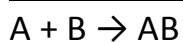
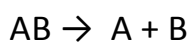


Type of ReactionsSymbolic form

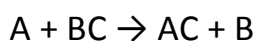
1) Synthesis or combination



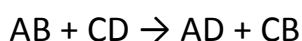
2) Decomposition



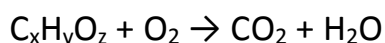
3) Displacement (single)



4) Displacement (double)



5) Combustion



Note: Displacement reactions are often in water (aqueous) so apply the solubility rules to identify states of products as well as ion combinations that change to their stable compound form.

Table 1. Consider the following Ion combinations and stable products!

Ions Combined	Formula	Change to Stable Form:
$[H^+, S^{2-}]$	$H_2S(aq)$	$H_2S(g)$
$[H^+, CO_3^{2-}]$	$H_2CO_3^*(aq)$	$CO_2(g), H_2O(l)$
$[H^+, HCO_3^-]$	$H_2CO_3^*(aq)$	$CO_2(g), H_2O(l)$
$[H^+, SO_3^{2-}]$	$H_2SO_3^*(aq)$	$SO_2(g), H_2O(l)$
$[H^+, HSO_3^-]$	$H_2SO_3^*(aq)$	$SO_2(g), H_2O(l)$
$[NH_4^+, OH^-]$	$NH_4OH^*(aq)$	$NH_3(g), H_2O(l)$

Note: H_2S is not very soluble in water and turns into a gas when formed.

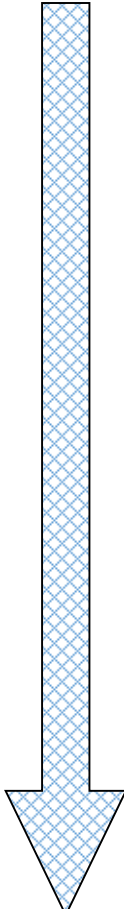
Table 2: Solubility Rules of Some Common Compounds in Water

ALL Solublebut....	Insolublewhen combined with:
Li^+, Na^+, K^+, NH_4^+	No exceptions!
$NO_3^-, C_2H_3O_2^-, ClO_3^-, HCO_3^-$	No exceptions!
Cl^-, Br^-, I^-	Ag^+, Hg_2^{2+}, Pb^{2+}
SO_4^{2-}	$Sr^{2+}, Ba^{2+}, Ca^{2+}$ $Pb^{2+}, Ag^+, Hg_2^{2+}, Hg^{2+}$

ALL Insolublebut....	Solublewhen combined with:
OH^-	Li^+, Na^+, K^+, NH_4^+ partially soluble: $Sr^{2+}, Ba^{2+}, Ca^{2+}$
S^{2-}	$Sr^{2+}, Ba^{2+}, Ca^{2+}$ Li^+, Na^+, K^+, NH_4^+
CO_3^{2-}, PO_4^{3-}	Li^+, Na^+, K^+, NH_4^+

NOTE: Memorize information presented in Tables 1 and 2.

Most reactive



Least reactive

Li Rb K Cs Ba Sr Ca Na	These metals will also replace a hydrogen from liquid water, $\text{H}_2\text{O}(\text{l})$. (as H_2 gas)
Mg Al Mn Zn Cr Fe	These metals will also replace 1 hydrogen from hot $\text{H}_2\text{O}(\text{l or g})$ at or above H_2O 's normal boiling point. (as H_2 gas)
Cd Co Ni Sn Pb H (H_2)	
Cu Hg Ag Pt Au	

Table 3.
Activity Series in single replacement reactions involving metals, cations and H_2O .