Name_____Block_____Date_____

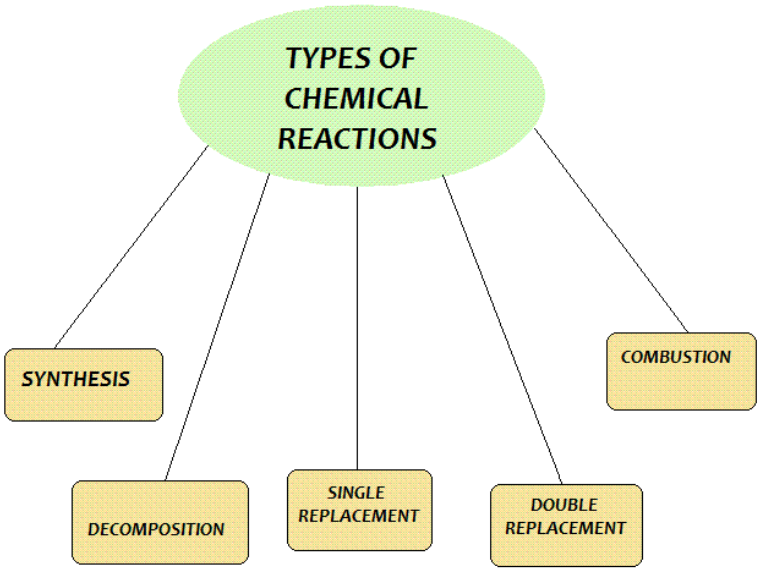
Due ☞ Test Day!

Pretest: Unit 8 Chemical Equations

The following is an overview of the concepts, ideas, and problems we have covered in this unit. You are, however, responsible for all material covered, regardless if found here or not! Therefore, be sure to review all your notes, worksheets, assignments, handouts, readings, labs, problems, etc.. On the day of the test you will want to be well-acquainted with the material and organized, you will not want to waste time trying to understand an idea or searching for some needed information. Arrive prepared!

Text References:

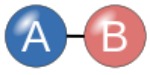
- Describing Chemical Reactions (8.1)
- Types of chemical reactions (8.2)
- Activity Series (8.3)
- Compounds in Aqueous Solutions (13.1)

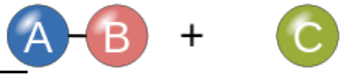


Know the following vocabulary:

- aqueous solution
- chemical equation
- chemical reaction
- coefficient
- combustion reaction
- decomposition (analysis) reaction
- double-replacement (double-displacement) reaction
- precipitate
- product
- reactant
- single-replacement (single-displacement) reaction
- synthesis (combination) reaction

_____ 

_____ 

_____ 

_____ 

Practice Problems

1.) Write and/or complete and balance the following chemical equations. In the space provided, use letters (A-G) to indicate the best classification of the reaction:

A. Combination or synthesis reactions
B. Decomposition reactions
C. Single-replacement reactions cationic
D. Single-replacement reactions anionic
E. Double-replacement reactions neutralization
F. Double-replacement reactions precipitation
G. Combustion reactions
∅. None of the above

____ a. $Zn(OH)_2 + H_3PO_4 \rightarrow Zn_3(PO_4)_2 + H_2O$

____ b. $C_5H_{10} + O_2 \rightarrow CO_2 + H_2O$

____ c. $NaOH + CO_2 \rightarrow Na_2CO_3 + H_2O$

____ d. Ammonia gas (NH_3) burns in oxygen to produce nitrogen gas and liquid water.

____ e. Solid mercuric oxide decomposes into its elements.

____ f. Aqueous solutions of silver nitrate and potassium sulfate react to form a precipitate of silver sulfate and aqueous ___?____ .

____ g. Copper metal reacts with aqueous silver chlorate to produce silver metal and aqueous copper (II) chlorate.

____ h. Aluminum reacts with fluorine to yield solid aluminum fluoride.

____ i. Chlorine gas is added to a solution of potassium iodide.

3.) Write balanced chemical reactions for the following, <u>including phases</u>. (Assume all reactions take place. <u>No need to verify</u>!)

a.) $Mg_3N_2(s)$ --->

---

b.) $AlBr_3(s)$ --->

---

c.) ---> $AgCl(s)$

---

d.) $Zn(s)$ + $Al(NO_3)_3(aq)$ --->

---

e.) $MgBr_2(aq)$ + $(NH_4)_2CO_3(aq)$ --->

---

f.) $Mg(s)$ + $FeBr_3(aq)$ --->

---

g.) $H_2SO_4(aq)$ + $Al(OH)_3(aq)$ --->

---

h.) $Ba(C_2H_3O_2)_2(aq)$ + $Sn(CrO_4)_2(aq)$ --->

---

i.) $C_3H_6(aq)$ + $O_2(aq)$ --->

4.) Predict whether each of the following reactions will take place. If it does, write a complete and balanced chemical equation, including phases. If no reaction takes place, write NO RXN.

a.) $Al(s) + Zn(NO_3)_2(aq) \rightarrow$

---

b.) $MgBr_2(aq) + (NH_4)_2CO_3(aq) \rightarrow$

---

c.) $Cl_2(g) + FeBr_3(aq) \rightarrow$

---

d.) $H_2SO_4(aq) + Al(OH)_3(aq) \rightarrow$

---

e.) $Ca(C_2H_3O_2)_2(aq) + Sn(CrO_4)_2(aq) \rightarrow$

---

f.) Aqueous solutions of potassium iodide and mercurous chlorate are mixed together.

---

g.) Zinc metal is dropped into an aqueous solution of plumbic acetate.

---

h.) Liquid bromine is poured into aqueous sodium fluoride.

5.) From the data below, determine the activity series of these six elements:
X, Y, Z, H, Ba, and Hg, placing the most active one first in the box provided below.

Reactants	Observations
X + H_2SO_4	Bubbles form
Y + H_2SO_4	No Reaction
Z + $BaCl_2$	No Reaction
Y + $HgCl_2$	A liquid metal begins to appear
Z + H_2SO_4	Bubbles form
Z + X$(NO_3)_2$	A dark substance begins to form on the Z metal

Work space: (if needed)

Activity Series:

most active least active

Reviewing Vocabulary

Match the definition in Column A with the term in Column B.

Column A		Column B
_____	**1.** A reaction in which a compound breaks down into two or more elements or new compounds	**a.** aqueous solution
_____	**2.** A number written in front of a chemical formula	**b.** chemical equation
_____	**3.** A solid produced during a chemical reaction in a solution	**c.** chemical reaction
_____	**4.** A solution in which the solvent is water	**d.** coefficient
_____	**5.** A statement that uses chemical formulas to show the identities and relative amounts of the substances involved in a chemical reaction	**e.** combustion reaction
_____	**6.** The process by which the atoms of one or more substances are rearranged to form different substances	**f.** single-replacement reaction
_____	**7.** A reaction in which two or more substances react to produce a single product	**g.** decomposition reaction
_____	**8.** A starting substance in a chemical reaction	**h.** double-replacement reaction
_____	**9.** A reaction in which oxygen combines with a substance and releases heat and light energy	**i.** synthesis reaction
_____	**10.** A reaction in which the atoms of one element replace the atoms of another element in a compound	**j.** precipitate
_____	**11.** A reaction involving the exchange of positive ions between two compounds dissolved in water	**k.** product
_____	**12.** A substance formed during a chemical reaction	**l.** reactant

STANDARDIZED TEST PRACTICE
CHAPTER 10

Use these questions and the test-taking tip to prepare for your standardized test.

1. Potassium chromate and lead(II) acetate are both dissolved in a beaker of water, where they react to form solid lead(II) chromate. What is the balanced net ionic equation describing this reaction?

a. $Pb^{2+}(aq) + C_2H_3O_2^{-}(aq) \rightarrow Pb(C_2H_3O_2)_2(s)$
b. $Pb^{2+}(aq) + 2CrO_4^{-}(aq) \rightarrow Pb(CrO_4)_2(s)$
c. $Pb^{2+}(aq) + CrO_4^{2-}(aq) \rightarrow PbCrO_4(s)$
d. $Pb^{+}(aq) + C_2H_3O_2^{-}(aq) \rightarrow PbC_2H_3O_2(s)$

2. What type of reaction is described by the following equation?

$Cs(s) + H_2O(l) \rightarrow CsOH(aq) + H_2(g)$

a. synthesis
b. combustion
c. decomposition
d. replacement

3. Which of the following reactions between halogens and halide salts will occur?

a. $F_2(g) + FeI_2(aq) \rightarrow FeF_2(aq) + I_2(l)$
b. $I_2(s) + MnBr_2(aq) \rightarrow MnI_2(aq) + Br_2(g)$
c. $Cl_2(s) + SrF_2(aq) \rightarrow SrCl_2(aq) + F_2(g)$
d. $Br_2(l) + CoCl_2(aq) \rightarrow CoBr_2(aq) + Cl_2(g)$

Interpreting Tables Use the table to answer questions 4–6.

Physical Properties of Select Ionic Compounds

Compound	Name	Physical state at room temp.	Soluble in water?	Melting point (°C)
$NaClO_3$	sodium chlorate	solid	yes	248
Na_2SO_4	sodium sulfate	solid	yes	884
$NiCl_2$	nickel(II) chloride	solid	yes	1009
$Ni(OH)_2$	nickel(II) hydroxide	solid	no	230
$AgNO_3$	silver nitrate	solid	yes	212

4. An aqueous solution of nickel(II) sulfate is mixed with aqueous sodium hydroxide. Will a visible reaction occur?

a. No, solid nickel(II) hydroxide is soluble in water.
b. No, solid sodium sulfate is soluble in water.
c. Yes, solid sodium sulfate will precipitate out of solution.
d. Yes, solid nickel(II) hydroxide will precipitate out of solution.

5. When $AgClO_3(aq)$ and $NaNO_3(aq)$ are mixed, _____ .

a. no visible reaction occurs
b. solid $NaClO_3$ precipitates out of solution
c. NO_2 gas is released from the reaction
d. solid Ag metal is produced

6. Finely ground nickel(II) hydroxide is placed in a beaker of water. It sinks to the bottom of the beaker and remains unchanged. An aqueous solution of hydrochloric acid (HCl) is then added the beaker, and the $Ni(OH)_2$ disappears. Which of the following equations best describes what occurred in the beaker?

a. $Ni(OH)_2(s) + HCl(aq) \rightarrow NiO(aq) + H_2(g) + HCl(aq)$
b. $Ni(OH)_2(s) + 2HCl(aq) \rightarrow NiCl_2(aq) + 2H_2O(l)$
c. $Ni(OH)_2(s) + 2H_2O(l) \rightarrow NiCl_2(aq) + 2H_2O(l)$
d. $Ni(OH)_2(s) + 2H_2O(l) \rightarrow NiCl_2(aq) + 3H_2O(l) + O_2(g)$

7. The combustion of ethanol, C_2H_6O, produces carbon dioxide and water vapor. The equation that best describes this process is _____ .

a. $C_2H_6O(l) + O_2(g) \rightarrow CO_2(g) + H_2O(l)$
b. $C_2H_6O(l) \rightarrow 2CO_2(g) + 3H_2O(l)$
c. $C_2H_6O(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(g)$
d. $C_2H_6O(l) \rightarrow 3O_2(l) + 2CO_2(g) + 3H_2O(l)$

8. What is the product of this synthesis reaction?

$Cl_2(g) + 2NO(g) \rightarrow ?$

a. NCl_2
b. 2NOCl
c. N_2O_2
d. 2ClO