

Hey there! I know summer assignments might not be the most exciting thing on your agenda, but trust me, there's a method to the madness! Completing your AP Chemistry assignment now means you'll be better equipped to tackle the course when the school year starts. Plus, it's a chance to explore some cool chemistry concepts at your own pace. So, dive in, have fun, and remember, it's all about setting yourself up for success! If you need any help along the way, I'm here for you. **You've got this!**

READ ALL DIRECTIONS CAREFULLY – it is your responsibility to read and complete all directions as stated. You should be prepared to take a test over this material at the end of the first week of school. Procrastination is detrimental to your success in AP Chemistry.

Foundations of Chemistry

Review Targets:

- Determine and record the number of significant figures in a measured quantity.
- Convert numbers between scientific notation and standard form.
- Determine the number of significant figures to report in the result of mathematical calculations.
- Use a ruler or other measuring device to make a measurement to the correct number of significant figures.
- Correctly assign a value when making a measurement, showing the precision of the instrument used.
- Convert between units of measure and metric units.
- Use dimensional analysis to solve problems.
- Convert between temperature scales and Kelvin.
- Calculate the density of a substance and perform calculations using density.
- Differentiate between homogeneous and heterogeneous mixtures.
- Differentiate among elements, compounds and mixtures.
- Differentiate between chemical and physical changes and properties.
- Use a particulate diagram to illustrate the differences between the types of matter.
- Describe various separation techniques.
- Describe mass differences and charge differences among electrons, protons and neutrons.
- Calculate numbers of electrons, protons, and neutrons in an atom, given the atomic number and the mass number.
- Recognize early history theories of the atom.
- Understand Dalton's Atomic Theory.
- Understand the Periodic Table.
- Name simple ionic and covalent compounds, given the formula.
- Write the formula for simple ionic and molecular compounds.
- Name and write formulas for simple acids and bases.
- Identify and name common polyatomic ions.
- Balance and identify the five types of chemical equations.
- Determine whether a compound is soluble.
- Write molecular, complete ionic, and net ionic reactions.
- Identify spectator ions in a precipitation reaction.
- Use moles as a conversion between moles, grams and number of particles.
- Determine mass percent composition from a chemical formula.
- Determine an empirical formula from experimental data.
- Calculate a molecular formula from an empirical formula and molar mass.
- Recognize the relationship between chemical quantities in a balanced equation.
- Carry out conversions between reactants and products in a chemical equation using the mole to mole ratio from a balanced equation.
- Calculate limiting reactant, theoretical yield and percent yield in a balanced chemical equation.

Sections:

1. Significant Figures
2. Metric System & Dimensional Analysis
3. Density
4. Classification of Matter
5. Mixture Separation Techniques
6. Structure of the Atom
7. History of Atomic Structure
8. The Periodic Table
9. Chemical Nomenclature
10. Chemical Equations
11. Polyatomic Ions: formulas, names, and charges
12. The Mole
13. Percent Composition
14. Empirical and Molecular Formulas
15. Stoichiometry
16. Limiting Reactant, Theoretical Yield, & Percent Yield

Section 1: Significant Figures and Dimensional Analysis

1. Round each of the following numbers to four significant figures, and express the result in scientific notation:

	<u>4 sig figs</u>	<u>scientific notation</u>
a) 328 437	_____	_____
b) 600.2780	_____	_____
c) 0.0003267	_____	_____
d) 10.099	_____	_____
e) 0.0200047	_____	_____

2. How many significant figures are in each of the following?

a) 0.060 = _____	e) $8.7 \times 10^7 =$ _____	i) 0.440 = _____
b) 7408 = _____	f) 5060 = _____	j) 0.00100 = _____
c) 9020 = _____	g) $8.85 \times 10^3 =$ _____	k) 0.69 = _____
d) $4.36 \times 10^{-5} =$ _____	h) 30 = _____	l) 728 = _____

3. Complete the following operations and round to the proper number of significant figures.

a) $20 \div 3.530 =$ _____	f) $3.11 \times 21.9 \times 9000 =$ _____
b) $9.560 \times 0.003 \times 1009 =$ _____	g) $4 \times 7 \times 1200 =$ _____
c) $44.5 \div 40 =$ _____	h) $1.6 \times 40 =$ _____
d) $0.07 \div 68.898 =$ _____	i) $9080 \div 3.6 =$ _____
e) $0.003 \times 0.04 \times 4000 =$ _____	j) $0.0038 \times 84.6 =$ _____

Section 2: Metric System & Dimensional Analysis

1. Metric Conversions: The prefixes milli (0.001) and kilo (1000) should become second nature and you should no longer need to write out a conversion or use a calculator for these. If a problem says, "25.0 mL of" you should immediately be able to write down 0.0250 L. If a problem says, "6.5 kJ of heat" you should immediately be able to know this is 6500 J.

- | | | |
|---------------------------|--------------------------|------------------------|
| 1) 0.750 L = _____ mL | 5) 31.5 mmol = _____ mol | 9) 47 mL = _____ L |
| 2) 100.0 mL = _____ L | 6) 5000 g = _____ kg | 10) 0.050 L = _____ mL |
| 3) 0.100 mol = _____ mmol | 7) 5250 J = _____ kJ | |
| 4) 6.5 kg = _____ g | 8) 3.00 mL = _____ L | |

2. Complete the following dimensional analysis problems. You must show your dimensional analysis set up. Record your answer with the correct units and proper number of significant figures.
- 1) The Sun has a radius at the equator of 695,700 kilometers. What is that distance in miles?
 - 2) How many inches are there in 355 millimeters?
 - 3) A school bus has a mass of 11.062 kg. Convert the mass to grams and pounds.
 - 4) Convert 38925 mg to kg.
 - 5) Convert 365 nanometers to kilometers.
 - 6) Convert 467.88 in³ to m³.
 - 7) How many ml are 32.20 cm³?
 - 8) Convert 37.2 km/hr to inches/second.
 - 9) How many feet are between the first and third story of a building (2 story)? 1 story = 3.33 meters.
100 centimeters = 1 meter; 1 inch = 2.54 cm; 1 foot = 12 inches
 - 10) New York City has approximately 7,931,000 million people. Each person has 2 hands and each hand has 5 fingers. How many fingers are in New York City? Give your answer in scientific notation.

Section 3: Density

Complete the following density problems. You must show the equation and set up. Record your answer with the correct units and proper number of significant figures.

- 1) An apple has a mass of 140.0 grams and a volume of 150 ml. What is the density and will the apple sink or float in water?
- 2) What is the volume of 22.8 g of a liquid that has a density of 1.789 g/mL?

- 3) A rectangular block has dimensions of 6.4 cm x 7.4 cm X 16.0 mm. The block has a mass of 498 grams. What is the density of the rectangular block?
- 4) What is the density (g/mL) of an object that has a mass of 24.01 grams and, when placed into a graduated cylinder, causes the water level to rise from 55.2 mL to 63.6 mL?
- 5) Aluminum foil has a density of 2.70 g/cm. If a 1.61 gram piece of aluminum foil has a length of 24.0 cm and a width of 14 cm, calculate the thickness of the foil.

Section 4: Classification of Matter

- 1) Draw a diagram of the 3 states of matter.

SOLID



LIQUID



GAS



- 2) Complete the following chart by placing an X under the correct column.

Substance	Homogenous mixture	Heterogeneous mixture	Compound	Element
platinum				
air				
pure water				
trail mix				
salt (NaCl)				
vegetable soup				
sweet tea				
aluminum				
calculator				
carbon dioxide				

3) How is a **chemical change** different from a **physical change**? What signs suggest a **chemical reaction** has happened?

4) Label each particulate diagram with the correct letter.

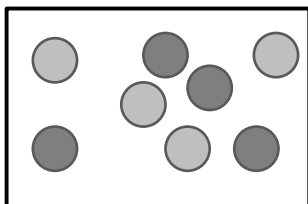
A. Element

B. Compound

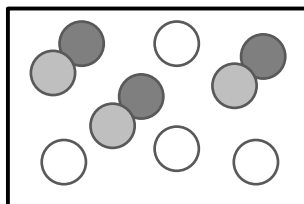
C. Mixture of Elements

D. Mixture of Compounds

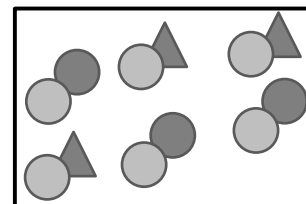
E. Mixture of Elements and Compounds



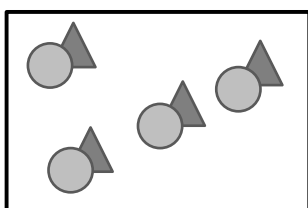
1. _____



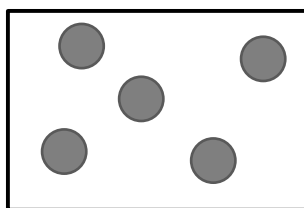
2. _____



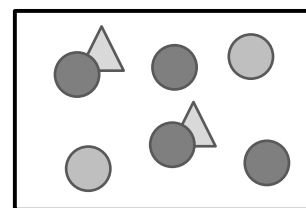
3. _____



4. _____



5. _____



6. _____

5) Complete the following chart by placing an X under the correct column.

Example	Physical change	Chemical change	Example	Physical change	Chemical change
Breaking a glass vase			Putting sugar in hot water		
Applying Makeup to your face			Mowing your lawn		
Cooking a steak			Pouring water on the floor		
Digesting your lunch			Ironing your clothes		
Burning a match			Exploding a firecracker		
Tearing paper			Melting ice cream		

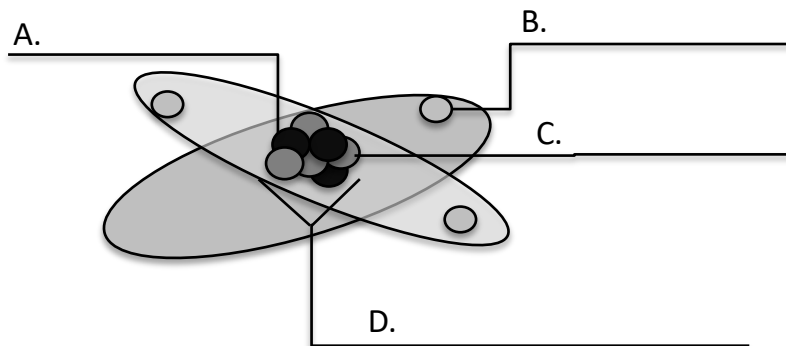
Section 5: Mixture Separation Techniques

- 1) Describe distillation (in detail). Sketch a diagram of the setup.
- 2) Describe filtration (in detail). Sketch a diagram of the setup.
- 3) Describe chromatography (in detail). Sketch a diagram of the setup.
- 4) Describe paper chromatography (in detail). Sketch a diagram of the setup.

Section 6: Structure of the Atom

1. Place the correct letter(s) in the blanks. Fill in the missing information.

- 1) ___ has no charge
- 2) ___ contains the protons and neutrons
- 3) ___ same number of these in a neutral atom
- 4) ___ the particle with a positive charge
- 5) ___ the particle with a negative charge
- 6) Name this element. _____
- 7) Mass number: _____
- 8) Atomic number: _____
- 9) Compare the mass of the three subatomic particles.



2) Fill in the missing information for the following elements.

Element	Atomic Number (A)	Mass Number (Z)	# Protons	# Electrons	# Neutrons	Isotopic Notation
Neon						
			92			
						${}_{29}^{63}\text{Cu}$
		82			125	
	11					
				47		
			80			
	74					
					0	
Bromine						

3) Fill in the missing information for the following isotopes.

Isotope	Mass Number	Atomic Number	# protons	# neutrons	Isotopic Notation
Carbon-13					
			6	6	
	235	92			
			50	64	
Iron-57					
Zinc-65		30			
					${}_{11}^{23}\text{Na}$

4) Complete the following table of ions.

Ion	# protons	# electrons	# neutrons
${}^{23}_{11}\text{Na}^+$			
	20	18	
${}^{64}_{29}\text{Cu}^{2+}$			
	13	10	
	17	18	
${}^{16}_8\text{O}^{2-}$			

Section 7: History of Atomic Structure

1) Place the correct letter(s) in the blanks.

- A) Billiard Ball Model B) Plum Pudding Model C) Rutherford Model
D) Bohr Model E) Quantum Mechanical Model



1. _____



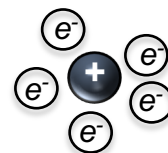
2. _____



3. _____



4. _____



5. _____

2) How did Rutherford's model improve on Thomson's model?

3) According to the current Quantum Model of the atom, describe the movement and location of the electron.

Section 8: The Periodic Table

1) What is the difference between a group and a period?

2) _____ developed the first Periodic Table in _____. He arranged the elements in order of _____. For undiscovered "missing" elements, he _____.

3) List properties of metals, nonmetals and metalloids including where each is located on the periodic table.

4. Using the directions below complete the Periodic Table on the following page.
- 1) Draw the staircase line in a bold black pen.
 - 2) Neatly write the symbol and atomic mass of each element in its proper box.
 - 3) Complete the key for each box on the periodic table.
 - 4) Color each family of elements a different color. Make a key.
 - 5) Write the group numbers (Roman numerals) at the top of each column.
 - 6) Number periods 1-7 down the left side.
 - 7) Write the charges of the main group elements at the top of each column. (IA-VIIIA)
 - 8) Make a heading for your periodic table.



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	3	11	19	37	55	87	2	10	18	36	54	86	118				
2	4	12	20	38	56	88	6	14	22	30	48	66	84	102	116	134	152
3							13	21	29	37	45	53	61	69	77	85	93
4							26	34	42	50	58	66	74	82	90	98	106
5							44	52	60	68	76	84	92	100	108	116	124
6							76	84	92	100	108	116	124	132	140	148	156
7							108	116	124	132	140	148	156	164	172	180	188

57	58	59	60	61	62	63	64	65	66	67	68	69	70	71			
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103			

Section 9: Chemical Nomenclature

1. Use the following rules to design your own flowchart for naming chemical compounds. Use the next page of this packet. Be neat and use the entire sheet of paper.

❖ **Ionic Compounds:**

- Cations are named first and usually retain the name of the element.
- Anions can be single atoms or polyatomic ions.
- Anions typically end in "-ide" or retain their polyatomic ion name.
- Roman numerals indicate the charge of the cation if it's a transition metal or metal with variable oxidation states.

Example:

- NaCl: Sodium chloride
- Ca(NO₃)₂: Calcium nitrate

Naming ionic compounds with polyatomic ions:

- Cations retain their names. (including NH₄⁺)
- Anions retain their names or end in "-ate" or "-ite" if they are polyatomic ions.
- If the compound contains a transition metal, the Roman numeral indicating the charge is placed in parentheses after the metal name.

Examples:

- NaNO₃: Sodium nitrate
- Fe₂(SO₄)₃: Iron(III) sulfate

❖ **Molecular Compounds:**

- Named by using prefixes to indicate the number of atoms of each element present.
- The second element ends in "-ide."
- Prefixes include mono-, di-, tri-, tetra-, penta-, hexa-, hepta-, octa-, nona-, and deca-.
- **Examples:**
- CO₂: Carbon dioxide
- N₂O₅: Dinitrogen pentoxide

❖ **Acids:**

- Binary acids are named with the prefix "hydro-" and end in "-ic acid."
- Oxyacids are named based on the polyatomic ion present.
 - If the polyatomic ion ends in "-ate," the acid name ends in "-ic acid."
 - If the polyatomic ion ends in "-ite," the acid name ends in "-ous acid."
- **Examples:**
- HCl: Hydrochloric acid
- H₂SO₄: Sulfuric acid

❖ **Hydrates:**

- Compounds containing water molecules bound to the ions are named as the ionic compound followed by a prefix indicating the number of water molecules, then "hydrate."
- **Example:**
- CuSO₄·5H₂O: Copper(II) sulfate pentahydrate

Name: _____

Naming Compounds

Ionic or Covalent

Does it begin with a nonmetal?

YES

COVALENT

USE NUMBER PREFIXES!!

First Atom:

- Use the name of the first atom with prefix representing the number of atoms.
- Don't use the prefix mono- on the first atom.

Second Atom:

- Add suffix —ide to stem of atom name
- Use prefix representing the number of atoms.
- Use the prefix mono- (without final o) with elements that begin with a vowel
- Example: carbon monoxide

NO

Does it begin with a metal or ammonium (NH₄⁺)?

YES

IONIC

Naming **CATIONS** (positive ion)—always comes first!

One Possible Charge → Use name of the atom. DO NOT USE roman numerals!

More Than One Possible Charge → Use name of the atom. DO USE roman numerals! roman numerals = ion charge

Naming **ANIONS** (negative ion)—always comes second!

Ammonium → NH₄⁺

Does it begin with H⁺?

YES

ACID

BINARY ACID (H⁺ and halogen) → Use prefix hydro— and suffix —ic plus the word acid.

OXYACID (H⁺ and polyatomic ion) → Change —ate to —ic & —ite to —ous plus the word acid.

Does it have •H₂O added at the end of the formula?

YES

POLYATOMIC

Use polyatomic name

MONATOMIC

Add —ide suffix to stem of atom name.

HYDRATE—name number of water molecules using number prefixes.

Name: _____

Ion Nomenclature

IONS

CATIONS

ANIONS

MONATOMIC

POLYATOMIC

MONATOMIC

POLYATOMIC

- ✓ One Possible Charge
 - ✓ **DO NOT USE ROMAN NUMERALS!**
 - ✓ Groups 1, 2 & 3*
—and some transition metals
- EXAMPLES**
- Na⁺ sodium ion
Ca²⁺ calcium ion
Ag⁺ silver ion
Zn²⁺ zinc ion
Cd²⁺ cadmium ion
Zr⁴⁺ zirconium ion
W⁶⁺ tungsten ion
Al³⁺ aluminum ion

- ✓ More Than One Possible Charge
 - ✓ Always Check Transition Metals & p-block Metals!
- EXAMPLES**
- Fe²⁺ iron (II) ion
Fe³⁺ iron (III) ion
Cu⁺ copper (I) ion
Cu²⁺ copper (II) ion

- ✓ A few, but for this course—just ammonium
- NH₄⁺

- ✓ ends in —ide
- EXAMPLES**
- Cl⁻ chloride ion
O²⁻ oxide ion
N³⁻ nitride ion

- ✓ ends in: —ite, —ate, —ide
- ✓ two atoms: —ide CN⁻
- ✓ Less oxygen: —ite SO₃²⁻
- ✓ More oxygen: —ate SO₄²⁻
- ✓ hypo— one less than —ite
- ✓ per— one more than —ate

EXAMPLES

- CN⁻ cyanide ion
PO₃³⁻ phosphite ion
PO₄³⁻ phosphate ion
ClO⁻ hypochlorite ion
ClO₂⁻ chlorite
ClO₃⁻ chlorate
ClO₄⁻ perchlorate ion

*Except for Thallium

2) All Mixed Up!

Write the name for each of the following compounds/molecules and acids:

1. PbI_2 _____
2. Al_2O_3 _____
3. CaSO_3 _____
4. $\text{Na}_2\text{SO}_4 \cdot 7\text{H}_2\text{O}$ _____
5. $\text{Ca}_3(\text{PO}_4)_2$ _____
6. Na_3N _____
7. Li_2O _____
8. BaSO_4 _____
9. ZnCl_2 _____
10. AgNO_3 _____
11. H_2SO_4 _____
12. $\text{HC}_2\text{H}_3\text{O}_2$ _____
13. NO_2 (Not an ion) _____
14. NH_4NO_3 _____
15. K_2S _____
16. $(\text{NH}_4)_2\text{S}$ _____
17. Fe_2O_3 _____
18. CCl_4 _____
19. H_2S _____
20. K_2CO_3 _____
21. FeCl_3 _____
22. $\text{Mg}(\text{OH})_2$ _____
23. NH_4Br _____
24. Mg_3P_2 _____
25. P_2S_5 _____
26. HClO_4 _____
27. $\text{CoCl}_2 \cdot 7\text{H}_2\text{O}$ _____

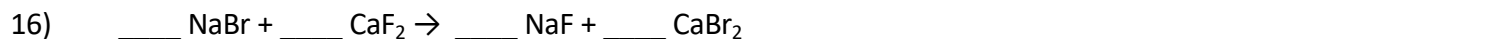
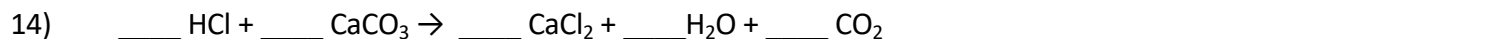
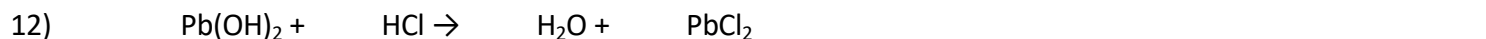
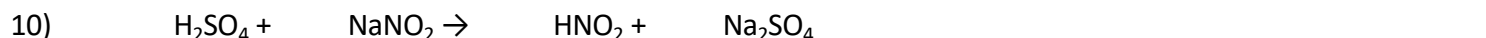
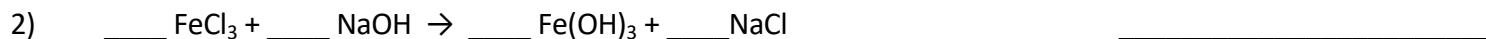
3) All Mixed Up!

Write the formula for each of the following compounds/molecules and acids:

- 1) nitric acid _____
- 2) barium sulfate _____
- 3) chlorine trifluoride _____
- 4) sulfur hexachloride _____
- 5) beryllium oxide _____
- 6) magnesium fluoride _____
- 7) hydrofluoric acid _____
- 8) sodium dihydrogen phosphate _____
- 9) silicon tetrachloride _____
- 10) lithium nitride _____
- 11) chromium (III) carbonate _____
- 12) tin (II) fluoride _____
- 13) ammonium acetate dihydrate _____
- 14) acetic acid _____
- 15) cobalt (III) nitrate _____
- 16) copper (I) sulfide _____
- 17) potassium chlorate _____
- 18) sodium oxide _____
- 19) potassium cyanide _____
- 20) copper (II) nitrate _____
- 21) sulfuric acid _____
- 22) lead (IV) sulfite _____
- 23) copper (I) chloride _____
- 24) zinc sulfide _____
- 25) ammonium hydrogen phosphate _____
- 26) hydrobromic acid _____
- 27) perchloric acid _____
- 28) silicon dioxide _____

Section 10: Chemical Equations

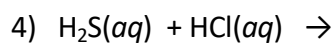
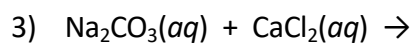
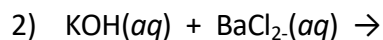
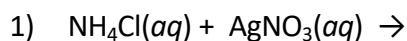
1. Balance the equations below. If there is a blank to the right of the equation, tell what type of reaction.



2) Using a solubility rules chart, determine the solubility of each compound and its ability to form a precipitate.

Compound	Soluble or Insoluble	Precipitate or No Precipitate
KI		
FeCO ₃		
(NH ₄) ₃ PO ₄		
AgCl ₂		
Pb(OH) ₂		
Al(OH) ₃		
MgSO ₄		
Na ₂ SO ₄		
Cu(NO ₃) ₂		
ZnS		

3) Complete and balance the following precipitation reactions. Circle spectator ions. Write the net ionic equation.



Section 11: Polyatomic Ions

Write the formula or name for each polyatomic ion.

Polyatomic Ion	Name
HSO_3^-	
MnO_4^-	
	dihydrogen phosphate
ClO_2^-	
	hydrogen sulfate
SO_3^{2-}	
	hydroxide
	phosphite
CrO_4^{2-}	
	cyanide
PO_4^{3-}	
NO_3^-	

Polyatomic Ion	Name
CO_3^{2-}	
	oxalate
	ammonium
ClO_3^-	
	hydrogen phosphate
$\text{Cr}_2\text{O}_7^{2-}$	
$\text{C}_2\text{H}_3\text{O}_2^-$	
	sulfate
ClO_4^-	
ClO^-	
	nitrite
	hydrogen carbonate

Section 12: The Mole

Work each mole problem. You must show your complete dimensional analysis set up. Circle your answers.

- How many moles are in 375 grams of Na_2SO_4 ?
- How many grams are in 2.3×10^{24} atoms of gold?
- How many grams are in 7.4×10^{23} molecules of AgNO_3 ?

- 4) How many molecules are in 152 grams of $\text{Pb}(\text{NO}_3)_2$?

- 5) How many grams are in 9.45 moles of N_2 ?

- 6) How many molecules are in 532 liters of Cl_2 at STP conditions?

- 7) How many liters are in 62.7 grams of CO_2 at STP conditions?

- 8) How many grams of chlorine are in 4.31×10^{23} molecules of CaCl_2 ?

- 9) How many grams of argon are present 25.01 L Ar @STP?

- 10) How many molecules of Li are in 9.34 grams of LiCl ?

Section 13: Percent Composition

- 1) Calculate the percent composition of KMnO_4 . K: _____ Mn: _____ O: _____

- 2) Calculate the percent composition of $\text{Al}_2(\text{SO}_4)_3$. Al: _____ S: _____ O: _____
- 3) What is the percentage of water found in $\text{Na}_2\text{SO}_4 \cdot 7\text{H}_2\text{O}$?
- 4) A 6.5 gram sample of a hydrate of BaCl_2 was heated and only 5.6 grams of the anhydrous salt remained. What percentage of water was driven off?

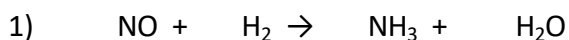
Section 14: Empirical & Molecular Formulas

- 1) Calculate the empirical formula of pineapple oil, ethyl butyrate. C: 62.04%, H: 10.41%, O: 27.55%.
- 2) Calculate the empirical formula of a common pain reliever. C: 73.03%, H: 6.13%, O: 20.84%
- 3) In an experiment, a compound decomposes into 24.5 g of nitrogen and 70.0 g of oxygen. Calculate the empirical formula.

- 4) Acetylene is a gas often used in welding torches. It has an empirical formula of CH and a molar mass of 26.04 g/mol. Find the molecular formula of acetylene.
- 5) An ingredient found in coffee and sodas has the mass percent composition of C: 49.48%, H: 5.19%, N: 28.85%, and O: 16.48%. The molar mass of this compound is 194.19 g/mol. Find the molecular formula and identify the compound.

Section 15: Stoichiometry

You must balance each equation. Show all work in dimensional analysis. Circle your final answer.



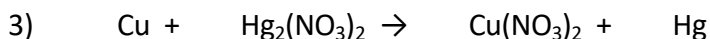
How many moles of H₂ will be produced from 6.32 moles of NH₃?

How many moles of NO will be produced from 4.35 grams of H₂O?

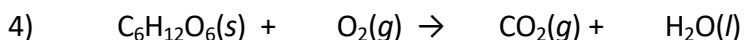
How many grams of NH₃ will be produced from 56.2 grams of NO?



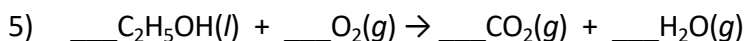
How many grams of calcium carbonate are required to prepare 50.0 g of calcium oxide?



If 1.20 moles of copper react with mercuric nitrate, how many moles of mercury form?



How many moles of glucose can be "burned" biologically when 10.0 mol of oxygen is available?



How many liters of CO₂ is produced when 387 grams of ethanol reacts at STP conditions?

Section 16: Limiting Reactant, Theoretical Yield, & Percent Yield

Show all work. Circle your answers.

- 1) You need 2 pieces of bread, 2 tablespoons of peanut butter, and 4 tablespoons of jelly to make a sandwich. If you have 24 pieces of bread, 10 tablespoons of peanut butter, and 26 tablespoons of jelly, what is the **limiting reactant**?

How many sandwiches can you make? _____

- 2) You are the owner of a bicycle factory. Each bicycle requires 2 wheels, a frame, and a handlebar. If your current inventory contained 427 wheels, 225 frames, and 275 handlebars, how many bicycles could be made?
- 3) For the reaction $\text{CaCO}_3(s) + \text{HCl}(aq) \rightarrow \text{CaCl}_2(aq) + \text{CO}_2(g) + \text{H}_2\text{O}(l)$
78.2 g solid CaCO_3 is mixed with 61.8 g HCl. How many grams of CO_2 will be produced?

What is the limiting reactant? _____

What is the excess reactant? _____

- 4) Consider the reaction $\text{Mg}_2\text{Si}(s) + \text{H}_2\text{O}(l) \rightarrow \text{Mg}(\text{OH})_2(aq) + \text{SiH}_4(g)$
Which of the reactants is the limiting reactant if the reaction starts with 50.0 g of each reactant?

What is the theoretical amount of hydrogen gas that should be produced?

- 5) In a certain experiment, $\text{KClO}_3(s) \rightarrow \text{KCl}(s) + \text{O}_2(g)$, 40.0 g KClO_3 is heated until it completely decomposes. The experiment is performed and the oxygen gas is collected and its mass is found to be 14.9 g.

What is the theoretical yield of oxygen gas?

What is the percent yield for the reaction?