Name: _____

AP Chemistry Summer Assignment 2024-2025 School Year

Hello! I am glad you have chosen to take AP Chemistry. I look forward to meeting/seeing all of you this Fall. This course will be similar in scope to a first year college Chemistry course. This means it is expected that you have taken a Chemistry course in high school before, and that you have completed most of your high school Algebra.

I have prepared an assignment for you to do during the Summer that has basic Chemistry and Math concepts we will need in order to get through this course.

This course will be focused on getting you ready for and passing the AP exam in May. We have a lot of content to cover and a lot of hard work ahead of us. You will be graded with college level expectations with an emphasis on performing in laboratory experiments and tests.

I encourage you to take your time with this Summer assignment, and complete some of it each day or week rather than waiting until the last week of Summer. Chemistry takes time to process and understand, and you will do much better if you spread out the assignment.

Have a great summer, and I look forward to seeing you in Fall.

Mr. Pease

The Assignment

Use print and internet resources to complete the following problems. Feel free to take extra practice quizzes or notes. ***Submit this assignment by August 19, 2024*** (first Monday after the first day of school). *This assignment will be worth 100 points at the start of the school year*.

Use separate pieces of paper for your explanations and work.

http://media.collegeboard.com/digitalServices/pdf/ap/ap-chemistry-course-and-exam-description.pdf

http://www.collegeboard.com/ap/students/chemistry/index.html

http://www.chemmybear.com/

https://chemfiesta.org/

http://science.widener.edu/svb/tutorial/rxnbalancingcsn7.html

http://www.chemistry-drills.com/balance.html

http://www.chemteam.info/

https://www.youtube.com/user/tdewitt451

https://www.khanacademy.org/science/hs-chemistry

(great resource, if you want to go through an entire high school chemistry course, try and do up to Unit 7)

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Chemistry:

1. Explain how to determine the number of Significant Figures in a value.
2. Explain the rules for determining sig figs when multiplying or dividing AND adding or subtracting.
3. How many significant figures are in the following numbers?

a. 420.0	b. 0.0000476	c. 10.
d. 7589	e. 4.30000×10^{-22}	f. 0.0000004
g. 432506.43	h. 35.17	i. 8671.50

4. Answer the following with the appropriate number of sig figs:
    a. 49.30 - 9.5 - 0.0033 =
    b. 9002 + 19.113 + 356.01 =
    c. $9.000 \times 10^{19} / 6.02 \times 10^{23}$ =
    d. (72) (2.013) / 7.09 =

5. Express the following in scientific notation:
    a. 0.0000809
    b. 0.00925
    c. 49,000,000,000
    d. 519,000

6. Convert the following values:
    a. 32.09 cm into km
    b. 9.00×10^{23} μm into mm
    c. 22.0 cm/s to miles/hour
    d. 19.3 g/mL into kg/m^3

7. Label the following either as a physical process or chemical process.

a. Corrosion of aluminum metal	b. Digesting a candy bar	c. Sublimation of dry ice (CO_2)
d. Melting of ice	e. Explosion of nitroglycerin	f. Pulverizing an aspirin

8. Explain the main differences between solid liquid and gas phase of matter.
9. Define the words: atomic number, atomic mass, mass number, molecular formula, empirical formula, isotopes, cation, anion, polyatomic ion, metalloid, alloy, allotrope
10. Explain the differences between element, compound, mixture and solution

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11. Determine the number of protons, neutrons and electrons in the following:
    a. $^{7}_{3}Li^{+1}$
    b. $^{35}_{17}Cl^{-}$
    c. $^{24}_{12}Mg^{+2}$
12. Explain the following trends across a period and down a column on the periodic table:
    a. Atomic radius
    b. Ionization energy
    c. electronegativity
13. Name the following (like NaCl = Sodium chloride) and indicate whether they are ionic or covalent compounds. Remember there are differences in naming ionic or covalent compounds:

a. FeS	b. N_2	c. $TiNO_3$	d. PO_5	e. $(NH_4)_2O$
f. C_2H_4	g. HCN	h. $LiClO_4$	i. $MgBr_2$	j. TiF_4

14. Write the formula for the following and indicate if it is ionic or covalent.

a. Silver chloride	b. Nickel (I) hydroxide	c. Carbon monoxide	d. Cobalt (II) acetate
e. Gold (III) Fluoride	f. Ammonia	g. Calcium Carbonate	h. Dinitrogen pentoxide

15. How many atoms are in 3.85 moles of lithium?
16. Convert 23.12 grams of Na_2CO_3 to molecules.
17. What is the mass of 12.0 atoms of carbon tetrafluoride?
18. How many moles are in 3.50 grams of $AlCl_3$?

Math (Solve for x):

19. $x = \log(2.5 \times 10^{-10})$
20. $x = 10^{-9.9}$
21. $30 = \frac{x}{20}$
22. $3.5 = \frac{2}{x}$
23. $x^2+6x+5 = 0$
24. $0.08 = \frac{x^2}{0.5 - x}$
25. If you have 9 red marbles, 6 blue marbles, 7 green marbles, and 2 orange marbles, what percentage of red marbles do you have?

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Prefix	Abbreviation	Meaning	Amount = 1 base unit (g, L, m)
Giga	G	1 gigameter (Gm) = 1 x 10^{9} m	1 g = 1 x 10^{-9} Gg
Mega	M	1 megameter (Mm) = 1 x 10^{6} m	1 g = 1 x 10^{-6} Mg
Kilo	k	1 kilometer (km) = 1 x 10^{3} m	1 g = 1 x 10^{-3} kg
Hecto	h	1 hectometer (hm) = 1 x 10^{2} m	1 g = 1 x 10^{-2} hg
Deka	D or da	1 dekameter (Dm) = 1 x 10^{1} m	1 g = 1 x 10^{-1} dag
Base Unit (g, L, m)			1 g = 1 x 10^{0} g
Deci	d	1 decimeter (dm) = 1 x 10^{-1} m	1 g = 1 x 10^{1} dg
Centi	c	1 centimeter (cm) = 1 x 10^{-2} m	1 g = 1 x 10^{2} cg
Milli	m	1 millimeter (mm) = 1 x 10^{-3} m	1 g = 1 x 10^{3} mg
Micro	µ (Greek letter mu)	1 micrometer (µm) = 1 x 10^{-6} m	1 g = 1 x 10^{6} µg
Nano	n	1 nanometer (nm) = 1 x 10^{-9} m	1 g = 1 x 10^{9} ng
Pico	p	1 picometer (pm) = 1 x 10^{-12} m	1 g = 1 x 10^{12} pg

TABLE 4.4

Names of Common Polyatomic Ions

Ion	Name	Ion	Name
NH_4^+	ammonium	CO_3^{2-}	carbonate
NO_2^-	nitrite	HCO_3^-	hydrogen carbonate (bicarbonate is a widely used common name)
NO_3^-	nitrate		
SO_3^{2-}	sulfite		
SO_4^{2-}	sulfate	ClO^-	hypochlorite
HSO_4^-	hydrogen sulfate (bisulfate is a widely used common name)	ClO_2^-	chlorite
		ClO_3^-	chlorate
OH^-	hydroxide	ClO_4^-	perchlorate
CN^-	cyanide	$C_2H_3O_2^-$	acetate
PO_3^{3-}	phosphite	MnO_4^-	permanganate
PO_4^{3-}	phosphate	$Cr_2O_7^{2-}$	dichromate
HPO_4^{2-}	hydrogen phosphate	CrO_4^{2-}	chromate
$H_2PO_4^-$	dihydrogen phosphate	O_2^{2-}	peroxide

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PERIODIC TABLE OF ELEMENTS
Chemical Group Block
PubChem
Atomic Number
Name
17 35.45
Cl
Chlorine
Halogen
Atomic Mass, u
Symbol
Chemical Group Block