

Science 10  
Review for Chemistry Test

Key

Metalloids, Metals and Nonmetals

THE Elements

metals ←																		→ nonmetals																																																																						
<input type="checkbox"/> Alkali Metals <input type="checkbox"/> Alkaline Earth Metals <input type="checkbox"/> Transition Metals <input type="checkbox"/> Lanthanides <input type="checkbox"/> Actinides																		<input type="checkbox"/> Other Metals <input type="checkbox"/> Metalloids <input type="checkbox"/> Other Nonmetals <input type="checkbox"/> Halogens <input type="checkbox"/> Noble Gases																																																																						
1 H Hydrogen	3 Li Lithium	4 Be Beryllium	5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon	11 Na Sodium	12 Mg Magnesium	13 Al Aluminum	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon	19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	55 Cs Cesium	56 Ba Barium	57-71 * Lanthanum Series	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon	87 Fr Francium	88 Ra Radium	89-103 ** Actinide Series	104 Rf Rutherfordium	105 Db Dubnium	106 Sg Seaborgium	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitnerium	110 Ds Darmstadtium	111 Rg Roentgenium	112 Cn Copernicium	113 Nh Nihonium	114 Fl Flerovium	115 Uup Ununpentium	116 Lv Livermorium	117 Uus Ununseptium	118 Uuo Ununoctium
72-71 *	57 La Lanthanum	58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium	89-103 **	89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium																																																									

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Identify each of the following elements as a metalloid, metal or nonmetal.

- a) iron metal
- b) carbon nonmetal
- c) neon nonmetal
- d) tungsten metal
- e) astatine nonmetal
- f) antimony metalloid
- g) aluminum metal
- h) terbium metal

## Types of Ions

### 1. monatomic ions (MI)

- > 1 type of atom involved:  $\text{Na}^{1+}$  (sodium ion)  
 $\text{Cl}^{1-}$  (chloride ion)

### 2. polyatomic ions (PI)

- > more than 1 type of atom involved:  $\text{NO}_3^{1-}$ ,  $\text{BO}_3^{3-}$ ,  $\text{NH}_4^{1+}$   
-> end in: "ate" ie/ sulfate ion,  $\text{SO}_4^{2-}$   
"ite" ie/ chlorite ion,  $\text{ClO}_2^{1-}$   
"ide" cyanide ion ( $\text{CN}^{1-}$ ), hydroxide ion ( $\text{OH}^{1-}$ ), peroxide ion ( $\text{O}_2^{2-}$ )

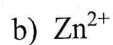
### 3. ions of multivalent metals (IMM)

- > 1 type of atom involved but more than one possible ion:  $\text{Cu}^{1+}$ ,  $\text{Cu}^{2+}$   
-> names include roman numerals: copper (I) ion, copper (II) ion

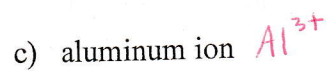
Identify each of the following ions as MI, PI or IMM.



PI



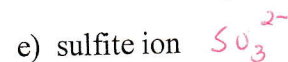
MI



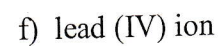
MI



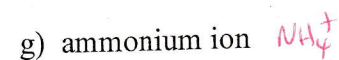
IMM



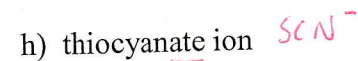
PI



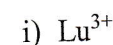
IMM



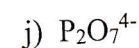
PI



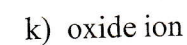
PI



MI



PI



MI

## Ionic Compounds

Start with a metal or  $\text{NH}_4^+$ .

1. simple binary compounds:  
 $\text{Li}_3\text{N}$  → lithium nitride
  
2. ionic compounds involving a polyatomic ion:  
 $\text{Mg}(\text{OH})_2$  → magnesium hydroxide  
 $(\text{NH}_4)_3\text{P}$  → ammonium phosphide
  
3. ionic compounds involving multivalent metals:  
 $\text{Cr}_2\text{O}_3$  → chromium (III) oxide
  
4. ionic compounds involving multivalent metals and polyatomic ions:  
 $\text{CuNO}_3$  → copper (I) nitrate

Complete the table below.

Name of Ionic Compound	Formula of Ionic Compound
Silver phosphide	$\text{Ag}_3\text{P}$
barium borate $\text{Ba}^{2+} (\text{BO}_3)^{-3}$ <del><math>\text{Ba}_3 \text{BO}_3</math></del>	$\text{B}_2\text{O}_3$
bismuth(V) sulfate	$\text{Bi}_2(\text{SO}_4)_5$
ammonium selenide $(\text{NH}_4)^+ \text{Se}^{2-}$ <del><math>\text{NH}_4 \text{Se}</math></del>	$(\text{NH}_4)_2\text{Se}$
manganese (IV) carbonate	$\text{Mn}(\text{CO}_3)_2$ $+4 \quad -4$
zinc chloride $\text{Zn}^{2+} \text{Cl}^{-}$ <del><math>\text{Zn} \text{Cl}_2</math></del>	$\text{ZnCl}_2$
iron (III) arsenide $\text{Fe}^{3+} \text{As}^{3-}$ <del><math>\text{Fe} \text{As}</math></del>	$\text{FeAs}$

## Molecular Compounds

*Involve nonmetals and metalloids.*

Prefixes: mono - 1      tri - 3      penta - 5      hepta - 7      nona - 9  
                 di - 2      tetra - 4      hexa - 6      octa - 8      deca - 10

1. simple binary compounds:

SO<sub>3</sub> - sulfur trioxide

C<sub>2</sub>H<sub>4</sub> - dicarbon tetrahydride

2. diatomic molecules:

hydrogen - H<sub>2</sub>

fluorine - F<sub>2</sub>      chlorine - Cl<sub>2</sub>

oxygen - O<sub>2</sub>

bromine - Br<sub>2</sub>

nitrogen - N<sub>2</sub>

iodine - I<sub>2</sub>

3. common names:

water - H<sub>2</sub>O

ammonia - NH<sub>3</sub>

hydrogen peroxide - H<sub>2</sub>O<sub>2</sub>

Complete the table below.

Name of Molecular Compound	Formula of Molecular Compound
<i>tetra phosphorous decahydride</i>	P <sub>4</sub> H <sub>10</sub>
oxygen dichloride	<i>OCl<sub>2</sub></i>
<i>tricarbon hexahydride</i>	C <sub>3</sub> H <sub>6</sub>
iodine monochloride	<i>ICl</i>
<i>dinitrogen trioxide</i>	N <sub>2</sub> O <sub>3</sub>
diphosphorous pentaoxide	<i>P<sub>2</sub>O<sub>5</sub></i>

## Types of Compounds

Identify each compound as ionic or molecular.

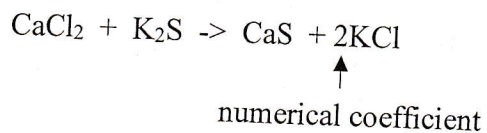
1.  $\text{PCl}_3$   
nm molecular
2.  $\text{Al(OH)}_3$   
m ionic
3.  $\text{SCl}_6$   
nm molecular
4.  $\text{Zn}_3(\text{PO}_4)_2$   
m ionic
5.  $\text{N}_2\text{O}_4$   
nm molecular
6.  $\text{CS}_2$   
nm molecular
7. silicon dioxide  
metalloid molecular
8. ammonium nitride  
 $\text{NH}_4^+$  ionic
9. nitrogen trihydride  
nm molecular
10. iron (II) sulfate  
m ionic
11. oxygen difluoride  
nm molecular
12. potassium iodide  
m ionic
13.  $\text{PbSO}_3$   
m ionic
14. carbon tetrachloride  
nm molecular

### Types of Reactions

1. Formation:  $A + B \rightarrow AB$  (1 product)
2. Decomposition:  $AB \rightarrow A + B$  (1 reactant)
3. Single Replacement Reaction:  $A + BC \rightarrow B + AC$   
element            compound            element            compound
4. Double Replacement Reaction:  $AB + CD \rightarrow AD + BC$   
compound            compound            compound            compound
5. Combustion Reaction: hydrocarbon +  $O_2 \rightarrow CO_2 + H_2O$

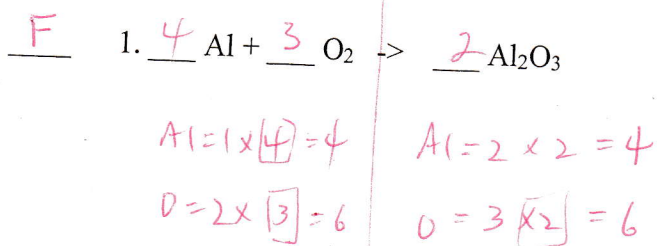
### Balancing Chemical Reactions

Use numerical coefficients to balance the atoms in a chemical reactions.



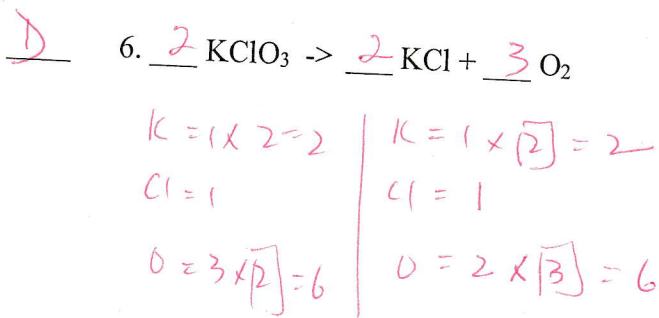
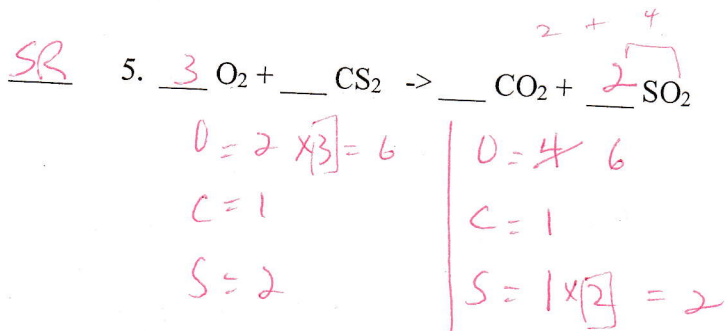
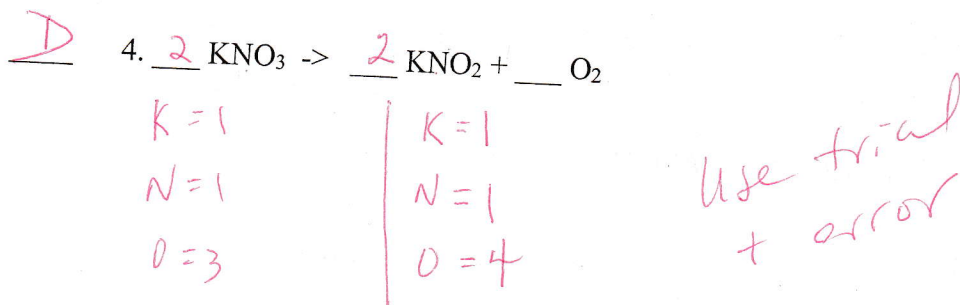
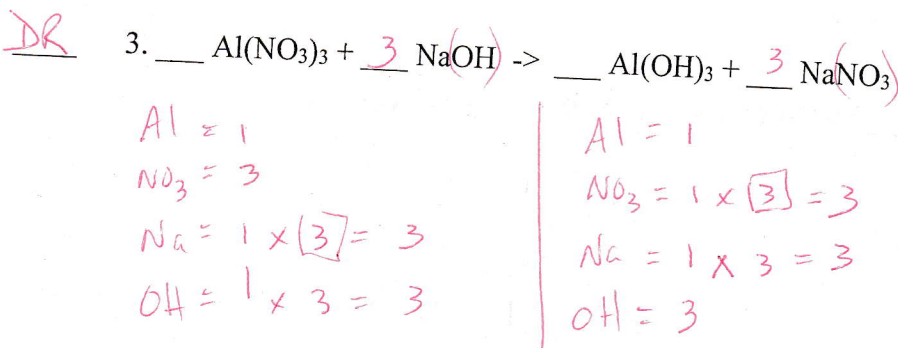
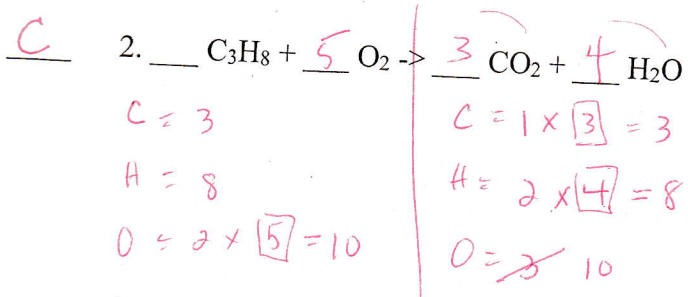
Identify each reaction as a formation reaction, decomposition reaction, single replacement reaction, double replacement reaction or combustion reaction.

Type

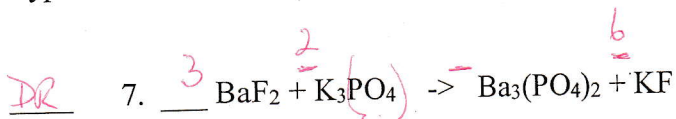


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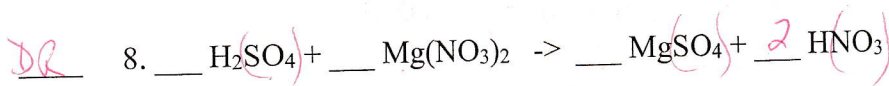
6+4=10



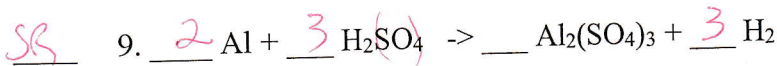
Type



$$\begin{array}{l|l} \text{Ba} = 1 \times [3] = 3 & \text{Ba} = 3 \\ \text{F} = 2 \times [3] = 6 & \text{F} = 1 \times 6 = 6 \\ \text{K} = 3 \times 2 = 6 & \text{K} = 1 \times [6] = 6 \\ \text{PO}_4 = 1 \times [2] = 2 & \text{PO}_4 = 2 \end{array}$$



$$\begin{array}{l|l} \text{H} = 2 & \text{H} = 1 \times 2 = 2 \\ \text{SO}_4 = 1 & \text{SO}_4 = 1 \\ \text{Mg} = 1 & \text{Mg} = 1 \\ \text{NO}_3 = 2 & \text{NO}_3 = 1 \times [2] = 2 \end{array}$$



$$\begin{array}{l|l} \text{Al} = 1 \times [2] = 2 & \text{Al} = 2 \\ \text{H} = 2 \times 3 = 6 & \text{H} = 2 \times [3] = 6 \\ \text{SO}_4 = 1 \times [3] = 3 & \text{SO}_4 = 3 \end{array}$$



$$\begin{array}{l|l} \text{W} = 1 & \text{W} = 1 \\ \text{O} = 3 & \text{O} = 1 \times [3] = 3 \\ \text{H} = 2 \times [3] = 6 & \text{H} = 2 \times 3 = 6 \end{array}$$