



Advanced Chemistry Summer Assignment 2021-2022

Contact Info:

- Mrs. Curtis & Mrs. Snow
- **Google Classroom: [Join by clicking this link](#) (you MUST join this for this course, please join prior to summer starting... right now! ☺)
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Dear Pre-AP Chemistry Student: Welcome to the exciting and challenging world of Advanced Chemistry! The objective of this assignment is to allow you to prepare for and strengthen your skills for the upcoming school year. The information presented here represents a starting point for Advanced Chemistry students. It is based off of what was taught to you in middle school with two extensions: conversions and atomic theory.

Advanced Chemistry is designed to prepare students for not only AP Chemistry but any AP course. It expands to topics beyond the scope of general high school chemistry and is taught at a quicker and more rigorous pace. Please know that we make ourselves available for tutoring before and after school, as well as will be providing an ample amount of help videos and notes on our Google Classroom page we have shared above. We can get you where you need to be, but you need to be willing to put in the effort. You must be fully committed to the course. You will need to invest time outside of class working on chemistry. Advanced Chemistry is a rewarding course, and will prepare you well for future AP classes.

You are expected to complete this assignment to be turned in on the 2nd day of class.

We are looking forward to a great year in Advanced Chemistry!

*****IF YOU WILL NOT/DO NOT HAVE ACCESS TO A COMPUTER OR THE INTERNET OVER THE SUMMER- PLEASE STOP BY MS. CURTIS' ROOM 162 TO PICK UP A PACKET OF READING MATERIAL THAT WILL HELP YOU ☺ ******

Summer Assignment due the 2nd class of School

Lesson 1: Periodic Table

Lesson 2: Conversions

Lesson 3: Density

Lesson 4: Atomic Theory

Lesson 5: "What's in an Atom?"

Lesson 1: Periodic Table

Watch the "[Tour of the Periodic Table](#)" video on Google Classroom or click on the link. Define each term below and label (with color coding) on the periodic table provided on the last page:

Groups

Periods

Alkali Metals

Alkaline Earth Metals

Halogens

Noble Gases

Non-metals

Transition Metals

"Poor" Metals

Metalloids

Lesson 2: Conversions (Dimensional Analysis)

Watch the "[Converting Units with Conversion Factors](#)" video on Google Classroom or click on link. Solve the following problems using the conversion factors below. You MUST use the method the video ex

Length	Energy (derived)
<i>SI unit : meter (m)</i>	<i>SI unit : Joule (J)</i>
1 km = 0.62137 mi	1 J = 1 kg·m ² / s ²
1 mi = 5280 ft	1 J = 0.239 cal
= 1.6093 km	= 1 C x 1 V
1 m = 1.0936 yd	1 cal = 4.184 J
1 in = 2.54 cm (exactly)	1 eV = 1.602 x 10 ⁻¹⁹ J
1 cm = 0.3937 in	
1 Å = 10 ⁻¹⁰ m	
Mass	Pressure (derived)
<i>SI unit : kilogram (kg)</i>	<i>SI unit : Pascal (Pa)</i>
1 kg = 2.2046 lb	1 Pa = 1 N/m ²
1 lb = 0.454 kg	= 1 kg/m·s ²
= 16 oz	1 atm = 101.325 kPa
1 amu = 1.6605402 x 10 ⁻²⁴ g	= 760 torr
	= 14.70 lb/in ²
	1 bar = 100 kPa
Temperature	Volume (derived)
<i>SI unit : kelvin (K)</i>	<i>SI unit : cubic meter (m³)</i>
0 K = -273.15°C	1 L = 10 ⁻³ m ³
= -459.67°F	= 1 dm ³
K = °C + 273.15	= 10 ³ cm ³
°C = ($\frac{5}{9}$ x °F) - 32°	= 1.0567 qt
°F = ($\frac{9}{5}$ x °C) + 32°	1 gal = 4 qt
	= 3.7854 L
	1 cm ³ = 1 mL
	1 in ³ = 16.4 cm ³

1. In Europe, the energy contained in foods is measured in Joules (rather than calories). How many calories would be contained in a food that has 1200 J per serving?
Conversion Factor I need to use: _____

Work:

2. You go to the doctor and they measure your weight to be 50.2 kg. How many pounds do you weigh?
Conversion Factor I need to use: _____

Work:

3. Challenge problem: You run track...your event is the 2 mile race. For fun you want to see how many centimeters you run each race....Figure it out!
Conversion FactorS I need to use:

Work:

Lesson 3: Density

Please view the video on [Density](#) on Google Classroom or by clicking on link. Define: Mass, Volume, Density and solve the practice problems.

Mass:

Volume:

Density:

Problems:

1. Samples A, B, & C have masses of 80 g, 12 g, and 33 g, and volumes of 20 mL, 4 cm³, and 11 mL, respectively. Which of the samples have the same density?
2. An object with a mass of 7.5g raises the level of water in a graduated cylinder from 25.1 mL to 30.1 mL. What is the density of the object?
3. Examine the density values for several common liquids in the table below. Sketch the results of an experiment that layered each of the liquids in a 1000 mL graduated cylinder.

Substance	Density (gm/cu.cm)
Water	1.00
Cooking oil	0.92
Sea Water	1.025
Carbon tetrachloride	1.58
Benzene	0.87
Glycerin	1.26
Methanol	0.79

4. What is the mass of a 35.5 mL sample of methanol? Use chart above for density.

Lesson 4: Atomic Theory

Using the resources provided on Google Classroom or links here ([History of Atom](#), [Brief-History of Atomic Theory](#), [The Development of Atomic Theory](#)), create a SIMPLE timeline on a piece of paper that includes the scientists listed below. For each “point” please provide: Name, Date (year), model created or improved (in terms of what they contributed to the idea of an “atom”), and a picture that would help you remember what their model of the atom (or addition to the model) is.

Scientists to include:

- 1) **Dalton**
- 2) **Rutherford**
- 3) **Democritus**

- 4) ***Chadwick***
- 5) ***Schrodinger***
- 6) ***Thomson***
- 7) ***Bohr***

Lesson 5: What is in an Atom?

After watching the “[Nuclide Symbols](#)” video on Google Classroom or by clicking the link, define the following terms and complete the table below.

Atomic #

Mass #

Isotope

Element	Isotope	Atomic Notation $\begin{smallmatrix} A \\ Z \end{smallmatrix} X$	Number of protons (Atomic Number, Z)	Number of nucleons (Mass Number, A)	Number of neutrons	Number of electrons
lithium	lithium-7	${}^7_3\text{Li}$				
	lithium-6					
			8	16		
				17	9	
				235		92
uranium				238		

PERIODIC TABLE OF THE ELEMENTS

PERIODIC TABLE OF THE ELEMENTS																		2			
1 H 1.008																	He 4.00				
3 Li 6.94	4 Be 9.01															5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.30															13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80				
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.91	54 Xe 131.29				
55 Cs 132.91	56 Ba 137.33	57 *La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.2	77 Ir 192.2	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)				
87 Fr (223)	88 Ra 226.02	89 ^tAc 227.03	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (271)	111 Rg (272)											

*Lanthanide Series

†Actinide Series

58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.4	63 Eu 151.97	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)