



Ephrata High School
Course Syllabus



Foundations of Chemistry
4205

I. Course Description

Foundations of Chemistry

1 Credit

Grades 11, 12

Course Level: Level 2

Corequisite: Algebra 2

Prerequisite: B or better in Algebra 1, B or better in Biology course, B or better in Physical Science course

The scope of this course includes understanding scientific concepts, atomic structure, classification of matter, nomenclature and chemical formula writing, chemical reactions, and the kinetic theory of matter. Laboratory work, demonstrations, and projects assist students in understanding these concepts. This course is designed for students who expect to encounter chemistry courses in nursing school or college. The content of this course is similar to Principles of Chemistry except that certain areas of study are developed in greater detail and depth, and there is significant emphasis on the mathematical relationships involved. Students should be taking at least Algebra 2 concurrently.

II. Materials & Equipment

Texts: Cobb, C. & M. L. Fetterolf. *The Joy of Chemistry: The Amazing Science of Familiar Things*. Prometheus Books. New York, 2005.

Schwarcz, J. *The Genie in the Bottle*. ECW Press. New York, 2001.

* Various supplemental books, journals & magazines as needed

Materials: A scientific calculator with logarithmic functions and scientific notation capabilities (TI- 83 or higher is recommended, but not required), three-ring binder, lab equipment and chemicals.

III. Course Goals & Objectives

- Students will acquire basic laboratory skills in the area of measurement and data collecting.
- Students will develop a general understanding of chemical principles and will be able to predict reaction outcomes.
- Students will gain experience working in small laboratory group situations.
- Students will become familiar with and understand the measurements,

calculations, and symbols used by chemists.

- Students will understand the classification of matter and the changes it undergoes.
- Students will gain an understanding of mole concepts and their applications in quantitative chemical relationships.
- Students will gain knowledge and understanding of the evolution of modern atomic structure theories and the periodic properties of elements.
- Students will gain an understanding of the relationship between chemical bonds, molecular structure, and chemical properties.
- Students will gain an understanding of the Kinetic Molecular Theory and its relationship to the states of matter.
- Students will gain an understanding of energy and its transfer in chemical reactions.
- Students will become familiar with the preparation and properties of solutions.
- Students will be made aware of their responsibilities as users of chemicals and their impact on the environment.

IV. Course Topics (Summary Outline)

- *Measurement, Conversions & Safety*
safety equipment, safety practices, metric conversions, factor-label method, significant figures, density, percent error
- *Matter & Energy*
classification of matter, properties of matter, changes in properties, energy transfer in systems, calorimetry
- *Atomic Structure*
atomic theory, structure of atoms, atomic number & atomic mass, elements, ions, average atomic mass & weighted averages
- *Electronic Structure*
quantum numbers, writing electron configurations, drawing Lewis dot diagrams, electromagnetic spectrum
- *Periodic Table*
history of the Periodic Table, sections of the Periodic Table, periodic trends
- *States of Matter*
states of matter, changes in state, graphical representations of state changes, solubility
- *Chemical Formulas*
covalent & ionic compounds, writing chemical formulas, chemical nomenclature

- *Molecular Structure*
bond types, bond polarity, molecular geometry, molecular polarity
- *Chemical Equations*
Law of Conservation of Mass, balancing equations, writing equations, identifying reaction types, predicting products of reactions
- *Moles & Mole Conversions*
mole, mole conversions using factor-label method, calculating formula mass, percent composition, empirical formulas
- *Gases & Gas Laws*
properties of gases, Boyle's law, Charles's law, ideal gas law, combined gas law
- *Stoichiometry*
stoichiometry conversions, limiting reactants, percent yield
- *Acids & Bases*
pH as a logarithmic scale, acids & bases, titrations between strong acids & strong bases, acid nomenclature
- *Nuclear Chemistry*
alpha and beta particles, radioactive decay, carbon dating, nuclear fission and fusion

V. Assignments & Grading

The marking period and course grade will be weighted based on tests and quizzes, final exam, homework and classwork, lab sheets, and a lab report. These grades are weighted according to the table below.

<u>Marking Period Grade</u>		<u>Final Grade</u>	
Homework & Classwork	10%	Marking Period Grades	20% each
Lab & Activity Sheets	30%	Final Exam Grade	20%
Test & Quizzes	60%		

All tests, quizzes and exams are meant to be taken during one class period – extra time will not be given. Unit tests and final exam are all common to the course. The Ephrata standard grading scale is used.

Any coursework assigned during an excused absence can be made up within a week of its original assignment. This means that labs and other assignments will NOT be made available after a week. It is the student's responsibility to make an appointment to make up this work outside of class. In cases of lengthy absences, exceptions will be made at the discretion of the teacher, but students must request an extension. Any assignments assigned when the student was in attendance, but not turned in because of an excused absence **MUST** be turned in the day of the student's return to class. ***It is the student's responsibility to ask for and make up any missed work – the instructor will not "chase you down" to complete missed work!***

Laboratory experiences are an important part of any chemistry course; however, horseplay will NOT be tolerated. Any student who chooses to exhibit any type of unauthorized behavior will be asked to leave the lab and will be given a zero for the lab grade. The students would not be allowed to make up the lab for credit. In extreme circumstances dependent upon the nature of the disruption (at the discretion of the teacher and administration), the course grade could also be forfeit.

Participation grades could be given at any time for any assignment, including note-taking, watching videos, and reading aloud.