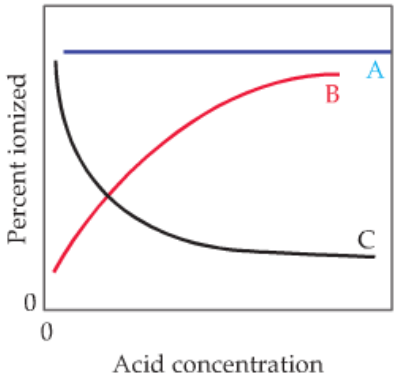
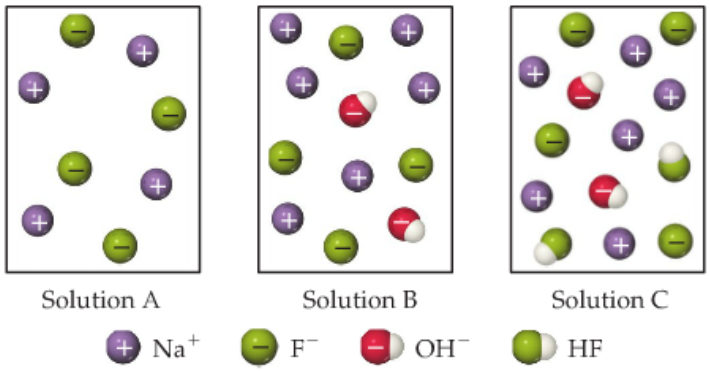
16.6 (a) Which of these three lines represents the effect of concentration on the percent ionization of a weak acid? (b) Explain in qualitative terms why the curve you chose has the shape it does. [Section 16.6]



16.8 Which of the following diagrams best represents an aqueous solution of NaF? The water molecules are not shown for clarity. Will this solution be acidic, neutral, or basic? [Section 16.9]



16.27 If a neutral solution of water, with pH = 7.00, is heated to 50 °C, the pH drops to 6.63. Does this mean that the concentration of $[H^+]$ is greater than the concentration of $[OH^-]$? Explain.

16.36 **(a)** If HNO_3 is added to water, how does $[OH^-]$ change? How does pH change? **(b)** Use the pH values in Figure 16.5 to estimate the pH of a solution with $[OH^-] = 0.014\ M$. Is the solution acidic or basic? **(c)** If pH = 6.6, first estimate and then calculate the molar concentrations of $H^+(aq)$ and $OH^-(aq)$ in the solution.

16.47 Calculate the concentration of an aqueous solution of NaOH that has a pH of 11.50.

16.48 Calculate the concentration of an aqueous solution of $Ca(OH)_2$ that has a pH of 10.05.

16.51 Lactic acid ($CH_3CH(OH)COOH$) has one acidic hydrogen. A 0.10 *M* solution of lactic acid has a pH of 2.44. Calculate K_a.

16.58 The acid-dissociation constant for chlorous acid ($HClO_2$) is 1.1×10^{-2}. Calculate the concentrations of H_3O^+, ClO_2^-, and $HClO_2$ at equilibrium if the initial concentration of $HClO_2$ is 0.0125 *M*.

16.71 Write the chemical equation and the K_b expression for the reaction of each of the following bases with water: **(a)** dimethylamine, $(CH_3)_2NH$; **(b)** carbonate ion, CO_3^{2-}; **(c)** formate ion, CHO_2^-.

16.79 **(a)** Given that K_a for acetic acid is 1.8×10^{-5} and that for hypochlorous acid is 3.0×10^{-8}, which is the stronger acid? **(b)** Which is the stronger base, the acetate ion or the hypochlorite ion? **(c)** Calculate K_b values for CH_3COO^- and ClO^-.

16.82 Using data from Appendix D, calculate $[OH^-]$ and pH for each of the following solutions: **(a)** 0.105 *M* NaF, **(b)** 0.035 *M* Na_2S, **(c)** a mixture that is 0.045 *M* in CH_3COONa and 0.055 *M* in $(CH_3COO)_2Ba$.

17.14 **(a)** Consider the equilibrium $B(aq) + H_2O(l) \rightleftharpoons HB^+(aq) + OH^-(aq)$. Using Le Châtelier's principle, explain the effect of the presence of a salt of HB^+ on the ionization of B. **(b)** Give an example of a salt that can decrease the ionization of NH_3 in solution.

17.17 **(a)** Calculate the percent ionization of 0.0075 *M* butanoic acid ($K_a = 1.5 \times 10^{-5}$). **(b)** Calculate the percent ionization of 0.0075 *M* butanoic acid in a solution containing 0.085 *M* sodium butanoate.

17.21 (**a**) Calculate the pH of a buffer that is 0.12 *M* in lactic acid and 0.11 *M* in sodium lactate. (**b**) Calculate the pH of a buffer formed by mixing 85 mL of 0.13 *M* lactic acid with 95 mL of 0.15 *M* sodium lactate.