**Steps to determine if a salt is acidic/basic/neutral**

1. Identify ions that the salt came from
2. Determine if the ions will hydrolyze
	* Figure out if ions came from a strong/weak acid/base
		+ From strong 🡪 ion won’t hydrolyze
		 = neutral contribution
		+ From weak 🡪 ion will hydrolyze
		 = acidic or basic contribution
3. If it hydrolyzes identify if the hydrolysis of the ion would form acid (H3O+)or base (OH-).
4. Figure out what the combo of each ion’s contribution would be to the solution
5. To determine the “winner” when acidic + basic
	* Compare the Ka and Kb values
	* The higher one means it is stronger, more dissociation so it will contribute more to the resulting solution

**Steps to find the actual pH value of a salt solution**

1. Do all the steps needed to determine which ion is the “stronger” one – which one can hydrolyze?
2. Write the hydrolysis reaction for that ion (or ions)
3. ICE Table time! Yes! More ICE tables! They just won’t go away! ☺ Use your hydrolysis rxn for ICE Table
4. Find [H3O+] or [OH-] from ICE Tables
5. Continue on with normal pH type calculations using the concentrations you found from the ICE Table

|  |  |
| --- | --- |
|  | **Makes the solution…** |
| **Acidic + Neutral** | Acidic |
| **Basic + Neutral** | Basic |
| **Neutral + Neutral** | Neutral |
| **Acidic + Basic** | Compare Ka and Kb to determine which “wins” |
| Ka(ion) > Kb(ion)  | Acidic |
| Ka(ion) < Kb(ion)  | Basic |
| Ka(ion) = Kb(ion)  | Neutral |
| **Remember:** Kw = Ka x KbKa(acidic ion) = $\frac{Kw}{Kb (of where ion came from)}$Kb(basic ion) = $\frac{Kw}{Ka (of where ion came from)}$ |

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|  |  |  |  |
| --- | --- | --- | --- |
|  | **Forms a…** | **Hydrolyzes?** | **So the ion makes sol’n** |
| **Strong Acid** | **Weaker** conjugate **base** | No | **Neutral** |
| **Weak Acid** | **Stronger** conjugate **base** | Yes | **Basic** |
| **Strong Base** | **Weaker** conjugate **acid** | No | **Neutral** |
| **Weak Base** | **Stronger** conjugate **acid** | Yes | **Acidic** |

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|  |  |  |  |
| --- | --- | --- | --- |
|  | **Forms a…** | **Hydrolyzes?** | **So the ion makes sol’n** |
| **Strong Acid** | **Weaker** conjugate **base** | No | **Neutral** |
| **Weak Acid** | **Stronger** conjugate **base** | Yes | **Basic** |
| **Strong Base** | **Weaker** conjugate **acid** | No | **Neutral** |
| **Weak Base** | **Stronger** conjugate **acid** | Yes | **Acidic** |