

## AP Chemistry – Summer Assignment 2016

AP Chemistry is a very challenging course. However, with a little advance preparation, you can ensure your success from the first day of school. This summer assignment has two goals. The first is to familiarize yourself with some of the online tools we will be using this year. The second is to review some topics from first year Chemistry and to memorize some material that we will use throughout the year. *There will be a quiz covering this material the first week of school.*

### Part 1: Get Connected

1. EMAIL: Email Ms. McHardy at [mchardy.chemistry@gmail.com](mailto:mchardy.chemistry@gmail.com) to join the email list. Use the subject “AP Chemistry”.
2. REMIND: Join the AP Chem group by texting “@dhs-apchem” to 81010.
3. ED PUZZLE: Create an account on EdPuzzle and join the class to access the tutorial videos using the code “zehmoro” or the link <https://edpuzzle.com/join/zehmoro>. Please use your real first and last name.

### Part 2: Review & Memorization

4. Watch the first two videos on EdPuzzle; “Welcome to AP Chem” and “Memorization”.
5. PERIODIC TABLE: The AP Chemistry periodic table does not contain any element names, only symbols. Before school begins in the fall, you must be able to recognize these common element symbols. Bold items are anomalous names.

aluminum Al	chromium Cr	<b>lead Pb</b>	radon Rn
<b>antimony Sb</b>	cobalt Co	lithium Li	rubidium Rb
argon Ar	<b>copper Cu</b>	magnesium Mg	selenium Se
arsenic As	fluorine F	manganese Mn	silicon Si
barium Ba	francium Fr	<b>mercury Hg</b>	<b>silver Ag</b>
beryllium Be	gallium Ga	neon Ne	<b>sodium Na</b>
bismuth Bi	germanium Ge	nickel Ni	strontium Sr
boron B	<b>gold Au</b>	nitrogen N	sulfur S
bromine Br	helium He	oxygen O	<b>tin Sn</b>
calcium Ca	hydrogen H	phosphorus P	<b>tungsten W</b>
carbon C	iodine I	platinum Pt	uranium U
cesium Cs	<b>iron Fe</b>	<b>potassium K</b>	<b>xenon Xe</b>
chlorine Cl	krypton Kr	radium Ra	zinc Zn

Use this Quizlet to review the most common element names: [https://quizlet.com/\\_2bp85v](https://quizlet.com/_2bp85v)  
Try playing the “Name That Element” category on QuizUp: <https://www.quizup.com/en>  
Overachiever? Use this Quizlet to review all 118 of the element names: [https://quizlet.com/\\_2bp8x4](https://quizlet.com/_2bp8x4)

6. IONS: Memorize the name, symbol and charge of the Polyatomic Ions and the multiple charges of the Transition Metals. Use this Quizlet to review these ions: [https://quizlet.com/\\_2bp98b](https://quizlet.com/_2bp98b)

*Names, Formulas, and Charges of Some Common Polyatomic Ions*

NH <sub>4</sub> <sup>+</sup>	Ammonium	PO <sub>4</sub> <sup>3-</sup>	Phosphate	MnO <sub>4</sub> <sup>-</sup>	Permanganate
C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup>	Acetate	HPO <sub>4</sub> <sup>2-</sup>	Hydrogen phosphate	MnO <sub>4</sub> <sup>2-</sup>	Manganate
NH <sub>2</sub> <sup>-</sup>	Amide	H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>	Dihydrogen phosphate	FO <sup>-</sup>	Hypofluorite
N <sub>3</sub> <sup>-</sup>	Azide	SO <sub>4</sub> <sup>2-</sup>	Sulfate	ClO <sup>-</sup>	Hypochlorite
BO <sub>3</sub> <sup>3-</sup>	Borate	HSO <sub>4</sub> <sup>-</sup>	Hydrogen sulfate	ClO <sub>2</sub> <sup>-</sup>	Chlorite
CO <sub>3</sub> <sup>2-</sup>	Carbonate	SO <sub>3</sub> <sup>2-</sup>	Sulfite	ClO <sub>3</sub> <sup>-</sup>	Chlorate
HCO <sub>3</sub> <sup>-</sup>	Hydrogen carbonate	HSO <sub>3</sub> <sup>-</sup>	Hydrogen sulfite	ClO <sub>4</sub> <sup>-</sup>	Perchlorate
C <sub>2</sub> O <sub>4</sub> <sup>2-</sup>	Oxalate	S <sub>2</sub> O <sub>3</sub> <sup>2-</sup>	Thiosulfate	BrO <sup>-</sup>	Hypobromite
CN <sup>-</sup>	Cyanide	HS <sup>-</sup>	Hydrogen sulfide	BrO <sub>3</sub> <sup>-</sup>	Bromate
OCN <sup>-</sup>	Cyanate	OH <sup>-</sup>	Hydroxide	BrO <sub>4</sub> <sup>-</sup>	Perbromate
SCN <sup>-</sup>	Thiocyanate	O <sub>2</sub> <sup>2-</sup>	Peroxide	IO <sup>-</sup>	Hypoiodite
NO <sub>2</sub> <sup>-</sup>	Nitrite	CrO <sub>4</sub> <sup>2-</sup>	Chromate	IO <sub>3</sub> <sup>-</sup>	Iodate
NO <sub>3</sub> <sup>-</sup>	Nitrate	Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	Dichromate	IO <sub>4</sub> <sup>-</sup>	Periodate

Metal Cations	
Sb <sup>+3</sup> Antimony(III) [aka antimonous]	Pb <sup>+2</sup> Lead(II) [aka plumbous]
Sb <sup>+5</sup> Antimony(V) [aka antimonic]	Pb <sup>+4</sup> Lead(IV) [aka plumbic]
Bi <sup>+3</sup> Bismuth(III) [aka bismuthous]	Mn <sup>+2</sup> Manganese(II)
Bi <sup>+5</sup> Bismuth(V) [aka bismuthic]	Mn <sup>+3</sup> Manganese(III)
Cd <sup>+2</sup> Cadmium	Mn <sup>+4</sup> Manganese(IV)
Cr <sup>+2</sup> Chromium(II) [aka chromous]	Mn <sup>+7</sup> Manganese(VII)
Cr <sup>+3</sup> Chromium(III) [aka chromic]	Hg <sub>2</sub> <sup>+2</sup> Mercury(I)
Co <sup>+2</sup> Cobalt(II) [aka cobaltous]	Hg <sup>+2</sup> Mercury(II)
Co <sup>+3</sup> Cobalt(III) [aka cobaltic]	Ni <sup>+2</sup> Nickel(II)
Cu <sup>+1</sup> Copper(I) [aka cuprous]	Ni <sup>+3</sup> Nickel(III)
Cu <sup>+2</sup> Copper(II) [aka cupric]	Ag <sup>+1</sup> Silver
Au <sup>+1</sup> Gold(I) [aka aurous]	Sn <sup>+2</sup> Tin(II) [aka stannous]
Au <sup>+3</sup> Gold(III) [aka auric]	Sn <sup>+4</sup> Tin(IV) [aka stannic]
Fe <sup>+2</sup> Iron(II) [aka ferrous]	Zn <sup>+2</sup> Zinc
Fe <sup>+3</sup> Iron(III) [aka ferric]	

7. SOLUBILITY RULES: Memorize the Solubility Rules. Make flashcards or use the other memorization tools provided to find what works best for you.

### SOLUBILITY RULES

Solubility is a result of an interaction between polar water molecules and the ions which make up an ionic crystal.

- All compounds containing Group 1 alkali metal cations and the ammonium ion (NH<sub>4</sub><sup>+</sup>) are soluble.
- All compounds containing NO<sub>3</sub><sup>-</sup>, ClO<sub>4</sub><sup>-</sup>, ClO<sub>3</sub><sup>-</sup>, and C<sub>2</sub>H<sub>3</sub>O<sub>2</sub><sup>-</sup> anions are soluble.
- All chlorides, bromides, and iodides are soluble except those containing Ag<sup>+</sup>, Pb<sup>2+</sup>, or Hg<sup>2+</sup>.
- All sulfates are soluble except those containing Hg<sup>2+</sup>, Pb<sup>2+</sup>, Sr<sup>2+</sup>, Ca<sup>2+</sup>, or Ba<sup>2+</sup>.
- All hydroxides are insoluble except compounds of the alkali metals, Ca<sup>2+</sup>, Sr<sup>2+</sup>, and Ba<sup>2+</sup>.
- All compounds containing PO<sub>4</sub><sup>3-</sup>, S<sup>2-</sup>, CO<sub>3</sub><sup>2-</sup>, and SO<sub>3</sub><sup>2-</sup> ions are insoluble except those that also contain alkali metals or NH<sub>4</sub><sup>+</sup>.

Use this Quizlet to practice applying the solubility rules [https://quizlet.com/\\_2bpc7e](https://quizlet.com/_2bpc7e).

Try this video for a mnemonic device: <https://www.youtube.com/watch?v=AsCLuLS-yZY>. Note that there is one mistake in the rules on this video. Did you find it?

8. NOMENCLATURE: Review naming ionic and covalent compounds.

#### Naming Binary Ionic Compounds

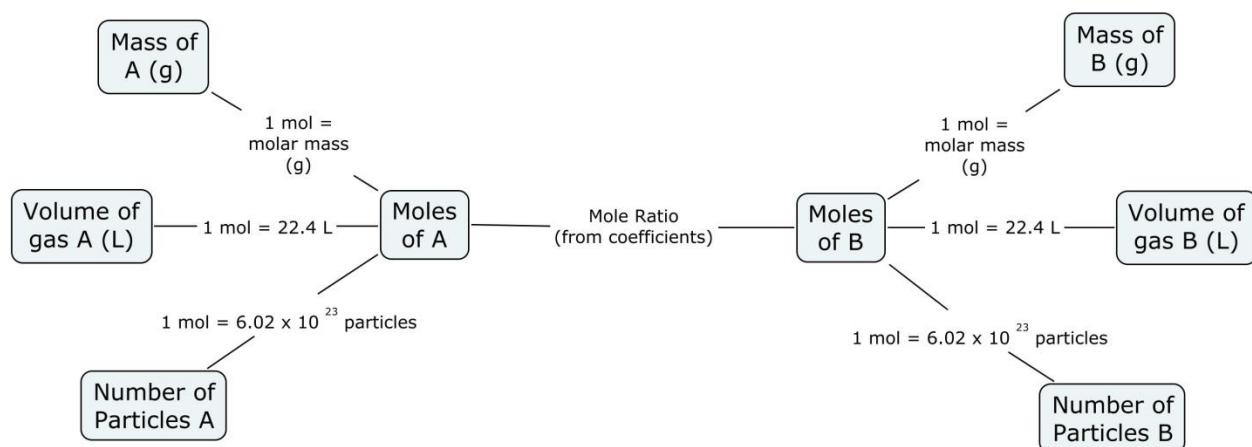
- Determine the charges on the cation (positive metal ion) and the anion (negative nonmetal ion).  
Ex: magnesium is Mg<sup>2+</sup> and chlorine becomes Cl<sup>-</sup>
- Balance the charges (charges should net zero).  
Ex: the ratio of Mg<sup>2+</sup> to Cl<sup>-</sup> is 1:2
- Cation is always written first (in name and in formula)  
Ex: the formula is MgCl<sub>2</sub>
- Combine element names and change the ending of the anion name to -ide.  
Ex: magnesium chloride
- The Roman numeral after a transition metal indicates its charge.  
Ex: copper(II) is Cu<sup>2+</sup>

#### Naming Binary Covalent Compounds

- The number of each atom in the chemical formula must be indicated.
- List the element names in the same order as they appear in the formula.  
Ex: P<sub>2</sub>O<sub>5</sub> is diphosphorus pentoxide
- If the subscript of the first element is one, the 'mono' is omitted.  
Ex: CO<sub>2</sub> is carbon dioxide

The number of each atom is given by prefixes	
Mono-	1
Di-	2
Tri-	3
Tetra-	4
Penta-	5
Hexa-	6
Hepta-	7
Octa-	8
Nona-	9
Deca-	10

9. STOICHIOMETRY: Watch the two videos on EdPuzzle.



10. SURVEY: After you have completed your summer assignment, respond to this survey to indicate and timestamp your completion: <http://goo.gl/forms/R8vPDrJsvQh6Z9IE2>

### Summer Assignment Checklist

- Join email list and remind
- Watch first two videos on EdPuzzle
- Memorize common elements
- Memorize polyatomic ions and metal cations
- Memorize the solubility rules
- Watch the two stoichiometry videos on EdPuzzle
- Complete the survey

### First Week Quiz

Note: the quiz is NOT multiple choice. Be prepared to show work and explain answers.

- Given an element's symbol, provide the element's name and vice versa.
- Given an ionic compound, determine if it is soluble or insoluble in water.
- Solve stoichiometry and mole conversions problems like the ones in the videos you watched.
- Given a polyatomic ion, provide its chemical formula (including charge) and vice versa.

### Lab Notebook

A lab notebook is required for this course and a carbonless notebook is highly recommended. They can be found at most bookstores (expensive route) or online ([Amazon search for carbonless lab notebook](#)). Most people find the 50 page (50 sets) version adequate, but if you write overly large, or prefer to leave a lot of space around your writing, then you should consider the 100 page book. The last choice is a quad-ruled composition notebook. This will not provide you with duplicate copies of your work, but may be easier to obtain. We will complete our first formal lab the second week of school and a bound lab notebook must be used.

**That's it! Have a great summer and I'll see you in August!**