

## Generalizations on Acid-Base Properties of Salts to Recognize Types of Species Present

1. Memorize the strong acids:  
HCl, HBr, HI, HNO<sub>3</sub>, HClO<sub>4</sub>,  
H<sub>2</sub>SO<sub>4</sub>, HClO<sub>3</sub>
2. Memorize strong bases:  
LiOH, NaOH, KOH, RbOH,  
Ca(OH)<sub>2</sub>, Sr(OH)<sub>2</sub>, Ba(OH)<sub>2</sub>
3. All weak acids have a K<sub>a</sub> value  
less than 1 but greater than K<sub>w</sub>.  
Some weak bases are in Table  
14.3 of the text.
4. All conjugate bases of weak  
acids are weak bases, i.e., all  
have a K<sub>b</sub> value less than 1 but  
greater than K<sub>w</sub>. Some examples  
of these are the conjugate bases

of the weak acids in Table 14.2 of the text.

5. All conjugate acids of weak bases are weak acids, i.e., all have a  $K_b$  value less than 1 but greater than  $K_w$ . Some examples of these are the conjugate acids of the weak bases in Table 14.3 of the text.
6. Alkali metal ions ( $\text{Li}^+$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Rb}^+$ ,  $\text{Cs}^+$ ) and heavier alkaline earth metals ( $\text{Ca}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ba}^{2+}$ ) have no acidic or basic properties in water.
7. All conjugate bases of strong acids ( $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{NO}_3^-$ ,  $\text{ClO}_4^-$ ,  $\text{HSO}_4^-$ ) have no basic properties in water ( $K_b < K_w$ ) and only  $\text{HSO}_4^-$  has any acidic properties in water.