Honors Chemistry 2- Inorganic Chemistry

Building on what you previously have learned in Chemistry 1, the following topics will be further explored:

Introduction

- Review balancing equations and predicting products
- Significant figures and introduction to uncertainty
    - Accuracy limits of measuring devices
    - Uncertainty of averages
    - Error analysis-using the uncertainty to evaluate significant sources of error and the effect on valid conclusions
    - Suggestions for improving experiments

I. Stoichiometry

- Correctly calculate mole conversions including: (1) mass; (2) volume, and (3) particles.
- Calculate the limiting and excess reagents and % yield.
- Determine empirical and molecular formulas from % composition.

II. Solution Chemistry

- Understand the solvation process and its effects on physical properties
- Perform Molarity and % composition calculations.
- Be able to make solutions from solids or existing solutions by dilution
- Be able to prepare samples for spectrophotometric analysis.

III. Equilibrium, Acids and Bases

- Understand dynamic chemical equilibrium→Calculate Ka, Kb, Keq
- Use LeChatelier's principle to predict equilibrium shifts
- Compare Arrhenius, Bronsted-Lowry, and Lewis Acid/Base theories.
- Perform pH, [H+], [OH-] calculations
- Perform titrations and necessary calculations
- Qualitatively understand buffers and buffering capacity.

IV. Oxidation and Reduction

- Correctly assign oxidation numbers.
- Identify and balance a redox equation for half-reactions in both acidic and basic systems.
- Understand spontaneous and non-spontaneous electrochemical cells and their applications
- Diagram and calculate the standard potential of an electrochemical cell.

V. Energetics, Kinetics and the Gas Laws

- Perform calculations using the Combined Gas Law and the Ideal Gas Law
- Perform Celsius to Kelvin conversions. Perform conversions between atmospheres, kiloPascals, and torr (mmHg).
- Calculate standard enthalpy change.
- Calculate standard entropy change.
- Calculate standard Gibb's free energy change.
- Use thermodynamic values to predict spontaneity.
- Predict the effect of conditions on reaction rates.
- Understand collision theory and its application to reaction rates.

VI. Further Atomic Structure and Bonding Concepts*

- Be able to describe and sketch the shapes of electron orbitals *s* & *p*. (*d*-orbital shapes not required)
- Construct electron configurations through Kr.
- Be able to make predictions about ionization energies using periodic tables.
- Be able to determine the shape of a molecule using VSEPR Theory.
- Be able to use molecular geometry and electronegativity to determine polarity of molecules and types of attraction present.

**** These final topics are a natural lead-in to chemistry 3 (Organic).***