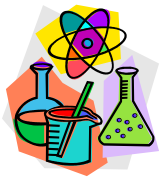
Congratulations New AP Chemistry Student!



☞ You are enrolled to take AP Chemistry next school year 2022-2023! ☺ I am really looking forward to sharing the fun and puzzles with you!

Summer Assignment Instructions:

1. **Pick up your textbook**

   You can pick up your textbook from the textbook room after school is out. If you cannot pick up your textbook, there is a PDF version of the pages you need—link here or on Mrs. Richardson's or Mrs. Sanders's page on the school website (look for the tab labeled "AP Chemistry Summer Assignment").

2. **Summer Reading & Practice Questions**

   Read the following sections of the textbook, take notes (optional but recommended), and then answer the "practice questions" under the green sample exercises for each section. You can check your answers to selected questions at the end of the book. The ones you want look like this:



   The questions listed in the table below are due by the second day of class. To get full credit, you must *show all work* for any calculations, and *explain your answers* for any multiple choice/short answer questions.

Section to Read	Exercises/Problems to Complete
1.2: Classifications of Matter	End of chapter problems (pg 35): #1.1, 1.2
1.6: Uncertainty in Measurement	Sample exercise 1.7: Practice Exercises #1 & #2 Sample exercise 1.8: Practice Exercises #1 & #2 Sample exercise 1.9: Practice Exercises #1 & #2
1.7: Dimensional Analysis	Sample exercise 1.10: Practice Exercises #1 Sample exercise 1.11: Practice Exercises #1 & #2 Sample exercise 1.12: Practice Exercises #2
2.3: The Modern View of Atomic Structure	Sample exercise 2.2: Practice Exercises #1 & #2 Sample exercise 2.3: Practice Exercises #1 & #2
2.5: The Periodic Table	Sample exercise 2.5: Practice Exercises #1 & #2
2.6: Molecules and Molecular Compounds	Sample exercise 2.6: Practice Exercises #1 & #2
2.7: Ions and Ionic Compounds	Sample exercise 2.7: Practice Exercises #1 & #2

3. ***Optional*: Extra Practice Questions**

   If you want extra practice to help prepare you for the summer review quiz, we recommend the following end of chapter problems! All answers to these questions can be found at the back of the book. These will not be collected, but they can help you prepare! I recommend saving them for about a week before we get back so its fresh in your mind!
   Chapter 1: 1.13, 1.15, 1.17, 1.43, 1.45, 1.47, 1.49, 1.51, 1.53, 1.55, 1.57,
   Chapter 2: 2.4, 2.21, 2.23, 2.25, 2.27, 2.29, 2.43, 2.45, 2.49, 2.55, 2.57, 2.59, 2.61, 2.63

4. **Memorization:**

   You will need to have the following things memorized for next year. There will be quizzes on them near the beginning of the year!

   1. Lab equipment quiz: memorize the names of the lab equipment and know the difference between volumetric/graduated! The lab equipment pages are in this document (pages 3-4).

   2. Ion quiz: know the names and formulas of everything on the FRONT of the ion sheet! The list of ions to memorize is in this document (pages 5-6). Here is a quizlet to help as well (link also on Mrs. Richardson's or Mrs. Sanders's school website). You will be able to use a periodic table on this quiz.
      ☞ Know them from **Name → symbol + charge** AND **symbol + charge → Name**

Other Reminders/Helpful Info:

1. **Quizzes:**
   We will have 3 beginning of the year quizzes. They will be during week 2-3.
   1. Summer Review Quiz: covers everything from the review slides, as well as metric prefixes you must know!
   2. Lab equipment quiz: memorize the names of the lab equipment and know the difference between volumetric/graduated!
   3. Ion quiz: know the names and formulas of everything on the FRONT (first page) of the ion sheet!
      ☞ Know them from **Name → symbol + charge** AND **symbol + charge → Name**

2. **Required Materials for AP Chem:**
   a. Scientific OR graphing calculator—everyone will need one!
   b. Textbook—you can pick them up at the end of the school year, or you can use the online scans of the textbook pages that are posted online.

3. **Optional Materials for AP Chem:**
   c. Review Book: If you would like to purchase an AP review book, Mrs. Richardson recommends either *The Princeton Review* for AP Chemistry (has best practice problems) or *Crash Course* by Adrian Dingle (has best overview of material).
   d. For Mrs. Sander's class, you can choose to purchase a lab notebook (not required, and Mrs. Richardson's class does not use a lab notebook.)
   Suggestion: 100 pg spiralbound ¼" grid carbonless copy lab notebook
   By Barbakam or…currently $16 online at Barnes and Noble

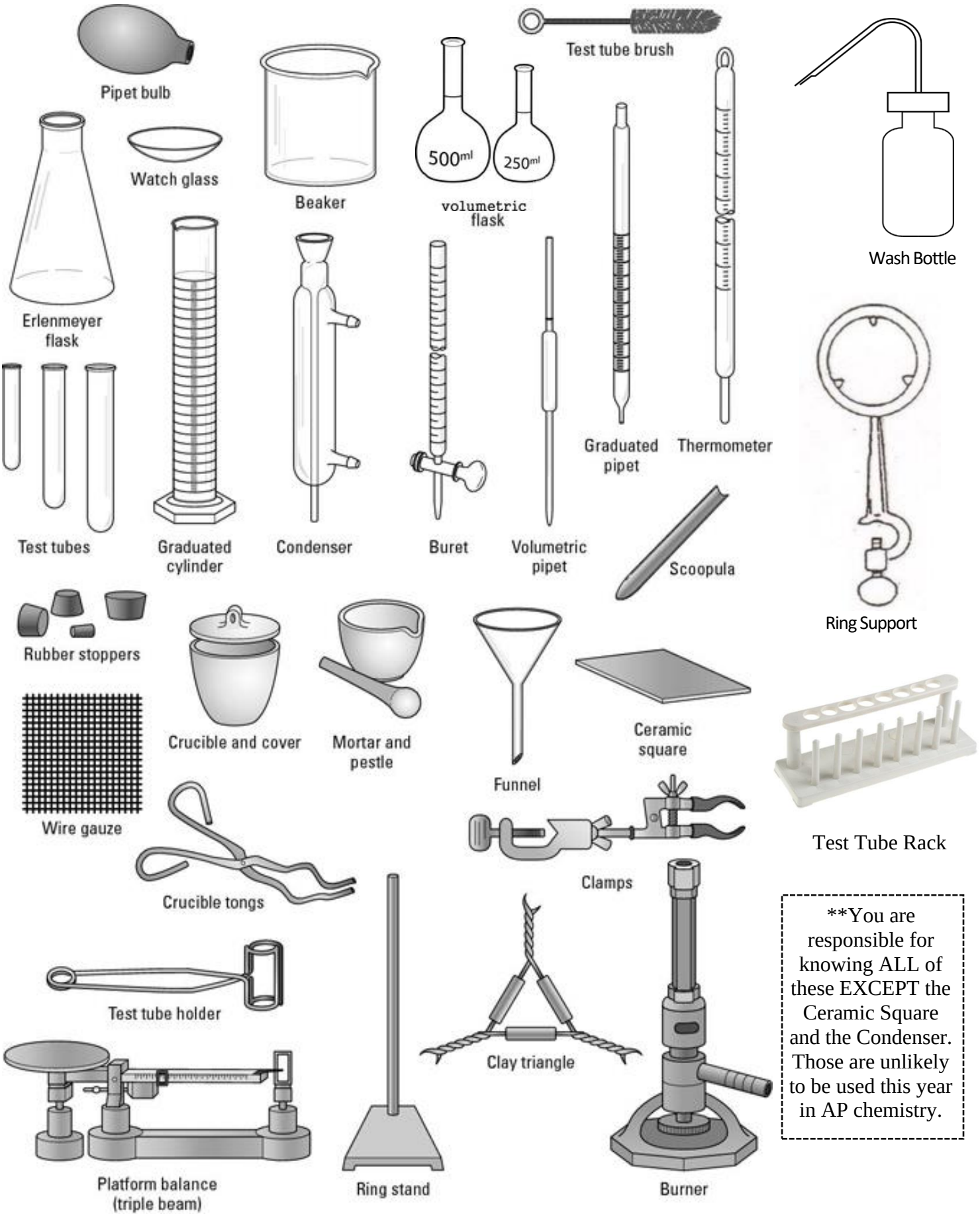
***NOTE*: For all ONLINE reference sheets…please check Mrs. Richardson's or Mrs. Sanders's website over the summer. If you have questions, please email Mrs. Richardson (richardsonj@luhsd.net) or Mrs. Sanders (sandersm@luhsd.net).**

Have a wonderful summer and see you in a few months!!



Sincerely,
Mrs. Mindy Sanders
Mrs. Jennifer Richardson

Assorted Lab Equipment

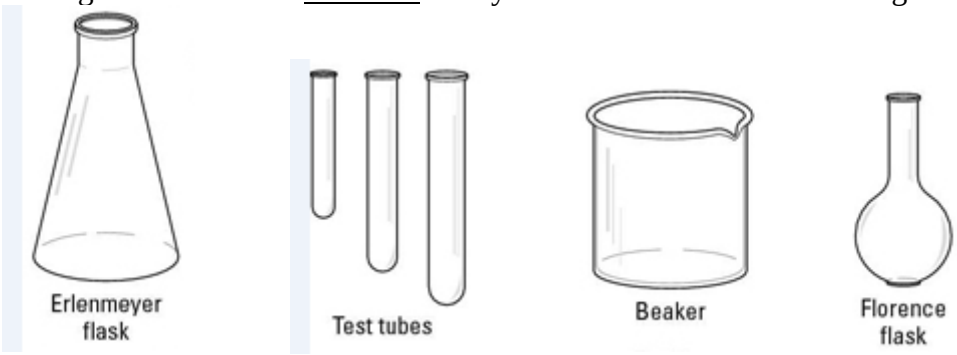


**You are responsible for knowing ALL of these EXCEPT the Ceramic Square and the Condenser. Those are unlikely to be used this year in AP chemistry.

Lab Equipment Reference Sheet

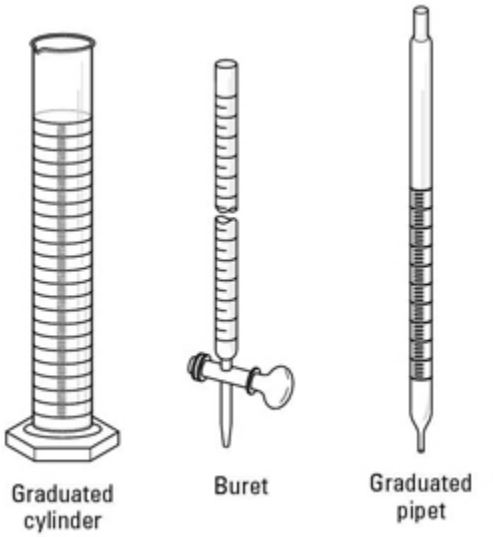
Glassware: Reaction Vessels

The following pieces of glassware are for reactions—they are not intended for measuring accurate quantities!

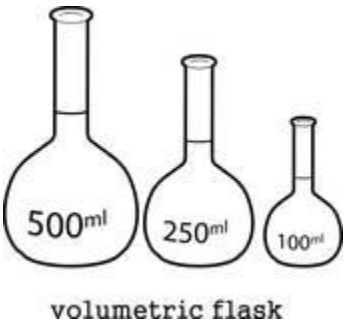


Glassware: Measuring Volumes of Liquids

There are two types of glassware that are intended for measurement. The first type is graduated glassware—this type has *graduations*, or small markings on the side, to indicate different volumes. Notice how they are all long and narrow—this is to make them more accurate in their measurements!



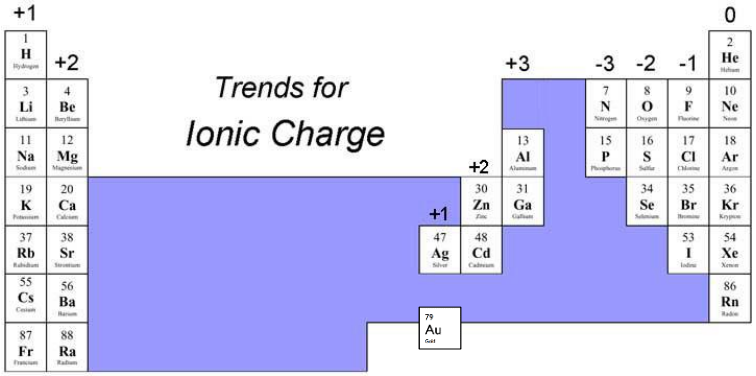
The second type of glassware for measurement is volumetric glassware. This type *only measures one volume!* This means that it only has *one line* to indicate a volume. They are extremely precise, so they are good for measuring accurate volumes and making solutions.





AP Chemistry Ions to Know

The FRONT of this paper has ions you MUST KNOW (memorize them)! The back of this paper is a reference sheet—these are handy to know, but you won't be expected to memorize them.



Part 1: Monatomic Ions

Monatomic ions are ions made of a single atom (mono = one, atomic = atom). You can determine the charge of most main group elements by their location on the periodic table.

To Name Monatomic Ions:

Cations (positive) = "element name" + "ion"

Ex: Hydrogen ion = H^{+1}

Ex: Magnesium ion = Mg^{2+}

Anions (negative) = "element name" + "-ide" + "ion"

Ex: Fluoride ion = F^{-1}

Ex: Oxide ion = O^{-2}

You must know the names and charges of all the monatomic ions shown on the periodic table above.

Part 2: Monatomic Ions with Multiple Charges

Transition metals and some other monatomic ions can have more than one possible charge. This only happens with *cations.* To name them, we either use a roman numeral indicating their charge (new system), or we use an -ous or -ic ending (old system). Hint: "-ous" is always the lower charge and "-ic" is always the higher charge! The ones listed below are most useful, but there is a full list on the back of this sheet!

Ion Symbol	Ion Name (New System)	Ion Name (Old System)
Fe^{2+}	Iron (II) ion	Ferrous ion
Fe^{3+}	Iron (III) ion	Ferric ion
Cu^{1+}	Copper (I) ion	Cuprous ion
Cu^{2+}	Copper (II) ion	Cupric Ion
Pb^{2+}	Lead (II) ion	Plumbous ion
Pb^{4+}	Lead (IV) ion	Plumbic ion

Part 3: Polyatomic ions

Polyatomic ions are groups of covalently bonded atoms that *collectively* have a positive or negative charge. The list below has the most common ones, which are the most important to memorize.

You must memorize: name → formula AND formula → name!!!

Name	**Formula**
Ammonium	NH_4^+
Hydroxide	OH^-
Nitrate	NO_3^-
Nitrite	NO_2^-
Acetate	CH_3COOH^- or $C_2H_3O_2^-$
Carbonate	CO_3^{2-}
Bicarbonate	HCO_3^-
Cyanide	CN^-

Name	**Formula**
Permanganate	MnO_4^-
Chromate	CrO_4^{2-}
Dichromate	$Cr_2O_7^{2-}$
Amide	NH_2^-
Sulfate	SO_4^{2-}
Sulfite	SO_3^{2-}
Phosphate	PO_4^{3-}
Hydronium	H_3O^+

Complete Ion List: For Reference Only!

You only need to memorize the FRONT of this paper, not this side.

	CATIONS		**ANIONS**	
Ions with Multiple Charges	Manganous	Mn^{2+}		
	Manganic	Mn^{3+}		
	Mercurous	Hg_2^{2+}		
	Mercuric	Hg^{2+}		
	Ferrous	Fe^{2+}		
	Ferric	Fe^{3+}		
	Cuprous	Cu^{1+}		
	Cupric	Cu^{2+}		
	Stannous	Sn^{2+}		
	Stannic	Sn^{4+}		
	Chromous	Cr^{2+}		
	Chromic	Cr^{3+}		
	Plumbous	Pb^{+2}		
	Plumbic	Pb^{+4}		
Monovalent (+1/-1) Polyatomic Ions			Permanganate	MnO_4^-
			Manganate	MnO_3^-
	Ammonium	NH_4^+	Hydroxide	OH^-
	Hydronium	H_3O^+	Hydroxide with Deuterium	OD^-
			Nitrate	NO_3^-
			Nitrite	NO_2^-
			Acetate	CH_3COO^- or $C_2H_3O_2^-$
			Bicarbonate	HCO_3^-
			Periodate	IO_4^-
			Iodate	IO_3^-
			Iodite	IO_2^-
			Triiodide	I_3^-
			Hypoiodite	IO^-
			Hypochlorite	ClO^-
			Bisulfite	HSO_3^-
			Cyanide	CN^-
			Amide	NH_2^-
			Dihydrogen phosphate	$H_2PO_4^-$
Divalent (+2/-2) Polyatomic Ions			Chromate	CrO_4^{2-}
			Dichromate	$Cr_2O_7^{2-}$
			Oxalate	$C_2O_4^{2-}$
			Sulfate	SO_4^{2-}
			Sulfite	SO_3^{2-}
			Peroxide	O_2^{2-}
			Carbonate	CO_3^{2-}
			Monohydrogen phosphate	HPO_4^{2-}
Trivalent (+3/-3) Polyatomic Ions			Phosphate	PO_4^{3-}

