What makes a good buffer system?

1. weak Acid + conjugate base
2. weak acid + strong base
3. strong acid + weak base

Whatever is weak has to be higher in amount

[ ] = concentration of... (M)

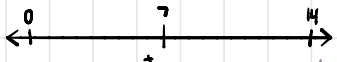
LiOH — strong base
HNO_3 — strong acid

NaCl — conjugate base
HCl — Strong acid ← Not a scenario for a good buffer system

HCN, — weak acid
LiCN — basic salt ← equal amounts of weak acid + conj. base = ideal buffer system

HCN — weak acid
NaBr — salt ← not conjugate base or strong base.

HNO_3 — Strong acid
$LiNO_3$ — neutral salt



$pH = -\log[H_3O^+]$ $\quad$ $pOH = -\log[OH^-]$

$pH + pOH = 14$ @ 25°C

is it an acid?
- produces H^+ ions
- donates (loses) H^+ ion
  - gives to $H_2O \rightarrow H_3O$

is it a base?
releases OH^- ions
proton (H^+) acceptors

Conjugate acid: add H^+ ion; increase charge (+1)

Conjugate Base: remove H^+ ion; decrease charge (-1)

additional formulas $[H_3O^+] = 10^{-pH}$

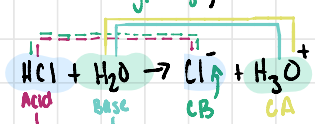
$[OH^-] = 10^{-pOH}$

Acid base rules

(-) (+)

Hydrogen + metal = base ; H^-

Hydrogen + nonmetal = acid (Typically); H^+



strong acid ← completly ionizes → loses H^+ ion (donates H^+ ion)

based on sign (-)

Based on sign (+)

if it completly dissociates there is a one way arrow

identify Acid, Base, C.A., C.Base

whats happening to this (+) gaining a H^+

notice the signs.