

- Calculate the mass of the product of 6.40 g of magnesium with 1.32 g of oxygen.
- Calculate the mass of the zinc that reacts with 4.11 g of hydrochloric acid to form 9.1 g of zinc chloride and 3.97 g of hydrogen gas.
- During the combustion of 5.00 g of Butane in the presence of oxygen, 4.01 g of carbon dioxide and 3.55 g of water is given off. How much oxygen was needed to totally combust the butane?
- Iron combines with 4.00 g of Copper (II) nitrate to form 6.01 g of Iron (I) nitrate and 0.400 g copper metal. How much iron did it take to convert the $Cu(NO_3)_2$?

Sample Assessment Questions

- Consider the following decomposition reaction:
 $2 H_2O_2 \rightarrow 2 H_2O + O_2$
 If 72 grams of water and 64 grams of oxygen are produced, what mass of H_2O_2 decomposed?
 a. 72 grams
 b. 136 grams
 c. 64 grams
 d. Not enough information given

- Consider the following chemical reaction:
 $2 NaCl + Ca(OH)_2 \rightarrow CaCl_2 + 2 NaOH$
 If the mass of 191 grams $NaCl$ reacted with 74 grams of calcium hydroxide and 80 grams of sodium hydroxide is produced, what mass of calcium chloride is produced?
 a. 52.5 grams
 b. 111 grams
 c. 91 grams
 d. 185 gram

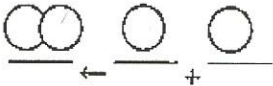



Versatile Activity
Conservation of Mass
TAKS Objective 4-8C
 (Pattern # 5)

1	When 72.9 g of magnesium is reacted with 28.0 g of nitrogen gas, no magnesium or nitrogen is left over. How much magnesium nitride is produced?	7	Is the Law of Conservation of Mass being followed in this equation? $2\text{Al}_2\text{O}_3 \rightarrow 2\text{Al} + 3\text{O}_2$
2	$\text{Mg}_{(s)} + \text{ZnCl}_{2(aq)} \rightarrow \text{MgCl}_{2(aq)} + \text{Zn}_{(s)}$ 45.0 g 297.6 g 176.5 g ? g	8	$\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$? g 80.0 g 66.0 g 36.0 g
3	$\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$ If 125 g of KClO_3 are heated, what is the total mass of the products?	9	$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ How many molecules of oxygen would be required to produce 8 molecules of water?
4	Does this equation support the Law of Conservation of mass? $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$	10	If a cake recipe calls for 25.0 g of sugar, how much sugar will the baked cake contain?
5	What is the coefficient of for O_2 when this equation is balanced? $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	11	How many molecules of water would be produced from 6 molecules of aluminum hydroxide? $2\text{Al}(\text{OH})_3 \rightarrow \text{Al}_2\text{O}_3 + 3\text{H}_2\text{O}$
6	If all the reactants in a chemical reaction are used, what is true about the mass of the products?	12	What might be true when measuring the mass of the products in this reaction? $\text{Zn}_{(s)} + 2\text{HCl}_{(aq)} \rightarrow \text{ZnCl}_{2(aq)} + \text{H}_{2(g)}$

A	B	C	D	E	F
125 g	4	yes	100.9 g	same mass	166.1 g
G	H	I	J	K	L
7	9	no	25.0 g	different mass	22.0 g

Chemical Reactions

Name _____

Type of Reaction	Definition	★ Equation
Synthesis		
Decomposition		
Single Replacement		
Double Replacement		

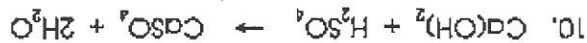
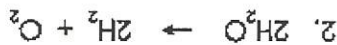
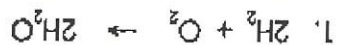
Colors: A = Red, B = Blue, C = Green, D = Yellow

2. Use colored pencils to circle the common atoms or compounds in each equation to help you determine the type of reaction it illustrates. Use the code below to classify each reaction.

S = Synthesis D = Decomposition SR = Single Replacement DR = Double Replacement



4



Classify the reactions below as synthesis, decomposition, single replacement (cationic or anionic) or double replacement.

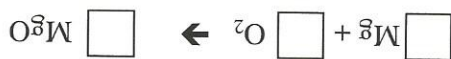
CLASSIFICATION OF CHEMICAL REACTIONS

Already Balanced!

Name _____

Balancing Act

Atoms are not _____ or _____ during a chemical reaction. Scientists know that there must be the _____ number of atoms on each _____ of the _____. To balance the chemical equation, you must add _____ in front of the chemical formulas in the equation. You cannot _____ or _____ subscripts!



Mg = _____
O = _____
Mg = _____
O = _____

1) Determine number of atoms for each element.

2) Pick an element that is not equal on both sides of the equation.

3) Add a coefficient in front of the formula with that element and adjust your counts.

4) Continue adding coefficients to get the same number of atoms of each element on each side.

Try these:



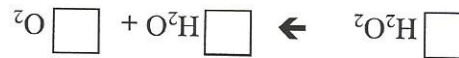
Ca = _____
O = _____



N = _____
H = _____



Cu = _____
C = _____
O = _____

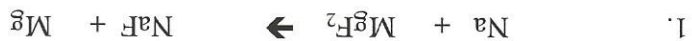


H = _____
O = _____
H = _____
O = _____

Balancing Act Practice

Name _____

Balance each equation. Be sure to show your lists! Remember you cannot add subscripts or place coefficients in the middle of a chemical formula.

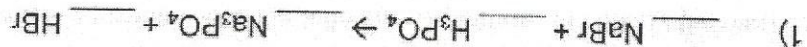


Challenge: This one is tough!

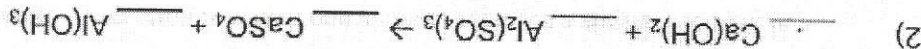


Types of Reactions Worksheet

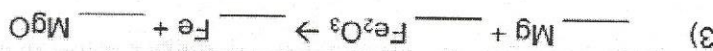
Balance the following equations and indicate the type of reaction taking place:



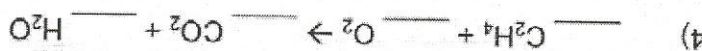
Type of reaction: _____



Type of reaction: _____



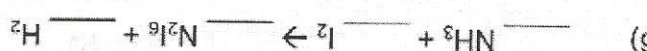
Type of reaction: _____



Type of reaction: _____



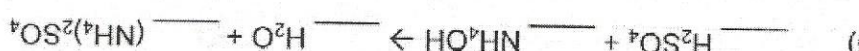
Type of reaction: _____



Type of reaction: _____



Type of reaction: _____



Type of reaction: _____

Balance the following chemical equations. Use the following definitions to classify the reactions as synthesis, decomposition, single replacement or double replacement.

Synthesis-a reaction in which two or more substances combine to form a new compound.

Decomposition-A reaction in which a single compound produces two or more simpler substances.

Single Replacement-A reaction in which one element replaces a similar element in a compound.

Double Replacement-A reaction in which the ions of two compounds exchange places in an aqueous solution to form two new compounds.

Combustion Reaction-A reaction in which a hydrocarbon combines with oxygen, forming carbon dioxide and water.

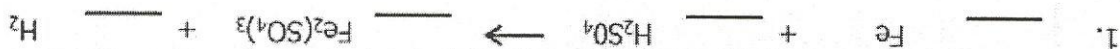
1. $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
2. $\text{Na} + \text{I}_2 \rightarrow \text{NaI}$
3. $\text{N}_2 + \text{O}_2 \rightarrow \text{N}_2\text{O}$
4. $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$
5. $\text{KI} + \text{Cl}_2 \rightarrow \text{KCl} + \text{I}_2$
6. $\text{HCl} + \text{Ca(OH)}_2 \rightarrow \text{CaCl}_2 + \text{H}_2\text{O}$
7. $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$
8. $\text{K}_3\text{PO}_4 + \text{HCl} \rightarrow \text{KCl} + \text{H}_3\text{PO}_4$
9. $\text{S} + \text{O}_2 \rightarrow \text{SO}_3$
10. $\text{KI} + \text{Pb(NO}_3)_2 \rightarrow \text{KNO}_3 + \text{PbI}_2$
11. $\text{CaSO}_4 + \text{AlBr}_3 \rightarrow \text{CaBr}_2 + \text{Al}_2(\text{SO}_4)_3$
12. $\text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{O}_2$
13. $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$
14. $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
15. $\text{Mg(NO}_3)_2 + \text{K}_3\text{PO}_4 \rightarrow \text{Mg}_3(\text{PO}_4)_2 + \text{KNO}_3$

Name: _____

Date: _____

Balancing Equations

Balance the following chemical equations.



Name _____

Period _____

Date _____

A **synthesis** reaction occurs when two or more reactants form one product.
 A **decomposition** reaction occurs when one reactant forms two or more products.
 A **single displacement** reaction occurs when one element tries to replace another element in a compound.
 A **double displacement** reaction occurs when two compounds switch ions.

Classify each equation below as:

S = synthesis
 SD = single displacement
 D = decomposition
 DD = double displacement

Type	Equation
1. S, D, SD, DD	magnesium oxide ----> magnesium + oxygen
2. S, D, SD, DD	lithium + copper II sulfate ----> copper + lithium sulfate
3. S, D, SD, DD	barium nitride + aluminum oxide --> barium oxide + aluminum nitride
4. S, D, SD, DD	carbonic acid ----> water + carbon dioxide
5. S, D, SD, DD	iron + oxygen ----> iron III oxide
6. S, D, SD, DD	copper II sulfate + potassium bromide ----> copper II bromide + potassium sulfate
7. S, D, SD, DD	magnesium + hydrochloric acid ----> hydrogen + magnesium chloride
8. S, D, SD, DD	lead IV nitrate + silver phosphate ----> lead IV phosphate + silver nitrate
9. S, D, SD, DD	barium chloride + potassium ----> barium + potassium chloride
10. S, D, SD, DD	aluminum + nitrogen ----> aluminum nitride

(over)

review of reactions

01/31/08

1

10

Writing Formula Equations from Word Equations

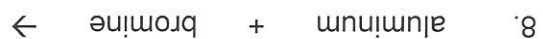
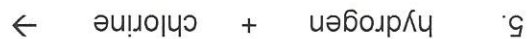
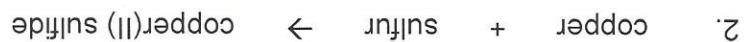
Name _____

- A) Write formula equations that represent the reactions described in the following word equations.
 B) Balance the equation that you wrote. NOTE: If a formula is wrong, the equation may not balance.

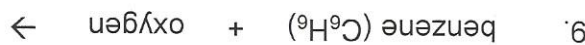
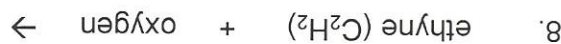
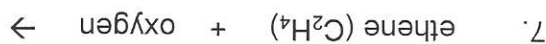
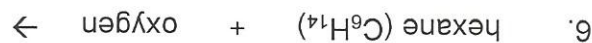
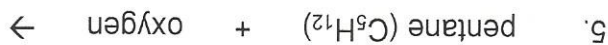
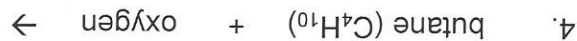
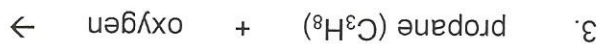
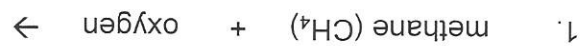
1.	Barium reacts with nitrogen to produce barium nitride	3:1:1
2.	Magnesium phosphide is broken down into phosphorus and magnesium	1:2:3
3.	Strontium iodide reacts with lithium to produce strontium and lithium iodide.	1:2:1:2
4.	Cesium oxide is mixed with aluminum chloride to produce aluminum oxide and cesium chloride.	3:6:1:6
5.	Hexane (C_6H_{14}) is burned with sufficient oxygen to produce carbon dioxide and water.	1:6:6:6
6.	Iron III chloride reacts with sodium sulfide to make iron III sulfide and sodium chloride.	2:3:1:6
7.	Beryllium oxide decomposes when heated into oxygen gas and beryllium.	2:1:2
8.	Copper I nitrate is poured into a container with barium wire to make barium nitrate and copper.	2:1:1:2
9.	Hot strontium reacted with fluorine gas to make strontium fluoride	1:1:1
10.	Butene (C_4H_8) is burned in an oxygen rich environment and makes carbon dioxide and water.	1:6:4:4

Worksheet #2: Synthesis Reactions

In synthesis reactions, two or more reactants come together to form one compound.
 $A + B \rightarrow AB$
Complete the following word equations, and write and balance the formula equation.

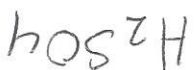
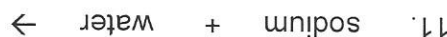
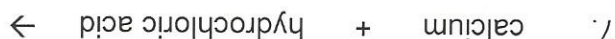
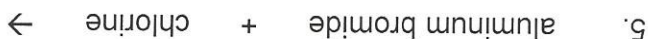
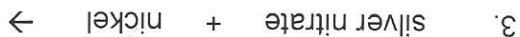


Worksheet #6: Combustion Reactions
We will focus on the combustion of hydrocarbons. Hydrocarbons react with oxygen to form carbon dioxide and water.

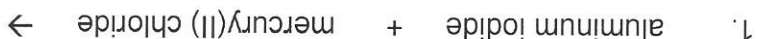
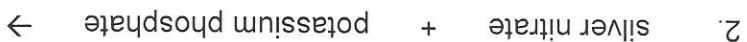
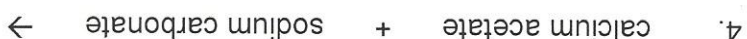
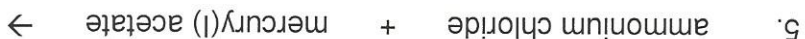
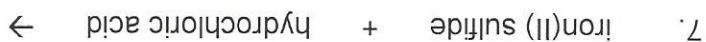


Worksheet #4: Single-Replacement Reactions

- Step 1 - Write the formulas of the reactants on the left of the yield sign
Step 2 - Look at the Activity Series on page 333 to determine if the replacement can happen
Step 3 - If the replacement can occur, complete the reaction and balance it. If the reaction cannot happen, write N.R. (no rxn) on the product side.

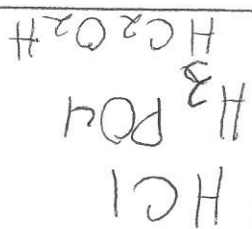


Examine the products of the reactions on this page, and determine in each whether a gas, water, or a precipitate is formed. Use solubility Table B.9 on page R54 at the back of your textbook to determine the solubilities of the reaction products. If there is no gas, water, or precipitate produced, put an "X" through the yield sign, because no reaction occurs.



In these reactions, all you do is look at the names of the reactants, and "switch partners". Just be sure that the new pairs come out with the positive ion named first, and paired with a negative ion.

Worksheet #5: Double-Replacement Reactions



Predicting Products of Chemical Reactions Worksheet

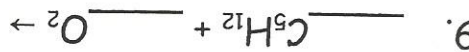
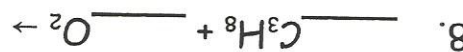
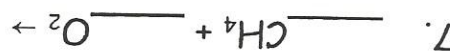
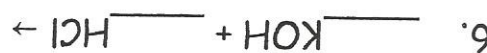
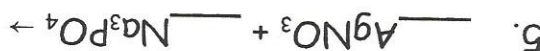
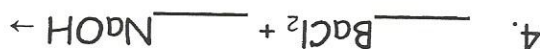
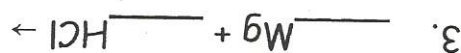
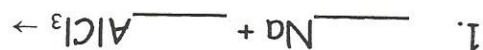
Name _____ Date _____ Period _____

Directions:

- Write the reactants for the chemical equations below in the boxes on the Predicting Products of Chemical Reactions template. (The template has space to do three reactions at a time)
- Then build the reactants using the ions cards provided.
- Then predict the products of the chemical reactions by rearranging the ions cards and placing them in the products boxes.
- Make sure that the chemical formulas of the products are correct. Do this by using the subscript cards (small cards) provided.
- Also make sure to balance the chemical reactions using the coefficient cards (large cards)
- Fill in the blank spaces below with your final answer.

Pre-Lab Questions:

- What is used to predict the products of a single replacement reaction?
- What are the products of a combustion reaction?
- Can two positive ions form a compound? Can two negative ions form a compound?



Questions:

W

For each of the following reactions identify if it is a single replacement, double replacement, or combustion, predict the products and balance the equation. The correct chemical formulas for the products that are compounds are in the box below.

Ag_2SO_4	H_2O	$\text{Zn}(\text{MnO}_4)_2$
FeBr_3	CO_2	H_2O
$\text{H}_2\text{O (H-OH)}$	NaBr	$\text{Pb}(\text{NO}_3)_2$
KCl	CO_2	Na_2SO_4

