

# Chemistry Chapter 8 Worksheet

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Name: \_\_\_\_\_

Provide a short and specific definition in YOUR OWN WORDS. Do not use the definition from the book

*It should be noted that the chemical formulas and chemical names may not really exist. These chemical formulas and chemical names were created so you could practice using the naming rules.*

Additional Notes:

Chemical equation \_\_\_\_\_

\_\_\_\_\_

Precipitate \_\_\_\_\_

\_\_\_\_\_

Coefficient \_\_\_\_\_

\_\_\_\_\_

Word equation \_\_\_\_\_

\_\_\_\_\_

Formula equation \_\_\_\_\_

\_\_\_\_\_

Reversible reaction \_\_\_\_\_

\_\_\_\_\_

Synthesis reaction \_\_\_\_\_

\_\_\_\_\_

Decomposition reaction \_\_\_\_\_

\_\_\_\_\_

Electrolysis \_\_\_\_\_

\_\_\_\_\_

Single-displacement reaction \_\_\_\_\_

\_\_\_\_\_

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Double-displacement reaction \_\_\_\_\_

\_\_\_\_\_

Combustion reaction \_\_\_\_\_

\_\_\_\_\_

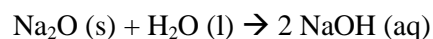
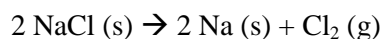
Activity series \_\_\_\_\_

\_\_\_\_\_

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## Section 8.1

1. Circle the reactants and place a rectangle around the products in the following equations.



2. Write down the 4 things that are considered evidence of a chemical reaction.

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

3. Complete the following table.

Symbol	Purpose
+	
→	
	Reversible reaction
	Solid State
(l)	
	Gas State
	Aqueous State

4. Explain, in your own words, the meaning of aqueous.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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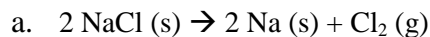
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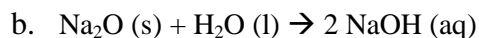
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5. Translate the following into word equations.



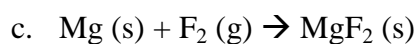
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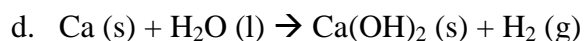
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6. Write the skeleton equations for the following reactions.

a. Solid potassium react with liquid water to produce aqueous potassium hydroxide and hydrogen gas

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b. Adding solid sodium oxide to liquid water will produce an aqueous solution of sodium hydroxide.

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c. A piece of lithium metal is dropped into a container of nitrogen gas, the resulting chemical reaction produces solid lithium nitride.

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d. A chunk of sodium oxide is placed in a container of carbon dioxide gas producing solid sodium carbonate.

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7. Write down the 7 diatomic (in correct notation).

\_\_\_\_\_

8. What state(s) of matter do the above elements (molecules) need to be in to be considered diatomic?

\_\_\_\_\_

9. Write the formula equations for the following reactions.

a. Two Solid potassium atoms react with two water molecules to produce two aqueous potassium hydroxide molecules and a hydrogen gas molecule.

\_\_\_\_\_

b. Solid sodium oxide reacts with liquid water to produce two aqueous sodium hydroxide molecules.

\_\_\_\_\_

c. Six solid lithium atoms react with a nitrogen gas molecule to produce two solid lithium nitride molecules.

\_\_\_\_\_

d. Solid sodium oxide reacts with carbon dioxide gas to produce solid sodium carbonate.

\_\_\_\_\_

10. How many moles are of each element/compound are present in the following balanced equations?

Equations	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
$2 \text{H}_2\text{O} \rightarrow 2 \text{H}_2 + \text{O}_2$			
$6 \text{Li} + \text{N}_2 \rightarrow 2 \text{Li}_3\text{N}$			
$2 \text{Na}_2\text{O} \rightarrow 2 \text{Na} + \text{O}_2$			
$2 \text{H}_2\text{O}_2 \rightarrow 2 \text{H}_2\text{O} + \text{O}_2$			

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11. What is the relative mass for each element/compound present in the following balanced equations?

Equations	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
$2 \text{H}_2\text{O} \rightarrow 2 \text{H}_2 + \text{O}_2$			
$6 \text{Li} + \text{N}_2 \rightarrow 2 \text{Li}_3\text{N}$			
$2 \text{Na}_2\text{O} \rightarrow 2 \text{Na} + \text{O}_2$			
$2 \text{H}_2\text{O}_2 \rightarrow 2 \text{H}_2\text{O} + \text{O}_2$			

This area is for your work

**What do you notice about the mass of the reactants and the mass of the products?**

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12. Balance the following equations.

- a.  $\underline{\quad}$  Ca +  $\underline{\quad}$  H<sub>2</sub>O →  $\underline{\quad}$  Ca(OH)<sub>2</sub> +  $\underline{\quad}$  H<sub>2</sub>
- b.  $\underline{\quad}$  Fe +  $\underline{\quad}$  O<sub>2</sub> →  $\underline{\quad}$  Fe<sub>3</sub>O<sub>4</sub>
- c.  $\underline{\quad}$  C<sub>6</sub>H<sub>14</sub> +  $\underline{\quad}$  O<sub>2</sub> →  $\underline{\quad}$  CO<sub>2</sub> +  $\underline{\quad}$  H<sub>2</sub>O
- d.  $\underline{\quad}$  AlCl<sub>3</sub> +  $\underline{\quad}$  AgNO<sub>3</sub> →  $\underline{\quad}$  Al(NO<sub>3</sub>)<sub>3</sub> +  $\underline{\quad}$  AgSO<sub>4</sub>
- e.  $\underline{\quad}$  Cl<sub>2</sub> +  $\underline{\quad}$  H<sub>2</sub>O →  $\underline{\quad}$  HCl +  $\underline{\quad}$  HClO
- f.  $\underline{\quad}$  Mg (s) +  $\underline{\quad}$  FeO<sub>2</sub> (aq) →  $\underline{\quad}$  Fe (s) +  $\underline{\quad}$  MgO (aq)
- g.  $\underline{\quad}$  Mg(s) +  $\underline{\quad}$  O<sub>2</sub> (g) →  $\underline{\quad}$  MgO (s)
- h.  $\underline{\quad}$  AgNO<sub>3</sub> +  $\underline{\quad}$  NaCl →  $\underline{\quad}$  AgCl +  $\underline{\quad}$  NaNO<sub>3</sub>
- i.  $\underline{\quad}$  Ba(ClO<sub>3</sub>)<sub>2</sub> →  $\underline{\quad}$  BaCl<sub>2</sub> +  $\underline{\quad}$  O<sub>2</sub>
- j.  $\underline{\quad}$  Br<sub>2</sub> +  $\underline{\quad}$  KI →  $\underline{\quad}$  KBr +  $\underline{\quad}$  I<sub>2</sub>
- k.  $\underline{\quad}$  Ca +  $\underline{\quad}$  H<sub>2</sub>O →  $\underline{\quad}$  + Ca(OH)<sub>2</sub> +  $\underline{\quad}$  H<sub>2</sub>
- l.  $\underline{\quad}$  NaCl +  $\underline{\quad}$  Br<sub>2</sub> →  $\underline{\quad}$  NaBr +  $\underline{\quad}$  Cl<sub>2</sub>
- m.  $\underline{\quad}$  CaCO<sub>3</sub> +  $\underline{\quad}$  →  $\underline{\quad}$  CaO +  $\underline{\quad}$  CO<sub>2</sub>
- n.  $\underline{\quad}$  CaO +  $\underline{\quad}$  CO<sub>2</sub> →  $\underline{\quad}$  CaCO<sub>3</sub>
- o.  $\underline{\quad}$  Cl<sub>2</sub> +  $\underline{\quad}$  NaBr →  $\underline{\quad}$  Br<sub>2</sub> +  $\underline{\quad}$  NaCl
- p.  $\underline{\quad}$  Cu +  $\underline{\quad}$  AgNO<sub>3</sub> →  $\underline{\quad}$  Ag +  $\underline{\quad}$  Cu(NO<sub>3</sub>)<sub>2</sub>
- q.  $\underline{\quad}$  Fe +  $\underline{\quad}$  Cu(NO<sub>3</sub>)<sub>2</sub> →  $\underline{\quad}$  Fe(NO<sub>3</sub>)<sub>2</sub> +  $\underline{\quad}$  Cu
- r.  $\underline{\quad}$  Fe +  $\underline{\quad}$  HCl →  $\underline{\quad}$  FeCl<sub>3</sub> +  $\underline{\quad}$  H<sub>2</sub>
- s.  $\underline{\quad}$  Fe +  $\underline{\quad}$  O<sub>2</sub> →  $\underline{\quad}$  Fe<sub>2</sub>O<sub>3</sub>
- t.  $\underline{\quad}$  FeS +  $\underline{\quad}$  HCl →  $\underline{\quad}$  FeCl<sub>2</sub> +  $\underline{\quad}$  H<sub>2</sub>S
- u.  $\underline{\quad}$  FeS →  $\underline{\quad}$  Fe +  $\underline{\quad}$  S
- v.  $\underline{\quad}$  Cr +  $\underline{\quad}$  ZnF →  $\underline{\quad}$  CrF<sub>3</sub> +  $\underline{\quad}$  Zn
- w.  $\underline{\quad}$  H<sub>2</sub> +  $\underline{\quad}$  O<sub>2</sub> →  $\underline{\quad}$  H<sub>2</sub>O
- x.  $\underline{\quad}$  H<sub>2</sub>O →  $\underline{\quad}$  H<sub>2</sub> +  $\underline{\quad}$  O<sub>2</sub>
- y.  $\underline{\quad}$  HgO →  $\underline{\quad}$  Hg +  $\underline{\quad}$  O<sub>2</sub>
- z.  $\underline{\quad}$  K +  $\underline{\quad}$  Cl<sub>2</sub> →  $\underline{\quad}$  KCl
- aa.  $\underline{\quad}$  K +  $\underline{\quad}$  H<sub>2</sub>O →  $\underline{\quad}$  KOH +  $\underline{\quad}$  H<sub>2</sub>
- bb.  $\underline{\quad}$  KCl +  $\underline{\quad}$  O<sub>2</sub> →  $\underline{\quad}$  KClO<sub>3</sub>
- cc.  $\underline{\quad}$  KClO<sub>3</sub> →  $\underline{\quad}$  KCl +  $\underline{\quad}$  O<sub>2</sub>
- dd.  $\underline{\quad}$  KOH +  $\underline{\quad}$  H<sub>2</sub>SO<sub>4</sub> →  $\underline{\quad}$  K<sub>2</sub>SO<sub>4</sub> +  $\underline{\quad}$  H<sub>2</sub>O
- ee.  $\underline{\quad}$  Mg +  $\underline{\quad}$  O<sub>2</sub> →  $\underline{\quad}$  MgO
- ff.  $\underline{\quad}$  Mg(s) +  $\underline{\quad}$  H<sub>2</sub>O →  $\underline{\quad}$  MgO(s) +  $\underline{\quad}$  H<sub>2</sub>(g)
- gg.  $\underline{\quad}$  Mg(s) +  $\underline{\quad}$  N<sub>2</sub>(g) →  $\underline{\quad}$  Mg<sub>3</sub>N<sub>2</sub>(s)
- hh.  $\underline{\quad}$  MgCl<sub>2</sub> →  $\underline{\quad}$  Mg +  $\underline{\quad}$  Cl<sub>2</sub>
- ii.  $\underline{\quad}$  Na<sub>2</sub>O +  $\underline{\quad}$  CO<sub>2</sub> →  $\underline{\quad}$  Na<sub>2</sub>CO<sub>3</sub>
- jj.  $\underline{\quad}$  NaCl +  $\underline{\quad}$  H<sub>2</sub>SO<sub>4</sub> →  $\underline{\quad}$  Na<sub>2</sub>SO<sub>4</sub> +  $\underline{\quad}$  HCl
- kk.  $\underline{\quad}$  NaI +  $\underline{\quad}$  Br<sub>2</sub> →  $\underline{\quad}$  NaBr +  $\underline{\quad}$  I<sub>2</sub>

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13. Write out the balanced equation.

- a. Cobalt (II) sulfide reacts with nitric acid to produce nitrogen monoxide, water, solid sulfur, and cobalt (II) nitrate.

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- b. Carbon dioxide reacts with sodium hydroxide to produce sodium carbonate and water.

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- c. Solid copper reacts with aqueous nitric acid to produce liquid water, solid copper (II) nitrate, and aqueous nitrogen monoxide.

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- d. Fluorine gas reacts with solid uranium to produce solid uranium (VI) fluoride.

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- e. Solid magnesium is placed in a container of nitrogen gas and solid magnesium nitride is formed.

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- f. Lithium nitride and water react to make lithium hydroxide and ammonia.

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## Section 8.2

14. Write the 5 different reaction types AND their General Formula.

Reaction Type	General Formula

15. In a synthesis reaction...

- Almost all metals react with oxygen to produce \_\_\_\_\_
- Groups \_\_\_\_ and \_\_\_\_\_ react with sulfur to produce sulfides
- Group 1 metals react with water to produce \_\_\_\_\_

16. Write the “yields arrow” with the appropriate symbol for the following...

- Electrolysis \_\_\_\_\_
- Adding heat \_\_\_\_\_

17. What forms when you decompose a metal carbonate?

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18. What forms when you decompose a metal hydroxide?

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19. What forms when you decompose a metal chlorate?

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20. What is another name for a single-displacement reaction?

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21. What forms when a single-replacement reaction happens between an active metal and water?

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22. What forms when a single-replacement reaction happens between a less active metal and steam?

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23. What is another name for a double-displacement reaction?

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24. Balance and identify the reaction type for the following reactions.

Reaction	Reaction Type
$\text{___ Mg} + \text{___ HCl} \rightarrow \text{___ H}_2 + \text{___ MgCl}_2$	
$\text{___ Na}_2\text{SO}_4 + \text{___ HCl} \rightarrow \text{___ H}_2\text{SO}_4 + \text{___ NaCl}$	
$\text{___ H}_2\text{O} \rightarrow \text{___ H}_2 + \text{___ O}_2$	
$\text{___ Fe} + \text{___ FeCl}_3 \rightarrow \text{___ FeCl}_3$	
$\text{___ Al} + \text{___ CuSO}_4 \rightarrow \text{___ Cu} + \text{___ Al}_2(\text{SO}_4)_3$	
$\text{___ Al(OH)}_3 + \text{___ HNO}_3 \rightarrow \text{___ Al(NO}_3)_3 + \text{___ H}_2\text{O}$	

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25. Complete, and identify the reaction type, for the following (disregard the Activity Series)... (remember the “special” reactions, indicated with an \*)

- a. Solid magnesium reacts with a solution of iron (III) chloride to produce solid iron and .....

Reaction Type: \_\_\_\_\_

- b. Liquid water and solid barium oxide react to produce aqueous barium hydroxide.

Reaction Type: \_\_\_\_\_

- c. Solid sodium hydroxide is dropped into aqueous sulfuric acid to produce...

Reaction Type: \_\_\_\_\_

- d. Aqueous sodium chromate is mixed with aqueous silver (I) nitrite to produce...

Reaction Type: \_\_\_\_\_

- e. Solid magnesium reacts with nitrogen gas to produce...

Reaction Type: \_\_\_\_\_

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- f. Mercury (I) oxide breaks apart to produce ...  
Reaction Type: \_\_\_\_\_
- g. \*Calcium oxide reacts with water to form...  
Reaction Type: Synthesis (Special) \_\_\_\_\_
- h. \*Potassium carbonate breaks apart to form...  
Reaction Type: \_\_\_\_\_
- i. \*Potassium reacts with water to form...  
Reaction Type: \_\_\_\_\_
- j. Gold (II) phosphate reacts with tin (II) oxide to form...  
Reaction Type: \_\_\_\_\_

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- k. Iron (IV) reacts with sulfur to form...  
Reaction Type: \_\_\_\_\_
- l. \*Magnesium chlorate breaks apart to form...  
Reaction Type: \_\_\_\_\_
- m. Calcium reacts with potassium phosphate to produce...  
Reaction Type: \_\_\_\_\_
- n. \*Calcium oxide reacts with water to form...  
Reaction Type: \_\_\_\_\_
- o. \*Manganese (III) reacts with water to form...  
Reaction Type: \_\_\_\_\_

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- p. Chlorine gas reacts with silver (III) bromide to form bromine gas and...  
Reaction Type: \_\_\_\_\_
- q. Calcium oxide reacts with potassium chloride to form...  
Reaction Type: \_\_\_\_\_
- r. Beryllium reacts with Nickel (IV) fluoride to produce...  
Reaction Type: \_\_\_\_\_
- s. Potassium nitride decomposes to produce...  
Reaction Type: \_\_\_\_\_
- t. \*Iron (III) hydroxide breaks apart to from...  
Reaction Type: \_\_\_\_\_

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- u. Mercury (II) chlorate and copper (IV) hydroxide react to make...  
Reaction Type: \_\_\_\_\_
- v. Silver (IV) phosphate reacts with Cobalt (III) nitrate to produce...  
Reaction Type: \_\_\_\_\_
- w. Liquid water decomposes into...  
Reaction Type: \_\_\_\_\_
- x. \*Potassium oxide and water synthesize to produce...  
Reaction Type: \_\_\_\_\_
- y. Copper (IV) sulfate reacts with Mercury (II) phosphide to produce...  
Reaction Type: \_\_\_\_\_

## Section 8.3

26. Explain how the Activity Series works.

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27. Complete, and identify the reaction type, for the following (remember to USE the **Activity Series**)... (remember the “special” reactions)

\*\*If the reaction will not happen, write “No Reaction”

- a. Solid magnesium reacts with a solution of iron (III) chloride to produce solid iron and .....

Reaction Type: \_\_\_\_\_

- b. Solid Lithium is placed in aqueous hydrochloric acid and produces...

Reaction Type: \_\_\_\_\_

- c. Liquid diatomic bromine is added to a container of sodium iodide crystals and produces solid diatomic iodine and another solid.

Reaction Type: \_\_\_\_\_



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- d. Copper (II) is placed in a container of aqueous hydrochloric acid and...  
Reaction Type: \_\_\_\_\_
- e. A solution of iron (II) chloride is poured over a piece of platinum wire and...  
Reaction Type: \_\_\_\_\_
- f. A piece of calcium is dropped into a container of nitrous acid and...  
Reaction Type: \_\_\_\_\_
- g. A piece of sodium chloride is placed in a container of barium sulfate and...  
Reaction Type: \_\_\_\_\_
- h. A piece of sodium carbonate is heated to produce...  
Reaction Type: \_\_\_\_\_

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- i. A piece of iron is placed in a container of oxygen gas and ...  
Reaction Type: \_\_\_\_\_
- j. A piece of sodium iodide is placed in a container of chlorine gas and produces solid diatomic iodine and another solid.  
Reaction Type: \_\_\_\_\_
- k. Chromium (III) bromide reacts with sodium nitrate and...  
Reaction Type: \_\_\_\_\_
- l. Solid iron is placed in a container of aqueous magnesium chloride and...  
Reaction Type: \_\_\_\_\_
- m. Tin (IV) nitrate reacts with potassium sulfate and...  
Reaction Type: \_\_\_\_\_