

**AP Chemistry Summer Assignment 2019-2020**  
**Northland Preparatory Academy**

Welcome to AP Chemistry! I think you will find AP Chemistry one of the most fascinating and rewarding courses you will take. You will be expected to come to the 1st day of class prepared and ready to work. Over the summer you will have one of your first assignments for the year. It is listed below.

Please make sure to pick up your textbook before the end of school. Check out your textbook with me, Mr. Harris, in room 109. We have more students than textbooks, so some of you will need to double up on one book.

Chemistry, The Central Science 13th edition

- Brown, LeMay, Bursten, Murphy, Woodward, Stoltzfus
  - IBSN : 0321910419
  - ISBN-13 : 9780321910417
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**Your summer assignment!**

**This summer assignment can affect your placement in this class. The summer assignment is DUE the 1st DAY OF SCHOOL, 2019!**

**Part I: Get your book!**

- Please pick up your book in my room, 109. You MUST have a book cover!

**Part II: Memorize Strong Acids and Strong Bases**

- Strong Acids the BIG 6: Acronym P.I.N. C.B.S. All other acids are WEAK.
  - Create Flashcards or Quizlet for the Strong Acids!
    1. P = perchloric acid =  $\text{HClO}_4$
    2. I = hydroiodic acid =  $\text{HI}$
    3. N = nitric acid =  $\text{HNO}_3$
    4. C = hydrochloric acid =  $\text{HCl}$
    5. B = hydrobromic acid =  $\text{HBr}$
    6. S = sulfuric acid =  $\text{H}_2\text{SO}_4$
  
  - Memorize Strong Bases: Note these are Group 1 (Li to Cs) & Group 2 (Ca to Ba) metals. All other bases are WEAK.
  - Create Flashcards or Quizlet for the Strong Bases!
    1. Lithium hydroxide =  $\text{LiOH}$
    2. Sodium hydroxide =  $\text{NaOH}$
    3. Potassium hydroxide =  $\text{KOH}$
    4. Rubidium hydroxide =  $\text{RbOH}$
    5. Cesium hydroxide =  $\text{CsOH}$
    6. Calcium hydroxide =  $\text{Ca(OH)}_2$
    7. Strontium hydroxide =  $\text{Sr(OH)}_2$
    8. Barium hydroxide =  $\text{Ba(OH)}_2$
  
  - Memorize the Solubility Rules: You will not get a solubility table this year! You must memorize which compounds are soluble and not soluble through these rules.
    - Create Flashcards or Quizlet for soluble/insoluble compounds!
- Always Soluble or Aqueous:
- 1. All metals in Group 1 (unless with  $\text{O}^{2-}$ )

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- 2.  $\text{NH}_4^+$  (no exceptions)
- 3.  $\text{NO}_3^-$  (no exceptions)
- 4.  $\text{C}_2\text{H}_3\text{O}_2^-$  (sometimes written as  $\text{CH}_3\text{COO}^-$ )

Insoluble or Not Aqueous:

- Halogens (group 7 non metals) are soluble with all elements/polyatomics unless they get “SLaMmed” into a precipitate.
  - 1. S = silver = Ag. Example  $\text{AgCl}$  = solid/insoluble
  - 2. L = lead = Pb. Example  $\text{PbCl}_2$  = solid/insoluble
  - 3. M = mercury = Hg. Example  $\text{HgCl}_2$  = solid/insoluble
- Sulfates are soluble unless they get “CaBaSr SLaMmed” into a precipitate.
  - 1. Ca =  $\text{CaSO}_4$  = solid/insoluble/ppt.
  - 2. Ba =  $\text{BaSO}_4$  = solid/insoluble/ppt.
  - 3. Sr =  $\text{SrSO}_4$  = solid/insoluble/ppt.

Phosphate ( $\text{PO}_4^{3-}$ ) & Carbonates ( $\text{CO}_3^{2-}$ ) are INSOLUBLE except with group 1 &  $\text{NH}_4^+$ .

Sulfides ( $\text{S}^{2-}$ ) are INSOLUBLE except with group 1, 2, &  $\text{NH}_4^+$

- Memorize Common Polyatomic Ions
- Create Flashcards or Quizlet of polyatomic ions! Be sure to include charges!

Charge is (1-)	Charge is (2-)	Charge is (3-)	Charge is (1+)
acetate $\text{C}_2\text{H}_3\text{O}_2^-$	carbonate $\text{CO}_3^{2-}$	borate $\text{BO}_3^{3-}$	ammonium $\text{NH}_4^+$
bromate $\text{BrO}_3^-$	dichromate $\text{Cr}_2\text{O}_7^{2-}$	phosphite $\text{PO}_3^{3-}$	hydronium $\text{H}_3\text{O}^+$
hypochlorite $\text{ClO}^-$	chromate $\text{CrO}_4^{2-}$	phosphate $\text{PO}_4^{3-}$	
chlorite $\text{ClO}_2^-$	manganate $\text{MnO}_4^{2-}$		
chlorate $\text{ClO}_3^-$	oxalate $\text{C}_2\text{O}_4^{2-}$		
perchlorate $\text{ClO}_4^-$	silicate $\text{SiO}_3^{2-}$		
cyanide $\text{CN}^-$	selenate $\text{SeO}_4^{2-}$		
bicarbonate $\text{HCO}_3^-$	sulfite $\text{SO}_3^{2-}$		
formate $\text{HCOO}^-$	sulfate $\text{SO}_4^{2-}$		
permanganate $\text{MnO}_4^-$			
nitrite $\text{NO}_2^-$			
nitrate $\text{NO}_3^-$			
hydroxide $\text{OH}^-$			
bisulfite $\text{HSO}_3^-$			
thiocyanate $\text{SCN}^-$			
iodate $\text{IO}_3^-$			

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**Part III: Chemistry Content Review**

- I suggest you read and review Chapters 1–3 before beginning the summer assignment.
- You need to be able to:
  - Complete unit conversions using dimensional analysis including density and SI units
  - Complete calculations using significant figures
  - Calculate conversions between temperature (Celsius, Kelvin, Fahrenheit)
  - Build prior knowledge of classification of matter: compounds vs mixtures, separation techniques, chemical and physical changes/properties
  - Build prior knowledge basic atomic structure: Subatomic particles, atomic structure
  - Build prior knowledge of locations of elements on the periodic table: periodic table trends
  - Be able to name simple compounds (Section 2.8)
  - Complete calculations using stoichiometry involving chemical reactions and balancing chemical reactions.
  - Calculate percent composition, empirical formula, molecular formula, and percent yield.

Directions:

- Clearly show the method used and the steps involved in arriving at your answers. It is to your advantage to do this, since you may obtain partial credit if you do, and you will receive little or no credit if you do not.
- Be sure to include units when appropriate, and attention should be paid to significant figures.
- If you use an equation in your solution, you must write:
  - (1) the equation
  - (2) substitution of values with units
  - (3) the final answer with proper units and significant figures.
- You must use dimensional analysis (the factor-label method) for problems that involve unit conversions and/or stoichiometry. (This is the same method that is used in all of the textbook examples.)

**Complete the following practice problems on a separate sheet of paper and be prepared to turn these problems in on the 1st day of school!**

**Chapter 1, page 33: # 1.7, 1.11, 1.13, 1.21, 1.29, 1.51**

**Chapter 2, page 75: # 2.21, 2.25, 2.29, 2.35, 2.63, 2.65, 2.73, 2.75, 2.77,**

**Chapter 3, page 126: # 3.13, 3.21, 3.25, 3.35, 3.37, 3.47, 3.57, 3.63, 3.69, 3.83, 3.99**