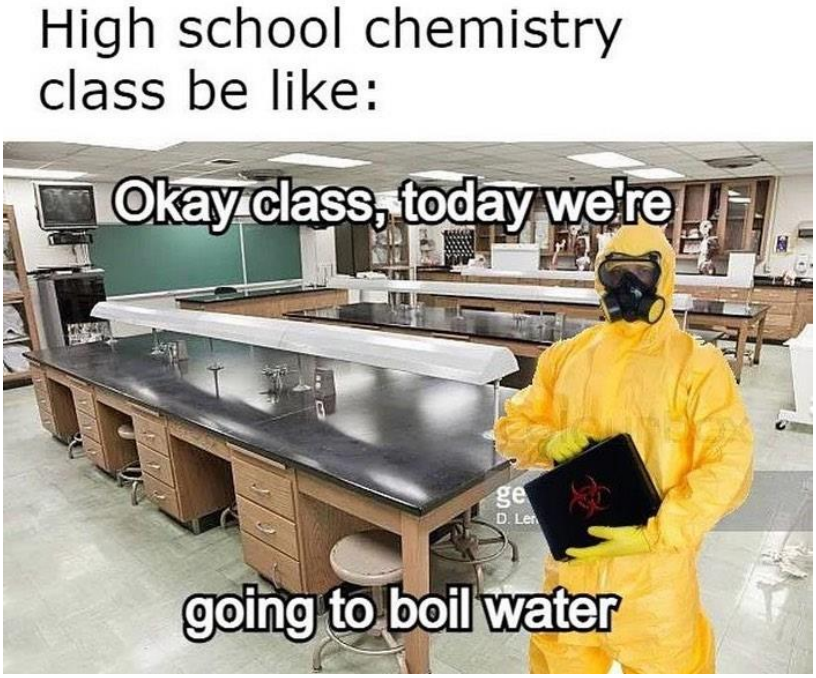
AP Chemistry Summer Assignment

2024-2025



Mr. Heitzman

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Dear AP Students and Parents,

First, welcome to AP chemistry! I am very excited to be teaching another year of this class at Maryvale, and I am very excited for the group of students we have in the program this year. Each student in this class has exhibited potential in the fields of both math and science and has been given the opportunity to take on perhaps the biggest challenge that any high school has to offer, AP chemistry.

Taking AP chemistry is the equivalent of taking first year chemistry at the college level. What this means is that there will be a lot expected of you in this class. It will not be uncommon for a student to have to spend up to 5 hours or more a week either working on assignments or studying for AP chemistry. There is no doubt about it that AP chemistry will push students past what they are used to in a normal class. Students that are accustomed to receiving A's in all of their classes should be prepared to get some B's and C's on tests and possibly even for a semester grade.

The biggest difference, besides amount of material and content, compared to honors chemistry is the pace at which AP chemistry will be taught at. As stated before, this is college level chemistry and, unfortunately, there is a deadline of early May that the material must be learned by. I cannot slow down or spend too much time on just one topic. If you miss a day, do not understand a concept, or fall behind, it is your responsibility to come to me and make up the work or catch up on the material. If you need help with a topic, please come to me early and often because this class builds on itself quickly and it is easy to get buried if you don't understand a topic.

Luckily for us, it is not all doom and gloom! AP chemistry is a very exciting class where we get to dive deep into chemistry and take on some more fun and interesting lab experiments. This class can also be very rewarding, if you step up and take the challenge head on there are few classes that can offer the sense of accomplishment and pride that comes along with conquering the AP chemistry class!

As the title of this document suggests, this is your summer work assignment for AP chemistry. I know that no one wants to do work over the summer but for this class it is extremely important that you take this summer work seriously. Your chemistry skills will get rusty very quickly if we do not keep them sharp over the span of three months. The summer assignment not only keeps your skills sharp but is just good practice to make sure you firmly grasp the concepts of your previous chemistry classes. This will also ensure that we can jump into chemistry material straight away next year and do not have to spend as much time on the basics. Use your materials from last year and your friends as a resource, but I beg you to not copy off one another because it will leave you behind the eight ball for the start of the year.

This assignment is due the first day of class and will be worth multiple homework assignments so do not blow it off! If you need my help, I am always available for questions, and you can reach out to me via email which is listed on the front page!

I look forward to seeing you next year,

Mr. Heitzman

SUMMER WORK!

Name these elements and polyatomic ions without looking! (obviously I don't know if you looked or not, but still)

Na-	Br-	Mg-
I-	Cl-	K-
He-	H-	C-
Cu-	Fe-	Li-
S-	N-	F-
PO_4-	CO_3-	SO_4-
ClO_3-	ClO_2-	NO_3-

Once again without looking, write the most common charge associated with each of these when they form an ion. (some will have multiple)

Write the following in scientific notation or take them out of scientific notation.

156,000	0.000045	56,932
0.034	9,870,000	0.0000123
4.5×10^{6}	1×10^{-1}	2.3×10^{2}
9.8×10^{-9}	8.9×10^{9}	1.23×10^{-4}

How many significant figures are in the following

1,230	1.30	0.0030
$2.3x10^{23}$	9,009	1000.

Do the following calculations with the appropriate number of significant figures

12.3 + 4	34.5x12	90.12-80.234
4x 24	23.4/78.22	100+ 34.6

Convert the following

23 g to mg	0.156 km to m	57.8 ng to g
34 ml to kl	1,200 hg to kg	34.4 cm to km
34 ^oC to ^oF, K	120 ^oF to ^oC and K	1000 K to ^oC, ^oF

Complete the following tables

N is neutral, A is anion, C is cation

# protons, # electrons	Symbol	N, A, or C
19 p, 18 e^-	K^+	**C**
33 p, 36 e^-		
30 p, 30 e^-		
26 p, 23 e^-		
35 p, 36 e^-		

	Ca^{+2}	
	N^{-3}	
	Al	N

Atomic Symbol	Name-#	Atomic Number	Atomic Mass	# protons	# neutrons	# electrons
$^{222}_{86}Rn$						
	Cobalt – 60					
				80	117	
			90	38		
					21	19
		34	79			

Name the following Ionic Compounds

Na_2S $Pb(SO_4)_2$ MgO

$CuCl_2$ $Al_2(CO_3)_3$ LiF

V_2O_5 BeI_2 KBr

Write the formula for the following ionic compounds

Magnesium nitride iron (ii) phosphide sodium nitrate

Copper (i) phosphate potassium chlorite silver oxide

Zinc iodide lead (ii) bromate lithium chloride

Name the following molecular formulas

SF_6	NO	CO
N_2O_4	P_5O_{10}	CCl_4
Cl_2O_7	CH_4	H_2O

Write the formulas for the following molecular compounds

Dinitrogen monoxide	iodine heptafluoride	tetraphosphorus octoxide
Carbon dioxide	tetraphosphorus nonasulfide	tetra arsenic decoxide
Disulfur dichloride	silicon dioxide	oxygen difluoride

Name the following acids

HCl	H_2SO_4	H_2S
HBr	$HClO_2$	H_3PO_4
HClO	$HClO_4$	$HBrO_3$

Write the formulas for the following acids

Hydroiodic acid	chloric acid	carbonic acid
Sulfurous acid	nitric acid	nitrous acid
Hydrochloric acid	iodic acid	acetic acid

Calculate the molar mass of the following

Cu	Zn	N_4O_2
$Fe_3(PO_4)_2$	Al_2O_3	H_2SO_4

Calculate the following

How many moles are in 5.4×10^{22} atoms of Na?

How many molecules are in 2.5 mol Cl_2?

How many moles are in 100 g of AgBr?

How much does 3.1 mol $Fe_2(SO_4)_3$ weigh in grams?

We have a 50 g sample of NaCl, calculate how many molecules are in this sample.

If we have 6.4×10^{24} molecules of Al_2O_3 how much does it weigh in grams?

How many moles of oxygen are in 3.4 moles $Cu_3(PO_4)_2$?

If you have a 600g sample of Mg_3N_2 how much of the mass is nitrogen responsible for?

We have a sample of $(NH_4)_2S$. If we have 53.2 g of N how much does the entire compound weigh?

Write the balanced chemical equation, complete ionic, and net ionic equations for the following precipitation reactions (if they occur)

The reactions between:

Sodium sulfide and iron (ii) nitrate

Ammonium hydroxide and copper (ii) chloride

Potassium chloride and silver nitrate

Lithium phosphate and sodium acetate

Write the following acid base neutralization reactions and balance them:

Hydrochloric acid and sodium hydroxide

Sulfurous acid and potassium hydroxide

Phosphoric acid and lithium hydroxide

Hydrobromic acid and magnesium hydroxide

Write the oxidation states for the following reactions and say what is oxidized and what is reduced.

$Fe\,(aq) + H_2O_2(aq) \rightarrow Fe^{+2}(aq) + 2\,OH^{-1}(aq)$

$4NaOH(aq) + Ca(OH)_2(aq) + C(s) + 4ClO_2(g) \rightarrow 4NaClO_2(aq) + CaCO_3(s) + 3H_2O(l)$

$16\ HCl_{(aq)} + 5\ SnCl_{2(aq)} + 2\ KMnO_{4(aq)} \rightarrow 2\ MnCl_{2(aq)}\ 5\ SnCl_{4(aq)} + 8\ H_2O_{(l)} + 2\ KCl_{(aq)}$

Balance the following equations:

___ $NaNO_3$ + ___ $PbO \rightarrow$ ___ $Pb(NO_3)_2$ + ___ Na_2O

___ AgI + ___ $Fe_2(CO_3)_3 \rightarrow$ ___ FeI_3 + ___ Ag_2CO_3

___ $C_2H_4O_2$ + ___ $O_2 \rightarrow$ ___ CO_2 + ___ H_2O

___ $ZnSO_4$ + ___ $Li_2CO_3 \rightarrow$ ___ $ZnCO_3$ + ___ Li_2SO_4

___ V_2O_5 + ___ $CaS \rightarrow$ ___ CaO + ___ V_2S_5

___ $Mn(NO_2)_2$ + ___ $BeCl_2 \rightarrow$ ___ $Be(NO_2)_2$ + ___ $MnCl_2$

___ $AgBr$ + ___ $GaPO_4 \rightarrow$ ___ Ag_3PO_4 + ___ $GaBr_3$

___ H_2SO_4 + ___ $B(OH)_3 \rightarrow$ __ $B_2(SO_4)_3$ + ___ H_2O

___ S_8 + ___ $O_2 \rightarrow$ ___ SO_2

___ Fe + ___ $AgNO_3 \rightarrow$ ___ $Fe(NO_3)_2$ + ___ Ag

Write the electron configuration and orbital diagram for each of the following elements.

Al- Mg- Ne-

Cl- Ag- U-

Survey!

What was the hardest part of the summer work?

What was the easiest part of the summer work?

Why are you taking AP chemistry?

What are you most looking forward to in AP chemistry?

What are you most scared or nervous about when it comes to AP chemistry?

What are you most excited about this year that has nothing to do with chemistry?