

AP Chem Summer Work -- 2022

Key Points:

- June and July = Relax and have fun! Do not do this assignment before August 12. It is intended as a warm up for the year. This assignment shouldn't take a long time.
- Due Date = Monday, August 22.
 - Communicate with me if this poses a difficulty for you.
- Print the assignment. Complete it. Scan it or use a scanner app and email me the pdf.
 - Please do not send photos from your phone. If you need help with scanning, let me know.
- You must memorize the chart of polyatomic ions before school starts.
 - We will quiz on this the first week.
- See the AP Chemistry OnCampus course page for helpful material including:
 - The official periodic table, polyatomic ion table, and equations sheets for the course
 - Links to good sites for review.

Honor Pledge: You are welcome to use any and all materials (including the Internet) to assist you in completing this assignment. You may collaborate with friends. However, my expectation is that the work you submit is in fact your work, not copies of someone else's work. Please affirm your honor with regard to this assignment below.

Pledged _____

Significant Figures:

How many significant figures are in each of the following?

1) 9009 = 2) 0.7600 = 3) 54.0 = 4) 0.060 =

Round each of the following numbers to three significant figures:

1) 4.87920 = 2) 0.42911 = 3) 345 =

Complete the following calculations and round the answer to the correct number of significant figures:

1) $1.394 / 0.80 =$ 2) $341 + 290 + 14 =$

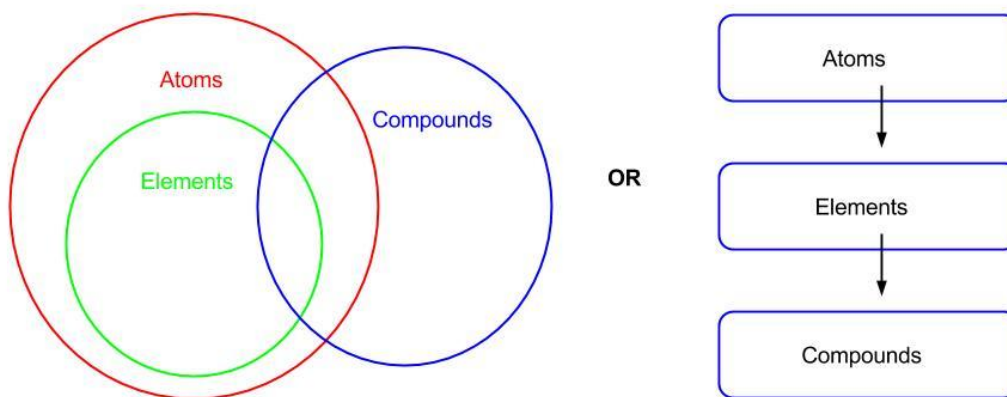
3) $(24.98 + 3.1) / 12.14 =$

Essential Terms:

For the following terms, create a diagram or picture that shows the relationships between the terms. You can do a flow chart or a Venn diagram, or your own creation. The key is that your diagram/chart/picture should show how the terms are related (not listing definitions).

matter, atom, ion, element, compound, pure substance, mixture, isotopes, cation, anion, proton, neutron, electron

A partial example:



Elements are made from atoms. Elements can join to make compounds...

Isotopes:

How many protons (p^+), neutrons (n^0), and electrons (e^-) are in an atom of platinum--198?

What is the complete element symbol (showing atomic number, mass number, and charge) for the atom that contains 27 p^+ , 30 n^0 , and 25 e^- ?

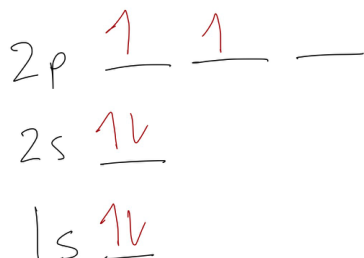
Complete the following table related to isotopes:

Isotope Symbol ${}_Z^AX^{+/-}$	Atomic #	Mass #	# of protons	# of neutrons	# of electrons	Charge
${}_{27}^{60}\text{Co}^{2+}$						
			52	78		2-
	53	131				1-

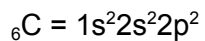
Atomic Structure

For an atom of carbon, see the following:

Orbital Diagram



Electron Configuration



Noble Gas Configuration



Produce the orbital diagram, electron configuration, and noble gas configuration for the following elements:

Phosphorous -- ${}_{15}\text{P}$

Iron -- ${}_{26}\text{Fe}$

Write only the noble gas configuration for the following elements:

Calcium -- ${}_{20}\text{Ca} =$

Gold -- ${}_{79}\text{Au} =$

Naming and Formula Writing:

Name the following:

FeCl_3		BaS	
$(\text{NH}_4)_3\text{PO}_3$		$\text{Cr}(\text{NO}_2)_3$	
N_2O_6		PF_3	
$\text{Cd}(\text{OH})_2$		K_2O	

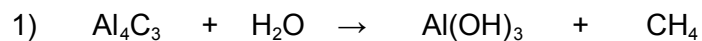
Write chemical formulas for the following:

silicon dioxide		zinc chlorite	
lithium carbonate		sodium perchlorate	
copper (II) phosphate		calcium phosphide	
silver sulfide		trinitrogen pentafluoride	

Name the following acids or write the formula for the acid if the name is given:

nitrous acid		H_3AsO_3	
oxalic acid		HCN	
HBr		HClO_3	

Balance the following reactions:



Write and balance the following reactions:

1) Titanium (IV) chloride reacts with water to produce titanium (IV) oxide and hydrochloric acid.

2) Lead (II) nitrate and sodium carbonate react to form...

Atomic Mass, Moles, Stoichiometry

1) The average mass of a carbon is 12.011 amu. What is your chance of picking up a carbon atom with this mass? Explain.

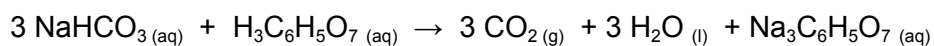
2) How many grams are in 0.25 moles CaBr_2 ?

3) How many molecules are in 18.2 grams of $\text{Mg}(\text{OH})_2$?

4) What volume (at standard temperature and pressure) would 45.7 grams of carbon dioxide occupy?

5) Air bags inflate according to the following reaction: $2 \text{NaN}_3(\text{s}) \rightarrow 2 \text{Na}(\text{s}) + 3 \text{N}_2(\text{g})$
How many grams of nitrogen gas would be produced when 58.4 grams of sodium azide (NaN_3) reacts completely according to the reaction above?

6) The fizz produced when an Alka-Seltzer tablet is dissolved in water is due to the reaction of sodium bicarbonate and citric acid:



In a certain experiment, 1.00 g of sodium bicarbonate and 1.00 g of citric acid are allowed to react. **(a)** Which is the limiting reactant? **(b)** How many grams of carbon dioxide form? **(c)** How many grams of the excess reactant remain after the limiting reactant is produced?