

AP Chemistry Summer Assignment for School Year 2019-2020

Welcome to AP Chemistry! The AP Chemistry course is a college level chemistry course; this means **you will be treated more like a college student than a high school student!** The responsibility for completing work and doing homework will fall on your shoulders more so than in a traditional high school course. While this is exciting, it does have its downside. Students in AP classes need to possess an unusually high level of motivation, commitment and maturity.

Enclosed in this packet you will find some important information and your summer assignments. The first two parts of your assignment can be completed soon; part three should NOT be completed until **mid to late August**. The purpose of completing this in August is to get your mind back in the chemistry mindset. This is especially important if you had chemistry last year and stoichiometry is just a vague memory after a year of physics. I will also loan you a copy of an old Honors Chemistry textbook to help you review and accomplish your task. Please return the textbook sometime during the first week of school.

Your summer assignment has three parts:

- 1) Between June 24-July 15, 2019 sign up for Remind texts:
Text: 81010
Message: @26383h
- 2) Between June 24-July 15, 2019 sign up for the AP Chem Google classroom:
Visit: classroom.google.com
Class code: ck39y9u
- 3) Complete Summer Assignment for Chapters 1-3 (essentially a review of major topics covered in Honors Chemistry). The Summer Assignment is included in this packet.

The assignments for Chapters 1-3 will be due **the day you return** to school in September. It will count as a grade! The answer key will be posted on the Google Classroom that day. It is your responsibility to come prepared with questions about any topics covered in Chapters 1-3 by the second day of school. We will discuss any issues then and have a test on sections of Chapters 1-3 on the third day of school. There is a lot to cover in AP Chemistry and we need to hit the ground running in September!

The third day test will concentrate on the first three (3) chapters in the AP Chemistry text, which includes the following topics:

- Chemical Foundations- sig figs, dimensional analysis, classification of matter
- Atoms, Molecules and Ions- nomenclature, ions, isotopes

- Stoichiometry- molar mass, moles, percent comp, empirical/molecular formulas, stoich (including limiting reactant)
- Oxidation States

We will start the school year with Chapter 4 in the AP Chemistry text.

Much information was introduced in Honors Chemistry but needed in detail for AP Chemistry. I've attached a two-sided sheet for you. The front has topics you should have memorized in Honors Chemistry and the back has topics you had learned about but now need to memorize for AP.

- The Solubility Rules (I've attached a new copy for you).
- Polyatomic Ions:
 - You needed to know four for Honors Chemistry. Four **new** ones to now add to your repertoire are acetate, carbonate, chromate and phosphate.
- The Strong Acids and Strong Bases. Realize they are based on the solubility rules of the anions (chloride, nitrate, sulfate, hydroxide) (with the exception of perchlorate, which we will learn about next year).

You may find the following website handy to help you with additional review. Bookmark this site; it will be helpful all year.

<http://www.sciencegeek.net>

The site is full of useful information and interactive quizzes. FYI: When it refers to the "stock system", it is helping you practice the Roman numeral "middle initials" for the transition metals.

I hope you are looking forward to AP Chemistry as much as I am!

Mrs. O'Leary

AP Chemistry Summer Assignment
Complete and show work on a separate piece of paper.

- Perform the following calculations and report your answer with the correct amount of sig figs or decimal places.
 - 5.18×0.0208
 - $8.123 / 4.3$
 - $21 + 13.8 + 130.36$
 - $116.8 - 0.33$
 - $(25.36 - 4.15) / 2.317$
 - $(1.33 \times 2.8) + 8.41$
 - 3 pumpkins \times 1.69 pounds
 - $0.001 / 1000$
- An 8.47g sample of a solid is placed in a 25.00mL flask. The remaining volume in the flask is filled with benzene, in which the solid is insoluble. The solid and benzene together weigh 24.54g. The density of the benzene is 0.879g/mL. What is the density of the solid?
- Fill in the following table using your knowledge of atomic structure

	Symbol	Atomic Number	Mass Number	# of Protons	# of Neutrons	# of Electrons
A	13					
	C					
X	28					
	Si					
Z	35					
	Cl ⁻¹					
A = mass # Z = atomic #	24					
	Mg ⁺²					
	12					

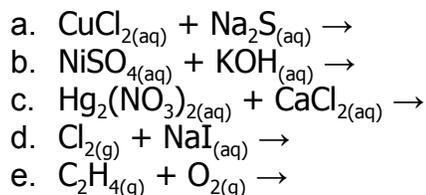
4. Write the correct name for each of the following compounds:

a. Ag_2CrO_4 b. $\text{Pb}(\text{OH})_2$ c. H_2SO_4 d. KOH e. HNO_2 f. $\text{HC}_2\text{H}_3\text{O}_2$ g. BF_3	h. FeI_3 i. NH_4NO_3 j. HF k. NH_3 l. Na_2CO_3 m. Cu_2O	n. $\text{Zn}(\text{NO}_2)_2$ o. N_2O_5 p. CdCr_2O_7 q. HClO_4
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5. Write the correct formula for each of the following compounds:

a. zinc phosphate b. iron (II) sulfate c. sodium oxide d. hydroiodic acid e. potassium permanganate f. nitric acid g. barium hydroxide	h. silver chloride i. ammonium sulfide j. hydrosulfuric acid k. iodine pentachloride l. tetraphosphorus hexoxide m. phosphoric acid	n. tin (IV) acetate o. aluminum sulfite p. methane q. sulfurous acid
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6. Write balanced molecular equations and balanced net ionic equations for the following.



7. Identify the oxidation number of the sulfur in the following molecules and ions:

- a. H_2S
b. SO_3^{2-}
c. H_2SO_4

8. How many glucose molecules ($\text{C}_6\text{H}_{12}\text{O}_6$) are in 5.23 grams?

9. Phosphorus has a molecular formula of P_4 and sulfur has a molecular formula of S_8 . How many grams of phosphorus contain the same number of molecules as 6.41g of sulfur?

10. Calculate the mass percentage of oxygen in Mn_2O_3
11. Calculate the empirical formula for a solid which contains 2.08 g aluminum and 1.85 g oxygen.
12. Calculate the empirical formula for a salt which is 17.7% Mg, 10.2% N, 2.9% H, 22.5% P and 46.7% O
13. A compound contains only carbon, hydrogen, and oxygen. Combustion of 10.68mg. of the compound yields 16.01mg of CO_2 and 4.37mg of H_2O . The molar mass of the compound is 176.1g/mol. What are the empirical and molecular formulas of the compound?
14. Potassium permanganate reacts with sulfuric acid to produce potassium sulfate, manganese (VII) oxide and water. How many grams of Mn_2O_7 can be formed from 196 g of KMnO_4 ?
15. Lithium nitride is prepared by reacting lithium metal and nitrogen gas. Calculate the mass of lithium nitride formed from 56.0 g of nitrogen gas and 56.0 g of lithium.
16. How would you prepare 50.0ml of 0.25M solution of $\text{NaCl}_{(\text{aq})}$?
17. An unknown sample of mystery element T is analyzed. According to the data 7.42% of the element is ${}^6\text{T}$ and 92.58% is ${}^7\text{T}$. The true mass of ${}^6\text{T}$ is 6.02amu and 7.02amu for ${}^7\text{T}$. Calculate the average atomic mass and identify the element.

Items That Should Have Been Memorized from Honors Chemistry

1. Periodic Table:

A. First 30 elements symbols and names, along with the 11 "irregulars"

-
-
-

B. The 7 diatomic elements:

-
-

C. Family (Group) (Column) Names and Period (Row) Names

2. Nomenclature Skills:

A. The 3 common molecule names and formulas:

-
-
-

B. Molecular Compounds: Binary Non-Metal and Non-Metal (need prefixes)

1	4	7	10
2	5	8	
3	6	9	

C. Ionic Compounds:

I. Binary Metal and Non-Metal (name the cation, name the anion)

a. Simple cations (non-transition Metals): Charge is from location on periodic table

Transition metal exceptions: always (only) Ag^{+1} and Zn^{+2} and Cd^{+2}

b. Type II cations (transition metals): Roman numeral represents the charge
Non-transition metal exceptions: tin (IV) & tin (II); lead (IV) & lead (II)

II. Polyatomic Cation and/or or Anion (need "()" if more than one)

a. Four polyatomic ion names and formulas (including charges):

-
-

D. Acids:

- Without oxygen from "ide" ions: "hydro"root"ic acid"
- With oxygen from "ate" polyatomic ions: root"ic acid"
- With oxygen from "ite" polyatomic ions: root"ous acid"

Pre-AP Chemistry – Additional Items to Memorize

1. Solubility Rules (pay attention to exceptions)

2. Nomenclature Skills:

A. Polyatomic Ions: If know a root"ate" ion formula, the root"ite" ion has one less oxygen in the formula, but the same charge.

- Nitrate NO_3^{1-}
- Nitrite NO_2^{1-}
- Sulfate SO_4^{2-}
- Sulfite SO_3^{2-}
- etc.

B. Four new polyatomic ion names and formulas (including charges):

- Acetate $\text{C}_2\text{H}_3\text{O}_2^{1-}$ (also written as $\text{CH}_3\text{COO}^{1-}$)
- Carbonate CO_3^{2-}
- Chromate CrO_4^{2-}
- Phosphate PO_4^{3-}

3. Strong Acids (100% ionized in water)

- Hydrochloric acid HCl chlorides are soluble
- Nitric acid HNO_3 nitrates are soluble
- Sulfuric acid H_2SO_4 sulfates are soluble
- Perchloric acid HClO_4 (we'll learn why later in AP Chem)

4. Strong Bases (100% ionized in water)

- Sodium hydroxide NaOH sodium salts are soluble
- Potassium hydroxide KOH potassium salts are soluble
- Calcium hydroxide Ca(OH)_2 exceptions - moderately soluble;
- Strontium hydroxide Sr(OH)_2 what does dissolve is
- Barium hydroxide Ba(OH)_2 100% ionized