Hello,

I am so excited that you are taking AP Chemistry next year and that I get to teach it! We are going to have a blast! There are important dates I want to point out so that you are prepared for the first day of school.

I am not going to lie and tell you that this course is going to be easy, because it's not. But, if you are determined and show me all the hard work you put into it, I promise that it's going to be worth it. We are going to have a fun year and I cannot wait!

Have a great summer,

Ms. Budz

1st Week of School

1st Day Back (half-day, August 18th) → **Summer Work Packet Due**, Syllabus handed out.

2nd Day Back (half-day, August 19th) → Go over Summer packets.

3rd Day Back (1:40 Dismissal, August 20th) → Quiz on Summer Packet Work, not including naming.

4th Day Back (full day, August 21st) → Quiz on Polyatomic ions and Naming

If you have any questions of the summer, please email me @ kbudz@jca-online.com or message me on teams. I am here to help you as much as I can. Just please do not email me the day before everything is due, because I cannot promise that I will answer you on time.

AP Chemistry

Summer Assignment

Kbudz – 2026-2027

Name: _____

The following topics below were covered in chemistry, if you need help on them, please let me know….

Topic 1: Significant Figures

1. Determine the number of significant figures in each of the following:
    a. 0.7540 _____
    b. 12500 _____
    c. 1000.01 _____
    d. 1200 _____
    e. 1.04×10^3 _____
    f. 0.0080050 _____
2. Perform the following calculations and round to the appropriate number of significant figures:
    a. 34.66 + 333.0 = _____
    b. 1.23 + 9.66 = _____
    c. 445 – 1.22 = _____
    d. 18.2 x 1.998 = _____
    e. 10.2 / 1.34 = _____
3. Round each of the following numbers to three significant figures
    a. 167.789 _____
    b. 0.00000445345 _____
    c. 25.0545 _____
    d. 3.1415926536 _____
    e. 8504.0435 _____
    f. 14.4335 _____

Topic 2: Metric and Temperature Conversions

4. Use dimensional analysis (factor-label method) to make the following metric conversions:
    a. 3.40 m to cm
    b. 289 cm to nm
    c. 125145 J to kJ
    d. 164 mg to g
    e. 46.5 mL to L
5. Make the following temperature conversions.
    a. 162˚F to ˚C
    b. 0.0˚F to K
    c. -18˚C to K

Topic 3: Algebra Expressions

6. What is the density equation? _____
7. What is the density of an object that has a mass of 13.5 g and a volume of 7.2 mL?

8. Gas laws are important in Chemistry, but in AP we don't have a day that we learn them. It is assumed that you know what they are. You must memorize these. Write the gas law equation for each of the following and write down what each variable means.

Boyles Law:

Charles Law:

Avogadro's Law:

Combined Gas Law:

Gay-Lussac's Law:

Ideal Gas Law:

Dalton's Law of Partial Pressure:

Topic 4: Nomenclature

9. Name or write the formula for the following ionic compounds.

a. LiCl		g. tin (II) bromide	
b. $Mg(OH)_2$		h. potassium phosphate	
c. K_3P		i. nickel (II) perchlorate	
d. Fe_2O_3		j. sodium hydroxide	
e. FeO		k. zinc phosphate	
f. $ZnCl_2$		l. ammonium sulfate	

10. Name or write the formula for the following covalent compounds.

a. CO		g. nitrogen tribromide	
b. CBr_4		h. tetraphosphorus decaoxide	
c. SO_2		i. xenon hexafluoride	
d. N_2O_4		j. dicarbon tetrafluoride	

11. Name or write the formula for the following acids:

a. HCl		g. hydrobromic acid	
b. HNO_3		h. hydronitric acid	
c. $HC_2H_3O_2$		i. phosphoric acid	
d. H_2SO_4		j. hydrosulfuric acid	

Topic 5: Atomic structure

12. Determine the number of protons, neutrons, and electrons in each of the following:
    a. $^{39}_{19}K$
    b. $^{23}_{11}Na^{1+}$
    c. $^{208}_{82}Pb$
    d. $^{33}_{15}P^{3-}$

13. Write the symbol for the atom that contains:
    a. 24 protons, 21 electrons, and 24 neutrons
    b. 34 protons, 45 neutrons, and 34 electrons
    c. 8 protons, 10 neutrons, and 10 electrons

Topic 6: Writing and Balancing Chemical Equations

14. Balance the following chemical equations
    a. _____ Cr (s) + _____ O_2 (g) → _____ Cr_2O_3 (s)

    b. _____ SiH_4 (g) → _____ Si (s) + _____ H_2 (g)

    c. _____ SO_3 (g) → _____ SO_2 (g) + _____ O_2 (g)

    d. _____ $Pb(NO_3)_2$ (s) → _____ PbO (s) + _____ NO_2 (g) + _____ O_2 (g)

    e. _____ C_3H_8 (g) + _____ O_2 (g) → _____ CO_2 (g) + 1 _____ H_2O (g)

    f. _____ C_2H_5OH (l) + _____ O_2 (g) → _____ CO_2 (g) + _____ H_2O (g)

15. Write a balanced chemical equation for each of the following reaction descriptions.
    a. When a 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. Gaseous ammonia and oxygen react to produce nitrogen monoxide gas and water vapor.

Topic 7: Moles and Stoichiometry

16. Find the Molar Mass for the following compounds.
    a. H_2O

    b. C_4H_{10}

c. NaCl

17. Convert the following to number of moles.
    a. 76.8 g of NaOH

    b. 34.2 g of He

    c. 8.9 g of CH_4

18. Convert the following to mass.
    a. 0.89 mol of H_2O

    b. 12.34 mol of $BeBr_2$

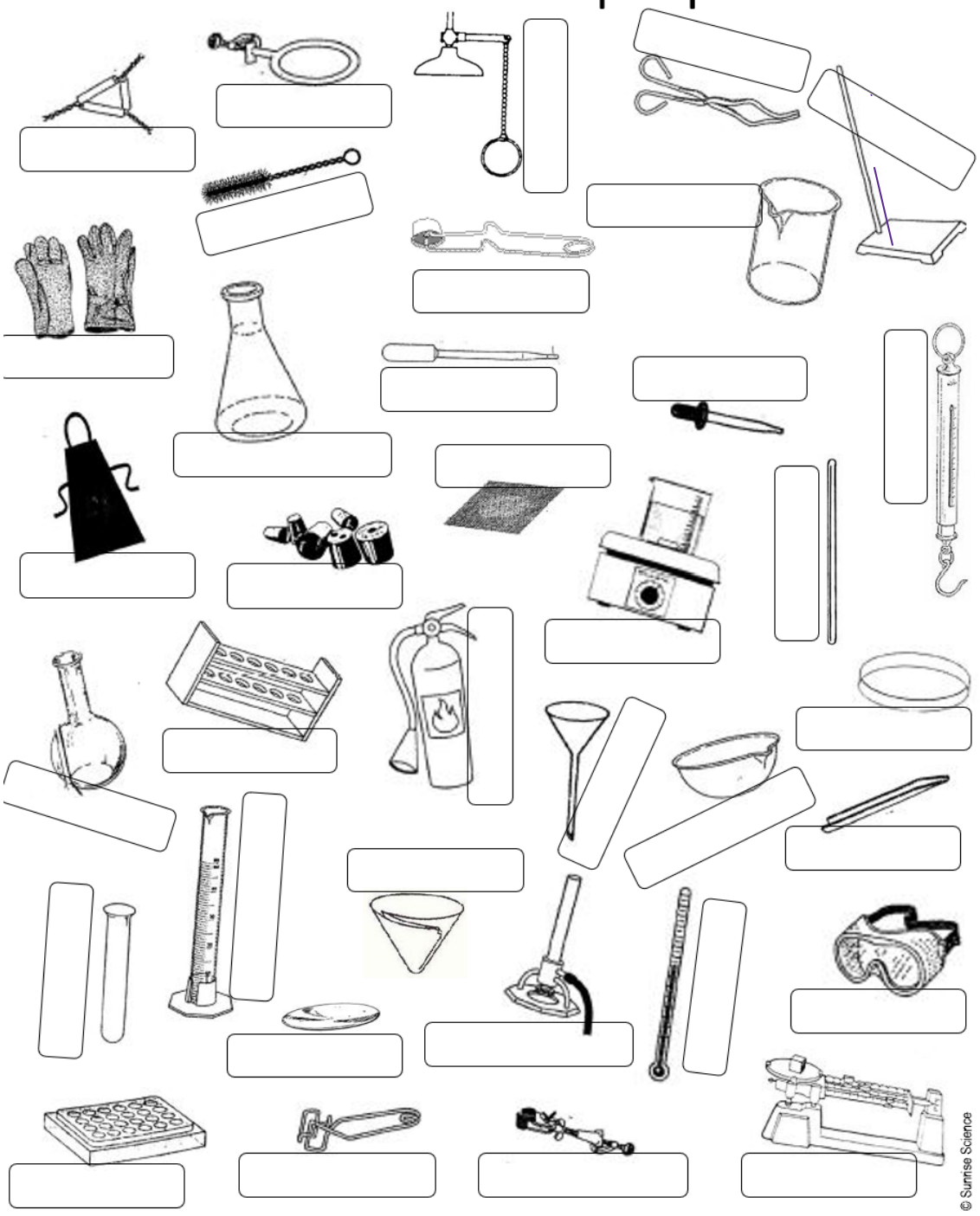
    c. 0.34 mol of Carbon

Topic 8: Lab Equipment

Label the correct name for the lab equipment shown.

Name _____ Date _____ Class _____

Common Lab Equipment



Topic 9: Polyatomic ions

You will be quizzed on the following, so you must memorize them.

Common Polyatomic Ions

acetate	$C_2H_3O_2^-$
ammonium	NH_4^+
arsenate	AsO_4^{3-}
arsenite	AsO_3^{3-}
azide	N_3^-
benzoate	$C_7H_5O_2^-$
borate	BO_3^{3-}
bromate	BrO_3^-
carbonate	CO_3^{2-}
chlorate	ClO_3^-
chlorite	ClO_2^-
chromate	CrO_4^{2-}
cyanide	CN^-
dichromate	$Cr_2O_7^{2-}$
dihydrogen phosphate	$H_2PO_4^-$
dihydrogen phosphite	$H_2PO_3^-$
hydrogen carbonate	HCO_3^-
hydrogen phosphate	HPO_4^{2-}
hydrogen phosphite	HPO_3^{2-}
hydrogen sulfate	HSO_4^-
hydrogen sulfide	HS^-
hydrogen sulfite	HSO_3^-
hydroxide	OH^-
hypochlorite	ClO^-
iodate	IO_3^-
manganate	MnO_4^{2-}
nitrate	NO_3^-
nitrite	NO_2^-
oxalate	$C_2O_4^{2-}$
perchlorate	ClO_4^-
permanganate	MnO_4^-
peroxide	O_2^{2-}
phosphate	PO_4^{3-}
phosphite	PO_3^{3-}
silicate	SiO_3^{2-}
sulfate	SO_4^{2-}
sulfite	SO_3^{2-}
tartrate	$C_4H_4O_6^{2-}$
thiocyanate	SCN^-
thiosulfate	$S_2O_3^{2-}$

AsO_3^{3-}	arsenite
AsO_4^{3-}	arsenate
BO_3^{3-}	borate
BrO_3^-	bromate
$C_2H_3O_2^-$	acetate
$C_2O_4^{2-}$	oxalate
$C_4H_4O_6^{2-}$	tartrate
$C_7H_5O_2^-$	benzoate
ClO^-	hypochlorite
ClO_2^-	chlorite
ClO_3^-	chlorate
ClO_4^-	perchlorate
CN^-	cyanide
CO_3^{2-}	carbonate
$Cr_2O_7^{2-}$	dichromate
CrO_4^{2-}	chromate
$H_2PO_3^-$	dihydrogen phosphite
$H_2PO_4^-$	dihydrogen phosphate
HCO_3^-	hydrogen carbonate
HPO_3^{2-}	hydrogen phosphite
HPO_4^{2-}	hydrogen phosphate
HS^-	hydrogen sulfide
HSO_3^-	hydrogen sulfite
HSO_4^-	hydrogen sulfate
IO_3^-	iodate
MnO_4^-	permanganate
MnO_4^{2-}	manganate
N_3^-	azide
NH_4^+	ammonium
NO_2^-	nitrite
NO_3^-	nitrate
O_2^{2-}	peroxide
OH^-	hydroxide
PO_3^{3-}	phosphite
PO_4^{3-}	phosphate
$S_2O_3^{2-}$	thiosulfate
SCN^-	thiocyanate
SiO_3^{2-}	silicate
SO_3^{2-}	sulfite
SO_4^{2-}	sulfate