

2024-2025 AP Chemistry Summer Assignment

As part of your AP Chemistry course, you are expected to prepare for the course over the summer. You will need to memorize the following information before the course begins in the fall. **You will be turning in the practice worksheet during the first week of school.** If you have questions while working on this assignment, write them down and Mrs. Riemenschneider will be able to help you in August.

1. Memorize the following:

a. Common Symbols from the Periodic Table of Elements

The AP Chemistry periodic table does not contain any element names, only symbols. You must be able to recognize these common element symbols. Bold items are anomalous names.

Helpful Quizlet: https://quizlet.com/_6illr7?x=1jqt&i=vnwa9

b. Name and Symbols of Metal Cations and Polyatomic Ions

Memorize the **name**, **chemical formula**, and **charge(s)** of the common ions listed in the two tables provided below. Both tables must be memorized.

Helpful Quizlet: https://quizlet.com/_6illvh?x=1jqt&i=vnwa9

2. Be able to name and write formulas for ionic compounds, covalent compounds, and acids.

You will frequently see the names for compounds and knowing their formula is imperative for understanding. Use the flowchart attached to help you determine how to name and write formulas. A flow chart is only one way of presenting this information, can you use a third study method to present it another way?

Helpful Quizlet: https://quizlet.com/_9v0v0w?x=1qqt&i=vnwa9

3. Complete the practice worksheet attached.

This worksheet contains practice problems that will prepare you for your first quiz. It includes material listed above as well as review questions on skills most commonly seen in AP Chemistry. Your answers to all calculation questions should include correct units. This page will be turned in during the first week of school

What to expect on the first quiz:

The quiz is **NOT** multiple choice. Be prepared to show work and explain answers.

- Given an element's symbol or chemical formula, provide the element or formula's name and vice versa.
- Given a polyatomic ion, provide its chemical formula (including charge) and vice versa.
- Be able to name ionic and covalent formulas, including acids.
- Complete basic stoichiometry problems and answer questions using appropriate significant figures.

Final Note: Class Materials

You will need a binder for this course. It needs to have at least 9 tabs as well and loose leaf notebook paper. You will also need a scientific calculator. While a graphing calculator is nice, they are expensive. A [TI-30XS](#), or equivalent, will be appropriate. It needs to be able to do logarithmic calculations. If any of these purchases place an undue financial burden on your family, let Mrs. Riemenschneider know during the first week of school.

Common Symbols from the Periodic Table of Elements

aluminum Al	chromium Cr	lead Pb	radon Rn
antimony Sb	cobalt Co	lithium Li	rubidium Rb
argon Ar	copper Cu	magnesium Mg	selenium Se
arsenic As	fluorine F	manganese Mn	silicon Si
barium Ba	francium Fr	mercury Hg	silver Ag
beryllium Be	gallium Ga	neon Ne	sodium Na
bismuth Bi	germanium Ge	nickel Ni	strontium Sr
boron B	gold Au	nitrogen N	sulfur S
bromine Br	helium He	oxygen O	tin Sn
calcium Ca	hydrogen H	phosphorus P	tungsten W
carbon C	iodine I	platinum Pt	uranium U
cesium Cs	iron Fe	potassium K	xenon Xe
chlorine Cl	krypton Kr	radium Ra	zinc Zn

Metal Cations	
Sb ⁺³ Antimony(III)	Pb ⁺² Lead(II)
Sb ⁺⁵ Antimony(V)	Pb ⁺⁴ Lead(IV)
Bi ⁺³ Bismuth(III)	Mn ⁺² Manganese(II)
Bi ⁺⁵ Bismuth(V)	Mn ⁺³ Manganese(III)
Cd ⁺² Cadmium	Mn ⁺⁴ Manganese(IV)
Cr ⁺² Chromium(II)	Mn ⁺⁷ Manganese(VII)
Cr ⁺³ Chromium(III)	Hg ₂ ⁺² Mercury(I)
Co ⁺² Cobalt(II)	Hg ⁺² Mercury(II)
Co ⁺³ Cobalt(III)	Ni ⁺² Nickel(II)
Cu ⁺¹ Copper(I)	Ni ⁺³ Nickel(III)
Cu ⁺² Copper(II)	Ag ⁺¹ Silver
Au ⁺¹ Gold(I)	Sn ⁺² Tin(II)
Au ⁺³ Gold(III)	Sn ⁺⁴ Tin(IV)
Fe ⁺² Iron(II)	Zn ⁺² Zinc
Fe ⁺³ Iron(III)	

Common Polyatomic Ions

monovalent polyatomic cations (+1 charge):

H_3O^+ hydronium

NH_4^+ ammonium

monovalent polyatomic anions (-1 charge):

BrO_4^- perbromate

BrO_3^- bromate

BrO_2^- bromite

BrO^- hypobromite

ClO_4^- perchlorate

ClO_3^- chlorate

ClO_2^- chlorite

ClO^- hypochlorite

IO_4^- periodate

IO_3^- iodate

IO_2^- iodite

IO^- hypoiodite

MnO_4^- permanganate

MnO_3^- manganate

NO_3^- nitrate

NO_2^- nitrite

$\text{C}_2\text{H}_3\text{O}_2^-$ acetate

CH_3COO^- acetate

CN^- cyanide

OCN^- cyanate

SCN^- thiocyanate

OH^- hydroxide

N_3^- azide

NH_2^- amide

O_2^- superoxide

divalent polyatomic anions (-2 charge):

CrO_4^{2-} chromate

$\text{Cr}_2\text{O}_7^{2-}$ dichromate

SO_4^{2-} sulfate

SO_3^{2-} sulfite

$\text{S}_2\text{O}_3^{2-}$ thiosulfate

CO_3^{2-} carbonate

$\text{C}_2\text{O}_4^{2-}$ oxalate

O_2^{2-} peroxide

tri and tetravalent anions (-3/-4 charge):

BO_3^{3-} borate

PO_3^{3-} phosphite

PO_4^{3-} phosphate

AsO_4^{3-} arsenate

AsO_3^{3-} arsenite

polyatomic anions containing hydrogen:

HCO_3^- hydrogen carbonate (aka bicarbonate)

HSO_4^- hydrogen sulfate (aka bisulfate)

HSO_3^- hydrogen sulfite (aka bisulfite)

HPO_4^{2-} hydrogen phosphate

H_2PO_4^- dihydrogen phosphate

HS^- hydrogen sulfide

Significant Figures and Uncertainty in Measurement and Calculations:

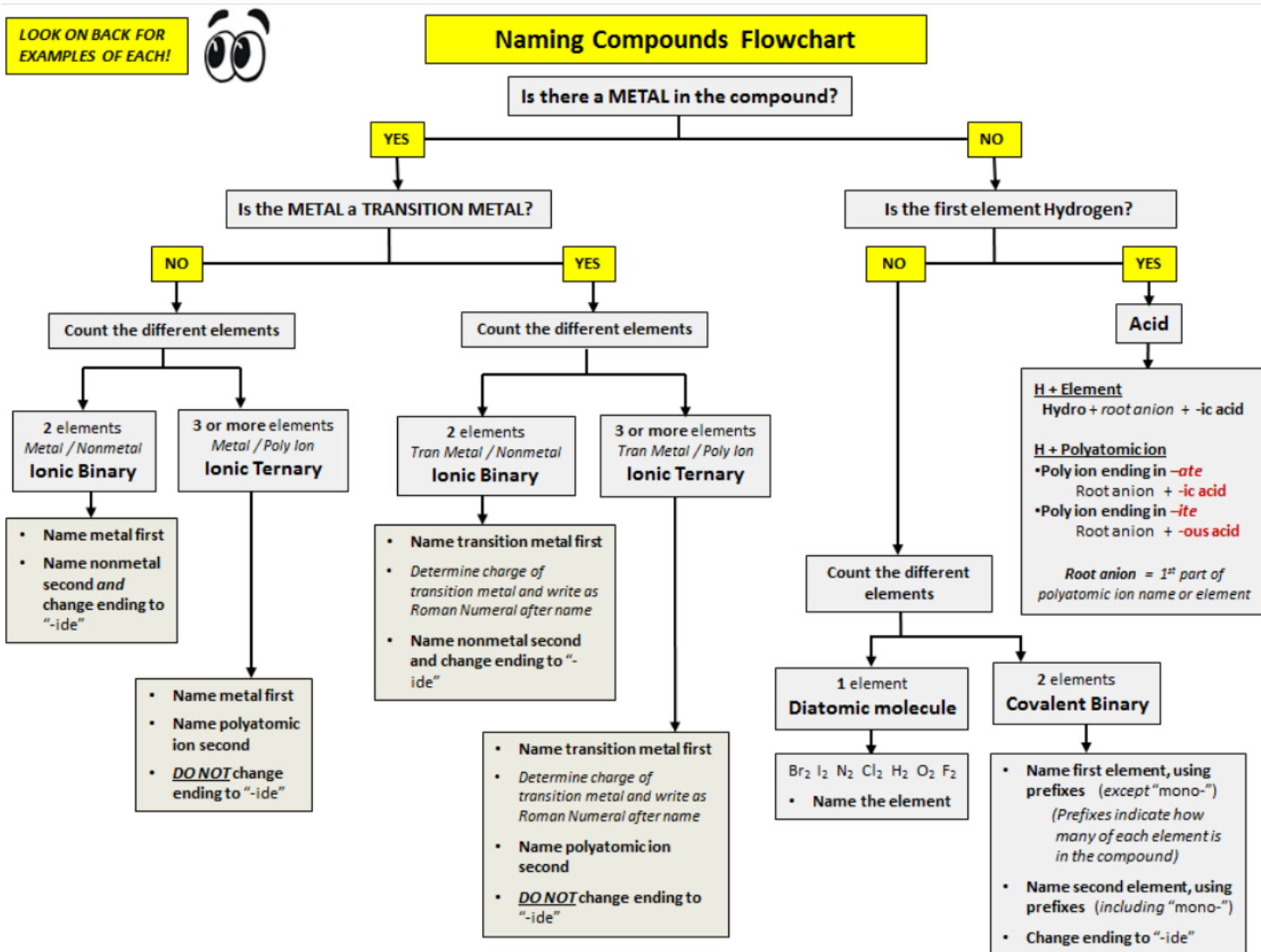
1. Measured Numbers:

All *measured numbers* have some degree of uncertainty.

When recording measurements, *record only the significant figures*. Record measurements to include one decimal estimate beyond the smallest increment on the measuring device.

Examples (consider a measuring instrument like a ruler):

- If smallest increment = 1m, then record measurement to 0.1m (i.e. 3.1 *m*)
 - If smallest increment = 0.1m, then record measurement to 0.01m (i.e. 5.67 *m*)
 - If smallest increment = 0.01m, then record measurement to 0.001m (i.e. 12.675 *m*)
- c. Unless otherwise stated the uncertainty in the last significant figure (*the uncertain digit*) is assumed to be ± 1 unit. Modern digital instruments and many types of volumetric glassware will state the level of uncertainty.



Name: _____

AP Chemistry Summer Assignment Practice Worksheet

Part 1: Naming and Writing Formulas

Antimony tribromide _____

Aluminum sulfide _____

Lithium oxide _____

P_4S_5 _____

Tin (II) hydroxide _____

chlorine dioxide _____

B_2Si _____

NF_3 _____

Iron (III) phosphide _____

Cobalt (III) carbonate _____

Hydrogen iodide _____

SeF_6 _____

$Zn_3(PO_4)_2$ _____

$Be(NO_3)_2$ _____

Dinitrogen trioxide _____

$Na_2(SO_3)$ _____

Sodium hydroxide _____

Iodine pentafluoride _____

$Cu(CH_3COO)_2$ _____

Hexaboron silicide _____

Si_2Br_6 _____

$Cu(HCO_3)_2$ _____

Phosphorus triiodide _____

CH_4 _____

Fill in the symbols and charges of the ions and then write the correct chemical formulas and the chemical names in the corresponding blocks. The first one is done for you.

IONS	Sodium Na⁺	Calcium	Aluminum	Ammonium	Hydrogen
Chloride Cl⁻	NaCl Sodium chloride				
Nitrate					
Oxide					
Sulfide					
Phosphate					
Iodide					

Part 2: Stoichiometry Review

1. How many grams are in a 2.8 mol sample of iron?
2. Given the equation: $2 \text{ K} + \text{Cl}_2 \rightarrow 2 \text{ KCl}$
How many grams of KCl are produced from 1.00 g of Cl_2 and excess K?
3. What is the percent composition by mass of each element in $\text{Ca}_3(\text{PO}_4)_2$?
4. The following reaction occurs: $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
 - a. How many grams of AgCl result from the reaction of 1.30 g of NaCl and 3.5 g of AgNO_3 ?
 - b. Identify the limiting reactant and the excess reactant.
 - c. How much of the excess reactant is left over?
 - d. If the reaction actually yielded 2.7g, what is the percent yield and the percent error for the reaction?
5. What is the empirical formula of zircon if its percent composition by mass is 34.91% O, 15.32% Si, and 49.76% Zr?
6. How many atoms of Aluminum are in a 63 g sample of Al_2O_3 ?
7. Calculate the number of moles of O_2 gas present in a sample that contains 4.00×10^{29} molecules.