# Southmoreland School District
# AP Chemistry Curriculum Overview

## AP Chemistry Overview:

The Advanced Placement course is equivalent to two semesters of college chemistry at the science, engineering or pre-medicine major level. Students will be expected to maintain a rigorous pace that will require a great deal of independent study, reading of the text and supplemental materials and high-level problem solving. Students will follow a college-style format consisting of weekly quizzes, multi-chapter exams and comprehensive mid-term and final exams. Topics covered will include chemical reactions, stoichiometry, gas behavior, thermochemistry, atomic and bonding theories, liquids, solids, solution chemistry, kinetics, equilibrium, acids and bases, reaction spontaneity, electrochemistry, nuclear chemistry and organic chemistry. A laboratory component is also included which will require written laboratory reports. All students taking the course will receive the coursework and experience necessary for the AP Chemistry Examination.

## Module Titles:

*** Modules with an asterisk are for Advanced Chemistry 1**

**Module 1: * Chemical Foundations**
**Module 2: * Atoms, Molecules, and Ions**
**Module 3: * Stoichiometric Relationships**
**Module 4: * Aqueous Reactions and Solution Stoichiometry**
**Module 5: * Gases**
**Module 6: * Thermochemistry**
**Module 7: * Atomic Structure and Periodicity**
**Module 8: Concepts of Bonding**
**Module 9: Liquids, Solids, and Solutions**
**Module 10: Chemical Kinetics**
**Module 11: Chemical Equilibrium**
**Module 12: Spontaneity, Entropy, and Free Energy**
**Module 13: Electrochemistry**
**Module 14: Nuclear Chemistry**
**Module 15: Organic Chemistry**

## Module Overviews:

**Module 1-7: Advanced Chemistry 1 Review**

* The first few weeks of the AP Course will be spent on a quick review of modules 1 - 7 of the Advanced Chemistry 1 curriculum.

**Module 8: Concepts of Bonding**
Students will apply the concepts of the localized and delocalized electron theories of bonding to determine bond polarity, bond character, and molecular geometries for chemical compounds.

**Module 9: Liquids, Solids, and Solutions**
Students will apply the concepts of intermolecular forces of attraction and colligative properties of solutions to calculate boiling points, melting points, vapor pressure, and osmotic pressure of solids, liquids and solutions.

**Module 10: Chemical Kinetics**
Students will interpret rate, concentration, and time data, as well as the effect of catalysts on rates of reaction,  to determine differential and integrated rate laws and the energy changes involved with chemical reactions.

**Module 11: Chemical Equilibrium**
Students will apply the concepts of Le Chatelier's Principle and chemical equilibrium to quantify the positions of reactions at equilibrium.

**Module 12: Spontaneity, Entropy, and Free Energy**
Using thermodynamic data students will determine reaction spontaneity and degree of completion.

**Module 13: Electrochemistry**
Students will use the concepts of electrolytic and galvanic cells to determine reaction spontaneity, degree of completion, and

**Module 14: Nuclear Chemistry**
Students will learn to distinguish between alpha, beta, and gamma decay processes to determine the decay stages of radioactive isotopes of elements.

**Module 15: Organic Molecules**
Students will learn to name organic molecules using standard functional groups and the IUPAC naming conventions and to determine the products of substitution and elimination reactions.