AP CHEMISTRY 2019 SUMMERWORK

Instructor: **Enyonam Akondo**
Summer Contact: enyonamakondo@clovisusd.k12.ca.us

Assignment Access Code: lbhz900

eTEXT ACCESS: www.pearsonschool.com/access
Access CODE (50 max): **SSNAST-WHIFF-LODEN-BOMBS-TOPAZ-CAIRD**
Course ID: MCAKONDO2722615

Intent of Assignment:

- ☐ Establish basic expectations of AP level chemistry in terms of student work and text.
- ☐ Reintroduce and Refine some of the basic concepts and skills learned in chemistry.
- ☐ Demonstrate student commitment and work ethic.
- ☐ Allows us to spend more class time on the more rigorous and less familiar concepts during the school year.

Assignment Due Date:

Assignments must be completed and turned in by ***August 19, 2019***

Resources:

- ☐ Chemistry, A Molecular Approach (AP Edition) 4th Edition (Nivaldo J. Tro)…**eText**
- ☐ http://socratic.org/chemistry…225 Chemistry Topics on file
- ☐ https://www.youtube.com/watch?v=6pUzPh_lCO8&list=PLllVwaZQkS2op2kDuFifhStNsS49LAxkZ
- ☐ Bozeman Science AP Chemistry
- ☐ 5 Steps To A 5 (AP Chemistry 2018)…Optional, but strongly recommended

Assignment Requirements

1. ALL calculation-based question must be supported by mathematical setup. Units must be included in work and answer. Sloppy work will result in deduction of points. I must be able to clearly understand your work.
2. Work must be completed in PENCIL only.
3. If you complete a section/segment of questions on a separate sheet of paper, You MUST include a section title.

Topic & Resource	ASSIGNMENT Task(s)
Uncertainty in Measurement & Significant Figures ☐ **PREVIEW-READ…Ch.1.3 – 1.7** ☐ **WATCH Video Tutorial Accuracy and Precision, Systematic Error and Random Uncertainty.** **https://www.youtube.com/watch?v=icWY7nICrfo** ☐ **WATCH Video Tutorials @ socratic.org…** ○ Significant Figures ○ Scientific Notation ○ Accuracy, Precision, and Percent Error ○ Separating Mixtures ☐ **REVIEW "Reporting Laboratory Data" in Lab Manual**	***A.*** **WORKSHEET 1…***Error and Error Analysis in Chemistry Experiments* ***B.*** **WORKSHEET 2…***Classification of Matter*
Fundamental Chemical Laws & Early Experiments ✓ **PREVIEW-READ Ch.2.2-2.5** ✓ **REVIEW: Fundamental Chemical Laws** http://chemwiki.ucdavis.edu/Textbook_Maps/General_Chemistry_Textbook_Maps/Map%3A_Chemistry_(Zumdahl_and_Zumdahl)/02%3A_Atoms_Molecules_and_Ions/2.02_Fundamental_Chemical_Laws **http://chemistry.csudh.edu/faculty/krodriguez/CHEM110/Ch2_Atoms_Molecules_and_Ions/2_2_Fundamental_Chemical_Laws.pdf** ✓ **WATCH Video Tutorials @ socratic.org…** ○ Atomic Models ○ Mass Conservation ○ Laws of Proportions ○ Cathode Ray Tube Experiment ○ Millikan's Oil Drop Experiment ○ Rutherford's Gold Foil Experiment ○ Discovery of the Neutron	**C. WORKSHEET 3…***Isotopes and Mass Spectrometry*
Molecules & Ions, Periodic Table (Introduction), & Naming Compounds ✓ **PREVIEW-READ Ch. 2.6 – 2.8** ✓ **WATCH Video Tutorials @ socratic.org…** ○ The Periodic Table ○ Metals and Nonmetals ○ Metalloids ○ Ionic Compounds ○ Polyatomic Ions ○ Writing Ionic Formulas ○ Naming Ionic Compounds ○ Covalent Formulas and Nomenclature	***D.*** **WORKSHEET 4:** *Writing Formulas and Naming Compounds (AKA Chemical Nomenclature)*

The Mole, Molar Mass, Percent Composition of Compounds, Empirical & Molecular Formulas ✓ **PREVIEW-READ Ch.3.8 – 3.10** ✓ **WATCH Video Tutorials @ socratic.org…** o The Mole o Percent Composition o Empirical and Molecular Formulas	***F.*** **WORKSHEET 5:** *Empirical & Molecular Formula*
STOICHIOMETRY ✓ **PREVIEW-READ Ch. 3.11 – 4.3** ✓ **WATCH Video Tutorials @ socratic.org…** ○ Stoichiometry ○ Mole Ratios ○ Equation Stoichiometry ○ Limiting Reagent ○ Percent Yield	**G. WORKSHEET 6:** *Mass Conservation in Chemical Reactions*
Solutions: Solubility & Concentration Expression **HOMOGENEOUS MIXTURES** ✓ **PREVIEW Ch. 4.4 & 13.4** ✓ **WATCH Video Tutorials @ socratic.org…** ○ Solutions ○ Solute ○ Solvent ○ Solution Formation ○ Solvation and Dissociation ○ Saturated and Supersaturated Solutions ○ Measuring Concentration ○ Solving Using PPM (Parts Per Million) ○ Molarity ○ Percent Concentration ○ Dilution Calculations ○ Factors Affecting Solubility ○ Solubility Graphs	**H. WORKSHEET 7:** *Solutions*

AP Chemistry Summer Assignment Worksheets (1-7)

WORKSHEET 1 (Ch.1: Significant Figures, Accuracy & Precision)

1. State the number of significant digits in each measurement

a. 0.003068 m		e. 7500 m		g. 75.00 m	
b. 4.6 x 10^5 km		f. 750 m		h. 75.000 m	
c. 75,000 m		g. 75 m		i. 10 cm	
d. 5.029 mm		h. 75.0 m		j. 1.00 x 10^{-4} cm	

2. Round the following numbers as indicated:

(A) To four figures:				
3.682417	21.860051	375.6523	45.4673	112.511
(B) To the 1/10th place:				
8.235	1.3511	5.687524	2.473	7.555
(C) To the 1/100th place:				
79.2588	41.86632	0.03062	22.494	3.4125

3. Solve the following problems and report answers with appropriate number of significant digits.

a) 6.201 cm + 7.4 cm + 0.68 cm +12.0 cm		e) 5.7621 m x 6.201 m	
b) 8.264 g - 7.8 g		f) 1.6 km + 1.62 m +1200 cm	
c) 12.00 m+15.001 kg		g) 40.002 g/ 13.000005 g	
d) 1.31 cm x 2.3 cm		h) 10.4168 m - 6.0 m	

4. Express the following numbers in their equivalent scientific notational form:

a) 123,876.3		d) 0.000238	
b) 0.000000000000211		e) 1,236,840	
c) 422000		f) 0.0000205	

5. Identify the sums, differences, products or quotients of the following:

a) $(6.3 \times 10^{-2}) - (2.1 \times 10^{-2})$		f) $(3.56 \times 10^{5})(4.21 \times 10^{6})$	
b) $8.45 \times 10^{7} / 6.74 \times 10^{3}$		g) $(5.11 \times 10^{2}) - (4.2 \times 10^{2})$	
c) $(8.41 \times 10^{4}) + (9.71 \times 10^{4})$		h) $9.7 \times 10^{8} / 8.6 \times 10^{-2}$	
d) $(2 \times 10^{7})(8 \times 10^{-9})$		i) $(4.11 \times 10^{-6}) + (7.51 \times 10^{-4})$	
e) $(8.2 \times 10^{3}) + (4.0 \times 10^{3})$		j) $1/(4.7 \times 10^{-2} / 5.7 \times 10^{-6})$	

Error and Error Analysis in Chemistry Experiments)

SCENARIO A:

Suppose an experiment has been performed to determine the mass percent of sulfate ions in a sample. To show the precision of the method used, the experiment was repeated four times, with the following results:

Sample	**% Sulfate**	**Mean**	**Absolute Deviation**	**Average Deviation**	**Percent Deviation**
A	**44.02**				
B	**44.11**				
C	**43.98**				
D	**44.09**				

WORK/PROOF NEEDED

1. What is the experimental "mean" or "average" value? Record this value in the table above.

2. Determine the "Absolute Deviation" and record the values in the table above. You need only show a sample calculation using "SAMPLE A" data.

3. Determine the experimental "Average Deviation". Record this value in the table above.

4. Determine the "Percent Deviation" (AKA. Relative Precision) value for the experiment. record these values in the table above. You need only show a sample calculation using "SAMPLE A" data.

5. For each of the values you determined, discuss their relevance/purpose. Be concise, BUT specific in your explanation:

Mean	
Absolute Deviation	
Average Deviation	
Percent Deviation	

<u>SCENARIO B:</u>

An AP Chemistry student was given the very challenging task (1^{st} day of school) to determine the density of an irregular object. The student used a digital balance to measure the object's mass, and then measured the object's volume by displacing water in a graduated cylinder, with gradations of 0.1mL. The mass of the object was determined to be 4.52g and the level of the water in the cylinder was 19.55mL and 23.55mL when the object was placed into the water.

1. Calculate the object's density.

2. Determine the uncertainty of the
   a. Mass

   b. Volume

3. Calculate the percent error that resulted if the theoretically accepted value (according to the handbook of Chemistry & Physics) for the sample measured is known to be 0.703 g/cm^3.

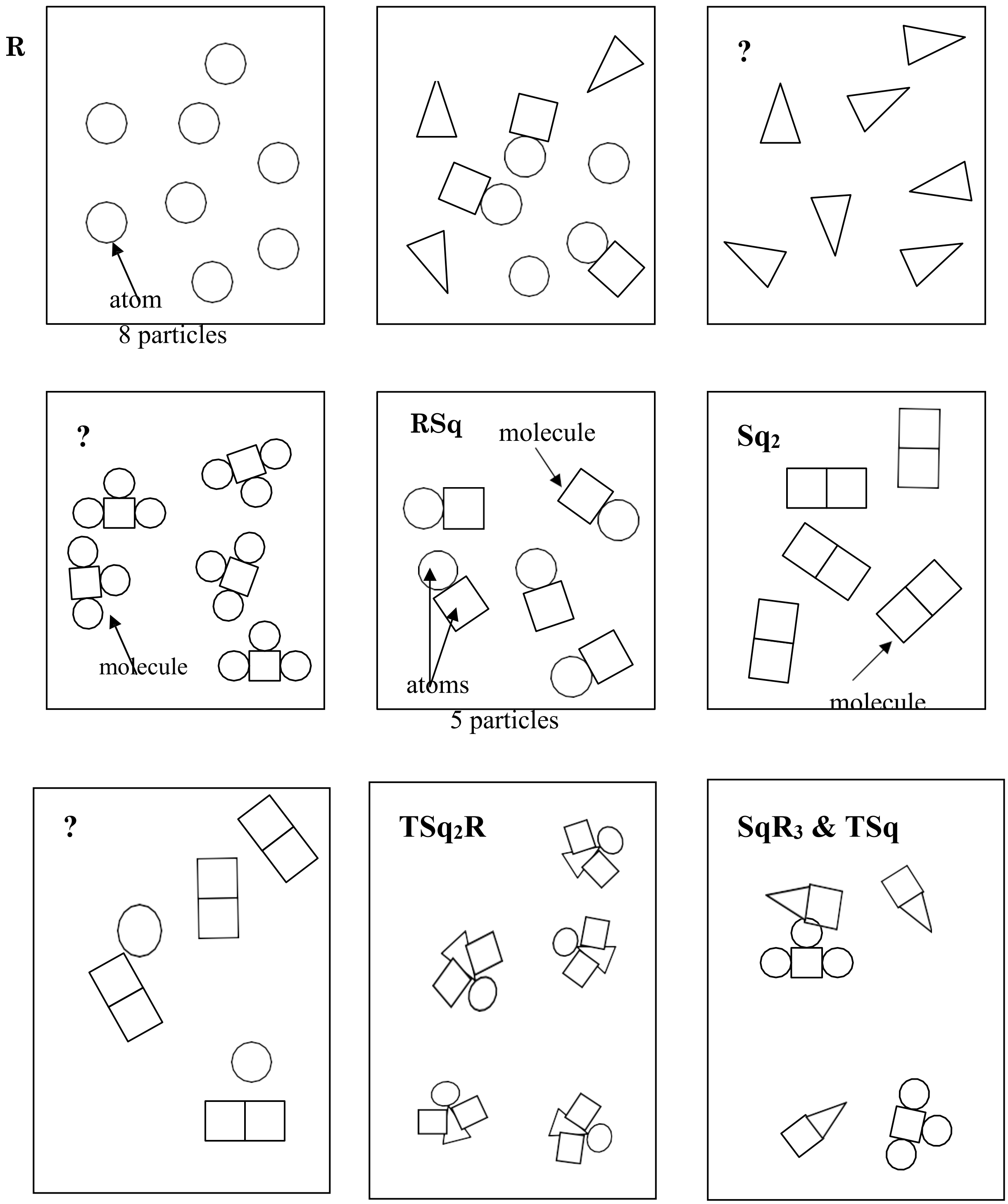
WORKSHEET 2 Classification of Matter

Why?

How do atoms combine to make different types of matter?

Look at the things in this room. They are all matter. That matter may be pure or it may be a mixture. Can you tell by looking at it? What if you looked at it under a microscope? Then could you tell? Something that looks pure may not really be pure. It depends on what type of particles that thing is made of. In this activity we will explore how the smallest chemical units of matter determine whether something is classified as an

Model 1



5 particles

✓Circle a molecule of RSq in Model 1. How many atoms are in a molecule of RSq?

✓Circle a molecule of TSq_2R in Model 1.

a. How many different types of atoms are found in a molecule of TSq_2R?

b. How many Sq atoms are in a molecule of TSq_2R?

✓a) How many different types of atoms are found in a sample of SqR_3 & TSq?

b) How many different types of molecules are found in a sample of SqR_3 & TSq?

✓a) What does it mean when two atoms are touching in the drawings of Model 1?

b) What does it mean when two atoms or molecules are **not** touching in the drawings of Model 1?

✓a) Can a *particle* be a single atom?

4. Can a *particle* be a molecule?

5. How many particles are in the drawing representing T & RSq & R in Model 1?

✓Compare the codes listed at the top of each drawing in Model 1 with the shapes in that box.

a. What do the letters R, Sq and T in the codes represent?

b. What do the small numbers (subscripts) in the codes represent?

c. When atoms are touching, how is that communicated in the code?

d. When atoms or molecules are not touching, how is that communicated in the code?

e. In Model 1 there are three drawings that are labeled "**?**". Write codes to properly label these drawings.

✓The manager should appoint one group member to cut apart Model 1 to separate the nine drawings. As a team, sort the pictures into those where all the particles in the drawing are identical, and those that have more than one type of particle in the drawing.

Read This!

Matter is classified as a **pure substance** when all of the particles are the identical. Matter is classified as a

8. Identify which set of drawings from #7 are pure substances and which set are mixtures. List the codes for each set here.

Pure Substances		Mixtures
____________	____________	____________
____________	____________	____________
____________	____________	____________

☐ How are the codes (chemical formulas) for pure substances different from those for mixtures?

☐ As a team, take the set of pure substances drawings from #8 and sort them into those containing only one type of atom and those with two or more types of atoms.

Read This!

Elements are defined as substances made from only one type of atom.
Compounds are defined as substances made from two or more types of atoms.

☐ Identify which set of drawings from #10 are elements and which set are compounds. List the codes for each set here.

Elements	Compounds
____________	____________
____________	____________
____________	____________

☐ How are the codes (chemical formulas) for elements different from those for compounds?

☐ Use what you have just learned about chemical formulas to identify the following as element, compound or mixture.

○ Br_2 b. $NaHCO_3$ c. $C_6H_{12}O_6$ & H_2O

d. Cu & Zn e. CO_2 f. Al

Extension Questions

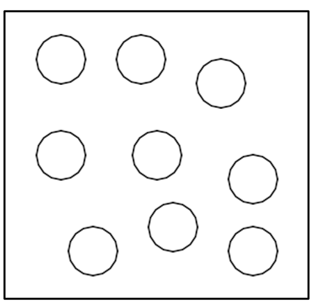
- Often times it is useful to separate matter. For example, you strain cooked pasta to get the liquid out. In a fuel cell, water is separated into hydrogen and oxygen.

  C. Which type of matter can be separated by physical methods (no bonds need to break) such as filtering or distillation?

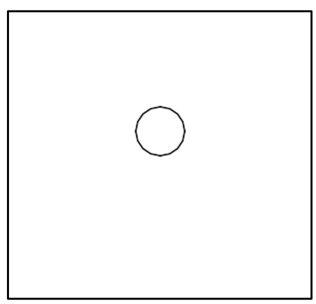
  D. Which type of matter needs to be separated by chemical methods (breaking of bonds required) such as electrolysis or decomposition?

- Students in a chemistry course were asked the following question on a unit exam:
  "*Draw a diagram representing an element using circles as atoms.*"

✓ The following diagrams represent the two types of answers given by students. Which drawing is the best representation of an element? Explain.



Drawing A



Drawing B

✓ If Drawing B was a sample from the substances in Model 1, which substance(s) could be represented? Is a single atom a good representation of any of them?

WORKSHEET 3 (Isotopes and Mass Spectrometry)

Background: The mass spectrometer can be used to find the average atomic mass of atoms. Essentially, the mass spec is a curved tube that has a vaporizer, an ionizer, a magnet, and a detector at the end (See Figure 1). The machine works by first vaporizing a sample injected into it. Next, the sample is ionized (giving it a charge) as it passes through a stream of electrons. Once in an ionic state, the sample particles are accelerated through the tube by a set of magnets. Because of their momentum, ions with greater mass will not change their path as much as smaller ions. At the end of the tube is a detector. The detector identifies the mass of each particle by its path and creates a graph showing the relative abundance (how much) of each isotope is there. In this way the mass spectrometer can determine mass and the relative abundance of each isotope in the sample.

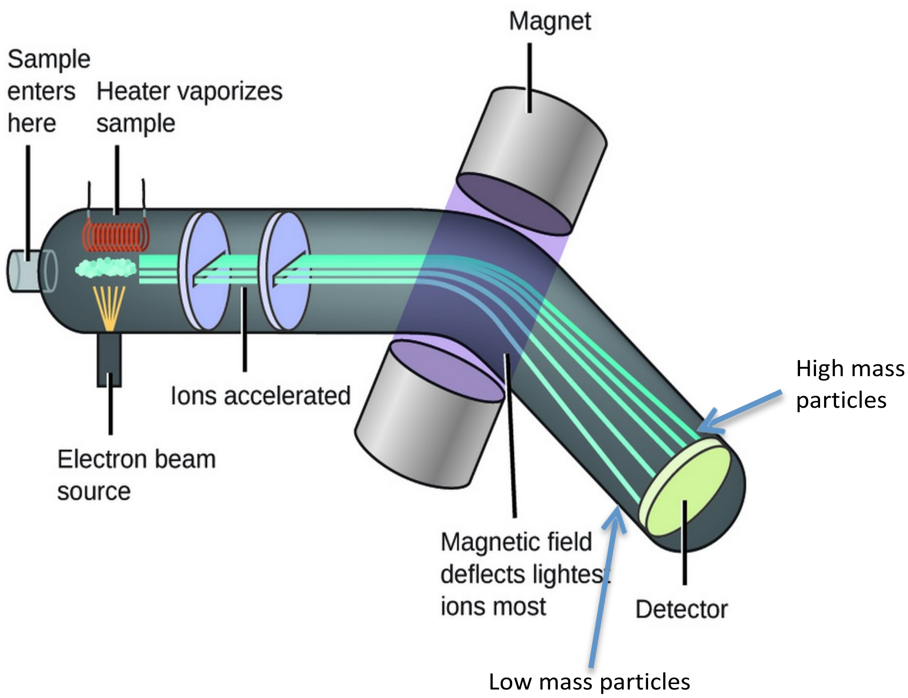


Figure 1: A diagram of a mass spectrometer. A sample is injected into the machine, vaporized by a heater, and then ionized by a stream of high-energy electrons. The resulting Ions are accelerated through parallel electric plates and then deflected in a magnetic field before they reach a detector.

The computer will create a graph of isotope mass and relative abundance. See Figure 2.

Since the tallest (most abundant) line is for mass number 20, it can be deduced that neon's average atomic mass is closer to 20.

These graphs can also be used to calculate the average atomic mass using this equation:

For example, we can calculate neon's average atomic mass:

$$\text{Avg. atomic mass} = \frac{(\% * mass\ number) + (\% * mass\ number)....}{100}$$

For example, we can calculate neon's average atomic mass:

$$\frac{(90.92 * 20) + (0.260 * 21) + (8.82 * 23)}{100} =$$

$$\frac{1818.4 + 5.46 + 202.86}{100} = \frac{2026.72}{100} = \boxed{20.3}$$

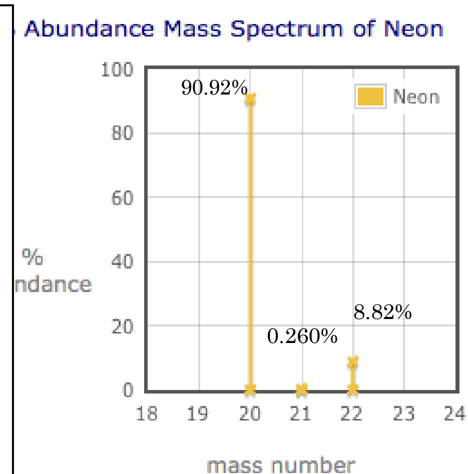


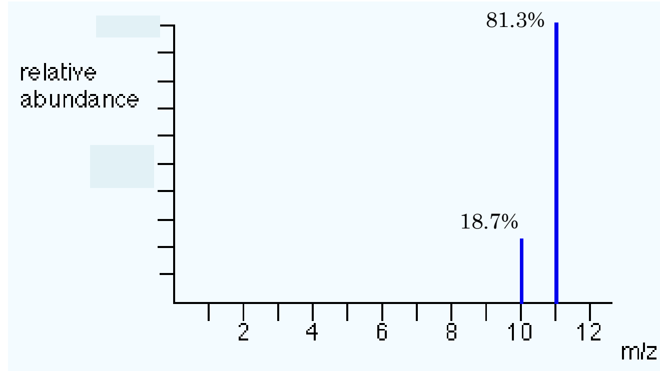
Figure 2: A sample diagram of a mass spectrum of Neon. It shows the mass number of each isotope and their relative abundance.

Question 1:

Consider this mass spectrum for the element boron to the right.

a. How many naturally occurring isotopes does boron have?

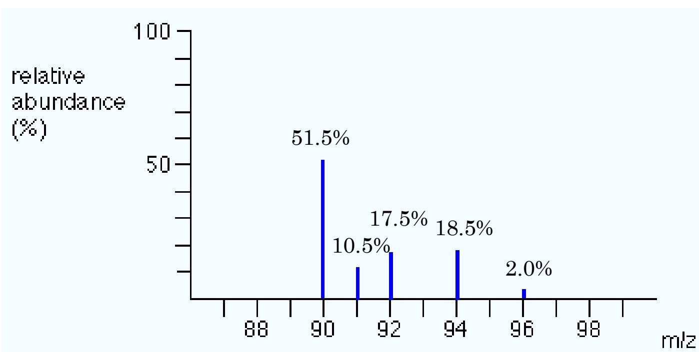
b. Calculate the atomic mass of boron-- check your answer with the atomic mass on the periodic table. **Show your work!**



c. How does boron's atomic mass compare with the mass numbers of its isotopes?

Question 2:

Consider the mass spectrum for zirconium below.



a. Which isotope is most abundant? Which isotope is least abundant?

b. Without referencing to the periodic table, Predict, what the atomic mass of zirconium will be:

(i) 93.5

(ii) 92

(iii) 90.5

c. Ok, NOW, calculate the atomic mass. Check your answer with the atomic mass on the periodic table. **Show your work!**

Question 3:

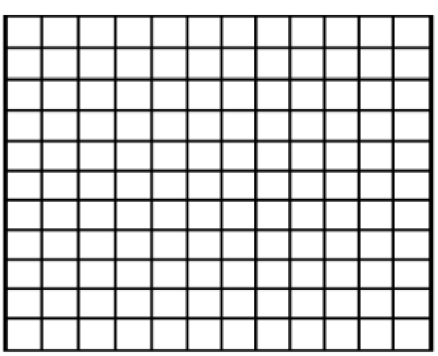
Lead has four naturally occurring, stable isotopes. The table shows their masses and relative abundance.

a. How many peaks will the mass spectrum for lead have?

b. Draw a mass spectrum for lead, based on the data in the table:

Mass Number	Relative Abundance (%)
204	1.4
206	25.0
207	21.6
208	52.0

Abundance (%)



Mass *Number*

c. Calculate the atomic mass. Check your answer with the atomic mass on the periodic table. Show your work!

WORKSHEET 4: **Writing Formulas and Naming Compounds**

(AKA Chemical Nomenclature)

BACKGROUND

Writing formulas and naming compounds can be confusing because there are different types of compounds that follow different rules. Additionally, some compounds (H_2O, NH_3, CH_4, etc.) simply have ***common names*** that must be memorized.

The two types of compounds we will focus on first are ***ionic compounds*** (formed from positive and negative ions) and ***binary nonmetal compounds*** (molecular compounds). Later we will add ***acids***. So… you must recognize the ***type*** of compound before you try to name it. [Note: + ion = "cation" and – ion = "anion".]

	Ionic	**Binary Nonmetal**
Formula	+ ion before – ion ex: NaCl $(NH_4)_2SO_4$ Al_2S_3	usually the less electronegative atom is first ex: CO CO_2 N_2O
Naming	Name of cation + name of anion • sodium chloride • ammonium sulfate • aluminum sulfide	Indicate the number (mono, di, tri, and kind of atoms. First element is simply name of element. Second element name ends with "ide". • carbon monoxide • carbon dioxide • dinitrogen monoxide

1. **Writing Ionic Formulas**

	Cl^-	NO_3^-	S^{2-}	CO_3^{2-}	N^{3-}	PO_4^{3-}	OH^-
Na^+							
NH_4^+							
Sn^{2+}							
Hg_2^{2+}							
Al^{3+}							
Sn^{4+}							

2. **Naming Ionic Compounds**

Cation	Anion	Formula	Name
Cu^{2+}	OH^-		
Ba^{2+}	SO_4^{2-}		
NH_4^+	$Cr_2O_7^{2-}$		
Ag^+	$C_2H_3O_2^-$		
Fe^{3+}	S^{2-}		

PREFIXES

mono	di	tri	tetra	penta	hexa	hepta	octa	nona	deca

III. Writing Formulas of Binary (containing only 2 different elements) Nonmetal Compounds

Name	Formula	Name	Formula
nitrogen trifluoride		phosphorus trichloride	
nitrogen monoxide		phosphorus pentachloride	
nitrogen dioxide		sulfur hexafluoride	
dinitrogen tetroxide		disulfur decafluoride	
dinitrogen monoxide		xenon tetrafluoride	

IV. Naming Binary Nonmetal Compounds

Name	Formula	Name	Formula
	CCl_4		HBr
	P_4O_{10}		N_2F_4
	ClF_3		XeF_3
	BCl_3		PI_3
	SF_4		SCl_2

V. Practice for Both Types of Compounds

Formula	Name
HCl	
PCl_5	
K_2S	
$NiSO_4$	
ClF_3	
OF_2	
$Al(OH)_3$	
NCl_3	
$(NH_4)_3PO_4$	

Formula	Name
	carbon dioxide
	ammonium carbonate
	sulfur dichloride
	calcium iodide
	boron trifluoride
	phosphorus triiodide
	magnesium perchlorate
	potassium permanganate
	aluminum phosphate

WORKSHEET 5: Empirical & Molecular Formula

DIRECTIONS- Use the information provided in each question to answer each follow up question on a separate sheet of paper.

1. Give the empirical formula that corresponds to each of the following molecular formulas.

a. Sodium peroxide, NaO

b. Terephthalic acid, $C_8H_6O_4$

c. Phenobarbital, $C_{12}H_{12}N_2O_3$

d. 1, 4-dichloro-2-butene, $C_4H_6Cl_2$

2. Which of the following pairs of compounds have the same **empirical** formula?

a. Acetylene, C_2H_2, and benzene, C_6H_6

b. Ethane, C_2H_6, and benzene, C_6H_6

c. Nitrogen dioxide, NO_2 , and dinitrogen tetroxide, N_2O_4

3. D. Diphenyl ether, $C_{12}H_8O$, and phenol, C_6H_5OHIn an experiment, a 2.514-g sample of calcium was heated in a stream of pure oxygen, and was found to increase in mass by 1.004 g. Calculate the **empirical formula** of calcium oxide.

4. A compound has the following percentages by mass: barium, 58.8%; sulfur, 13.74%; oxygen, 27.43%. Determine the **empirical formula** of the compound.

5. If a 1.271-g sample of aluminum metal is heated in a chlorine gas atmosphere, the mass of aluminum chloride produced is 6.280 g. Calculate the **empirical formula** of the aluminum chloride.

6. If cobalt metal is mixed with excess sulfur and heated strongly, a sulfide is produced that contains 55.06% cobalt by mass. Calculate the **empirical formula** of the sulfide.

7. A compound has the following percentage composition by mass: copper, 33.88%; nitrogen, 14.94%; oxygen 51.18%. Determine the **empirical formula** of the compound.

8. A compound with the empirical formula CH_2 was found to have a molar mass of approximately 84 g. What is the **molecular formula** of the compound?

9. A compound with the empirical formula CH_4O was found in a subsequent experiment to have a molar mass of approximately 192 g. What is the **molecular formula** of the compound?

10. A compound consists of 65.45% C, 5.492% H, and 29.06% O on a mass basis and has a molar mass of approximately 110 g/mol. Determine the **molecular formula** of the compound.

WORKSHEET 6: Mass Conservation in Chemical Reactions

DIRECTIONS- Use the information provided in each scenario to answer each follow up question.

Scenario A:

Burning coal and oil in a power plant produces pollutants such as sulfur dioxide, SO_2. The sulfur-containing compound can be removed from other waste gases, however, by the following reaction:

____ $SO_2(g)$ + ______ $CaCO_3(s)$ + _______ $O_2(g)$ → ______ $CaSO_4(s)$ + _______ $CO_2(g)$

[MM (g/mol) _________ _________ ________ → _________ _________ **]**

1. Fill-in the missing coefficients.
2. Fill-in the missing molar masses (MM)
3. Provide a molecular (particle-level) interpretation of the reaction:

4. Provide a molar interpretation of the reaction:

5. During a lab experiment, 155g of sulfur dioxide was reacted.
   a. What is the mass percent of sulfur dioxide?

   b. How many moles of sulfur dioxide makes up that amount?

   c. At STP, how much volume (in mL) would that amount of SO_2 gas take up?

   d. How many moles of calcium carbonate ($CaCO_3$) would have to react as well? What would that quantity of moles be in grams?

   e. How many moles of O_2 would also have to react as well? How many mL of space would that quantity of O_2 gas occupy at STP?

f. How many moles and grams of calcium sulfate ($CaSO_4$), and how many moles, liters, and grams of carbon dioxide were made?

Calculation	
Moles	
Volume (liters)	
Mass (grams)	

Scenario B:

The reaction of methane and water is one way to prepare hydrogen:

______ $CH_4(g)$ + ________ $H_2O(g)$ → ________ $CO(g)$ + ________ $H_2(g)$

[**Molar masses:** _____g/mol 18.02g/mol → ________ ________]

6. Assume that you used 995 g of CH_4 and 2510 g of water.
   a. Justify and then identify the "Limiting" reagent/reactant. Determine how many moles of the limiting reagent/reactant will react.

b. Identify the "Excess" reagent/reactant. Determine how many moles of the "Excess" reacts with the "Limiting".

c. Calculate the maximum volume of H_2 that can be yielded? What is that quantity in moles and grams?

d. How many moles and grams of the "Excess" reagent/reactant remains unreacted?

SCENARIO C

Diborane, B_2H_6, is a valuable compound in the synthesis of new organic compounds. One of several ways this born compound can be made is by the reaction

$2\ NaBH_4(s) + I_2(s) \rightarrow B_2H_6(g) + 2\ NaI(s) + H_2(g)$

[Molar masses: 37.84 253.8 27.67 149.9 2.02]

a. Suppose you use 1.203 g of $NaBH_4$ with an excess of iodine and obtain 0.295 g of B_2H_6. What is the percent yield of B_2H_6?

WORKSHEET 7: Solutions

DIRECTIONS - *Use the information provided in each question to answer each follow up question.*

Section A: Solubility & Solubility Curves

1. What is the difference between a solute and solvent?

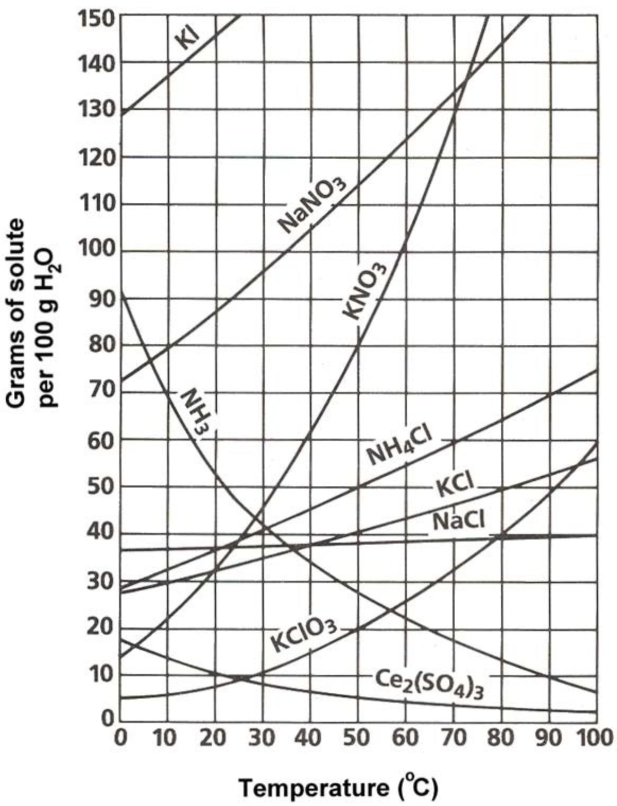
2. Define the terms miscible and immiscible.

3. How is "solubility" defined?

4. What are the differences between a saturated solution, unsaturated solution and a supersaturated solution?

5. How can you tell that a solution is saturated?

6. Use the solubility curve below to answer questions a - e. Be sure to note the units on the axes of the graph.



a. In general, how does temperature affect solubility?

b. Which compound is least soluble at 10°C?

c. How many grams of KCl can be dissolved in 100g of water at 80°C?

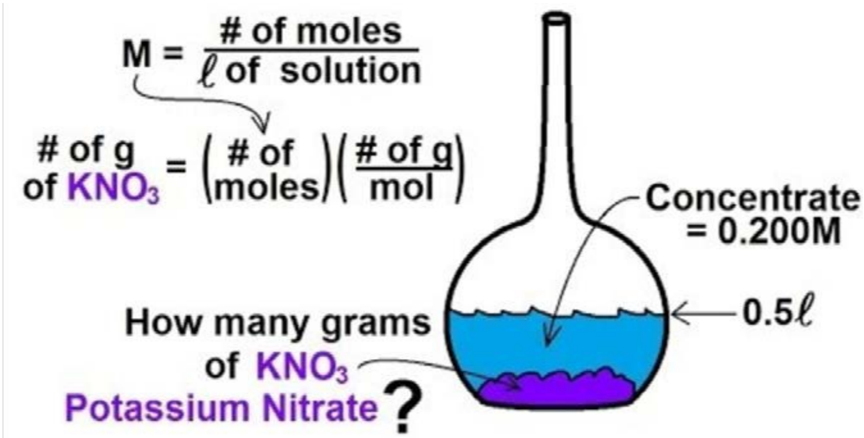
d. How many grams of NaCl can be dissolved in 50g of water at 90°C?

e. At 60°C, 72 g of NH4Cl are dissolved in 100g of Water. This solution is considered (check the box that applies):

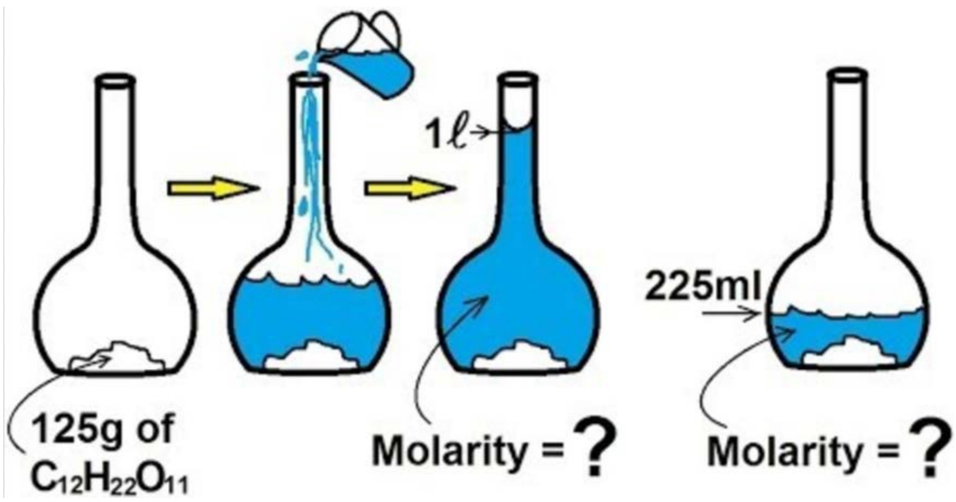
- ❑ Saturated
- ❑ Unsaturated
- ❑ Supersaturated
- ❑ Saturated with some left undissolved

Section B: Solution Concentration

1.



2.



3. What volume of 0.88 M potassium chromate (K_2CrO_4) contains 0.32 moles of potassium ions?

4. Concentrated ammonia contains 26 g per 100 mL of solution. What is the molarity of this solution?

5. What volume of 0.275M $Ba(OH)_2$ must be used to have 8.65 g of barium hydroxide?

6. What is the concentration of all ions present in a solution that is 0.250 M $AlCl_3$?

7. What mass of solute would be needed to prepare 125 mL of 0.188 M sodium phosphate (Na_3PO_4)?