



## AP Chemistry Summer Assignment 2019



The AP chemistry summer assignment is designed to refresh your memory of concepts learned in honors chemistry. Since you may not have seen this material in a year or more, it is vitally important that you take this summer assignment seriously. In class we will focus more on the material that is new in order to better prepare you for success on the AP exam in May.

### **NO EXCUSES WILL BE ACCEPTED AS TO WHY ASSIGNMENTS ARE INCOMPLETE OR MISSING ON THE FIRST DAY OF SCHOOL.**

Before Returning To School **YOU MUST:**

1. **READ AND BRIEFLY OUTLINE** Chapters 1, 2 and 3 of the Zumdahl text.
2. Familiarize yourself with prefixes on page 10 (Table 1.2)
3. Memorize the monatomic and polyatomic ions listed on the attached handout. If you desire, prepare flashcards. (quiz on ions administered during the second week of school)
4. Complete the following problems from the Zumdahl text :

Chapter 1 (pgs. 33-38) #’s 4, 5, 20, 22, 27, 28, 29, 31, 33, 35, 36, 38, 39, 42, 52, 57, 68, 69, 73, 77, 79, 81, 82, 83, 87, 88, 91, 92, 94, 96, 99

Chapter 2 (pgs. 73-79) #’s 21, 27, 29, 31, 35, 39, 49, 52, 53, 55, 56, 58, 59, 62, 67, 69, 71, 72, 75, 76, 77, 78, 80, 83, 86, 87, 88, 94(**only a,b,e,f**), 96, 97, 100

Chapter 3 (pgs. 126-134) #’s 10, 11, 13, 14, 18, 31, 37, 39, 46, 50, ( **b only for** 52, 54, 56, 58, 60, 62 ), 64, 74, 76, 77, 81, 82, 84, 86, 88, 94, 95, 101, 102, 104, 108, 124, 126, 141

### **Grading of Summer Outlines and Questions:**

For questions: Your answers must be **HANDWRITTEN**. All work must be shown for questions, including formulas and calculations. If you are unsure of how to answer a problem, you **MUST** at least attempt to answer it to get credit for a complete assignment.

For outlines: **DO NOT COPY THE SUMMARIES** at the end of each chapter. **THE SUMMARIES ARE NOT ACCEPTABLE AS OUTLINES.** As students qualified to register for AP Chemistry, you are expected to be familiar with the basic elements of an outline. Please feel free to ask questions. Outlines should consist of main concepts, not insignificant details. Your outlines will be graded on content and clarity. They should be **HANDWRITTEN** and presented in standard outline format. **DO NOT COPY OUTLINES FROM ANY OTHER SOURCE.** If your work resembles anyone else’s, the grade will be “divided” among the number of students.

You will have a test on chapters 1-4 within the first 4 weeks of your return to school. We will spend time in class going over the outlines and chapter problems before the test. This will be a review only, be prepared for it by studying the chapters again close to your return to school. This assignment is lengthy: **DO NOT WAIT UNTIL THE LAST MINUTE TO COMPLETE IT!!!** If you have any questions during the summer, you may email me at: [josekoll@aol.com](mailto:josekoll@aol.com).

**Textbook questions and outlines will comprise a major portion of your first marking period grade in A. P. Chemistry.**

The completed summer assignment is due on the first day of school. Bring your textbook on that day.

**TABLE 1**  
Some Common Metals with the Formulas of the Cations and Their Names

Metal (Symbol)	Cation <sup>a</sup>	Name of Cation <sup>b</sup>
Aluminum (Al)	*Al <sup>3+</sup>	Aluminum
Arsenic (Ar)	As <sup>3+</sup>	Arsenic (III) or arsenous
	As <sup>5+</sup>	Arsenic (V) or arsenic
Barium (Ba)	*Ba <sup>2+</sup>	Barium
Cadmium (Cd)	Cd <sup>2+</sup>	Cadmium
Calcium (Ca)	*Ca <sup>2+</sup>	Calcium
Copper (Cu)	Cu <sup>1+</sup>	Copper(I) or cuprous
	Cu <sup>2+</sup>	Copper(II) or cupric
Chromium (Cr)	Cr <sup>2+</sup>	Chromium (II) or chromous
	Cr <sup>3+</sup>	Chromium (III) or chromic
Cobalt (Co)	Co <sup>2+</sup>	Cobalt (II) or cobaltous
	Co <sup>3+</sup>	Cobalt (III) or cobaltic
Gold (Au)	Au <sup>1+</sup>	Gold (I) or aurous
	Au <sup>3+</sup>	Gold (III) or auric
Hydrogen <sup>c</sup> (H)	*H <sup>1+</sup>	Hydrogen
Iron (Fe)	Fe <sup>2+</sup>	Iron(II) or ferrous
	Fe <sup>3+</sup>	Iron(III) or ferric
Lead (Pb)	Pb <sup>2+</sup>	Lead(II) or plumbous
	Pb <sup>4+</sup>	Lead(IV) or plumbic
Lithium (Li)	*Li <sup>1+</sup>	Lithium
Magnesium (Mg)	*Mg <sup>2+</sup>	Magnesium
Manganese (Mn)	Mn <sup>2+</sup>	Manganese (II) or manganous
	Mn <sup>4+</sup>	Manganese (IV)
	Mn <sup>7+</sup>	Manganese (VII)
Mercury (Hg)	Hg <sub>2</sub> <sup>2+</sup>	Mercury(I) or mercurous <sup>d</sup> (a dimer)
	Hg <sup>2+</sup>	Mercury(II) or mercuric
Nickel (Ni)	Ni <sup>2+</sup>	Nickel(II)
Potassium (K)	*K <sup>1+</sup>	Potassium
Silver (Ag)	Ag <sup>1+</sup>	Silver
Sodium (Na)	*Na <sup>1+</sup>	Sodium
Strontium (Sr)	*Sr <sup>2+</sup>	Strontium
Tin (Sn)	Sn <sup>2+</sup>	Tin(II) or stannous
	Sn <sup>4+</sup>	Tin(IV) or stannic
Zinc (Zn)	Zn <sup>2+</sup>	Zinc

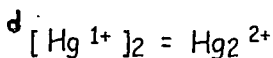
**TABLE 2**  
Some Common Nonmetals with the Formulas of the Anions and Their Names

Nonmetal (Symbol)	Anion	Name of Anion
Bromine (Br)	Br <sup>1-</sup>	Bromide ion
Chlorine (Cl)	Cl <sup>1-</sup>	Chloride ion
Fluorine (F)	F <sup>1-</sup>	Fluoride ion
Hydrogen (H)	H <sup>1-</sup>	Hydride ion
Iodine (I)	I <sup>1-</sup>	Iodide ion
Nitrogen (N)	N <sup>3-</sup>	Nitride ion
Oxygen (O)	O <sup>2-</sup>	Oxide ion
Oxygen dimer	(O <sub>2</sub> ) <sup>2-</sup>	Peroxide ion
Phosphorus (P)	P <sup>3-</sup>	Phosphide ion
Sulfur (S)	S <sup>2-</sup>	Sulfide ion

**note:** <sup>a</sup> In the cations marked with an asterisk (\*), you can determine the ionic charge using the periodic table. You must memorize the ionic charge on all other cations.

<sup>b</sup> The Roman numeral in parentheses indicates the ionic charge on each atom in the ion.

<sup>c</sup> Not a metal, but often reacts as a metal.



Experimental evidence indicates that mercury (I) exists as a dimer (two units) with an ionic charge of +1 on each atom.

**TABLE 3**  
**Some Common Polyatomic Ions and Their Formulas**

$\text{NH}_4^+$	Ammonium ion
$\text{AsO}_4^{3-}$	Arsenate ion
$\text{CO}_3^{2-}$	Carbonate ion
$\text{HCO}_3^-$	Hydrogen carbonate ion or bicarbonate ion
$\text{CN}^-$	Cyanide ion
$\text{SCN}^-$	Thiocyanate ion
$\text{C}_2\text{O}_4^{2-}$	Oxalate ion
$\text{C}_2\text{H}_3\text{O}_2^-$	Acetate ion
* * $\text{ClO}^-$	Hypochlorite ion
$\text{ClO}_2^-$	Chlorite ion
$\text{ClO}_3^-$	Chlorate ion
$\text{ClO}_4^-$	Perchlorate ion
$\text{CrO}_4^{2-}$	Chromate ion
$\text{Cr}_2\text{O}_7^{2-}$	Dichromate ion
$\text{OH}^-$	Hydroxide ion
$\text{NO}_2^-$	Nitrite ion
$\text{NO}_3^-$	Nitrate ion
$\text{MnO}_4^-$	Permanganate ion
$\text{PO}_3^{3-}$	Phosphite ion
$\text{PO}_4^{3-}$	Phosphate ion
$\text{HPO}_4^{2-}$	Hydrogen phosphate ion
$\text{H}_2\text{PO}_4^-$	Dihydrogen phosphate ion
$\text{SO}_3^{2-}$	Sulfite ion
$\text{HSO}_3^-$	Hydrogen sulfite ion or bisulfite ion
$\text{SO}_4^{2-}$	Sulfate ion
$\text{HSO}_4^-$	Hydrogen sulfate ion or bisulfate ion
$\text{S}_2\text{O}_3^{2-}$	Thiosulfate ion

\* \* Oxyhalides (for F, Cl, Br, and I)

1. Hypo - \_\_\_\_\_ - ite
2. \_\_\_\_\_ - ite
3. \_\_\_\_\_ - ate
4. Per - \_\_\_\_\_ - ate

Table 4

Greek Prefixes

Greek Prefix	Number
mono-	1
di-	2
tri-	3
tetra-	4
penta-	5
hexa-	6
hepta-	7
octa-	8
nona- (or ennea-)*	9
deca-	10

\* IUPAC prefers ennea- to the Latin nona-, but nona- is still used.