

AP Chemistry Summer Assignment
2024-2025

Dear AP Students and Parents,

First, welcome to AP chemistry! 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 make up the work and/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.

As the title of this document suggests, this is your summer work assignment for AP chemistry. Your chemistry skills will get rusty very quickly if you 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.

This assignment is due the first day of class and will be worth multiple homework assignments. Please contact me if you have any questions.

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

2.3×10^{23}

9,009

1000.

Do the following calculations with the appropriate number of significant figures

$12.3 + 4$

34.5×12

$90.12 - 80.234$

4×24

$23.4 / 78.22$

$100 + 34.6$

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 °C to °F, K

120 °F to °C and K

1000 K to °C, °F

Complete the following tables

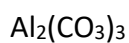
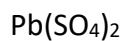
N is neutral, A is anion, C is cation

# 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



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



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



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

N₄O₂

Fe₃(PO₄)₂

Al₂O₃

H₂SO₄

Calculate the following

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

How many molecules are in 2.5 mol Cl₂?

How many moles are in 100 g of AgBr?

How much does 3.1 mol Fe₂(SO₄)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 Al₂O₃ how much does it weigh in grams?

How many moles of oxygen are in 3.4 moles Cu₃(PO₄)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 $(\text{NH}_4)_2\text{S}$. 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:

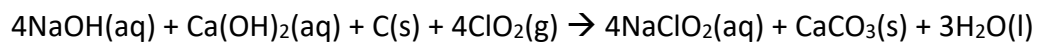
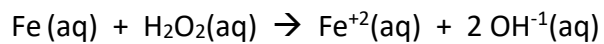
Hydrochloric acid and sodium hydroxide

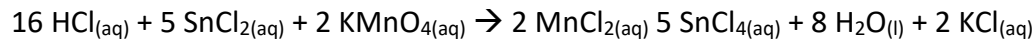
Sulfurous acid and potassium hydroxide

Phosphoric acid and lithium hydroxide

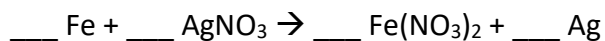
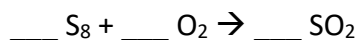
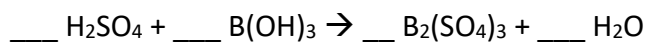
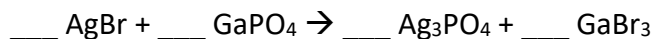
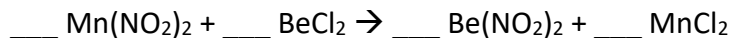
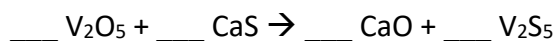
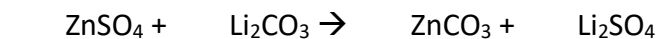
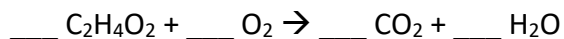
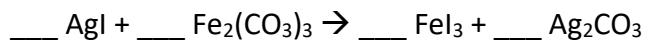
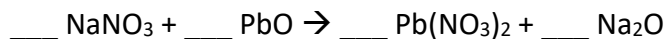
Hydrobromic acid and magnesium hydroxide

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





Balance the following equations:



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?