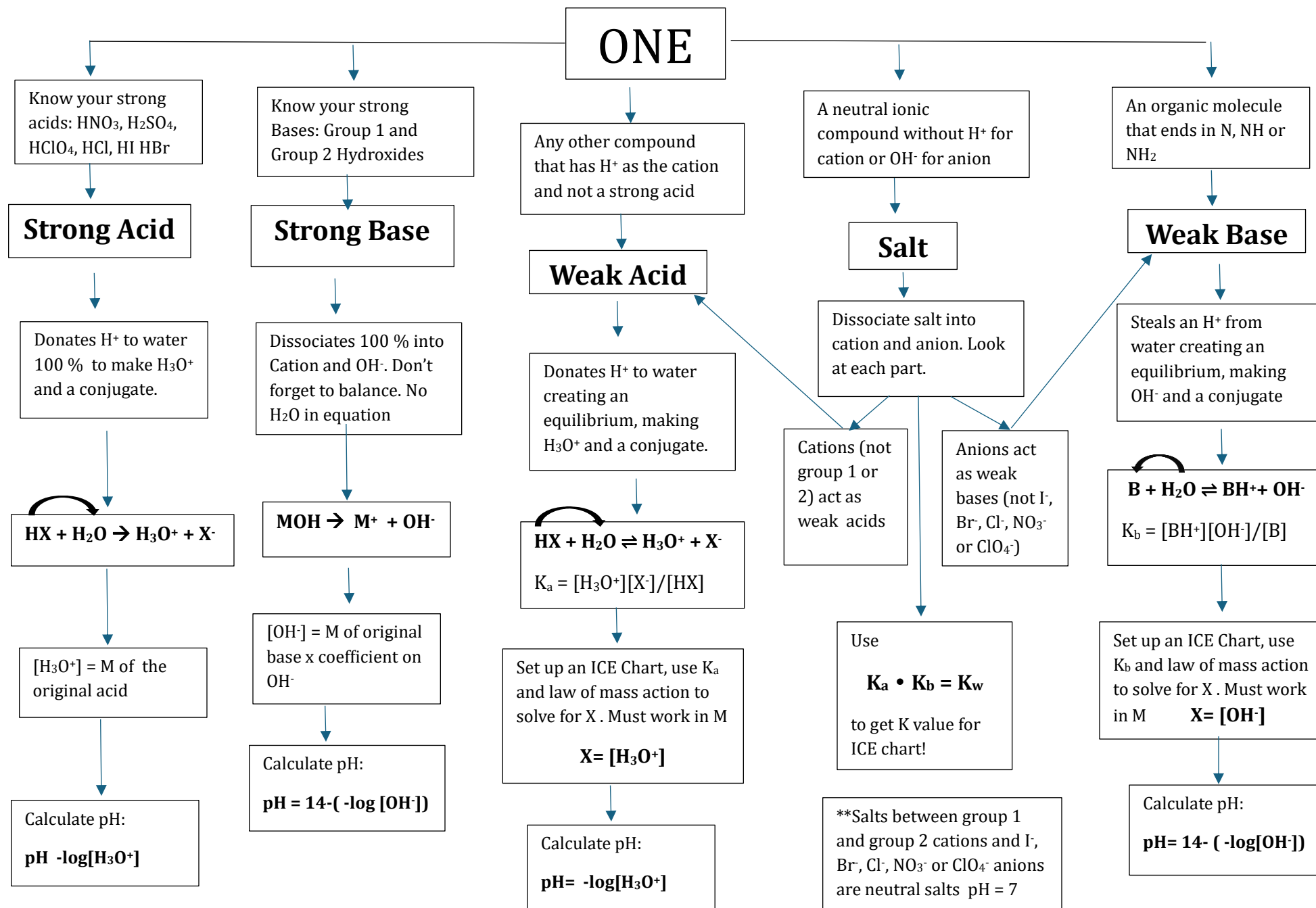


Acid/Base Chemistry How many Chemicals are you putting into the container?



Acid/Base Chemistry How many Chemicals are you putting into the container?

TWO

What are the two chemicals?

WEAK acid/base conjugate pair Conjugate is often in a salt (ex. HF and LiF or NH₃ and NH₄Cl)

2 strong (ex. strong acid with strong base) One type of titration

BUFFER

Common ion effect

Calculate pH: Use Henderson-Hasselbalch

Identify acid part of the buffer and get K_a of that weak acid

$$\text{pH} = \text{pK}_a + \log \text{B/A}$$

- B/A ratio can be in moles or M as long as volume does not change (not mixing two solutions together)
- pH buffer \approx pK_a More base pH > pK_a, more acid pH < pK_a
- Buffering Capacity depends on moles of each part

Write Neutralization Equation – **Completion Reaction**

Do BCA Table

Must be worked in moles (MxL)
There is a limiting reactant (fewer moles) – change in table

Look at “A” line on BCA.

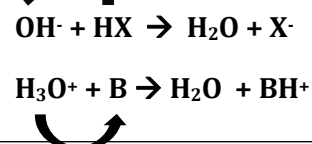
Before Equivalence pt in titration

If OH⁻ or H₃O⁺ is the limiting reactant, you have a **BUFFER**

At Equivalence pt. in a titration, there is no LR or ER. pH depends on the conjugate (product) present. Cation \rightarrow pH < 7. Anion \rightarrow pH > 7

Strong with a weak (ex. Strong acid with weak base). This is what many titrations are

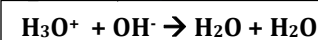
Bases react with Acids.
Never 2 bases or 2 acids.
OH⁻ (strong base) or H₃O⁺ (strong acid) are reactants.
Water is a product



After equivalence pt. in titration

If OH⁻ or H₃O⁺ is the excess reactant, convert to M using total volume

Write Neutralization Equation – **Completion Reactions**



NEVER A BUFFER

Do BCA Table

Must be worked in moles
There is a limiting reactant (fewer moles) – change in table

Excess reactant on “A” line controls pH. Convert back to molarity using total volume

Calculate pH using:

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

$$\text{pH} = 14 - (-\log[\text{OH}^-])$$

Acid/Base Chemistry How many Chemicals are you putting into the container?

Three

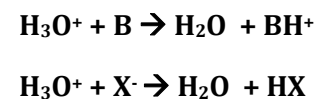
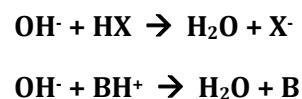
Adding a strong acid or base to a pre-existing buffer

Is the strong being added a strong base? (LiOH, NaOH, KOH)

Is the strong being added a strong acid? HI, HBr, HCl, HNO₃, HClO₄

Write a net Neutralization Equation of **strong base (OH⁻)** with the **ACID** component of the buffer – **Completion Reactions**

Write a net Neutralization Equation of **strong acid (H₃O⁺)** with the **BASE** component of the buffer – **Completion Reactions**



Do BCA Table

Must be worked in moles (M X L)

Since there are 3 chemicals present, there will be three numbers on the "B line" of the table

There is a limiting reactant (fewer moles of reactant). That quantity is the change in BCA table

Look at "A" line on BCA.

If OH⁻ or H₃O⁺ is the limiting reactant, you have a **BUFFER**

If OH⁻ or H₃O⁺ is the excess reactant, convert to M using total volume

Calculate pH using:
pH = pK_a + log B/A

Calculate pH using:
pH = -log[H₃O⁺]
pH = 14 - (-log[OH⁻])