Date _____ Name _____

Section _____ Team _____

Instructor _____ _____

Pre-Lab Study Questions

1. Why are burning candles and rusting nails examples of chemical change?

2. What is included in a chemical equation?

3. How does a combination reaction differ from a decomposition reaction?

4. Balance each of the following reactions, and identify the type of reaction:

Unbalanced Equation	Type of Reaction
a. $Al(s) + Fe_2O_3(s) \xrightarrow{\Delta} Al_2O_3 + Fe(l)$	
b. $KClO_3(s) \xrightarrow{\Delta} KCl(s) + O_2(g)$	
c. $Li(s) + Cl_2(g) \xrightarrow{\Delta} LiCl(s)$	
d. $C_2H_4(g) + O_2(g) \xrightarrow{\Delta} CO_2(g) + H_2O(g)$	
e. $CrCl_3(aq) + H_2S(g) \longrightarrow Cr_2S_3(s) + HCl(aq)$	

5. Complete and balance each of the following reactions:

Reactants	Type of Reaction
a. $K(s) + N_2(g) \longrightarrow$	Combination
b. $C_5H_{12}(g) + O_2(g) \xrightarrow{\Delta}$	Combustion
c. $Al(s) + CuSO_4(aq) \longrightarrow$	Single Replacement
d. $CoCl_3(aq) + AgNO_3(aq) \longrightarrow$	Double Replacement
e. $MgCO_3(s) \xrightarrow{\Delta}$	Decomposition

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REPORT SHEET

Chemical Reactions and Equations

A. Magnesium and Oxygen

1. Initial appearance of Mg _____

2. Evidence of chemical reaction _____

_____

_____

3. Balance: _____ $Mg(s)$ + _____ $O_2(g)$ ⟶ _____ $MgO(s)$

4. Type of chemical reaction: _____

B. Zinc and Copper(II) Sulfate

Time	$CuSO_4(aq)$ Appearance	$Zn(s)$ Appearance	Evidence of a Chemical Reaction
1. initial			
2. after 30 min			

3. ___ $Zn(s)$ + ___ $CuSO_4(aq)$ ⟶ ___ $Cu(s)$ + ___ $ZnSO_4(aq)$

4. Type of chemical reaction: _____

C. Reactions of Metals and HCl

Metal	1. Appearance of Metals	2. Evidence of a Chemical Reaction
$Zn(s)$		
$Cu(s)$		
$Mg(s)$		

3. ____ $Zn(s)$ + ____ $HCl(aq)$ ⟶ ____ $ZnCl_2(aq)$ + ____ $H_2(g)$

____ $Cu(s)$ + ____ $HCl(aq)$ ⟶ ____ $CuCl_2(aq)$ + ____ $H_2(g)$

____ $Mg(s)$ + ____ $HCl(aq)$ ⟶ ____ $MgCl_2(aq)$ + ____ $H_2(g)$

4. Type of chemical reaction:

Zn _____

Cu _____

Mg _____

D. Reactions of Ionic Compounds

D1 Reaction of $CaCl_2$ and Na_3PO_4

Reactants	1. Appearance of Solutions	2. Evidence of a Chemical Reaction
$CaCl_2(aq)$		
$Na_3PO_4(aq)$		

3. ____ $CaCl_2(aq)$ + ____ $Na_3PO_4(aq)$ ⟶ ____ $Ca_3(PO_4)_2(s)$ + ____ $NaCl(aq)$

4. Type of reaction: _____

D2 Reaction of $FeCl_3$ and KSCN

Reactants	1. Appearance of Solutions	2. Evidence of a Chemical Reaction
$FeCl_3(aq)$		
$KSCN(aq)$		

3. ____ $FeCl_3(aq)$ + ____ $KSCN(aq)$ ⟶ ____ $Fe(SCN)_3(aq)$ + ____ $KCl(aq)$

4. Type of reaction: _____

E. Sodium Carbonate and HCl

Reactants	1. Appearance of Reactants	2. Evidence of a Chemical Reaction
$HCl(aq)$		
$Na_2CO_3(s)$		

3. ____ $Zn(s)$ + ____ $HCl(aq)$ ⟶ ____ $ZnCl_2(aq)$ + ____ $H_2(g)$

____ $Cu(s)$ + ____ $HCl(aq)$ ⟶ ____ $CuCl_2(aq)$ + ____ $H_2(g)$

____ $Mg(s)$ + ____ $HCl(aq)$ ⟶ ____ $MgCl_2(aq)$ + ____ $H_2(g)$

4. Type of chemical reaction:

Zn _____

Cu _____

Mg _____

D. Reactions of Ionic Compounds

D1 Reaction of $CaCl_2$ and Na_3PO_4

Reactants	1. Appearance of Solutions	2. Evidence of a Chemical Reaction
$CaCl_2(aq)$		
$Na_3PO_4(aq)$		

3. ____ $CaCl_2(aq)$ + ____ $Na_3PO_4(aq)$ ⟶ ____ $Ca_3(PO_4)_2(s)$ + ____ $NaCl(aq)$

4. Type of reaction: _____

D2 Reaction of $FeCl_3$ and KSCN

Reactants	1. Appearance of Solutions	2. Evidence of a Chemical Reaction
$FeCl_3(aq)$		
$KSCN(aq)$		

3. ____ $FeCl_3(aq)$ + ____ $KSCN(aq)$ ⟶ ____ $Fe(SCN)_3(aq)$ + ____ $KCl(aq)$

4. Type of reaction: _____

E. Sodium Carbonate and HCl

Reactants	1. Appearance of Reactants	2. Evidence of a Chemical Reaction
$HCl(aq)$		
$Na_2CO_3(s)$		

3. Observation of burning match or splint _____

What caused the change in the burning match or splint?

4. ____ $Na_2CO_3(s)$ + ____ $HCl(aq)$ ____ ⟶ $CO_2(g)$ + ____ $H_2O(l)$ + ____ $NaCl(aq)$

5. Type of reaction: _____

F. Hydrogen Peroxide

Reactants	1. Appearance of Reactants	2. Evidence of a Chemical Reaction
$H_2O_2(aq)$		

3. ____ $H_2O_2(aq)$ $\xrightarrow{KI}$ ____ $H_2O(l)$ + ____ $O_2(g)$

4. Type of chemical reaction: _____

Questions and Problems

Q1 What evidence of a chemical reaction might you see in the following cases? Refer to Table 1.

a. dropping an Alka-Seltzer tablet into a glass of water

_____

b. bleaching a stain

_____

c. burning a match

_____

d. rusting of an iron nail

_____

Q2 Balance the following equations:

a. ____ $Mg(s)$ + ____ $HCl(aq)$ ⟶ ____ $H_2(g)$ + ____ $MgCl_2(aq)$

b. ____ $Al(s)$ + ____ $O_2(g)$ ⟶ ____ $Al_2O_3(s)$