§.4 Strong / Weak Acids / Bases

acids produce H^+
bases produce OH^-
} dissociate in soln

aq solns = eqm mixtures

$$HA_{(aq)} + H_2O_{(e)} \rightleftharpoons A^-_{(aq)} + H_3O^+_{(aq)}$$ position of eqm defines strength

Strong Acid: eqm lies extremely to right

$$HCl_{(aq)} \longrightarrow H^+_{(aq)} + Cl^-_{(aq)}$$ (no eqm)

Weak acid: eqm lies to left

$$CH_3COOH_{(aq)} \rightleftharpoons H^+_{(aq)} + CH_3COO^-_{(aq)}$$

Summary:
- Strong acid good H^+ donor → full dissociation creates weak conj. base → does not readily accept H^+
- weak acid poor H^+ donor, creates strong conj. base → readily accepts H^+

∴ strength = measure of dissociation in soln

★ do not confuse strength w/ concentration!!

Strong base: $NaOH_{(aq)} \rightarrow Na^+_{(aq)} + OH^-_{(aq)}$

Weak base: $NH_{3(aq)} + H_2O_{(l)} \rightleftharpoons NH_4^+{}_{(aq)} + OH^-_{(aq)}$

Summary: Opposite for bases
- Strong base good H^+ acceptor, weak conj. acid
- Weak base poor H^+ acceptor, strong conj. acid

	Acids	Bases
Strong	HCl	$LiOH$
	H_2SO_4	$NaOH$
	HNO_3	KOH
		$Ba(OH)_2$

★ all others weak (section 21)

	Acids	Bases
Weak	CH_3COOH	NH_3
	H_2CO_3	$C_2H_5NH_2$ (organic derivative of NH_3)
	H_3PO_4	

★ organic acids: aa + DNA

Distinguish b/w S + W A/B

Strong A/B contain higher [ion] than weak
→ used to distinguish them
(only valid at same [] + T)

1) Electrical conductivity
depends on [] of mobile ions
strong ↑ conductivity over weak

2) Rate of Rxn
↑ RoR w/ Strong
important for lab safety
not easy for quantifying data

3) pH
measure of $[H^+]$
direct comparison of strengths (equal [])