculate the percent ionization of an acid
* pH scale
	+ Memorize and be able to use the following formulas:
		- [H3O+] x [OH-] = 1.0 x 10-14
		- pH = - log [H3O+]
		- [H3O+] = 1.0 x 10-pH
	+ Classify a substance as an acid or a base based on its pH number
	+ Calculate the pH of substance if given the concentration of H+/H3O+ and vice versa
	+ Know what happens to the concentrations of hydronium ion and hydroxide ion as pH decreases (gets more acidic) or increases (gets more basic)
	+ Calculate how many times the [H+/H3O+] increases/decreases for a change in each step on the pH scale

High [H+/H3O+]

Low [OH-]

Low [H+/H3O+]

High [OH-]

[H+/H3O+] = [OH-]

* Indicators
	+ Use Table M to determine what color a given indicator would appear for a solution at a certain pH
* Reactions involved with acids and bases
	+ Predict the products in a reaction of an acid with a metal
	+ Predict the products in a reaction of an acid with a base (a neutralization reaction)
	+ Identify if the hydrolysis of a particular salt would form an acidic or basic solution
* Titration
	+ Explain why a titration would be performed
	+ Use the Titration Formula on Table T to calculate the unknown concentration or volume in a titration problem
		- \*Make sure to multiply the MAVA side by the # of H+ in the acid, and the MBVB side by the # of OH- in the base