



May 20, 2019

Dear AP Chemistry Student,

Congratulations on signing up for AP Chemistry! I am thrilled that you have decided to challenge yourself with this class next school year. As you know, AP classes are rigorous and require a significant amount of hard-work on the part of the student and the teacher in order to cover the required material and be prepared for the AP Chemistry exam in May of 2020.

The information covered in AP Chemistry is similar to a full-year of college chemistry and will coincide with the suggested outline provided by the AP chemistry committee. The main topics that will be covered include; atoms and elements, structure and properties of matter, chemical reactions, kinetics, thermodynamics and equilibrium.

In order to prepare for next year, you will have a required summer assignment that will count towards your first quarter grade next fall. This assignment is mostly a review of topics that you covered in Chemistry I. **Your assignment will be due on our second day of AP Chemistry class.** For your summer assignment, you need to complete the assignments described on the back of this paper. Most of the information is a review from chemistry I, but if you need additional resources, please access the following webpage:

<http://mrsrnixon.weebly.com/>. THE BEST WAY YOU CAN GIVE YOURSELF A CHANCE OF HAVING A SUCCESSFUL START IN AP CHEMISTRY IS TO TAKE THE TIME TO MAKE SURE YOU UNDERSTAND THE INFORMATION IN THIS ASSIGNMENT – WE MOVE QUICKLY STARTING ON DAY 1.

You should also familiarize yourself with the attached ion sheet as these are the ions you need to know for next year's class. (You are not allowed to use your ion sheet on tests and quizzes ☺).

If you have ANY questions, or have any difficulty accessing the problems or resources, please feel free to contact me by email @ [rnixon@yorktown.k12.in.us](mailto:rnixon@yorktown.k12.in.us). I hope that you have a safe and happy summer and I will see you in the fall.

Sincerely,

*Mrs. Rachel Nixon*

Mrs. Rachel Nixon

## Guidelines for completing assignments:

1. You must show your work for all quantitative math problems – this includes writing out all equations used and the work as well as a correct answer with a unit and the correct number of significant figures. *Please circle your final answer.*
2. *Please handwrite all work and please do not type it (this includes definitions).* You may make flashcards if you would like to for definitions.
3. Do your best for any question that involves an explanation, come up with something – just leaving it blank or simply saying I don't understand will not work ☺.
4. I have provided copies of all of the required problems and solutions to the odd numbered problems—on the website at <http://mrsrnixon.weebly.com/>

## Chapter 1 – Chemical Foundations

1. Define the following terms: accuracy, precision, density, matter, homogeneous mixture, heterogeneous mixture, solution, pure substance, physical change, compound, chemical change, element
2. Complete the problems in the chapter review starting on page 31 # 25, 27, 31, 33, 59, 61, 65, 67, 69, 80.
3. All problems may be found at the following link: <http://mrsrnixon.weebly.com/required-problems-and-solutions-to-odd-numbered-problems.html>

## Chapter 2 – Atoms, Molecules & Ions

1. Define the following terms: law of conservation of mass, law of definite proportions, law of multiple proportions, radioactivity, isotopes, atomic number, atomic mass number, covalent bonds, molecule, ionic bonding, ionic solid (or salt), groups (or families), periods, acids,
2. Describe the basic ideas of Dalton's Atomic Theory
3. **BRIEFLY** describe the following experiments of early chemistry. Make sure to include the date, the discoverer/scientist, what was discovered and what the experiment involved (basic design of the experiment). You can draw pictures if it helps you explain the experiment.
  - a. JJ Thomson's Cathode Ray Experiment
  - b. Robert Millikan's oil drop experiment
  - c. Ernest Rutherford's gold foil experiment
4. Sketch a periodic table (or print one off) and label the following sections: alkali metals, alkaline earth metals, halogens, noble gases, transition metals, lanthanides and actinides.
5. Complete the following problems in the chapter review starting on page 74 # 15, 21, 22, 43, 45, 47, 49, 51, 53, 54, 57, 59, 61, 63, 67, 69, 71

## Chapter 3 – Stoichiometry

1. You should be able to complete the following types of problems covered in the stoichiometry chapter
  - a. Conversions using moles, grams and Avogadro's Number
  - b. Average atomic masses
  - c. Percent composition and determining the empirical and molecular formula of a compound
  - d. Writing molecular equations
  - e. Stoichiometry problems, limiting/ excess reactant problems
2. Complete the following problems in the chapter review starting on page 121 in the textbook: 21, 27, 45, 53, 59, 63, 67, 75, 81, 87, 95 (a only)

**Please feel free to contact me at [rnixon@yorktown.k12.in.us](mailto:rnixon@yorktown.k12.in.us) if you have ANY questions!!**

**AP Common Polyatomic Ions**  
(Alphabetical order by ion name)

Name	Ion Symbol	Ion Name	Ion Symbol
Acetate	$\text{CH}_3\text{CO}_2^{1-}$ or $\text{CH}_3\text{COO}^{1-}$	Iodate	$\text{IO}_3^{1-}$
Ammonium	$\text{NH}_4^{1+}$	Nitrate	$\text{NO}_3^{1-}$
Arsenate	$\text{AsO}_4^{3-}$	Nitrite	$\text{NO}_2^{1-}$
Azide	$\text{N}_3^{1-}$	Oxalate	$\text{C}_2\text{O}_4^{2-}$
Bicarbonate or Hydrogen carbonate	$\text{HCO}_3^{1-}$	Perchlorate	$\text{ClO}_4^{1-}$
Bromate	$\text{BrO}_3^{1-}$	Permanganate	$\text{MnO}_4^{1-}$
Bromite	$\text{BrO}_2^{1-}$	Peroxide	$\text{O}_2^{2-}$
Carbonate	$\text{CO}_3^{2-}$	Phosphate	$\text{PO}_4^{3-}$
Chlorate	$\text{ClO}_3^{1-}$	Phosphite	$\text{PO}_3^{3-}$
Chlorite	$\text{ClO}_2^{1-}$	Thiocyanate	$\text{SCN}^{1-}$
Chromate	$\text{CrO}_4^{2-}$	Sulfate	$\text{SO}_4^{2-}$
Cyanide	$\text{CN}^{1-}$	Sulfite	$\text{SO}_3^{2-}$
Dichromate	$\text{Cr}_2\text{O}_7^{2-}$	Thiosulfate	$\text{S}_2\text{O}_3^{2-}$
Dihydrogen Phosphate	$\text{H}_2\text{PO}_4^{1-}$		
Dihydrogen Phosphite	$\text{H}_2\text{PO}_3^{1-}$		
Hydrogen Phosphate	$\text{HPO}_4^{2-}$		
Hydrogen Phosphite	$\text{HPO}_3^{2-}$		
Hydrogen Sulfate	$\text{HSO}_4^{1-}$		
Hydrogen Sulfite	$\text{HSO}_3^{1-}$		
Hydronium	$\text{H}_3\text{O}^+$		
Hypochlorite	$\text{ClO}^{1-}$		

**NOTE:** *-ite* ending means one less oxygen than the *-ate* form.

**PREFIXES:**

*per-* = one more oxygen than *-ate*

*hypo-* = one less oxygen than *-ite*

**AP Common Polyatomic Ions**  
(Alphabetical order by ion formula)

Name	Ion Symbol	Ion Name	Ion Symbol
Arsenate	$\text{AsO}_4^{3-}$	Permanganate	$\text{MnO}_4^{1-}$
Bromite	$\text{BrO}_2^{1-}$	Azide	$\text{N}_3^{1-}$
Bromate	$\text{BrO}_3^{1-}$	Ammonium	$\text{NH}_4^{1+}$
Oxalate	$\text{C}_2\text{O}_4^{2-}$	Nitrite	$\text{NO}_2^{1-}$
Acetate	$\text{CH}_3\text{CO}_2^{1-}$ or $\text{CH}_3\text{COO}^{1-}$	Nitrate	$\text{NO}_3^{1-}$
Hypochlorite	$\text{ClO}^{1-}$	Peroxide	$\text{O}_2^{2-}$
Chlorite	$\text{ClO}_2^{1-}$	Phosphite	$\text{PO}_3^{3-}$
Chlorate	$\text{ClO}_3^{1-}$	Phosphate	$\text{PO}_4^{3-}$
Perchlorate	$\text{ClO}_4^{1-}$	Sulfite	$\text{SO}_3^{2-}$
Cyanide	$\text{CN}^{1-}$	Thiocyanate	$\text{SCN}^{1-}$
Carbonate	$\text{CO}_3^{2-}$	Sulfate	$\text{SO}_4^{2-}$
Dichromate	$\text{Cr}_2\text{O}_7^{2-}$	Thiosulfate	$\text{S}_2\text{O}_3^{2-}$
Chromate	$\text{CrO}_4^{2-}$		
Dihydrogen Phosphite	$\text{H}_2\text{PO}_3^{1-}$		
Dihydrogen Phosphate	$\text{H}_2\text{PO}_4^{1-}$		
Hydronium	$\text{H}_3\text{O}^+$		
Bicarbonate or Hydrogen carbonate	$\text{HCO}_3^{1-}$		
Hydrogen Phosphite	$\text{HPO}_3^{2-}$		
Hydrogen Phosphate	$\text{HPO}_4^{2-}$		
Hydrogen Sulfite	$\text{HSO}_3^{1-}$		
Hydrogen Sulfate	$\text{HSO}_4^{1-}$		
Iodate	$\text{IO}_3^{1-}$		

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