Name: _____ **Date:** _____

Chemistry *~ Ms. Hart* **Class:** Anions or Cations

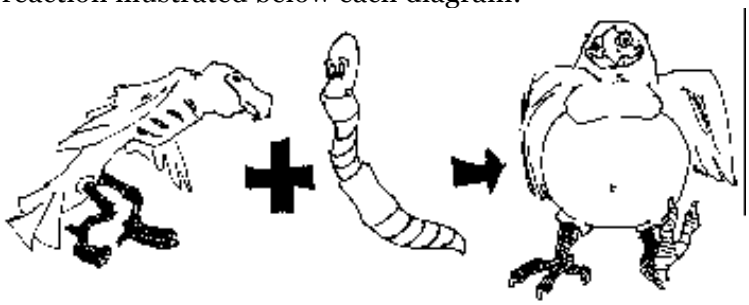
THE URBAN ASSEMBLY SCHOOL FOR CRIMINAL JUSTICE

6.8 - TYPES OF REACTIONS

Type of Reaction	Definition	Examples
Synthesis		$2H_2 + O_2 \rightarrow 2H_2O$ $4Fe + 3O_2 \rightarrow 2Fe_2$, $N_2 + 3H_2 \rightarrow 2NH_3$
Decomposition		$H_2O \rightarrow H_2 + O_2$ $CaCO_3 \rightarrow CaO + CO_2$
Single Replacement		$Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$ $F_2 + 2NaCl \rightarrow Cl_2 + 2NaF$
Double Replacement		$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ $Na_2S + 2HCl \rightarrow H_2S + 2NaCl$
Combustion		$2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$

CARTOON CHEMISTRY

Describe the chemical reaction illustrated below each diagram:



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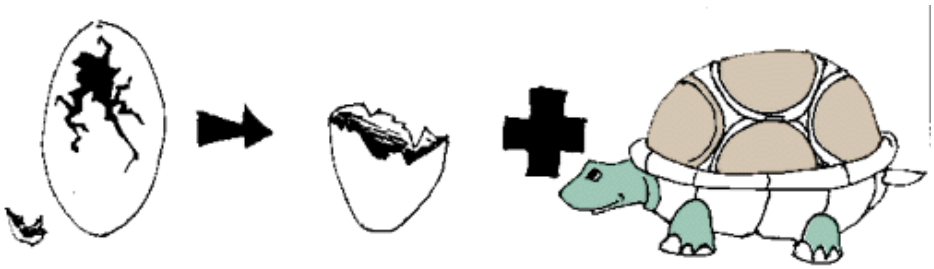
Type of reaction: _____



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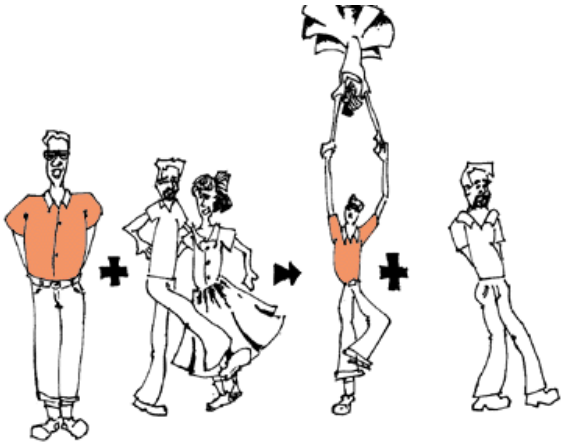
Type of reaction: _____



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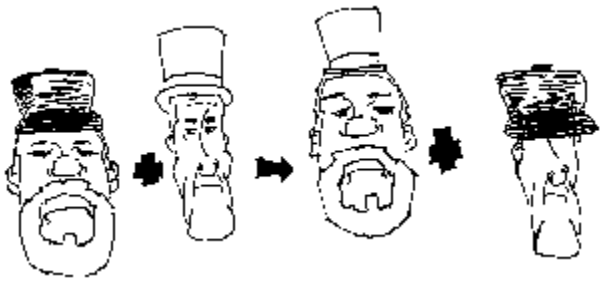
Type of reaction: _____



_____

Type of reaction: _____

Try These: Classify the following reactions as synthesis (S), decomposition (D), single replacement (SR), or double replacement (DR).

1) $Pb(NO_3)_2$ (aq) + 2KI (aq) → PbI_2(s) + $2KNO_3$(aq) DR

2) Zn (s) + $CuSO_4$ (aq) → $ZnSO_4$(aq) + Cu(s) SR

3) 2Mg (s) + O_2 (g) → 2MgO (s) S

4) H_2CO_3 (aq) → H_2O (l) + CO_2 (g) D

CLASSWORK:

Part I: Classify the reactions as synthesis (S), decomposition (D), single replacement (SR), or double replacement (DR).

5) $FeCl_3$ (aq) + 3NaOH (aq) → $Fe(OH)_3$ (s) + 3NaCl (aq) - DR

6) Cl_2 (g) + 2NaBr (aq) → 2NaCl (aq) + Br_2 (l) - SR

7) $2KClO_3$ (s) → 2KCl (s) + $3O_2$ (g) - D

8) 2K(s) + $2H_2O$ (l) → 2KOH (aq) + H_2 (g) - SR

Part II: Answer the following questions.

1. Given the balanced equation:

   $2KClO_3 \rightarrow 2KCl + 3O_2$

   Which type of reaction is represented by this equation?
   (1) synthesis
   (2) decomposition
   (3) single replacement
   (4) double replacement

2. Which list includes three types of chemical reactions?
   (1) condensation, double replacement, and sublimination
   (2) condensation, solidification, and synthesis
   (3) decomposition, double replacement, and synthesis
   (4) decomposition, solidification, and sublimation

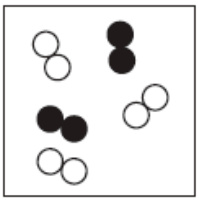
3. Given the balanced equation:

   $AgNO_3$ (aq) + NaCl (aq) → $NaNO_3$ (aq) + AgCl (s)

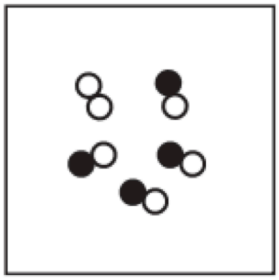
   This reaction is classified as
   (1) synthesis
   (2) decomposition
   (3) single replacement
   (4) double replacement

4. Given the reaction between two different elements in the gaseous state:

Box *A* below represents a mixture of the two reactants before the reaction occurs. The product of this reaction is a gas. In Box B, draw the system after the reaction has gone to completion, based on the Law of Conservation of Matter.



Box A
System Before Reaction



Box B
System After Reaction Has Gone to Completion

Part III: Balance and classify these reactions as synthesis (S), decomposition (D), single replacement (SR), and double replacement (DR).

Balance the equation... **...and classify it.**

1. _____ $Mg(OH)_2$ + 2 HCl → _____ $MgCl_2$ + 2 H_2O DR

2. _____ Na_2CO_3 + 2 HCl → 2 NaCl + _____ H_2CO_3 DR

3. 2 NH_4NO_2 → _____ N_2 + 2 H_2O D

4. 2 N_2 + 5 O_2 → 2 N_2O_5 S

5. _____ $MgCO_3$ → _____ MgO + _____ CO_2 D

6. 2 KBr + _____ Cl_2 → 2 KCl + _____ Br_2 SR

7. _____ Zn + _____ $CuSO_4$ → _____ Cu + _____ $ZnSO_4$ SR

6.8 – Chemical Reactions - HOMEWORK

GOOD PRACTICE MAKES PERFECT

Identify what type of reaction each of the following is – synthesis (S), decomposition (D), combustion (C), single-displacement (SD), or double-displacement (DD).

SR $2\ KI + Cl_2 \rightarrow 2\ KCl + I_2$

C $2\ ZnS + O_2 \rightarrow 2\ ZnO + 2\ S$

DR $K_2CO_3 + CuSO_4 \rightarrow CuCO_3 + K_2SO_4$

D $2\ NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$

S $H_2O + SO_3 \rightarrow H_2SO_4$

S $2\ H_2 + O_2 \rightarrow 2\ H_2O$

D $CaCO_3 \rightarrow CaO + CO_2$

S $Li_2O + H_2O \rightarrow 2\ LiOH$

DR $K_2CO_3 + 2\ AgNO_3 \rightarrow Ag_2CO_3 + 2\ KNO_3$

SR $H_2SO_4 + Zn \rightarrow ZnSO_4 + H_2$

D $2\ KClO_3 \rightarrow 2\ KCl + 3\ O_2$

C $C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$

DR $Co(OH)_3 + 3\ HNO_3 \rightarrow Co(NO_3)_3 + 3\ HOH$

S $CaO + H_2O \rightarrow Ca(OH)_2$

D $Ba(ClO_3)_2 \rightarrow BaCl_2 + 3\ O_2$

D $Na_2CO_3 \rightarrow Na_2O + CO_2$

DR $2\ AgC_2H_3O_2 + K_2CrO_4 \rightarrow Ag_2CrO_4 + 2\ KC_2H_3O_2$

DR $2\ KOH + H_2SO_4 \rightarrow K_2SO_4 + 2\ HOH$

C $2\ C_2H_5SH + 9\ O_2 \rightarrow 4\ CO_2 + 6\ H_2O + 2\ SO_2$

S $2\ KI + Cl_2 \rightarrow 2\ KCl + I_2$

DR $2\ NaCl + H_2SO_4 \rightarrow Na_2SO_4 + 2\ HCl$

DR $Al(OH)_3 + 3\ HC_2H_3O_2 \rightarrow Al(C_2H_3O_2)_3 + 3\ HOH$

C $C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$

D $Ni(ClO_3)_2 \rightarrow NiCl_2 + 3\ O_2$

DR $Cd_3(PO_4)_2 + 3\ (NH_4)_2S \rightarrow 3\ CdS + 2\ (NH_4)_3PO_4$

S $2Li + O_2 \rightarrow 2Li_2O$

S $2Na + Cl_2 \rightarrow 2NaCl$

S $4Fe + 3O_2 \rightarrow 2Fe_2O_3$

DR $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

SR $Ca + H_2O \rightarrow Ca(OH)_2 + H_2$

DR $CaCl_2 + 2AgNO_3 \rightarrow Ca(NO_3)_2 + 2AgCl$

C $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

Sample Regents Questions and More Practice!

1. Given the word equation:

sodium chlorate → sodium chloride + oxygen

Which type of chemical reaction is represented by this equation?

(1) double replacement
(2) single replacement
(3) decomposition
(4) synthesis

2. In which type of chemical reaction do two or more reactants combine to form one product, only?

(1) synthesis
(2) decomposition
(3) single replacement
(4) double replacement

3. Given the balanced equations representing two chemical reactions:

Cl2 + 2NaBr 2NaCl + Br2

2NaCl 2Na + Cl2

Which type of chemical reactions are represented by these equations?

(1) single replacement and decomposition
(2) single replacement and double replacement
(3) synthesis and decomposition
(4) synthesis and double replacement

4. Which balanced equation represents a single-replacement reaction?

(1) Mg + 2AgNO3 Mg(NO3)2 + 2Ag
(2) 2Mg + O2 2MgO
(3) MgCO3 MgO + CO2
(4) MgCl2 + 2AgNO3 2AgCl + Mg(NO3)2

Read pages 256-264 in your textbook and answer question #3 from page 264 in the space below:

3.

a. S

b. SR

c. D

d. C

e. D

f. S

g. DR

Look ahead? Tomorrow, we will be learning about the activity series. Read pages 265-267 to get a sneak peak!