

CHEM 4 PAL— Classifying Chemical Reactions

Part I: Classifying Chemical Reactions

1. Balance each of the following reactions. Reaction classifications options are shown in two boxes, box A and box B. Choose at least one option from each box for each reaction. If a reaction can be classified by more than 1 option, include those options as well. Solubility rules are located on the back of the worksheet.

- Precipitation
- Redox
- Acid-Base
- Combustion
- Gas Forming

- Synthesis
- Decomposition
- Single Displacement
- Double Displacement

- a. $\text{___}(\text{NH}_4)_2\text{Cr}_2\text{O}_7(\text{s}) \rightarrow \text{___}\text{H}_2\text{O}(\text{g}) + \text{___}\text{N}_2(\text{g}) + \text{___}\text{Cr}_2\text{O}_3(\text{s})$ _____
- b. $\text{___}\text{AgNO}_3(\text{aq}) + \text{___}\text{NaCl}(\text{aq}) \rightarrow \text{___}\text{AgCl}(\text{s}) + \text{___}\text{NaNO}_3(\text{aq})$ _____
- c. $\text{___}\text{HNO}_3(\text{aq}) + \text{___}\text{Ca}(\text{OH})_2 \rightarrow \text{___}\text{H}_2\text{O}(\text{l}) + \text{___}\text{Ca}(\text{NO}_3)_2(\text{aq})$ _____
- d. $\text{___}\text{K}_2\text{CO}_3(\text{aq}) + \text{___}\text{HCl}(\text{aq}) \rightarrow \text{___}\text{KCl}(\text{aq}) + \text{___}\text{H}_2\text{O}(\text{l}) + \text{___}\text{CO}_2(\text{g})$ _____
- e. $\text{___}\text{C}_8\text{H}_{18}(\text{aq}) + \text{___}\text{O}_2(\text{g}) \rightarrow \text{___}\text{CO}_2(\text{g}) + \text{___}\text{H}_2\text{O}(\text{l})$ _____
- f. $\text{___}\text{Al}(\text{s}) + \text{___}\text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{___}\text{Al}_2(\text{SO}_4)_3(\text{aq}) + \text{___}\text{H}_2(\text{g})$ _____

Part II: Predicting Products

2. Write the expected balanced reaction for each of the following sets of reactants.

- a. $\text{___}\text{LiOH}(\text{aq}) + \text{___}\text{NH}_4\text{Cl}(\text{aq}) \rightarrow$
- b. $\text{___}\text{C}_6\text{H}_{14}(\text{g}) + \text{___}\text{O}_2(\text{g}) \rightarrow$
- c. $\text{___}\text{HNO}_3(\text{aq}) + \text{___}\text{SrS}(\text{aq}) \rightarrow$
- d. $\text{___}\text{FeI}_3(\text{aq}) + \text{___}\text{(NH}_4)_2\text{CO}_3(\text{aq}) \rightarrow$
- e. $\text{___}\text{LiOH}(\text{aq}) + \text{___}\text{H}_3\text{PO}_4(\text{aq}) \rightarrow$
- f. $\text{___}\text{HCl}(\text{aq}) + \text{___}\text{Na}_2\text{SO}_3(\text{aq}) \rightarrow$

Soluble	Insoluble
Li^+ , Na^+ , K^+ , NH_4^+ , & NO_3^-	None
$\text{C}_2\text{H}_3\text{O}_2^-$ or CH_3COO^-	None
ClO_3^- & ClO_4^-	None
Cl^- , Br^- , & I^-	Compounds containing Ag^+ , Hg_2^{2+} , and Pb^{2+}
SO_4^{2-}	Compounds containing Ag^+ , Sr^{2+} , Ca^{2+} , Ba^{2+} , Hg_2^{2+} , and Pb^{2+}
Insoluble	Exceptions
S^{2-}	Compounds containing NH_4^+ , alkali metals*, Ca^{2+} , Sr^{2+} , & Ba^{2+}
CO_3^{2-}	Compounds containing NH_4^+ & alkali metals
PO_4^{3-}	Compounds containing NH_4^+ & alkali metals
OH^-	Compounds containing alkali metals, Ca^{2+} , Sr^{2+} , & Ba^{2+}
* Remember that alkali metals are those found in Group A1 of the periodic table	