

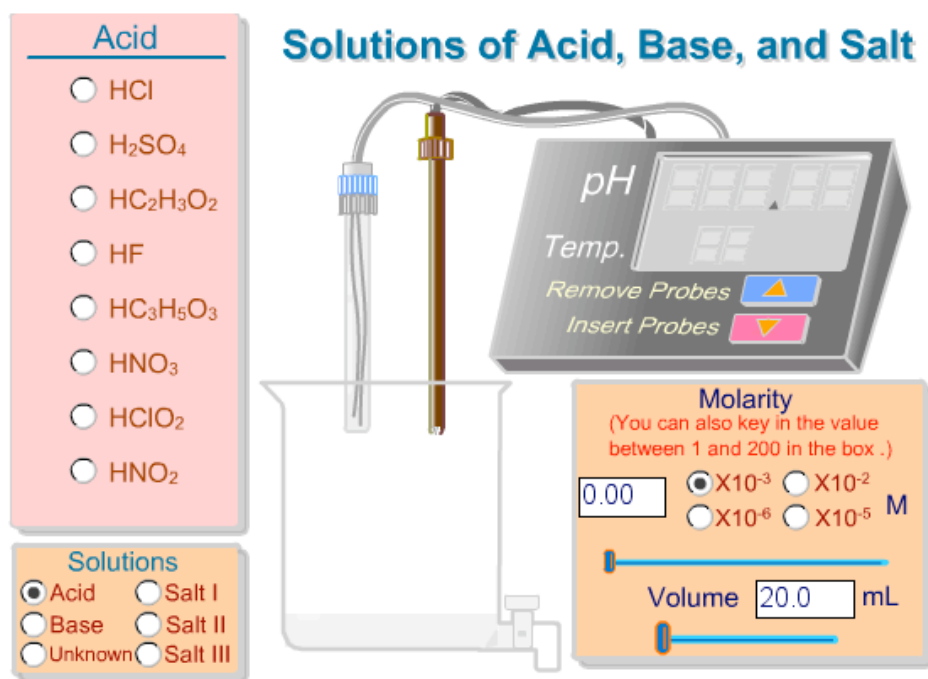
Acid/Base Salts

Name _____ Lab Section _____

Problem Statement: What are the acid and base properties of salt solutions?

I. Data Collection:

- A. Go to <http://cheminfo.chem.ou.edu/~mra/home.html> and open the Acid/Base pH Simulation. Your screen should look like the figure.



This simulation contains a pH meter. You can test the pH of strong and weak acid, strong and weak base and salt solutions of different concentrations. You will set up the conditions of each measurement using the radio buttons and slide bars and then insert the pH probes into the solution to obtain the pH of the solution.

B. In the Solutions menu, select Salt I and then select NaCl. Set the concentration of the solution at 1.00×10^{-2} M (use the slider bar or key in 1.00 and then the radio button). Set the volume at 100 mL (use the slider bar). Click on the Insert Probes button on the pH meter. Enter your pH data in the following table.

Solution	Concentration (M)	pH	[H ⁺]	[OH ⁻]
NaCl (aq)	1.00×10^{-2}			
NH ₄ NO ₃ (aq)	1.00×10^{-2}			
NaC ₂ H ₃ O ₂ (aq)	1.00×10^{-2}			
NH ₄ Cl (aq)	1.00×10^{-2}			
Na ₂ SO ₄ (aq)	1.00×10^{-2}			
NaCN (aq)	1.00×10^{-2}			
NaNO ₃ (aq)	1.00×10^{-2}			
NaF (aq)	1.00×10^{-2}			
(NH ₄) ₂ SO ₄ (aq)	1.00×10^{-2}			

C. Remove the probes. Measure the pH of 1.00×10^{-2} M concentrations of each of the salts in the list. Record your findings in the preceding table.

II. Data Analysis and Interpretation

A. pH is defined by the equation: $\text{pH} = -\log [\text{H}^+]$. Calculate the [H⁺] for each of the solutions in the table in the previous section and record your results in the table.

B. In a water solution the [H⁺] is related to the [OH⁻] by the following equation:

$$10^{-14} = [\text{H}^+] [\text{OH}^-]$$

Use this equation to calculate the [OH⁻] for each of the solutions in the table in the previous section and record your results in the table.

- C. Use the information from the table in Section I. B. to identify the acid/base characteristic of each of the salts. Enter your findings in the following table.

Solution	Acid/Base/Neutral	Ions
NaCl (aq)		
NH ₄ NO ₃ (aq)		
NaC ₂ H ₃ O ₂ (aq)		
NH ₄ Cl (aq)		
Na ₂ SO ₄ (aq)		
NaCN (aq)		
NaNO ₃ (aq)		
NaF (aq)		
(NH ₄) ₂ SO ₄ (aq)		

- D. Write an equation representing the reaction when NaCl is dissolved in water. What ions are present. List the ions present in each solution and record them in the preceding table.
- E. In the preceding table, circle the ion responsible for the acid/base characteristic of each solution.
- F. Write a hydrolysis equation to illustrate how salts exhibit acid base properties. Pick one acid salt and one base salt. (A hydrolysis equation is written by reacting an acid or base ion with water. A hydrogen ion is either removed from the salt and added to the water or removed from water and added to the salt to form the products.)