

Chemistry II Objectives Z & Z Ch 14 through pH weak acids  
Acids, Bases and pH

1. In table-form compare six properties of acids and six properties of bases.
2. Write out the Arrhenius definitions of acids and bases. Write equations that show the dissociation of an Arrhenius acid in water and an Arrhenius base in water.
3. Write out the Bronsted-Lowry definitions of acids and bases. Write equations that show the dissociation of a Bronsted-Lowry acid in water and an Bronsted-Lowry base in water.
4. a. Write an equation that describes what happens when ammonia is mixed with water. Identify acid, base, conjugate acid, and conjugate base.  
a. Write an equation that describes what happens when hydrochloric acid is mixed with water. Identify acid, base, conjugate acid, and conjugate base.
5. Define these terms:  
weak acid      strong acid      weak base      strong base      hydronium ion  
acid dissociation constant      base dissociation constant      acidic hydrogen  
monoprotic acid
6. Acetic acid is the conjugate acid of the acetate anion. It is a weak monoprotic acid that dissociates to an acetate ion and a hydronium ion in aqueous solution. Calculate  $K_a$  for acetic acid if a 1.0 M solution results in an equilibrium  $H_3O^+$  concentration of 0.0042 M.
7. Ammonia is a weak base. If the initial concentration of ammonia is 0.150 M and the equilibrium concentration of  $OH^-$  is  $1.6 \times 10^{-3}M$ , calculate  $K_b$  for ammonia.
8. What are the ion concentrations in pure water?
9. Describe the pH scale. What numbers compare to acids and bases? What would the pH of strong or weak acids or bases be?
10. Write an equation for the calculation of the pH of an acid or base.
11. What is the  $[OH^-]$  for a water solution in which  $[H_3O^+] = 4.2 \times 10^{-9}$ ? What is its pH? What is its pOH? Indicate if it is acid, base, or neutral.
12. Describe and differentiate between four ways to describe the strength of an acid.
13. Given the change in  $K_a$  at different temperatures, be able to indicate if a reaction is endothermic or exothermic.
14. Calculate the concentration of all species present and the pH of a 0.020 M HF solution. HF is a weak acid.  $K_a = 7.2 \times 10^{-4}$ .