2022 AP CHEMISTRY SUMMER HOMEWORK ASSIGNMENT

A good foundation of first year chemistry concepts is crucial to success in AP Chemistry.

You are expected to have mastered the following BEFORE taking the course.

- Classification of matter
- Certain scientific laws like the Laws of Conservation, Multiple Proportions, and Definite Proportions
- SI units and their prefixes
- Significant digit rules for measurements and calculations
- Dimensional Analysis
- Atomic structure
- Periodic table organization
- Chemical nomenclature
- Calculation of empirical and molecular formulas
- Stoichiometry, including limiting reagent, excess yield, and percent yield

The textbook for the course is Chemistry: The Central Science, 13th edition, by Brown and LeMay. Please get a book from my classroom and take it to the library for check out before leaving for summer break.

To review the topics covered in Honors Chemistry, you will be working through chapters 1-3 on your own.

Answer all exercises on paper, and **for any questions involving calculations, you must show your work.** The answers to odd numbered exercises are in the back of the textbook (although sometimes there are mistakes). You are responsible for checking and correcting your answers. We will discuss questions you may have during the first class, but **you are responsible** for this material since it is a prerequisite for the course. As you read the chapters, you should work through the sample and practice exercises contained in each chapter. **This material will be included on the first test of the school year, but we will not be covering the material in class. The formulas, names, and charges of common polyatomic ions must also be reviewed and memorized before the start of school. These are the same ions learned in Honors Chemistry.**

Read Chapter 1- Introduction: Matter and Measurement

Exercises on pp 34-37: **1.19, 1.27c, 1.29, 1.31b, 1.37, 1.39, 1.41, 1.47**

Read Chapter 2 – Atoms, Molecules and Ions

Exercises on pp 74-79: **2.22, 2.23, 2.27a,b, 2.29, 2.31, 2.38, 2.39, 2.43, 2.47, 2.55, 2.57, 2.59b,d, 2.61b,c, 2.62a,b, 2.71e,f,h, 2.73a,c,d, 2.77a,d,f**

Read Chapter 3 – Chemical Reactions and Reaction Stoichiometry

Exercises on pp 112-119: **3.1, 3.3, 3.5, 3.13b,c 3.17, 3.21b,c,e, 3.23c,f,g, 3.25a, 3.27a, 3.37a,c, 3.45b,c, 3.47c, 3.48a, 3.51a, 3.53b, 3.61, 3.63, 3.67a,b, 3.75, 3.77, 3.79, 3.83, 3.93**

Chemistry I
Polyatomic Ions

Here's a list of common polyatomic ions and acids:

Ion	*Name*	*Acid Formula*	*Acid Name*
NH_4^+	Ammonium*		
NO_3^-	Nitrate	HNO_3	Nitric Acid
NO_2^-	Nitrite	HNO_2	Nitrous Acid
OH^-	Hydroxide*	HOH	Water (not really an acid)
CN^-	Cyanide	HCN	Hydrocyanic Acid
SCN^-	Thiocyanate	HSCN	Thiocyanic Acid
ClO_4^-	Perchlorate*	$HClO_4$	Perchloric Acid
ClO_3^-	Chlorate*	$HClO_3$	Chloric Acid
ClO_2^-	Chlorite*	$HClO_2$	Chlorous Acid
ClO^-	Hypochlorite*	HClO	Hypochlorous Acid
$C_2H_3O_2^-$	Acetate	$HC_2H_3O_2$	Acetic Acid
MnO_4^-	Permanganate	$HMnO_4$	Permanganic Acid
SO_4^{2-}	Sulfate*	H_2SO_4	Sulfuric Acid
SO_3^{2-}	Sulfite*	H_2SO_3	Sulfurous Acid
HSO_4^-	Hydrogen sulfate or Bisulfate*	H_2SO_4	Sulfuric Acid
$S_2O_3^{2-}$	Thiosulfate	$H_2S_2O_3$	Thiosulfuric Acid
CO_3^{2-}	Carbonate	H_2CO_3	Carbonic Acid
HCO_3^-	Hydrogen carbonate or bicarbonate	H_2CO_3	Carbonic Acid
CrO_4^{2-}	Chromate	H_2CrO_4	Chromic Acid
$Cr_2O_7^{2-}$	Dichromate	$H_2Cr_2O_7$	
O_2^{2-}	Peroxide	H_2O_2	Hydrogen Peroxide (not really an acid)
$C_2O_4^{2-}$	Oxalate	$H_2C_2O_4$	Oxalic Acid
PO_4^{3-}	Phosphate*	H_3PO_4	Phosphoric Acid
HPO_4^{2-}	Hydrogen Phosphate*	H_3PO_4	Phosphoric Acid
$H_2PO_4^-$	Dihydrogen Phosphate*	H_3PO_4	Phosphoric Acid

Hints to help you remember these ions:

- For the asterisked (*) ions, you can figure out their charge from the non-oxygen element and the periodic table. Example: ClO_3^-: Cl corresponds to a 1- charge on the periodic table.
- Changing the number of Oxygens does not change the charge. Example: ClO_4^-, ClO_3^-, ClO_2^-, ClO^-
- Adding Hydrogens increases the charge by +1. Examples: PO_4^{3-}, HPO_4^{2-}, $H_2PO_4^-$
- Ammonium(NH_4^+) is the only + polyatomic ion you need to know.
- Phosphate (PO_4^{3-}) is the only 3- polyatomic ion you need to know.
- "Per-X-ate" → loses oxygen → "X-ate" → loses oxygen → "X-ite" → loses oxygen → "hypo-X-ite"

Hints to help you remember the acids:

- "Per-X-ate" ion corresponds to "Per-X-ic Acid"
- "X-ate" ion corresponds to "X-ic Acid"
- "X-ite" ion corresponds to "X-ous Acid"
- "Hypo-X-ite" ion corresponds to "hypo-X-ous Acid"

What about acids of mono-atomic anions? (Where anion ends in –ide) Like HCl? Or HF? "Hydro-X-ic Acid"

HCl	Hydrochloric Acid
HF	Hydrofluoric Acid
HCN	Hydrocyanic Acid