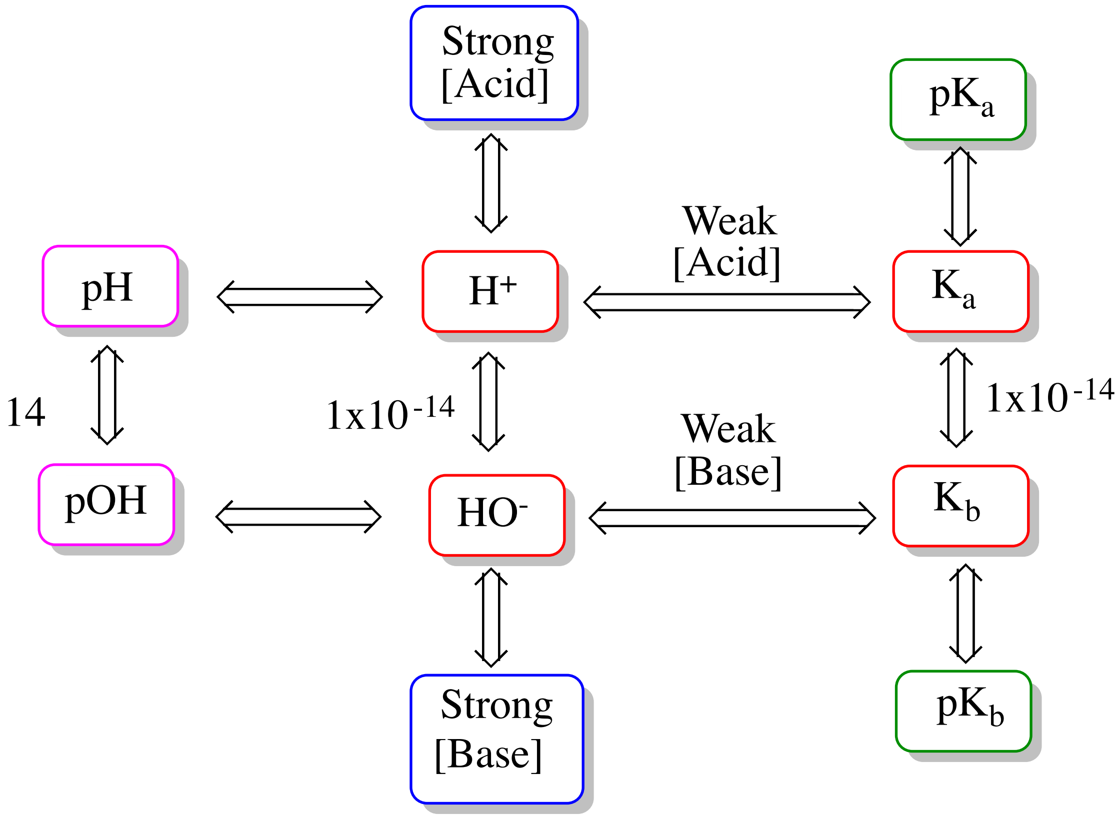
Acid-Base Concept Map General Chemistry II Jasperse



Key Equations, Numerical Relationships

1. $[H^+][HO^-] = 1.00 \times 10^{-14}$

2. $pH = -\log[H^+]$ $pOH = -\log[OH^-]$ $[H^+]=10^{-pH}$ $[OH^-]=10^{-pOH}$

3. $pH + pOH = 14$

Weak acid problems (assuming simplifying assumption)

4. $[H^{\oplus}] = \sqrt{K_a \times [HA]_{init}}$

5. $K_a = \dfrac{[H^+]^2}{[HA]_{init}}$

6. $pK_a = -\log K_a$ $pK_b = -\log K_b$ $K_a = 10^{-pKa}$ $K_b = 10^{-pKb}$

Weak base problems (assuming simplifying assumption)

7. $[HO^{\ominus}] = \sqrt{K_b \times [Base]_{init}}$

8. $K_b = \dfrac{[HO^-]^2}{[Base]_{init}}$

Conjugate K_aK_b

9. $K_aK_b = 10^{-14}$ for a conjugate acid/base pair.

Some Calculation Logic Scenarios

1.	Strong acid → pH	[Strong acid] → $[H^{\oplus}]$ → pH
2.	Strong base → pH	[Strong base] → $[HO^{\ominus}]$ → pOH → pH
3.	Weak acid + K_a → pH	[Weak acid] + K_a → $[H^{\oplus}]$ → pH
4.	pH of weak acid → K_a	pH → solve for $[H^{\oplus}]$ → K_a
5.	Weak base + K_b → pH	[Weak base] + K_b → $[HO^{\ominus}]$ → pOH → pH
6.	pH of weak base → K_b	pH → solve for $[HO^{\ominus}]$ → pOH → pH
7.	Weak base + K_a of conjugate acid → pH	K_a → K_b → $[HO^{\ominus}]$ → pOH → pH

- Many of these can be further lengthened by adding a pK_a → K_a or pK_b → K_b step.
- Many can also be further lengthened by having you calculate your molarity of a starting strong or weak acid.
    - Dilution: Given an original concentration, what is the concentration after diluting?
    - Grams in solvent, use grams and molecular weight to find moles, then moles and volume to determine molarity.