AP Chemistry 2026 Summer Work
Mrs. Swiatek

A Brief Introduction to AP Chemistry

WELCOME! Congratulations on making the decision to take AP Chemistry; it is a rigorous, fast-paced, and rewarding course. There is a lot to cover, and while we can do it, we will all need to work very hard. You should expect this class to be more difficult than your first chemistry class but also with some new cool lab work. All students are expected to take the AP exam in the spring. You will need a lab notebook (which I will provide), a binder, and a graphing calculator.

PACING AND GETTING EXTRA HELP

You will find that time is of the essence in this course. I will move at a pace that allows us to address the vast amount of required material prior to the exam, and students must expect to keep to this schedule. Students will need to study the text and watch AP Daily videos on their own, and class time will be used primarily for practice problems, labs, and activities that will move us forward. You may feel at times like we are moving quite fast in order to complete the curriculum by May. Additionally, many students who take AP classes are involved in other activities that will take them away from class. However, chemistry topics build upon each other, so students who fall behind must be responsible and take action to catch back up. Stay current with all assignments and come in for help as needed. Please communicate with me if you don't understand a topic so that I can best support your efforts during Focus Time or before/after school!

SUMMER WORK

There will not be enough time next year to reteach introductory chemistry content and cover all the new material tested on the AP exam. You are expected to be familiar with content covered in your first year chemistry course. This early work will allow us to spend our class time on more difficult topics. **This summer assignment is designed to help you prepare to take AP chemistry by helping you review important chemistry and math fundamentals that constitute the major prerequisite knowledge needed for success for this course.** Rushing through it the day before school starts is an ineffective method for reviewing this material. Students may certainly work together to complete the summer assignment, but your focus should be on the learning/reviewing, not on getting it done as quickly as possible.

A copy of the periodic table you will be using in AP Chemistry can be found at the end of this assignment. Please note that it does not include element names. You are encouraged to make flashcards and begin memorizing element symbols as well as the formulas and names of polyatomic ions (also listed at the end of this assignment).

I encourage you to take a break this summer! You should spread out the assignment in early/mid-August so it's fresh when we start the year and hit the ground running. You will have an opportunity to ask questions on anything in the summer assignment during orientation days or on the first day of school, but do not hesitate to email me over the summer as needed (lauraswiatek@grcatholiccentral.org)! **This assignment must be completed and ready to turn in on the second day of class. We will have an assessment on this material at the end of the first week, as well.**

I want to help you be as successful as possible in this course! I look forward to seeing all of you in the fall, and I am so excited to have you in AP Chemistry!

Summer Work Checklist

Part 1 – Fill out this survey about yourself and why you are taking the course before the first day of school. Include any other relevant details that can help me develop a sense of who you are and how you learn. Please take some time to do this thoughtfully, even if I have had you in class before. People grow and change! :)

Part 2 – Orient yourself to the AP Chemistry course
Read through the AP Chemistry Course Overview from the College board in order to get a feel for the course.

Part 3 – Complete Review Work
This is due on the second day of class. Students are encouraged to work together to complete the work but, as discussed on the front page, *focus on the learning.* You'll find links to websites and videos that can help you review each section.

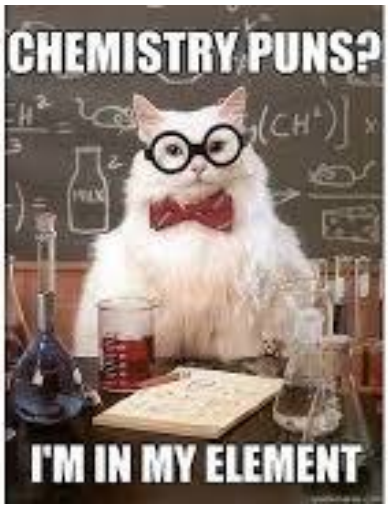
All work should be shown clearly (including units) on another sheet of paper, including (when applicable):

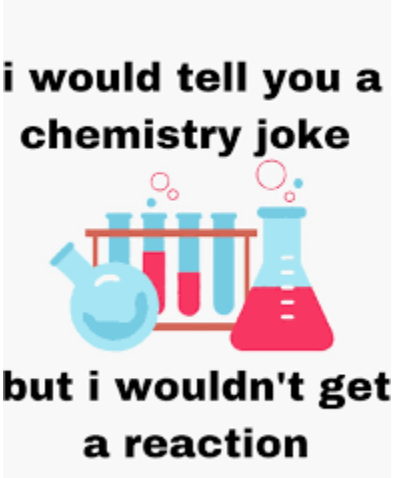
- equation being used
- knowns/unknowns
- equations with knowns plugged in
- algebraic work
- correct units and significant figures on answers

We will have an assessment on this work at the end of the first week of classes.

Congratulations on choosing AP Chemistry! It is a fun and fascinating course, and you should be proud that you are challenging yourself. This class will push you, make you a better student, get you very prepared for college, and help you prove to yourself how brilliant you really are! Your success in the course depends primarily upon your willingness to work hard. Remember, I'm here to support you and help you succeed. If you need anything, please do not hesitate to email me (or come see me when we're back in the fall)! Know that if you apply yourself here, you will reap the rewards. I'm so excited to work with you next year!

Mrs. Swiatek





AP Chemistry Boot Camp: Summer Assignment 2026

Significant Figures & Measurement

How to Make Accurate Measurements

https://youtu.be/sObrGonT71k

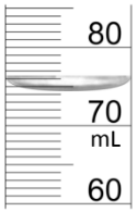
Rules for Significant Figures

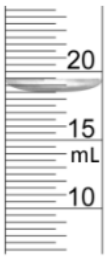
https://www.youtube.com/watch?v=l2yuDvwYq5g

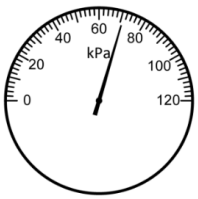
Calculations with Significant Figures

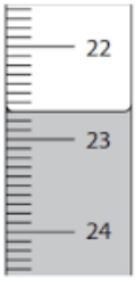
https://www.youtube.com/watch?v=l2yuDvwYq5g

1. *Identify the measurement to the correct number of place values.*

a. 

b. 

c. 

d. 

2. *Identify the number of significant figures.*

a. 1,245 m
b. 10,000 g
c. 3.02003×10^{14} m
d. 0.030 mL
e. 1,000. m
f. 10,733 g
g. 0.00420 mg
h. 990. torr
i. 325 K
j. 0.0004 L

3. *Round each of the following to 3 significant figures.*

a. 3.02003×10^{14} mL
b. 130,210 m
c. 0.42858 m
d. 37500 µg
e. 481.9×10^{-9} cm
f. 37.446 m
g. 49.0385 L
h. 0.00794 mg
i. 0.006008 g
j. 825,066 mm

4. *Perform the following calculations. Your answer should be written in the correct number of significant figures and include units when possible.*

a. 12 g + 0.677 g + 86.33 g
b. (355.78 g) / (0.056 g)
c. 97.34 mL – 34.1 mL
d. 0.14 mol x (6.02×10^{23} atoms/mol)
e. $\frac{1.26x10^{-3}kg}{(3.2m + 10m + 8.9m)(4.3x10^{-6}s)}$
f. 323 X 0.0002
g. 4008 ÷ 2.763
h. 66.3 + 27.008
i. 67.45 – 12.2
j. 4.1 X 6.22 X 5.478

Metric Conversions & Dimensional Analysis

SI Units & Conversion Factors

https://tinyurl.com/2p8v8upr

Dimensional Analysis

https://tinyurl.com/yzamkr6k https://youtu.be/d_WfCwJW0Og

5. *Show work using dimensional analysis. Follow significant figures and rounding rules unless the number of significant figures is specified. Include units where appropriate.*

   a. How many hours are in a week? Report your answer to three significant figures.
   b. Find the number of centimeters in 1.00×10^2 yards. (1 yd = 3 ft, 1 ft = 12 in, 2.54 cm = 1 in)
   c. If Jules Verne expressed the title of his famous book, Twenty Thousand Leagues Under the Sea in basic SI units, what would the title be? Round your answer to three significant figures. (1 league = 3.45 mi, 1 mi = 1609 m)
   d. How many µL are present in 250 mL of H_2O?
   e. Wavelengths are often represented in nm. What is the diameter of a helium (He) atom in nm if it is equivalent to 1.0×10^{-13} km?
   f. The area of a rectangular room has a length of 10.5 m and a width of 4.50 m. What is this area in m^2? In cm^2?
   g. The acceleration of a sphere is determined to be 9.52 m/s^2. What is the acceleration in km/min^2?
   h. I have a bar of gold that is 7.0 in 4.0 in 3.0 in. The density of gold is 19.3 g/cm^3. The price of gold currently is $1,945.94 per ounce. How much is my gold bar worth?
   i. If the RDA for vitamin C is 60 mg per day and there are 70 mg of vitamin C per 100 g of orange, how many 3 oz. oranges would you have to eat each week to meet this requirement?
   j. Owls generally maintain territories of 3 acres. How many owls could live in a large wooded area of 20 hectares? (1 hectare=1 sq. dekameter=100 m^2= 2.47 acres)

Classification of Matter, Properties, and Change

Classification of Matter

https://tinyurl.com/np9fd5wf

6. Identify each as pure substance (PS) or a mixture (M). Then label as element (E), compound (C), solution/homogeneous mixture (S) or heterogeneous mixture (H).

   a. Italian salad dressing
   b. Copper wire
   c. Aluminum nitrate
   d. Hydrochloric acid
   e. 98% isopropyl alcohol
   f. Carbon dioxide
   g. Salt water

Physical vs. Chemical Properties & Changes

https://tinyurl.com/2366nc9x

7. Identify each as physical property (PP) or chemical property (CP).

   a. Flammability
   b. Density
   c. Ability to react with oxygen
   d. Tarnishes
   e. Melting point
   f. Sublimation point
   g. Solubility
   h. Odor

8. Identify each as physical change (PC) or chemical change (CC).

   a. NaCl dissolves
   b. Iron rusts
   c. Ice melts
   d. Alcohol evaporates
   e. Wood rots
   f. Paper towel absorbs water
   g. Pancakes cook
   h. An apple is cut

Periodic Table

Organization of the Periodic Table

https://tinyurl.com/2v5vvve5
https://tinyurl.com/54naaatt

9. Which groups (columns) of elements represent the most reactive metals & the most reactive nonmetals?
10. Which group of elements is chemically inert?
11. Which types of elements form positively charged ions (cations)? Negatively charged ions (anions)?
12. Where on the periodic table will you find the elements with the most metallic character? Nonmetallic?
13. How do the periods (horizontal rows) of the periodic table correspond to an atom's structure?
14. How do the groups/families of the periodic table correspond to the number of valence electrons for a certain element? *(Note: this rule will not apply to the transition metals.)

Nomenclature

Ionic Compounds

https://tinyurl.com/yf2ck2z9

15. Name the following compounds:
    a. K_2O
    b. $MnCl_2$
    c. Cu_2O
    d. $ZnCO_3$
    e. $BaCr_2O_7$
    f. $Fe(CN)_3$
    g. $Mg_3(PO_4)_2$
16. Write formulas for the following compounds:
    a. Lithium fluoride
    b. Calcium phosphate
    c. Silver sulfide
    d. Aluminum sulfate
    e. Chromium (III) phosphide
    f. Lead (IV) hydroxide
    g. Ammonium sulfite
    h. Nickel (II) hypochlorite
    i. Rubidium chromate

Covalent (Molecular) Compounds

https://tinyurl.com/mr47a9fm

17. Name the following compounds:
    a. SO_3
    b. N_2O_5
    c. NH_3
    d. PCl_5
    e. P_4S_5
18. Write formulas for the following compounds:
    a. Antimony tribromide
    b. Carbon disulfide
    c. Nitrogen trifluoride
    d. phosphorus triiodide
    e. Dinitrogen trioxide

Acids

(*new; not addressed in intro chem)

https://tinyurl.com/58xnxp76

19. Name the following acids:
    a. $HClO_2$
    b. HNO_3
    c. H_2SO_4
    d. HCl
    e. H_2SO_3
20. Write formulas for the following acids:
    a. Hydrosulfuric acid
    b. Nitrous acid
    c. Carbonic acid
    d. Hydrocyanic acid
    e. Chloric acid

Chemical Bonding
https://youtu.be/S_k0kr2eZSQ

Ionic Compounds	Covalent Compounds
https://tinyurl.com/2x4dbzyp	https://tinyurl.com/mrys8vm4

21. Identify the type of bonding AND justify your answer.

a. Sulfur and hydrogen
b. Sulfur and cesium
c. Chlorine and bromine
d. Calcium and chlorine
e. Copper and sulfur
f. NaCl
g. MgB_{r2}
h. NBr_3

Chemical Reactions

Types of Chemical Reactions
https://tinyurl.com/bdfbvr47

22. Identify the type of chemical reaction represented by each equation below:

a. A + B → AB
b. AB → A + B
c. A + BC → B + AC
d. AB + CD → AD + CB
e. $C_xH_yO_z + O_2 \rightarrow CO_2 + H_2O$
f. $2Na(s) + Cl_2(g) \rightarrow 2NaCl(s)$
g. $2NaBr(aq) + Cl_2(g) \rightarrow 2NaCl(s) + Br_2(l)$
h. $3Na_3PO_4 + 3KOH \rightarrow 3NaOH + K_3PO_4$
i. $C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O$
j. $CaCO_3 \rightarrow CaO + CO_2$

Balancing Chemical Equations
https://youtu.be/e_C-V5vJv80

23. Balance each of the following skeleton equations:

a. $\_\_Fe + \_\_P_4 \rightarrow \_\_Fe_3P_2$
b. $\_\_Ca + \_\_H_2O \rightarrow \_\_Ca(OH)_2 + \_\_H_2$
c. $\_\_Ba(OH)_2 + \_\_H_3PO_4 \rightarrow \_\_Ba_3(PO_4)_2 + \_\_H_2O$
d. $\_(NH_4)_2CO_3 + \_Al(ClO_3)_3 \rightarrow \_Al_2(CO_3)_3 + \_NH_4ClO_3$
e. $\_\_NH_4NO_3(s) \rightarrow \_\_N_2(g) + \_\_O_2(g) + \_\_H_2O(g)$
f. $\_\_ C_5H_{10}O_2(l) + \_\_O_2(g) \rightarrow \_\_H_2O(g) + \_\_CO_2(g)$

Mole Conversions & Stoichiometry

Molar Mass & Mole Conversions
https://tinyurl.com/29h4wepb
https://tinyurl.com/5ddnvv32

24. Calculate the molar mass of each of the following:

a. $Ca(OH)_2$
b. CH_3COOH
c. $NH_4C_2H_3O_2$
d. $Pb(CO_3)_2$
e. $Al(ClO_3)_3$

25. Convert each of the following:
a. 500 atoms Fe to moles
b. 87.2 g $Pb(CO_3)_2$ to formula units
c. 4 mol $C_6H_{12}O_6$ to molecules
d. 452 g Argon to moles

Stoichiometry
https://tinyurl.com/vm4rmfrk
https://tinyurl.com/47wubv47
https://tinyurl.com/ch5cw8k5

$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O$

26. Complete the following calculations based on the given chemical reaction.

a. 13.7 g C_2H_2 react. How many grams of CO_2 produced?
b. How many grams C_2H_2 are needed to completely react with 18.5g O_2?
c. How many moles of water are produced when 32g O_2 react?

Limiting Reactants
https://tinyurl.com/4yrsx6j2
https://tinyurl.com/y3ymsdyz

$2\ BF_3 + 3\ H_2 \rightarrow 2\ B + 6\ HF$

27. Use the equation above to answer the following questions:
a. If 0.10 mol of BF_3 is reacted with 0.25 mol H_2, which reactant is the limiting reactant?
b. What is the maximum amount (in grams) of HF that can be produced from these amounts?
c. If 3.8 g HF are produced, what is the percent yield?

PERIODIC TABLE OF THE ELEMENTS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 **H** 1.008																	2 **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** 47.87	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** 65.38	31 **Ga** 69.72	32 **Ge** 72.63	33 **As** 74.92	34 **Se** 78.97	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** 95.95	43 **Tc**	44 **Ru** 101.07	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** 121.76	52 **Te** 127.60	53 **I** 126.90	54 **Xe** 131.29
55 **Cs** 132.91	56 **Ba** 137.33	57-71 *	72 **Hf** 178.49	73 **Ta** 180.95	74 **W** 183.84	75 **Re** 186.21	76 **Os** 190.23	77 **Ir** 192.22	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**	85 **At**	86 **Rn**
87 **Fr**	88 **Ra**	89-103 †	104 **Rf**	105 **Db**	106 **Sg**	107 **Bh**	108 **Hs**	109 **Mt**	110 **Ds**	111 **Rg**	112 **Cn**	113 **Nh**	114 **Fl**	115 **Mc**	116 **Lv**	117 **Ts**	118 **Og**

*Lanthanoids	57 **La** 138.91	58 **Ce** 140.12	59 **Pr** 140.91	60 **Nd** 144.24	61 **Pm**	62 **Sm** 150.36	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** 173.05	71 **Lu** 174.97
†Actinoids	89 **Ac**	90 **Th** 232.04	91 **Pa** 231.04	92 **U** 238.03	93 **Np**	94 **Pu**	95 **Am**	96 **Cm**	97 **Bk**	98 **Cf**	99 **Es**	100 **Fm**	101 **Md**	102 **No**	103 **Lr**

Symbols and Charges for Polyatomic Ions

Formula	Name	Formula	Name
NO_3^-	nitrate	ClO_4^-	perchlorate
NO_2^-	nitrite	ClO_3^-	chlorate
CrO_4^{2-}	chromate	ClO_2^-	chlorite
$Cr_2O_7^{2-}$	dichromate	ClO^-	hypochlorite
CN^-	cyanide	IO_4^-	periodate
MnO_4^-	permanganate	IO_3^-	iodate
OH^-	hydroxide	IO^-	hypoiodite
O_2^{2-}	peroxide	BrO_3^-	bromate
NH_2^-	amide	BrO^-	hypobromite
CO_3^{2-}	carbonate	HCO_3^-	hydrogen carbonate (bicarbonate)
SO_4^{2-}	sulfate	HSO_4^-	hydrogen sulfate (bisulfate)
SO_3^{2-}	sulfite	HSO_3^-	hydrogen sulfite (bisulfite)
$C_2O_4^{2-}$	oxalate	$HC_2O_4^-$	hydrogen oxalate (binoxalate)
PO_4^{3-}	phosphate	HPO_4^{2-}	hydrogen phosphate
PO_3^{3-}	phosphite	$H_2PO_4^-$	dihydrogen phosphate
$S_2O_3^{2-}$	thiosulfate	HS^-	hydrogen sulfide
AsO_4^{3-}	arsenate	BO_3^{3-}	borate
SeO_4^{2-}	selenate	$B_4O_7^{2-}$	tetraborate
SiO_3^{2-}	silicate	SiF_6^{2-}	hexafluorosilicate
$C_4H_4O_6^{2-}$	tartrate	SCN^-	thiocyanate
$C_2H_3O_2^-$	acetate		

(an alternate way to write acetate is CH_3COO^-)

NH_4^+ **ammonium** *The only positive polyatomic ion.*

Note: Writing just the plus sign or minus sign for ions with 1+ or 1- charges is acceptable.