Type of Reactions	Symbolic form
1) Synthesis or combination	$A + B \rightarrow AB$
2) Decomposition	$AB \rightarrow A + B$
3) Displacement (single)	$A + BC \rightarrow AC + B$
4) Displacement (double)	$AB + CD \rightarrow AD + CB$
5) Combustion	$C_xH_yO_z + O_2\ (g) \rightarrow CO_2(g) + H_2O(l)$

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 Soluble *…….but….*	***Insoluble ……..when 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 Insoluble *…….but….*	***Soluble ……..when combined with:***
OH^-	Li^+, Na^+, K^+, NH_4^+ Only 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.

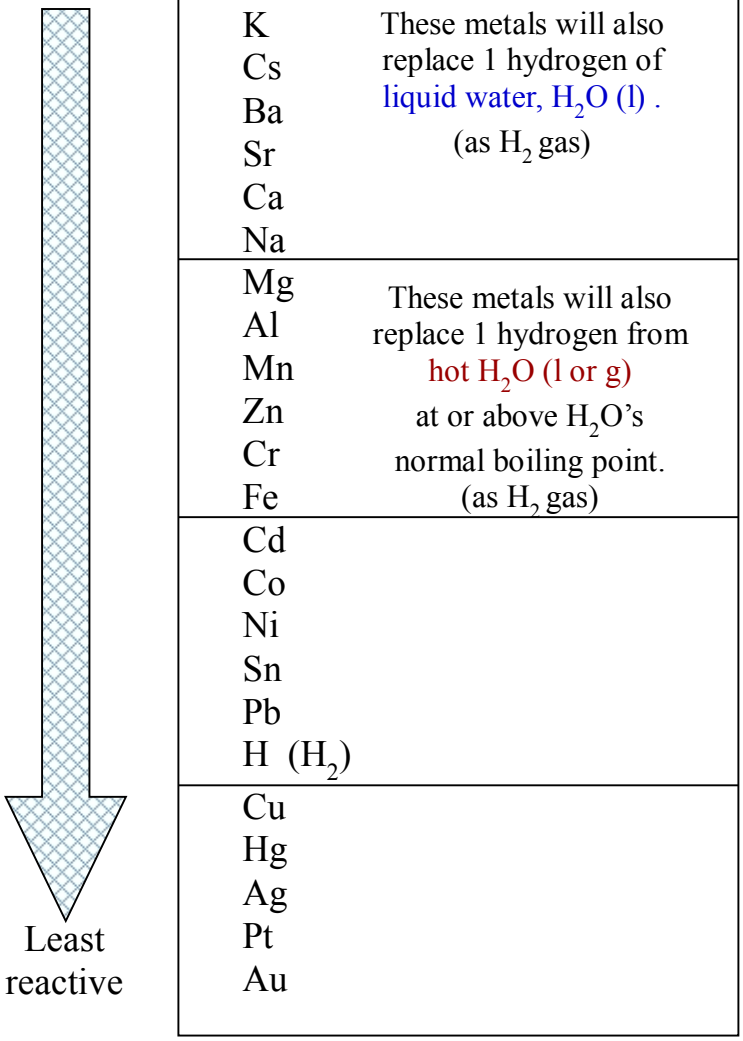

Table 3.
Activity Series in single replacement reactions involving, metals, cations and H_2O.