Dear Students,

Welcome to AP Chemistry!

There are 2 parts to your AP Chemistry summer assignment.

1) There is some basic information which you will have to study over the summer – see below. There will be a quiz on this material on the first day of class.

2) You are expected to complete units 1-10 in the FlinnPrep module over the summer. We will do a quick review of those units for approximately one week in the beginning of school and then you will have a test on that material. Attached is a pdf of instructions on how to set up a Flinn Prep account. You will have to pay $22.95 to get access. Please e-mail me to confirm you activated your account and that it's all set up.

The student linking code you will need is f8fqo

Have a great summer,
Mrs. Stein

AP CHEMISTRY SUMMER ASSIGNMENT

While you are enjoying your summer sun, you will begin your AP chemistry journey. This first assignment will give you a foundation which will be built upon as we study AP chemistry. You will be getting a code for the Flinn AP review site soon. In addition to completing the Flinn review, please complete the assignment below:

- **STUDY the "First Day Test" Material**

- **Put all your lab reports together (From previous year)**

- **Please visit the College Board AP Chemistry site:**

https://apstudent.collegeboard.org/apcourse/ap-chemistry

Scroll through the site and become familiar with the format of the AP Exam. Find the practice example section.

On the first day of class, you will be tested on the material below. During the first week of school, we will spend a week reviewing the Flinn Prep summer assignment and then you will be tested on the material – the exact test date will be scheduled on the first day of class. **NO LATE ASSIGNMENTS WILL BE ACCEPTED!!**

NOTE:

Although the mathematics on the AP chemistry exam is not difficult, students find it to be challenging because most of it requires basic arithmetic skills that you have not used since middle school (or even elementary school). Students generally have a good sense of how to use a calculator, but lack the skills of doing math without a calculator. Most math classes stress the use of calculators to solve problems and on the AP chemistry exam **seventy-five percent** of it is to be done **without** calculators. You will need to practice the basic math skills that you already know (just haven't used much in the past) to develop your thinking to solve the problems that you will encounter.

AP CHEMISTRY FIRST DAY TEST

AP Chemistry is a difficult course. It is not all about memorization; however, having these items memorized is essential for success in learning the concepts covered in the course. Make flashcards, have your friends and family quiz you, take the lists withyou on vacation, or do whatever it takes to get this information firmly planted in your head. Do **not** wait until the night before school begins.

The first day test will cover six areas of memorization:

1. Elements 1-56, 78-88 (names to symbols &symbols to names)
2. Determining Oxidation Numbers
3. Ions and Polyatomic Ions (including name, symbol and charge)
4. Nomenclature of Ionic Compounds and Molecular Compounds.
5. Rules for Naming Acids and common strong acids and bases
6. The concept of net ionic equations and memorization of one Solubility Rule listed at the end of this packet (If you need the other rules they will be given to you)

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Rules for Determining Oxidation Number

Oxidation Number: *A number assigned to an atom in a molecular compound or molecular ion that indicates the general distribution of electrons among the bonded atoms.*

1. The oxidation number of any uncombined element is O.
2. The oxidation number of a monatomic ion equal the charge on the ion.
3. The more electronegative element in a binary compound is assigned the number equal to the charge it would have if it were an ion.
4. The oxidation number of fluorine in a compound is always –1
5. Oxygen has an oxidation number of –2 unless it is combined with F, when it is +2, or it is in a peroxide, when it is –1.
6. The oxidation state of hydrogen in most of its compounds is+1 unless it combined with a metal, in which case it is –1.
7. In compounds, the elements of groups 1 and 2 as well as aluminum have oxidation number of +1, +2, and +3, respectively
8. The sum of the oxidation numbers of all atoms in a neutral compound is O.
9. The sum of the oxidation number of all atoms in a polyatomic ion equals the charge of the ion.

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Tables

COMMON ION CHART

POSITIVE IONS

+1	+2	+3	+4
H^+: hydrogen	Be^{+2}: beryllium	Fe^{+3}: iron (III)	Sn^{+4}: tin (IV)
Na^+: sodium	Mg^{+2}: magnesium	Au^{+3}: gold (III)	Pb^{+4}: lead (IV)
K^+: potassium	Ca^{+2}: calcium	Ga^{+3}: gallium	Mn^{+4}: manganese (IV)
Li^+: lithium	Sr^{+2}: strontium	In^{+3}: indium (III)	Ti^{+4}: titanium (IV)
Rb^+: rubidium	Ba^{+2}: barium	Tl^{+3}: thallium (III)	
Cs^+: cesium	Ra^{+2}: radium	Al^{+3}: aluminum	
Ag^+: silver	Fe^{+2}: iron (II)	Cr^{+3}: chromium (III)	**+6**
Au^+: gold (I)	Cu^{+2}: copper (II)	Ti^{+3}: titanium (III)	Cr^{+6}: Chromium (VI)
Cu^+: copper (I)	Zn^{+2}: zinc	Mn^{+3}: manganese (III)	
Tl^+: thallium (I)	Cd^{+2}: cadmium	Co^{+3}: cobalt (III)	
In^+: indium (I)	Hg_2^{+2}: mercury (I)		**+7**
	Hg^{+2}: mercury (II)		Mn^{+7}: manganese (VII)
NH_4^+: ammonium	Pb^{+2}: lead (II)		
	Sn^{+2}: tin (II)		
	Ni^{+2}: nickel		
	Co^{+2}: cobalt (II)		
	Mn^{+2}: manganese (II)		
	Ti^{+2}: titanium (II)		
	Cr^{+2}: chromium (II)		

Bi^{3+} Bismuth (III)

As^{3+} Arsenic (III)

+5

Bi^{5+} Bismuth (V)

H_3O^+ Hydronium

Table 6.8 Anions

Ionic Charge: 1−				Ionic Charge: 2−		Ionic Charge: 3−	
Halogens: Group 7A/17		***Oxyanions***		***Group 6A/16***		***Group 5A/15***	
F^-	Fluoride	ClO_4^-	Perchlorate	O^{2-}	Oxide	N^{3-}	Nitride
Cl^-	Chloride	ClO_3^-	Chlorate	S^{2-}	Sulfide	P^{3-}	Phosphide
Br^-	Bromide	ClO_2^-	Chlorite	***Oxyanions***		***Oxyanion***	
I^-	Iodide	ClO^-	Hypochlorite	CO_3^{2-}	Carbonate	PO_4^{3-}	Phosphate
Acid Anions		BrO_3^-	Bromate	SO_4^{2-}	Sulfate		
HCO_3^-	Hydrogen carbonate	BrO_2^-	Bromite	SO_3^{2-}	Sulfite		
HS^-	Hydrogen sulfide	BrO^-	Hypobromite	$C_2O_4^{2-}$	Oxalate		
HSO_4^-	Hydrogen sulfate	IO_4^-	Periodate	CrO_4^{2-}	Chromate		
HSO_3^-	Hydrogen sulfite	IO_3^-	Iodate	$Cr_2O_7^{2-}$	Dichromate		
$H_2PO_4^-$	Dihydrogen phosphate	NO_3^-	Nitrate	***Acid Anions***			
Other Anions		NO_2^-	Nitrite	HPO_4^{2-}	Hydrogen phosphate		
SCN^-	Thiocyanate	OH^-	Hydroxide	***Diatomic Elemental***			
CN^-	Cyanide	$C_2H_3O_2^-$	Acetate	O_2^{2-}	Peroxide		
H^-	Hydride	MnO_4^-	Permanganate				

Less Common but still know:

BrO^{4-} Bromate (VII) (Perbromate)

$HC_2O_4^-$ Hydrogen Oxalate

IO^- Hypoiodite

IO^{2-} [illegible]

Rules for Naming Ionic Compounds

1. Balance Charges (charges should equal zero)
2. Cation is always written first (in name and in formula)
3. Change the ending of the anion to -ide

-If necessary, use the stock system

- review the criss cross method

FOR NAMING MOLECULAR (COVALENT) COMPOUNDS--GREEK PREFIXES

mono-	hexa-
di-	hepta-
tri-	octa-
tetra-	nona-
penta-	deca-

ELEMENTS THAT EXIST AS DIATOMIC MOLECULES

BrINClHOF or HONClBrIF or H NO

Halogens

Br_2 I_2 N_2 Cl_2 H_2 O_2 F_2

You should know how to go from a name to a formula and a formula to a name. Look in your book if you need extra help or go to

http://www.chemteam.info/Nomenclature/Nomenclature.html

Rules for Naming an Acid

1. When the name of the anion ends in –ide, the acid name begins with the prefix hydro-, the stem of the anion has the suffix –ic and it is followed by the word acid.
   -ide becomes hydro _____ic Acid
   Cl^- is the Chlor**ide** ion so HCl = **hydro**chlor**ic acid**

2. When the anion name ends in –ite, the acid name is the stem of the anion with the suffix –ous, followed by the word acid.
   -ite becomes _____ous Acid
   ClO_2^- is the Chlor**ite** ion so $HClO_2$. = Chlor**ous** acid.

3. When the anion name ends in –ate, the acid name is the stem of the anion with the suffix –ic, followed by the word acid.
   -ate becomes _____ic Acid
   ClO_3^- is the Chlor**ate** ion so $HClO_3$ = Chlor**ic** acid.

TABLE OF STRONG ACIDS

Completely Ionized in Water to Give One (*or more*) Protons per Acid Molecule

HI	$H^+(aq) + I^-(aq)$	
HBr	$H^+(aq) + Br^-(aq)$	
$HClO_4$	$H^+(aq) + ClO_4^-(aq)$	
HCl	$H^+(aq) + Cl^-(aq)$	
$HClO_3$	$H^+(aq) + ClO_3^-(aq)$	
H_2SO_4	$H^+(aq) + HSO_4^-(aq)$	*(HSO_4^- is a weak acid that contributes additional protons)*
HNO_3	$H^+(aq) + NO_3^-(aq)$	

TABLE OF STRONG BASES

Completely Ionized in Water to Give One (*or more*) Hydroxides per Base Molecule

NaOH	**$Na^+(aq) + OH^-(aq)$**
KOH	**$K^+(aq) + OH^-(aq)$**
LiOH	$Li^+(aq) + OH^-(aq)$
RbOH	$Rb^+(aq) + OH^-(aq)$
CsOH	$Cs^+(aq) + OH^-(aq)$
$Ca(OH)_2$	$Ca^{2+}(aq) + 2OH^-(aq)$ *(but not very soluble)*
$Ba(OH)_2$	$Ba^{2+}(aq) + 2OH^-(aq)$ *(but not very soluble)*
$Sr(OH)_2$	$Sr^{2+}(aq) + 2OH^-(aq)$ *(but not very soluble)*

You must learn/review the concept of net ionic equations and precipitation reactions. See below for links to watch and read.

https://www.khanacademy.org/science/chemistry/acid-base-equilibrium/copy-of-solubility-equilibria-mcat/v/dissolution-and-precipitation

http://www.bozemanscience.com/ap-chem-027-chemical-equations

http://chemwiki.ucdavis.edu/Core/Inorganic_Chemistry/Reactions_in_Aqueous_Solutions/Precipitation_Reactions

Memorize the following Solubility Rule:

All sodium, potassium, ammonium, and nitrate salts are soluble in water. Know how to apply this rule**.**