

STRONG ACIDS	STRONG BASES
hydrochloric acid, $\text{HCl}_{(\text{aq})}$	LiOH , NaOH , KOH
nitric acid, $\text{HNO}_{3(\text{aq})}$	Li_2O , Na_2O , K_2O
perchloric acid, $\text{HClO}_{4(\text{aq})}$	$\text{Ca}(\text{OH})_2$, $\text{Sr}(\text{OH})_2$, $\text{Ba}(\text{OH})_2$
sulfuric acid, $\text{H}_2\text{SO}_{4(\text{aq})}$ (to $\text{HSO}_4^-_{(\text{aq})}$)	CaO , SrO , BaO
$(\text{H}^+ + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+)$	$(\text{O}^{2-} + \text{H}_2\text{O} \rightarrow 2 \text{OH}^-)$

WEAK ACIDS	WEAK BASES
phosphoric acid, $\text{H}_3\text{PO}_{4(\text{aq})}$	ammonia, $\text{NH}_3(\text{aq})$
carbonic acid, $\text{H}_2\text{CO}_3(\text{aq})$	
organic acids, $\text{R-CO}_2\text{H}$	organic amines, R-NH_2
salts of weak base conjugate acids, eg. $\text{R-NH}_3^+ \text{Cl}^-$	salts of weak acid conjugate bases, eg. $\text{Na}^+ \text{R-CO}_2^-$

K_a Reaction	K_b Reaction
$\text{HA} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{A}^-$	$\text{A}^- + \text{H}_2\text{O} \rightleftharpoons \text{HA} + \text{OH}^-$
$\text{BH}^+ + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{B}$	$\text{B} + \text{H}_2\text{O} \rightleftharpoons \text{BH}^+ + \text{OH}^-$

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1.0 \times 10^{-14} \text{ at } 25^\circ\text{C}$$

$$\text{pX} = -\log_{10}\text{X}$$

$$\text{pH} = -\log_{10}[\text{H}_3\text{O}^+]$$

$$\text{pOH} = -\log_{10}[\text{OH}^-]$$

$$\text{pK}_a = -\log_{10}K_a$$

$$[\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$

$$K_a = 10^{-\text{pK}_a}$$

$$\text{pH} + \text{pOH} = 14$$

$$\text{for same conjugate pair: } \text{pK}_a + \text{pK}_b = 14$$

$$K_a K_b = 1.0 \times 10^{-14}$$