

## *Norwood Public Schools*

# **AP Chemistry Curriculum Overview**

### **Description:**

AP Chemistry is an intensive, first-year college level chemistry course. It is designed to prepare students for the Advanced Placement Chemistry exam. Class time is spent on lecture, lab and problem solving. A large amount of class time is spent on chemical calculations. Students work collaboratively to solve problems from the supplemental textbooks and AP released exams. Homework problems from the textbook are assigned regularly with one question homework quizzes given on the due dates to check student understanding. Other forms of assessment include at least one quiz per chapter and a test on one or more chapters. Topics emphasized include acids and bases, equilibrium, kinetics, thermochemistry, electrochemistry, and redox reactions. Students will be encouraged to take the Advanced Placement Chemistry exam although preparation outside of class is still necessary. Students can expect to spend approximately 2 - 3 hours a week on homework and about the same on laboratory reports.

### **Learning Experiences:**

- Students complete a summer assignment before starting AP Chemistry. The assignment focuses on chapters 1 – 3 in the textbook, which cover review material from first year chemistry.
- Students work collaboratively to answer questions from the textbook, supplemental textbooks and old AP exams.
- Students complete laboratory experiments that focus on many of the topics learned throughout the year.
- Students keep a laboratory notebook.
- Students submit a complete lab report for each laboratory experiment. Lab reports will focus on discussion, data analysis, and calculations.
- Students generate graphs for a variety of laboratory experiments using Microsoft Excel.
- Students utilize Vernier Probeware during a variety of laboratory experiments.

## Content Outline:

### Term 1

Stoichiometry: Percent Composition, Empirical & Molecular Formulas, Limiting Reactants  
Chemical Reactions: Precipitation, Oxidation - Reduction  
Atomic Structure: Quantum Numbers, Electron Configurations, Periodic Trends  
Bonding: Molecular Structure, Bond Angles, Polarity, Hybridization, Sigma & Pi Bonds

### Term 2

Thermochemistry: Enthalpy, Calorimetry, Hess's Law, Standard Enthalpies, Bond Energies  
Spontaneity: Entropy, Free Energy  
Kinetics: Rate laws, Integrated Rate Laws, Half-life, Reaction Mechanisms  
Gases: Gas laws, Effusion & Diffusion

### Term 3

Equilibrium: Equilibrium Expressions, Le Chatelier's Principle, ICE Problems, Solubility Equilibrium  
Acids and Bases: Definitions, Strength, pH, Titrations, Indicators

### Term 4

Electrochemistry: Galvanic Cells, Standard Reduction Potentials, Cell Potential  
Liquids and Solids: Intermolecular Forces, Types of Solids, Changes of State, Phase Diagrams  
Solutions: Solution Composition, Vapor Pressure, Colligative Properties, Osmotic Pressure

## Resources Used:

- Zumdahl and Zumdahl. Chemistry. sixth edition. Houghton Mifflin. 2003.
- Zumdahl, Steven. Chemistry. third edition. Houghton Mifflin, 1999.
- Chang, Raymond. Chemistry. seventh edition. McGraw-Hill, 2002.
- Hall, James. *Experimental Chemistry*. third edition. DC Heath & Co. 1993.
- Vonderbrink, Sally Ann. *Laboratory Experiments for AP Chemistry*. first edition.

As of 3/21/12