

AP CHEM



Summer Assignment

Complete the 3 worksheets in this packet.

THEY ARE DUE BACK WEEK ONE!!!

Email: mvarela@ccboe.com

PERIODIC TABLE OF THE ELEMENTS

1	H 1.008																	2	He 4.00		
3	Li 6.54	Be 9.01																	9	F 19.00	Ne 20.18
11	Na 22.99	Mg 24.30																	17	Cl 35.45	Ar 39.95
19	K 39.10	Ca 40.08	Sc 44.96	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
37	Rb 85.47	Sr 87.62	Y 88.91	Zr 91.22	V 50.94	Cr 52.00	Mn 54.94	Fe 55.85	Co 58.93	Ni 58.69	Cu 63.55	Zn 65.39	Ga 69.72	Ge 72.59	As 74.92	Se 78.96	Br 79.90	Kr 83.80			
55	Cs 132.91	Ba 137.33	*La 138.91	Hf 178.49	Ta 180.95	W 183.85	Re 186.21	Os 190.2	Ir 192.2	Pt 195.08	Au 196.97	Hg 200.59	In 114.82	Sn 118.71	Sb 121.75	Te 127.60	I 126.91	Xe 131.29			
87	Fr (223)	Ra 226.02	†Ac 227.03	Rf (261)	Db (262)	Sg (266)	Bh (264)	Hs (277)	Mt (268)	Ds (271)	Rg (272)	Tl 204.38	Pb 207.2	Bi 208.98	Po (209)	At (210)	Rn (222)				
58	Ce 140.12	Pr 140.91	Nd 144.24	60	61	62	63	64	65	66	67	68	69	70	71						
90	Th 232.04	Pa 231.04	U 238.03	Pm (145)	Sm 150.4	Eu 151.97	Gd 157.25	Tb 158.93	Dy 162.50	Ho 164.93	Er 167.26	Tm 168.93	Yb 173.04	Lu 174.97							
				Np (237)	Pu (244)	Am (243)	Cm (247)	Bk (247)	Cf (251)	Es (252)	Fm (257)	Md (258)	No (259)	Lr (262)							

*Lanthanide Series

†Actinide Series

AP CHEMISTRY REQUIRED IONS

I. MONATOMIC ANIONS

- *-ide* suffix
- charge from location on periodic table

fluoride	F ¹⁻
chloride	Cl ¹⁻
bromide	Br ¹⁻
iodide	I ¹⁻

oxide	O ²⁻
sulfide	S ²⁻
selenide	Se ²⁻
telluride	Te ²⁻

nitride	N ³⁻
phosphide	P ³⁻
arsenide	As ³⁻

II. MONATOMIC CATIONS

- charge from location on periodic table

lithium	Li ¹⁺
sodium	Na ¹⁺
potassium	K ¹⁺
rubidium	Rb ¹⁺
cesium	Cs ¹⁺

beryllium	Be ²⁺
magnesium	Mg ²⁺
calcium	Ca ²⁺
strontium	Sr ²⁺
barium	Ba ²⁺

aluminum	Al ³⁺

III. POLYATOMIC ANIONS

- Parent anion *-ate* suffix
- One additional oxygen from parent *-per* (stem)*ate*
- One less oxygen from parent *-ite* suffix
- Two less oxygen from parent *hypo-* (stem)*ite*

perchlorate (one additional O)	ClO ₄ ¹⁻
chlorate (parent)	ClO ₃ ¹⁻
chlorite (one less O)	ClO ₂ ¹⁻
hypochlorite (two less O)	ClO ¹⁻

perbromate	BrO ₄ ¹⁻
bromate (parent)	BrO ₃ ¹⁻
bromite	BrO ₂ ¹⁻
hypobromite	BrO ¹⁻

periodate	IO ₄ ¹⁻
iodate (parent)	IO ₃ ¹⁻
iodite	IO ₂ ¹⁻
hypoiodite	IO ¹⁻

nitrate (parent)	NO ₃ ¹⁻
nitrite	NO ₂ ¹⁻

permanganate	MnO ₄ ¹⁻
manganate (parent)	MnO ₃ ¹⁻

sulfate (parent)	SO ₄ ²⁻
sulfite	SO ₃ ²⁻

peroxide (oxide is parent)	O ₂ ²⁻

phosphate (parent)	PO ₄ ³⁻
phosphite	PO ₃ ³⁻

IV. ADDITIONAL POLYATOMIC ANIONS

hydrogen sulfate (bisulfate)	HSO_4^{1-}
thiosulfate	$\text{S}_2\text{O}_3^{2-}$
thiocyanate	SCN^{1-}

hydroxide	OH^{1-}
-----------	------------------

cyanide	CN^{1-}
---------	------------------

chromate	CrO_4^{2-}
dichromate	$\text{Cr}_2\text{O}_7^{2-}$

carbonate	CO_3^{2-}
hydrogen carbonate (bicarbonate)	HCO_3^{1-}

acetate	$\text{CH}_3\text{COO}^{1-}$ or $\text{C}_2\text{H}_3\text{O}_2^{1-}$
---------	---

oxalate	$\text{C}_2\text{O}_4^{2-}$
---------	-----------------------------

hydrogen phosphate	HPO_4^{2-}
dihydrogen phosphate	$\text{H}_2\text{PO}_4^{1-}$

V. ADDITIONAL POLYATOMIC CATIONS

ammonium	NH_4^{1+}
hydronium	H_3O^{1+}

VI. COMMON TRANSITION METALS IONS

➤ More positive charge has an *-ic* suffix
less positive charge has an *-ous* suffix.

silver	Ag^{1+}
copper (I) (cuprous)	Cu^{1+}
copper (II) (cupric)	Cu^{2+}
gold (I) (aurous)	Au^{1+}
mercury (I) (mercurous)	Hg_2^{2+}

mercury (II) (mercuric)	Hg^{2+}
zinc (II)	Zn^{2+}
cadmium	Cd^{2+}
chromium (II) (chromous)	Cr^{2+}
manganese (II) (manganous)	Mn^{2+}
iron (II) (ferrous)	Fe^{2+}
cobalt (II) (cobaltous)	Co^{2+}
nickel (II) (nickelous)	Ni^{2+}
tin (II) (stannous)	Sn^{2+}
lead (II) (plumbous)	Pb^{2+}

gold (III) (auric)	Au^{3+}
chromium (III) (chromic)	Cr^{3+}
manganese (III) (manganic)	Mn^{3+}
iron (III) (ferric)	Fe^{3+}
cobalt (III) (cobaltic)	Co^{3+}
nickel (III) (nickelic)	Ni^{3+}

tin (IV) (stannic)	Sn^{4+}
lead (IV) (plumbic)	Pb^{4+}

AP Chemistry Worksheet 1: Structure of the Atom and the Periodic Table

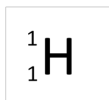
Notes:

Protons – located in the nucleus; protons are equal to the atomic #.

Neutrons – located in the nucleus; protons are equal to the atomic mass – atomic #

Electrons – surround the nucleus; in a neutral atom, electrons are equal to protons.

Atomic mass



Atomic number

1. Fill in the gaps in the following table, assuming each column represents a neutral

Symbol	${}^{39}_{19}\text{K}$				
Protons		25			82
Neutrons		30	64		
Electrons			48	56	
Mass#				137	207

2. Give the name and the common charge for elements found in each of these groups of the periodic table.

- (a) Group 1
- (b) Group 2
- (c) Group 17
- (d) Group 18

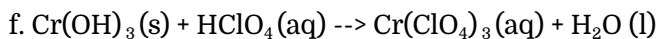
3. Describe where each type of element is found on the Periodic

- (a) Metals
- (b) Non-metals
- (c) Transition metals
- (d) Lanthanides

AP Chemistry Worksheet 2: Chemical Reactions

1. Balance the following equations:

- a. $\text{CO (g)} + \text{O}_2\text{(g)} \rightarrow \text{CO}_2\text{(g)}$
- b. $\text{N}_2\text{O}_5\text{(g)} + \text{H}_2\text{O (l)} \rightarrow \text{HNO}_3\text{(aq)}$
- c. $\text{PCl}_5\text{(l)} + \text{H}_2\text{O (l)} \rightarrow \text{H}_3\text{PO}_4\text{(aq)} + \text{HCl (aq)}$
- d. $\text{CH}_4\text{(g)} + \text{Br}_2\text{(g)} \rightarrow \text{CBr}_4\text{(l)} + \text{HBr (g)}$
- e. $\text{C}_5\text{H}_{10}\text{O}_2\text{(l)} + \text{O}_2\text{(g)} \rightarrow \text{CO}_2\text{(g)} + \text{H}_2\text{O (l)}$



Notes:

Synthesis: Two substances combine to form one.

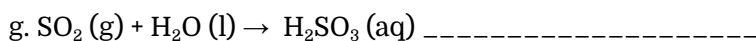
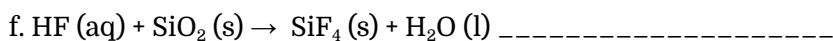
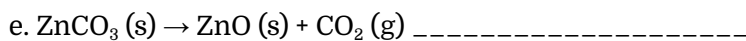
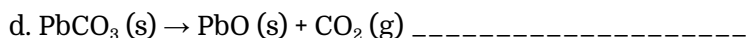
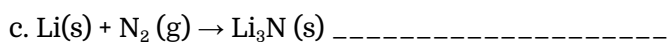
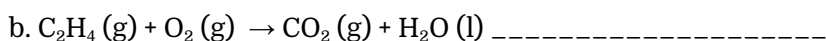
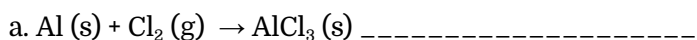
Decomposition: One substance breaks down into two or more substances.

Single Replacement: An element reacts with a compound to form a new compound and a new element.

Double Replacement: Two compounds react to form two new compounds.

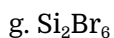
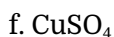
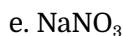
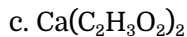
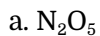
Combustion: A hydrocarbon reacts with O_2 to form carbon dioxide and water.

2. Balance the following equations, and indicate what type of reaction each one is:



AP Chemistry Worksheet 3: The Mole

1. Determine the molar mass of each of the following compounds:



2. A sample of glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, contains 2.03×10^{21} atoms of carbon.

a. How many atoms of hydrogen does it contain?

b. How many molecules of glucose does it contain?

c. How many moles of glucose does it contain?

d. What is the mass of the sample in grams?

3. Calculate the following amounts:

e. How many moles of chloride ions are in 0.0750 g of magnesium chloride?

b. What is the mass, in grams, of 3.50×10^{-3} mol of aluminum sulfate?

c. What is the mass, in grams, of 1.75×10^{20} molecules of caffeine, $C_8H_{10}N_4O_2$?

d. What is the molar mass of cholesterol if 0.00105 mol weighs 0.406 g?

4. Calculate the number of molecules in:

f. 0.0666 mol propane, C_3H_8 , a hydrocarbon fuel

g. A 50.0 mg tablet of acetaminophen, $C_8H_9O_2N$, an analgesic solid under the name of Tylenol

h. A tablespoon of table sugar, $C_{12}H_{22}O_{11}$, weighing 10.5 g