Exp. 2: Chemical Reaction Rates.
What factors affect the rate of a chemical reaction? Strong vs weak acid, surface area of a solid, concentration of the reactants, temperature. Predict the relative rates of reaction for acid + mossy zinc.

Exp. 1: Identification of Anions.
Predict the result of adding dilute H$_2$SO$_4$, AgNO$_3$ sol’n, KMnO$_4$ + H$_2$SO$_4$, or BaCl$_2$ sol’n to a salt containing either NO$_3^-$, CO$_3^{2-}$, SO$_3^{2-}$, or SO$_4^{2-}$. Identify the anion (one of the 4 listed) given the result of adding each of the 4 reagents.

Exp. 3: Reversible Reactions and Equilibria.
Le Chatelier’s Principle. What happens when CO$_2$ is bubbled through Ca(OH)$_2$ solution? When excess CO$_2$ is bubbled through the same solution? When the resulting solution is warmed? Why do these changes occur?

Exp. 8: Group I Analysis.
What conditions are used to precipitate Group I cations? Calculate the conc. of Pb$^{2+}$, Hg$_2^{2+}$, or Ag$^+$ left in solution given the K$_{sp}$ and the final chloride conc.

Exp. 15: Amphoterism and Ammonia Complexes.
Definition of amphoterism. An unknown contains either Zn$^{2+}$ or Al$^{3+}$. What happens when you add (a) a small amount of NaOH sol’n and then a large amount of NaOH sol’n, or (b) a small amount and then a large amount of ammonia to the unknown sol’n?

Exp. 4 & 5: Common Ion Effects and Indicators.
Definitions of an indicator, hydrolysis, and the common ion effect. Predict whether the salt solution will be acidic, basic, or neutral. What happens to the pH of a solution of acetic acid when sodium acetate is added? Why? What happens to the pH of a solution of ammonia when NH$_4$Cl is added? Why? Calculate the pH of a buffer.

New Exp.: Titration of a Weak Acid.
Given a titration curve (plot of pH vs vol. of titrant), locate the endpoint. How can the pK$_a$ of the weak acid be determined from the titration curve? Given the necessary volume and pH data ($V_{eq}$, pH at $V_{eq}$, 1/2$V_{eq}$, pH at 1/2$V_{eq}$), calculate K$_a$. 
Exp. 9: **Group II Analysis.**
What conditions are used to precipitate Group II cations?

Exp. 10: **Group III Analysis.**
What conditions are used to precipitate Group III cations?

Exp. 11 & 12: **Groups IV and V Analysis.**
What conditions are used to precipitate Group IV cations? What are the characteristic flame test colors for Na\(^+\), K\(^+\), Sr\(^{2+}\), Ba\(^{2+}\) and Ca\(^{2+}\)? How can one identify the presence of NH\(_4\)^+?

Exp. 14: **Identification of a Water Soluble Salt.**
Given the tests mentioned above, identify both the anion and the cation (or the Group # of the cation) of a water soluble salt.

**General Questions:**
What colors are associated with solutions of the following ions: Cu\(^{2+}\), Ni\(^{2+}\), Fe\(^{2+}\), CrO\(_4^{2-}\), MnO\(_4^-\)?