

Newark Catholic High School

Chemistry I

Teacher: P.J. Miller

Hours: 7:45 am -- 3:15 pm

Help sessions and appointments may be arranged outside the above hours

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[View the Text Book outline](#)

Grading Procedure:

- Quarterly grades will be determined on the basis of total points.
- Required written work will include homework and lab reports.
- Quizzes and tests will be completed during class time.
- Both semester exams will be comprehensive.
- All written work must be turned in on the due date in order to receive full credit.
- Credit for late work may be reduced by up to 25% for each day beyond the due date.

Grade Scale:

A	100-93	C	76-73	D+	69-67
A-	92-90	C+	79-77	D	66-63
B+	89-87	C-	72-70	D-	62-60
B	86-83			F	Below 60
B-	82-80				

Classroom Rules:

1. Be on time
2. Be seated
3. Be quiet
4. Be attentive
5. Be prepared
6. Be respectful
7. Be honest
8. Be observant of all laboratory safety procedures (Lab Safety Contract)
9. Be observant of all school rules

The student will:

Measurement

- use metric (SI) units in measurement of length, mass, and volume
- perform calculations with signed numbers and percentages
- graph and interpret experimental data
- apply the factor-label method to solving problems

Matter, Energy, and Changes

- classify matter in terms of elements, compounds, and mixtures
- distinguish among different types of mixtures (solutions, colloids, and suspensions)
- distinguish between chemical and physical changes and/or properties
- classify elements as metals, nonmetals, or metalloids based on their physical and chemical properties

Water Chemistry

- define the terms solution, solvent, and solute
- define the terms insoluble, unsaturated, saturated, and supersaturated
- use solubility curves to describe the effect of temperature on solubility
- given the pH of a solution, classify it as acidic, basic, or neutral
- describe, on a molecular level, what happens when a solid dissolves in water
- purify a water sample using separation and filtration

Modern Atomic Theory

- describe the properties of the three major subatomic particles
- describe the Bohr model of the atom
- determine the number of e^- , p^+ , and n^0 in a nuclide
- write electron dot notations

Chemical Bonding

- draw structural and electron-dot formulas for the first ten alkanes
- describe the process involved in covalent bonding
- explain endothermic and exothermic reactions in terms of bonds breaking and reforming
- predict solubility based on bond type and molecular shape
- relate properties to intermolecular forces

Chemical Shorthand

- write formulas for simple ionic compounds when provided with the charge and name of the anion and cation
- interpret symbols and formulas in a balanced equation in terms of atoms and molecules
- write balanced chemical equations and relate them to the law of conservation of matter
- write balanced equations, incorporating energy terms, for the combustion of hydrocarbon fuels

Descriptive Chemistry of the Elements (Periodic Table)

- predict physical and chemical properties of an element
- write formulas for various compounds
- identify elements by atomic masses and atomic numbers
- construct a workable periodic table given physical and chemical properties of a set of elements
- compare the reactivity of selected elements, and explain the differences in terms of the structure of their atoms
- define oxidation and reduction, and compare the three most common redox-reaction methods for separating metals from their ores
- relate chemical principles to the everyday world
 - discuss water purity as it relates to community health
 - give examples of renewable and nonrenewable resources
 - identify current major sources of energy and investigate alternative sources of for the future
 - compare the uses of food as a source of molecules for “building” and “burning”
 - evaluate the risks and benefits of various nuclear technologies
 - explore the technological issues of global warming, ozone depletion, and acid rain

Chemical Calculations

- calculate solution concentration as a percentage
- calculate the percent saturation of a solution
- demonstrate the ability to organize and interpret data in graphs or tables
- define the term mole and calculate the molar mass of a compound when provided its formula and the atomic masses of its elements

- calculate the percent by mass of an element in a compound given the formula of the compound
- calculate energies of various combustion reactions
- calculate energy changes (in joules and calories) from calorimetry data
- explain the concept of the mole and how atoms, molecules, and ions can be counted indirectly
- calculate molar masses for various compounds
- calculate the limiting reactant in a chemical change and relate the concept to biochemical processes
- use molar masses and abundance data of isotopes to calculate average relative mass of elements
- calculate % composition for a given compound
- solve mass-mass problems
- use mathematical equations (Charles' and Boyles law) to analyze the relationships among temperature, volume, and pressure of a gas

Carbon Chemistry

- explain the relationship between density and viscosity and the number of carbon atoms in a hydrocarbon molecule
- describe the process of fractional distillation listing the five major fractions
- name the first ten alkanes
- explain the effect of carbon chain length and side chains on hydrocarbon boiling points
- define the term isomer, and draw structural formulas for the isomers of a given hydrocarbon
- compare saturated with unsaturated hydrocarbons in terms of formulas, structures, and physical and chemical properties
- identify the functional groups for common alcohols, carboxylic acids, and esters
- give an example of addition and condensation polymerization
- compare and contrast mono-, di-, and polysaccharides in terms of structural formulas and properties
- identify the key functional groups in carbohydrates and fats and write an equation for the formation of a typical fat
- distinguish between saturated and unsaturated fats, relating the consumption of each to health
- describe how functional groups in amino acids interact in protein formation

Nuclear Chemistry

- distinguish between ionizing and non-ionizing radiation and their differing biological effects
- discuss the general properties of electromagnetic radiation, and the energy characteristics of radiation of various regions of the electromagnetic spectrum
- compare and contrast the general properties of alpha, beta, and gamma radiation, including penetrating power, and discuss safety considerations in terms of shielding abilities of cardboard, glass, and lead
- balance nuclear equations, and use them to describe natural radioactive decay
- explain the concept of half-life and discuss the implications of half-life for natural radioactivity and nuclear waste disposal
- solve half-life problems
- define nuclear transmutation, using a nuclear equation to illustrate the process
- distinguish nuclear fission from nuclear fusion

Qualitative Analysis

- perform safely and accurately the known experiments and record results
- identify the cation in an unknown salt

- identify the anion in an unknown salt
- report the correct formula and name for the unknown salt