



COVINGTON LATIN SCHOOL

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CHEMISTRY

Textbook:

Malone, Leo J., and Theodore O. Dolter. Basic Concepts of Chemistry. 8th Edition. Hoboken: John Wiley & Sons, 2010.

Murov, S., and Brian Stedjee. Experiments and Exercises in Basic Chemistry. 6th Edition. Hoboken: John Wiley & Sons, 2004.

Prerequisites:

Algebra I and Geometry.

Course Description:

Students enrolled in this course will receive an introduction to the following topics: measurements in chemistry; elements and compounds; matter and energy; periodic table and chemical nomenclature; chemical reactions; quantities in chemistry; stoichiometry; atomic theory; the chemical bond; gases; oxidation-reduction reactions; liquids; solids; molecular geometry; chemical kinetics; chemical equilibrium; acids, bases and salts; nuclear chemistry; organic chemistry; biochemistry. All quizzes and examinations are tailored to prepare the student for the AP Chemistry course. A substantial portion of the course (one double period per week) will require the student to perform hands-on laboratory experiments and submit a formal Laboratory Report detailing the experiment.

Course Goals:

1. to prepare to the student for AP Chemistry
2. to introduce the students to the principles of chemistry
3. to increase the students' knowledge of the chemical world around them
4. to ensure passage of all college-level chemistry courses
5. to equip the student with hands-on laboratory skills
6. to train the students to write scientific laboratory reports

Course Objectives:

1. to determine chemical formulas and stoichiometry experimentally
2. to determine chemical formulas and stoichiometry theoretically
3. to introduce the student to stoichiometry
4. to introduce the student to organic chemistry
5. to introduce the student to biochemistry
6. to introduce the student to common laboratory instrumentation

Course Sequence:

Semester 1/Quarter 1

1. **Measurements in Chemistry**
 - Classifications of matter
 - Properties of matter
 - Significant figures
 - Units of measurement
2. **Elements and Compounds**
 - The elements and their composition
 - Compounds and their composition
3. **Matter and Energy**
 - The properties of matter
 - The properties of energy
4. **Periodic Table and Chemical Nomenclature**
 - Relationships among the elements and the periodic table
 - The formulas and names of compounds
5. **Chemical Reactions**
 - The representation of chemical changes and three types of changes
 - Ions in water and how they react
6. **Quantities in Chemistry**
 - Measurement of masses of elements and compounds
 - Component elements of compounds

Quarter 2

7. **Stoichiometry**
 - Mass relationships in chemical reactions
 - Energy relationships in chemical reactions
 - Chemical reactivity
 - Avogadro's number
 - Empirical formulas
 - Limiting reactants
8. **Atomic Theory**
 - The energy of the electron in the atom
 - Electron configuration
9. **The Chemical Bond**
 - Chemical bonds and the nature of ionic compounds
 - Chemical bonds and the nature of molecular compounds
 - Distribution of charge in chemical bonds
10. **The Gaseous State**
 - The nature of the gaseous state and the effects of conditions
 - Relationships among quantities of gases, conditions, and chemical reactions
11. **Aqueous Solutions**
 - Solutions and the quantities involved
 - The effects of solutes on the properties of water

Semester 2/Quarter 3

12. **Acids, Bases, and Salts**

- Acids, bases, and the formation of salts
 - The measurement of acid strength
 - Salts and oxides as acids and bases
- 13. Oxidation-Reduction Reactions**
- Redox reactions-the exchange of electrons
 - Spontaneous and nonspontaneous redox reactions
- 14. Reaction Rates and Equilibrium**
- Collisions of molecules and reactions at equilibrium
 - The quantitative aspects of reactions at equilibrium
- 15. Nuclear Chemistry**
- Naturally occurring radioactivity
 - Induced nuclear changes and their uses
- 16. The Solid and Liquid States**
- The properties of condensed states and the forces involved
 - The liquid state and changes in state

Quarter 4

- 17. Organic Chemistry**
- Hydrocarbons
 - Other classes of organic compounds
- 18. Biochemistry**
- The building blocks of life
 - Amino acids
 - Proteins and Enzymes
 - Carbohydrates
 - Lipids
 - Nucleic acids (DNA, RNA, etc.)
 - Catalytic RNA

Evaluation:

Homework, Laboratory Reports, Quizzes, Tests, Exams

Supplemental Materials

ChemSketch Freeware from ACD Labs, Videos, Educational Websites