

AP CHEMISTRY SUMMER ASSIGNMENT

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PLEASE JOIN THE AP CHEMISTRY SUMMER CANVAS PAGE FOR RESOURCES AND UPDATES!

Introduction: There are several important reasons for doing your AP Chemistry summer assignment:

- To review basic concepts that you need to know on Day 1 walking into my class.
- To practice math skills which you will need for AP Chemistry
- To hit the ground running when we return in the fall.

AP Chemistry covers a lot of concepts at a fast pace. We need to get started right away and not waste time going over things you already know. Here's a little more of a breakdown for this year:

Homework: You will be given problem sets for each unit that we cover. You will have two days to complete problem sets. Tutoring will be available after school Mondays, Tuesdays, and Thursdays from 2:20 pm to 3:45 pm. Come with questions ready because these tutorings are often packed with students.

Study Skills: Learning good study skills is one of the most important things that you should master before you go to college. Most students taking AP chemistry are also taking other AP courses and are likely involved in lots of school activities. In order to survive, you will need to become an expert at time management. The key is not how long you study, but how effectively you are making use of your time. Develop a daily routine where you have a specific time and place to do your homework. Keep up on your readings and homework, try to find a group of students that are interested in forming study groups. Be sure to ask a lot of questions during class.

Summer Assignment Instructions: The following pages are ESSENTIAL for you to do well in the course. If you are a first year chemistry student, it will provide you with the essential knowledge to do well in the course. If you are a returning chemistry student, it will provide you with a quick refresher of previously covered topics. The assignment is due the Friday you return to school. **On that Friday, we will have a cumulative test that will cover all content from this summer assignment.**

If you need help with any of the topics covered, please contact me via email to assist you with the assignment. It is also a good idea to start by asking friends and looking up instructional videos to assist you through the assignment. You can find help videos, powerpoints, and other resources on your summer Canvas page to assist with your assignment.

Doodle Notes: It is expected that you take your notes in class then follow up with a doodle note each week on one of the topics you learned. A "doodle note" can include graphic organizers, Cornell notes, or colorful doodle notes. Examples of graphic organizers and doodle notes are provided on Canvas. Research shows that if you are interactive with your notes you will learn the material better! You are expected to do one note per week. To assist you with this process, you are to complete **five** one-page doodle notes on any of the topics below that your practice problems cover. You can find more information and examples on Canvas.

Required Supplies for the School Year:

- Scientific Calculator or Graphing Calculator (needs to have log and exponential functions!)
- Lined College-Ruled Paper
- Binder or Notebook for notes and homework packets (if you get a notebook please note that a five subject notebook will not be enough paper for all the notes we take. You will need two notebooks)
- Colored pencils or colored markers
- Highlighter
- Pencils and pens
- AP Chemistry review book... Princeton Review and ASAP Chemistry are two great books.

Links to helpful videos (more on Canvas!):

Review Videos:

Conversion between metric units: <https://bit.ly/2dlhiCD>

Converting Squared and Cubed Units: <https://youtu.be/6fN5cZ5gdrQ>

Density: <https://youtu.be/74jU3B-2bAE> and <https://youtu.be/7tVebi3TSsg>

Scientific notation: <https://youtu.be/i6lfVUp5RW8>

Moles and grams conversion: <https://youtu.be/CMnkSb2YsXI>

Grams, moles and particles/molecules conversion: <https://youtu.be/tBbCX6dQZPo>

Limiting Reactant: <https://youtu.be/nZOVR8EMwRU> and https://youtu.be/Mlu_v8rE1TY

Theoretical and Percent yield: <https://www.youtube.com/watch?v=itAj0s203CI>

Percent Composition by Mass: <https://www.youtube.com/watch?v=lywmGCFiUIA>

DO NOT DETACH FROM BOOK.

PERIODIC TABLE OF THE ELEMENTS																	
1																	18
H 1.008																	He 4.00
3	4											5	6	7	8	9	10
Li 6.94	Be 9.01											B 10.81	C 12.01	N 14.01	O 16.00	F 19.00	Ne 20.18
11	12											13	14	15	16	17	18
Na 22.99	Mg 24.30											Al 26.98	Si 28.09	P 30.97	S 32.06	Cl 35.45	Ar 39.95
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K 39.10	Ca 40.08	Sc 44.96	Ti 47.87	V 50.94	Cr 52.00	Mn 54.94	Fe 55.85	Co 58.93	Ni 58.69	Cu 63.55	Zn 65.38	Ga 69.72	Ge 72.63	As 74.92	Se 78.97	Br 79.90	Kr 83.80
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb 85.47	Sr 87.62	Y 88.91	Zr 91.22	Nb 92.91	Mo 95.95	Tc (97)	Ru 101.1	Rh 102.91	Pd 106.42	Ag 107.87	Cd 112.41	In 114.82	Sn 118.71	Sb 121.76	Te 127.60	I 126.90	Xe 131.29
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs 132.91	Ba 137.33	*La 138.91	Hf 178.49	Ta 180.95	W 183.84	Re 186.21	Os 190.2	Ir 192.2	Pt 195.08	Au 196.97	Hg 200.59	Tl 204.38	Pb 207.2	Bi 208.98	Po (209)	At (210)	Rn (222)
87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Fr (223)	Ra (226)	†Ac (227)	Rf (267)	Db (270)	Sg (271)	Bh (270)	Hs (277)	Mt (276)	Ds (281)	Rg (282)	Cn (285)	Uut (285)	Fl (289)	Uup (288)	Lv (293)	Uus (294)	Uuo (294)

*Lanthanoid Series

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
140.12	140.91	144.24	(145)	150.4	151.97	157.25	158.93	162.50	164.93	167.26	168.93	173.05	174.97

†Actinoid Series

90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
232.04	231.04	238.03	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)

Task One: Memorize the names of the elements and their corresponding symbols. The periodic table is provided for you on the AP exam and above is an exact copy of the periodic table you will be using. There are no names on the periodic table so it's important you know their name and symbol.

- You need to know elements 1-56, plus Pt, Au, Hg, Pb, Rn, Fr, Ra, U, Pu
- Many of these elements you already know and will be very easy to remember.
- Making flashcards is helpful!

Task Two: Memorize the ionic charges of the basic ions.

- Think about valence electrons! The charge is based on how many valence electrons an atom has and how it can achieve an octet!
- Think about the common elements/ions in that group:
 - Group 1 ions = +1
 - Group 2 ions = +2
 - Group 13 (3A) ions = +3
 - Group 15 (5A) ions = -3
 - Group 16 (6A) ions = -2
 - Group 17 (7A) / halogens = -1
 - Zn = +2
 - Ag = +1
 - Cu = +1 or +2
 - Fe = +2 or +3
 - Pb = +2 or +4
 - Sn = +2 or +

Task Three: Memorize the names, symbols, and charges of polyatomic ions below.

- Oxyanions - polyatomics containing oxygen... names end in -ate or -ite
 - -ate is used for the most common form
 - -ite is used for the form with the same charge, but one less oxygen
 - Example:
 - NO_3^- = nitrate
 - NO_2^- = nitrite
- Prefixes are also used
 - Per- indicates one more oxygen than the -ate form
 - Hypo- indicates one fewer oxygen than the -ite form
 - Example:
 - ClO_4^- = perchlorate (b/c it has one more O than the -ate form)
 - ClO_3^- = chlorate (b/c it is the most common)
 - ClO_2^- = chlorite (b/c it has one less oxygen than the -ate form)
 - ClO^- = hypochlorite (b/c it has one less oxygen than the -ite form)
- F, Cl, Br, I all behave the same
 - Therefore, if chlorate is ClO_3^- then bromate is BrO_3^-
 - Simply substitute one halogen for the other.
 - If you learn the chlorate series, you also automatically know the bromate, iodate, and fluorate series!

<u>+1</u>	<u>-1</u>	<u>-2</u>	<u>-3</u>
ammonium, NH_4^+	acetate, $\text{C}_2\text{H}_3\text{O}_2^-$ bromate, BrO_3^- hypobromite, BrO^- chlorate, ClO_3^- chlorite, ClO_2^- cyanide, CN^- bicarbonate, HCO_3^- hydroxide, OH^- hypochlorite, ClO^- iodate, IO_3^- nitrate, NO_3^- nitrite, NO_2^- thiocyanate, SCN^- permanganate, MnO_4^- perchlorate, ClO_4^-	carbonate, CO_3^{2-} chromate, CrO_4^{2-} dichromate, $\text{Cr}_2\text{O}_7^{2-}$ oxalate, $\text{C}_2\text{O}_4^{2-}$ peroxide, O_2^{2-} sulfate, SO_4^{2-} sulfite, SO_3^{2-} thiosulfate, $\text{S}_2\text{O}_3^{2-}$	phosphate, PO_4^{3-} phosphite, PO_3^{3-} arsenate, AsO_4^{3-}

Task Four: Math skills you need to master before the start of the school year:

Metric System

- Know the meaning of metric prefixes:

kilo- :

nano- :

deca- :

micro- :

deci- :

pico- :

centi- :

milli- :

- Know how to convert one measurement into another: (e.g. $0.765 \text{ cg} = \underline{\hspace{2cm}} \text{ mg}$)
- Know how to convert squared/cubed units (e.g. knowing that $2.54 \text{ cm} = 1 \text{ inch}$, $385.5 \text{ in}^2 = \underline{\hspace{2cm}} \text{ cm}^2$)

Dimensional Analysis (Train Tracks):

- When you convert from one unit to another, you can show your work using dimensional analysis.
- You know that you should always show enough work so that if your answer is incorrect, I can tell where you went wrong.

Scientific Notation:

- You can translate regular numbers into scientific notation and numbers written in scientific notation into normal notation.

Making Measurements:

- You can use a ruler or other measuring device to make a measurement to the correct number of significant figures
- You always include a unit on a measurement

Significant Figures:

- You can determine the number of significant figures in a given measurement (i.e., you know whether a “0” in a measurement is significant or not.)
- You can determine the precision involving measurement when the measurements are written with the correct number of significant figures.
- We will be rounding ALL of our answers to 3 significant figures this year in class (besides measurements using equipment/glassware)

Worksheet #1: Math Skills

Significant Figures:

1. How many significant figures (sig figs) are in the following numbers?

a. 0.7540 _____

b. 12500 _____

c. 10000.01 _____

d. 1200 _____

e. 1.04×10^3 _____

f. 0.0080050 _____

2. Round each of the following numbers to three sig figs.

a. 167.789 _____

b. 0.00000445345 _____

c. 25.0545 _____

d. 3.1415926536 _____

e. 8504.02435 _____

f. 14.4355 _____

Metric Conversions:

3. Make the following conversions (round answers to three sig figs and show work with units):

a. 3.40 m to cm

b. 289 cm to nm

c. 45.7 ml/s to kL/hr

d. 15 years to seconds

e. How many cm^2 are in an area of 4.21 in^2 ?

f. 400 cm^3 to m^3

g. 46.5 mL to L

h. 125145 J to kJ

i. -18.0°C to K

j. 212 K to $^\circ\text{C}$

Density:

4. A liquid has a density of 1.48 g/cm^3 . What volume of liquid has a mass of 5.00 grams?

5. The density of aluminum is 2.70 g/cm^3 . If a cube of aluminum weighs 13.5 grams, what is the length of the edge of the cube?

6. In an experiment, you measure the density of aluminum as 2.60 g/cm^3 . The accepted value is 2.70 g/cm^3 . What is the percent error in your measurement?

Scientific Notation:

7. The mass of a paperclip is about 0.525 grams. What is the mass of this paperclip in kg? (report your answer in scientific notation).

8. Write each number in scientific notation:
 - a. 0.0045 _____
 - b. 0.069 _____
 - c. 625 _____
 - d. 34121 _____
 - e. 0.000000000723 _____

9. Write each number in standard notation:
 - a. 7.015×10^{-3} _____
 - b. 5.20×10^{-6} _____
 - c. 2.84×10^7 _____
 - d. 1×10^4 _____
 - e. 8.26×10^0 _____

Moles:

Remember your mole conversions!

1 mol = _____ particles/atoms/formula units/molecules

1 mol = _____ L of a gas at STP

1 mol = _____ (in units of grams)

10. Vinegar is a dilute solution of acetic acid, CH_3COOH .

- Calculate the molar mass of acetic acid.
- How many molecules of CH_3COOH are contained within 43.4 g of acetic acid?
- How much would 0.450 moles of acetic acid weigh?
- How many molecules of acetic acid are in 0.450 moles?
- How many atoms of carbon are in 43.4 g of acetic acid?

Reactions

11. Balance the following and equations and tell what type of reaction it is (synthesis, decomposition, single replacement, double replacement, or combustion)

- $\text{KNO}_3 \rightarrow \text{KNO}_2 + \text{O}_2$ Type: _____
- $\text{AgNO}_3 + \text{K}_2\text{SO}_4 \rightarrow \text{Ag}_2\text{SO}_4 + \text{KNO}_3$ Type: _____
- $\text{CH}_3\text{NH}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{N}_2$ Type: _____
- $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow \text{HNO}_3$ Type: _____
- $\text{Na} + \text{Zn}(\text{NO}_3)_2 \rightarrow \text{Zn} + \text{NaNO}_3$ Type: _____
- $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ Type: _____
- $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO} + \text{NO}_2 + \text{O}_2$ Type: _____
- $\text{SO}_3 \rightarrow \text{SO}_2 + \text{O}_2$ Type: _____
- $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ Type: _____

10. What are diatomic molecules? List the 7.

11. Write a balanced chemical equation for each of the following reaction descriptions.

- a. When solid calcium carbonate is heated, solid calcium oxide and gaseous carbon dioxide are formed.

- b. Aluminum metal reacts with oxygen to form solid aluminum oxide.

- c. When solid mercury(II) sulfide is heated with oxygen, liquid mercury metal and gaseous sulfur dioxide are produced.

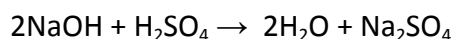
- d. When aqueous solutions of aluminum sulfate and barium chloride are mixed, solid barium sulfate and aqueous aluminum chloride are formed.

- e. Solid sodium bicarbonate reacts with hydrochloric acid to produce sodium chloride, water, and carbon dioxide gas.

- f. Gaseous ammonia and oxygen react to produce nitrogen monoxide gas and water vapor.

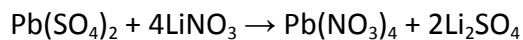
Stoichiometry:

12. Using the following equation:



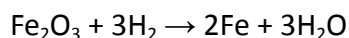
How many grams of sodium sulfate will be formed if you start with 200 grams of sodium hydroxide and you have excess sulfuric acid?

13. Using the following equation:



How many grams of lithium nitrate will be needed to make 250 grams of lithium sulfate, assuming that you have an adequate amount of lead (IV) sulfate to do the reaction?

14. Using the following equation:



Calculate how many grams of iron can be made from 16.5 grams of Fe_2O_3 .

Limiting Reactant and Percent Yield:

15. Determine the grams of sodium chloride produced when 10.0 g of sodium react with 10.0 g of chlorine gas according to the equation: $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$

16. Determine the mass of lithium hydroxide when 50.0 g of lithium are reacted with 45.0 g of water according to the equation: $2\text{Li} + 2\text{H}_2\text{O} \rightarrow 2\text{LiOH} + \text{H}_2$

17. Determine the percent yield of water produced when 68.3 g of hydrogen reacts with 85.4 g of oxygen and 86.4 g of water are collected. $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

Percent Composition:

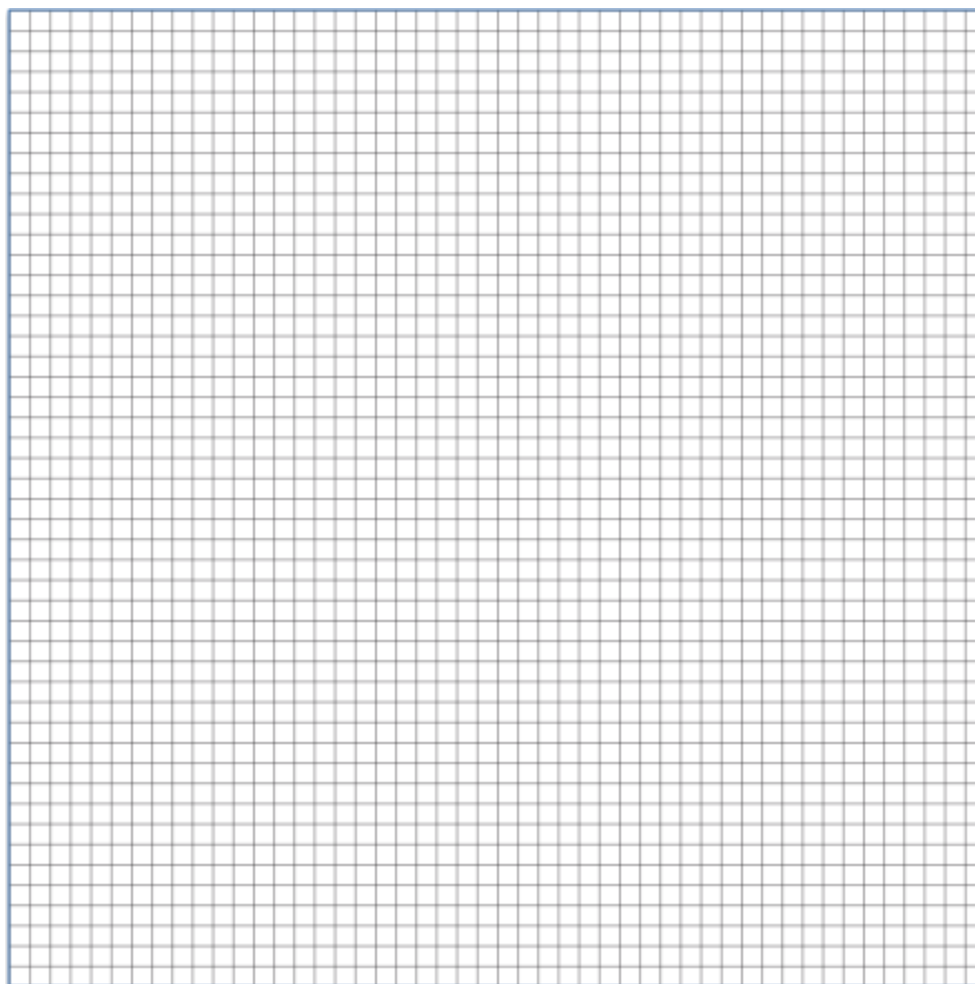
18. Calculate the percent composition of $C_{12}H_{22}O_{11}$ (sucrose). (Give percent of each element.)

Task Five: Graph and Data Analysis

19. When anhydrous calcium chloride is dissolved in water, the temperature of the system changes. A student obtains the following data when dissolving increasing amounts of $CaCl_2$ into 100 mL of water:

Mass of $CaCl_2$ dissolved, g	0.91	2.94	5.92	8.81	10.89
ΔT, °C	1.8	6.6	12.8	18.9	23.2

Plot the data on the graph below. Choose an appropriate scale, and label the axes appropriately.



Refer to the graph to answer the following questions.

Independent Variable:

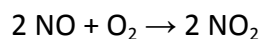
Dependent Variable:

Provide a descriptive title for the graph:

20. Describe the relationship between grams of calcium chloride salt and change in temperature in a sentence.
21. Draw a line of best fit. Determine its slope, including units.
22. Predict the change in temperature when:
- 4.33 g of CaCl_2 are dissolved
 - 9.56 g of CaCl_2 are dissolved
 - 15.4 g of CaCl_2 are dissolved
23. Predict the mass of CaCl_2 will result in:
- a 12.4°C change in temperature
 - A 44.9°C change in temperature

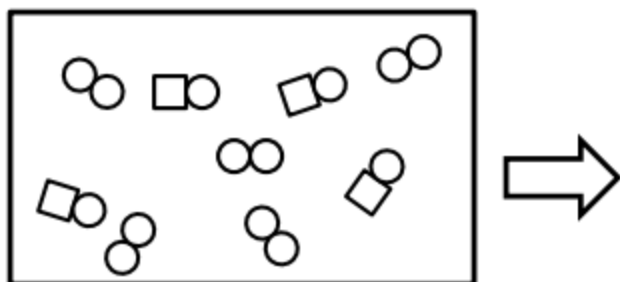
Task Six: Particulate Diagrams

24. Consider the synthesis of nitrogen dioxide



In the diagram below, nitrogen atoms are represented with squares and oxygen atoms are represented with circles. Using the conservation of matter, draw what you would expect to find in the reaction vessel once the reaction is complete.

Before Reaction:



After Reaction:

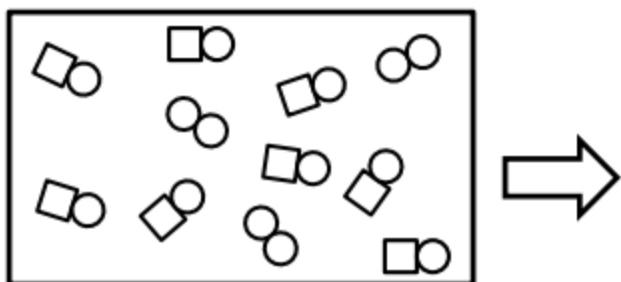
Limiting Reactant:

Excess Reactant:

Explanation:

25. Consider the same reaction, with different starting quantities. Draw the contents of the reaction vessel after the reaction is complete.

Before Reaction:



After Reaction:

Limiting Reactant:

Excess Reactant:

Explanation:

Task Seven: Math Skills - No Calculator!!!

Supply the answers in the blanks. No calculators please! The multiple choice section of the AP exam does not allow calculators and you need the practice doing mental math without one.

1. $1.62 \times 10^6 + 1.9 \times 10^5$ = _____

2. $1.62 \times 10^6 - 1.9 \times 10^5$ = _____

3. $3.72 \times 10^{-8} + 0.211 \times 10^{-7}$ = _____

4. $3.72 \times 10^{-8} - 0.211 \times 10^{-7}$ = _____

5. $(2.3 \times 10^4)(3.1 \times 10^4)$ = _____

6. square root of 9.0×10^{-8} = _____

7. cube root of 8.0×10^{-9} = _____

8. approximate square root of 3.2 = _____

9. $(2.6 \times 10^{-8}) / (0.52 \times 10^{-9})$ = _____

10. $10x = 2$ and $\log 2 = 0.30$; $x =$ _____

11. $x^2 / 0.10 = 4.0 \times 10^{-9}$ $x =$ _____

12. $xy = 16$ and $y^2 = 225$ $x =$ _____

13. $\frac{(2.4 \times 10^{-8})(0.25 \times 10^{-2})}{(1.5 \times 10^{-4})}$ $x =$ _____

14. $\log (1.0 \times 10^4)$ = _____

15. $\log (1.0 \times 10^{-4})$ = _____

16. $\log (2.3 \times 10^{-5})$ = _____

17. $(x + 0.1)(x) = 2.0 \times 10^{-8}$ $x =$ _____

18. $x + y = 3$ and $x - y = 9$ $x =$ _____

19. $(0.001)(0.001)$ = _____

20. $3.42/342$ = _____

21. If a megabuck is one million dollars and a kilobuck is one thousand dollars, how many kilobucks is 342 dollars?

22. A ten cm candle is being burned at both ends. One end burns at the rate of one cm per hour; the other end burns at one-half cm per hour. How far from the center of the candle will the burning ends meet?

23. A wooden cube three cm on edge is placed inside a cube box that is six cm on edge. How much free space is in the box?

Task Eight: Ionic and Covalent Naming

1. Provide the names for the following ionic compounds:

- a. AlF_3 _____
- b. $\text{Fe}(\text{OH})_2$ _____
- c. $\text{Cu}(\text{NO}_3)_2$ _____
- d. $\text{Ba}(\text{ClO}_4)_2$ _____
- e. Li_3PO_4 _____
- f. Hg_2S _____
- g. $\text{Cr}_2(\text{CO}_3)_3$ _____
- h. $(\text{NH}_4)_2\text{SO}_4$ _____

2. Write the chemical formulas for the following compounds:

- a. Copper (I) oxide _____
- b. Potassium peroxide _____
- c. Iron (III) carbonate _____
- d. Zinc nitrate _____
- e. Sodium bromite _____
- f. Aluminum hydroxide _____

3. Give the name of chemical formula for each of the following molecular substances:

- a. SF_6 _____
- b. XeO_3 _____
- c. Dinitrogen tetroxide _____
- d. Hydrogen cyanide _____
- e. IF_5 _____
- f. Dihydrogen monoxide _____
- g. Tetraphosphorus hexasulfide _____

4. Give the name or chemical formula for the following compounds:

- a. Ammonium oxalate _____
- b. Manganese (III) dichromate _____

- c. $\text{Ti}(\text{OH})_4$ _____
- d. $\text{Ni}(\text{ClO}_2)_3$ _____
- e. Dinitrogen pentoxide _____
- f. Aluminum oxide _____
- g. Fe_2S_3 _____

5. Name the following acids:

- a. $\text{H}_2\text{C}_2\text{O}_4$ _____
- b. HBrO_3 _____
- c. HBr _____
- d. HNO_2 _____
- e. H_2SO_4 _____
- f. HClO _____

6. Write the following acids:

- a. hydrochloric acid _____
- b. sulfuric acid _____
- c. nitric acid _____
- d. phosphorous acid _____
- e. carbonic acid _____
- f. acetic acid _____
- g. nitrous acid _____

7. Name the following bases:

- a. $\text{Ca}(\text{OH})_2$ _____
- b. $\text{Fe}(\text{OH})_3$ _____
- c. NaOH _____

8. Write the following bases:

- a. strontium hydroxide _____
- b. aluminum hydroxide _____
- c. lead(I) hydroxide _____

Task Nine: Previous Knowledge of Physical Science Review

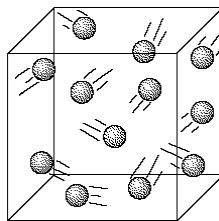
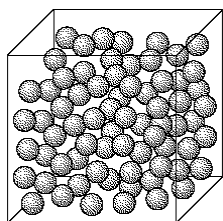
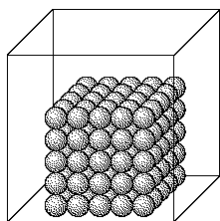
Matter and Change

1. What is the definition of matter? Give 2 examples that are matter and 2 that are not matter.

2. Fill in the chart with *definite* (has its own) or *indefinite* (has that of the container)

State of Matter	Volume	Shape
Solid		
Liquid		
Gas		

3. Which picture represents each state of matter?



4. Give 3 examples of physical properties.

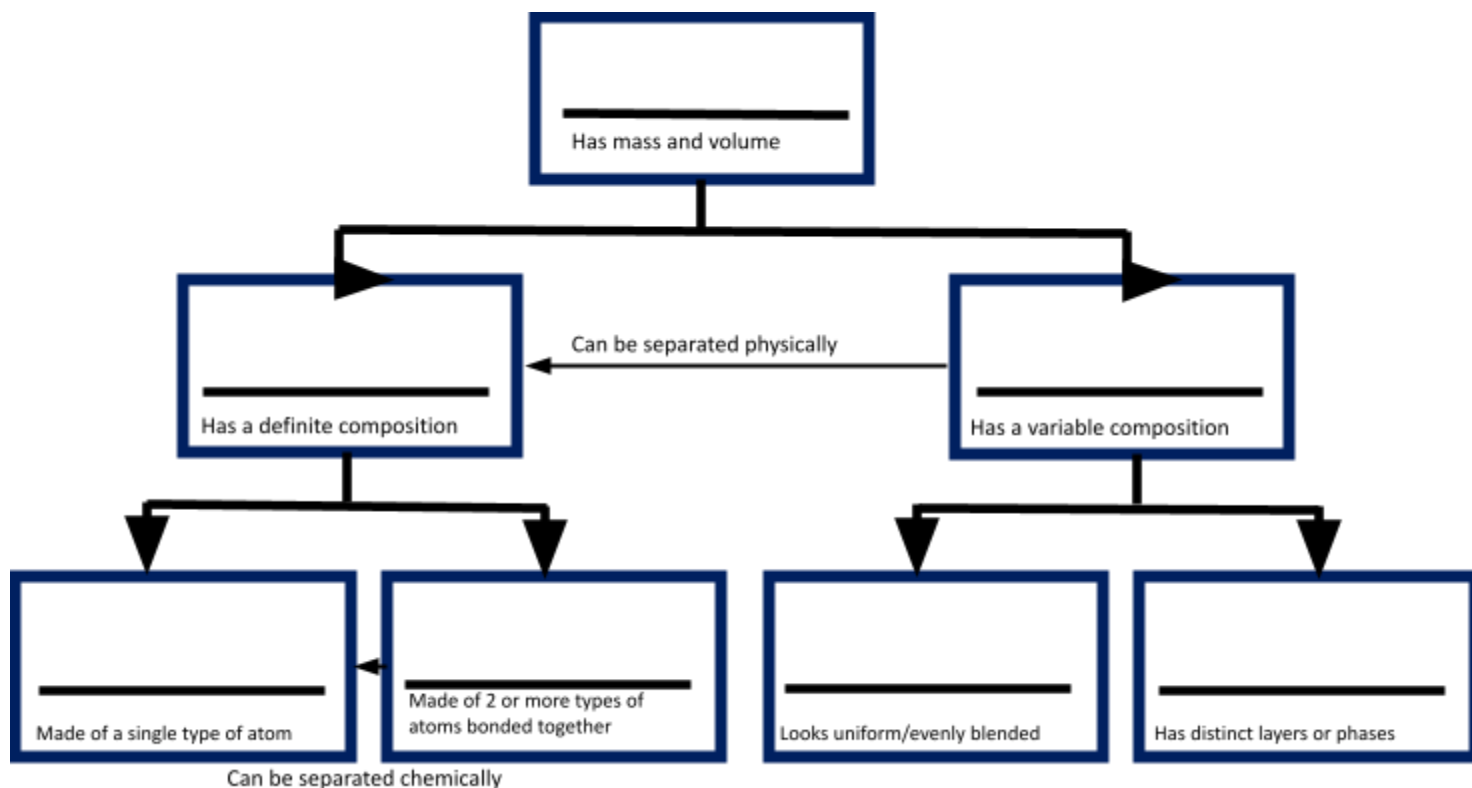
5. Give 3 examples of chemical properties.

6. What happens during a physical change? Give 3 examples.

7. What happens during a chemical change? Give 3 examples.

8. Give an example of a heterogeneous mixture and of a homogeneous mixture.

9. Fill in the following flowchart using the following words:
 element, homogenous, matter, mixture, heterogeneous, substance, and compound



Atomic Structure

1. Use the chart below to compare the different atomic models.

	Was this model created by experimentation?	Did this model consider the atom indivisible?	Did this model include electrons?	Did this model include a nucleus?	Did this model include defined orbits?	Did this model include an Electron Cloud?
Democritus						
Dalton						
Thomson						
Rutherford						
Bohr						
Schrodinger (Quantum)						

2. Fill in the chart below to compare the different subatomic particles.

	Relative Size	Relative Charge	Location in the Atom
Proton			
Neutron			
Electron			

3. What is an atomic number?

4. How do you find the number of protons, neutrons, and electrons in an atom?

5. Complete the table below:

Symbol	Atomic Number	Atomic Mass	Number of Protons	Number of Electrons	Number of Neutrons
K					
			51		
	10				
				23	

6. How are isotopes of the same element the same? How are they different?

7. How is atomic mass different from mass number? How is each one found?

8. Complete the table below for the isotopes listed.

Symbol	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons
U-236					
U-238					
¹² C					
¹⁴ C					

9. How many electrons can each of the sublevels hold?

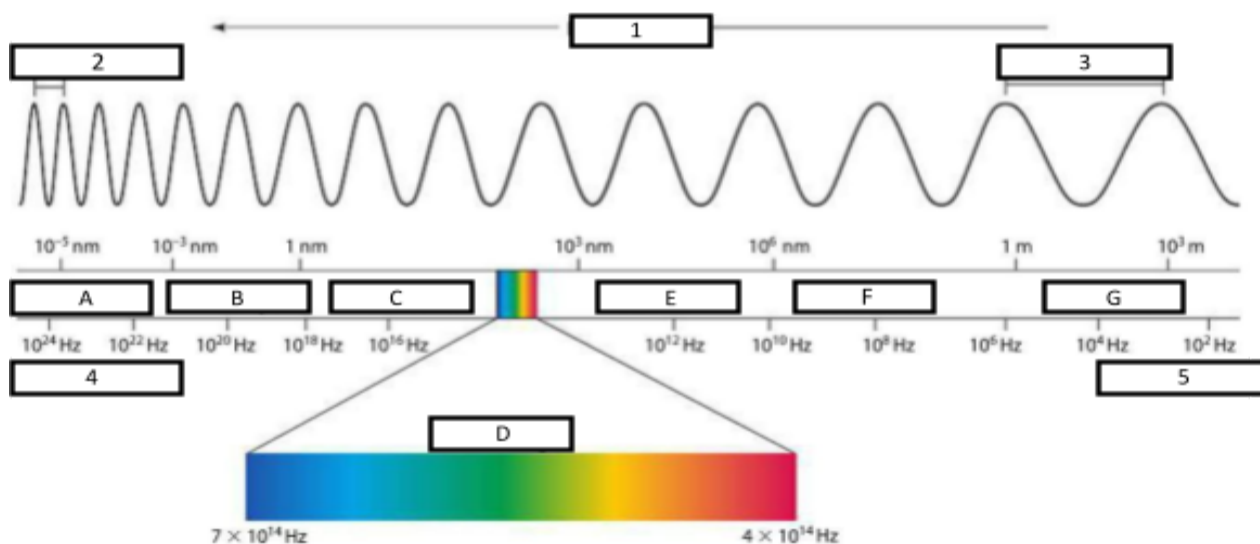
s = p = d = f =

10. What does isoelectronic mean?

11. Give the electron configurations for the elements listed below

- a. Lithium _____
- b. Sulfur _____
- c. Calcium _____
- d. Manganese _____
- e. Samarium _____

Electrons, Light, and Energy



1. Identify each of the lettered parts of the electromagnetic spectrum above with the names of the different parts of the spectrum: x-rays, visible light, microwaves, ultraviolet, infrared, gamma rays, and radio waves

A		E	
B		F	
C		G	
D			

2. Identify each of the numbered parts of the electromagnetic spectrum above with the following phrases: high frequency, long wavelength, low frequency, increasing energy, and short wavelength

1		4	
2		5	
3			

3. Use the previous image of the electromagnetic spectrum to help you complete these relationships:

- a. As the wavelength increases, the frequency _____.
- b. As the wavelength decreases, the frequency _____.
- c. As the wavelength increases, the energy _____.
- d. As the wavelength decreases, the energy _____.
- e. As the frequency increases, the energy _____.
- f. As the frequency decreases, the energy _____.

4. What happens when an electron absorbs a photon?

5. What happens when an electron releases a photon?

6. How are atomic emission spectra like fingerprints for the elements?

Periodic Table and Trends

1. The horizontal rows on the periodic table are called _____ and the vertical columns are called _____.
2. What do the elements in the same period have in common?
3. What do the elements in the same A group (1A, 2A, etc) have in common?
4. Fill in the table below.

Metal Properties	Nonmetal Properties

5. Describe the properties of metalloids.
6. Where are the metals, nonmetals and metalloids located on the periodic table?

7. Shade in the periodic table below according to the following color key.
- | | | |
|--------------------------------|----------------------------|--------------------|
| Alkali metals = red | transition metals = yellow | noble gases = blue |
| alkaline earth metals = orange | halogens = green | |

Periodic Table of the Elements

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8. Complete the table below by indicating if each trend increases or decreases to the right and down.

Trend	Change right across a period	Change down a group
Atomic Size		
Ionization Energy		
Electronegativity		

9. Which family does not have electronegativity values? Why?
10. Given these 4 elements – calcium, bromine, barium, and astatine
- Which has the largest atomic radius?
 - Which has the lowest ionization energy?
 - Which has the highest electronegativity?

Task Ten: Doodle Notes

As stated previously, it is expected that you take your notes in class then follow up with a doodle note each week on one of the topics you learned. A “doodle note” can include graphic organizers, Cornell notes, or colorful doodle notes. Examples of graphic organizers and doodle notes are provided on Canvas. Research shows that if you are interactive with your notes you will learn the material better! You are expected to do one note per week. To assist you with this process, you are to complete **five** one-page doodle notes on any of the topics below that your practice problems cover. You can find more information and examples on Canvas.

Doodle Note #1: Topic: _____

Doodle Note #2: Topic: _____

Doodle Note #3: Topic: _____

Doodle Note #4: Topic: _____

Doodle Note #5: Topic: _____

Use this rubric to help you design your doodle notes. These should take no more than 20-30 minutes to complete.

ELEMENT	3 YOU ARE A DOODLE REVOLUTIONARY!	2 TAKING NOTES, KINDA VISUAL...ish	1 NOT QUITE THERE... YET	SCORE
TEXT	<i>Used distinct type styles or fonts to set text apart. Used visual hierarchy to emphasize more important words or concepts. Used some words as visual mnemonics to help you understand some concepts</i>	<i>Some words are bigger or underlined, but nothing is bolder or in different styles of fonts.</i>	<i>Nothing special. Just written words</i>	
IMAGES	<i>Translated concepts into visualizations. Pictures serve to consolidate information that would otherwise take up more words.</i>	<i>Some doodles or designs, but not really any that relate directly or deliberately to the topic being covered</i>	<i>No doodles at all, may as well just be taking boring, ol' traditional notes</i>	
STRUCTURE	<i>Organizes the flow and relationships of concepts and information. Use of graphic organizers like mind-maps. Analyzes data, represents information with charts, graphs, or diagrams.</i>	<i>Used some dividers, bullets or lines, but no boxes, shapes, arrows or emphasis to help organize ideas.</i>	<i>Same old, same old, "outline" style notes.</i>	
PERSONALIZE	<i>Added accents or unique personalizations, comments, additions or annotations in order to help yourself understand and help make it more fun.</i>	<i>Perhaps some doodles or differences in text which makes notes stand out a little, but not much that make them especially different</i>	<i>Pretty much the same as anybody else's notes. Maybe just what was on the screen.</i>	
CONTENT	<i>Thorough, thoughtful and engaged. Doing your best to learn and capturing what you think you'll be able to use, not just to study..</i>	<i>Probably enough, maybe even as much as many teachers may recommend.</i>	<i>Notes seem incomplete, hurried or inadequate</i>	