



Course Overview

High School | Chemistry - Last Updated on April 4, 2025

DESCRIPTION

K-12 Content Area | Mission & Philosophy Statement

- Young people are born investigators, with natural curiosities about the physical, biological, and social worlds they experience. Anchoring science learning in real-world phenomena connects curiosities to core conceptual understandings.
- Students actively construct understanding through inquiry, experimentation, and analysis to develop science and engineering practices such as asking questions, planning and carrying out investigations, and constructing explanations.
- Integration of crosscutting concepts such as patterns, cause and effect, and systems thinking promote interdisciplinary understanding and sense-making of the natural world.
- Science learning occurs alongside other disciplines to foster holistic understanding and application of knowledge.

Course Description

This college-preparatory level chemistry course introduces students to the fundamentals of chemistry. Key concepts in chemistry are explored by fully integrating reading, technology, and inquiry-based labs and activities that emphasize independent research and analysis. This course will take students through the study of matter and energy, the science of the periodic table, acid and base theories, chemical reactions, stoichiometry, chemical bonding, chemical nomenclature, and nuclear chemistry. Emphasis is placed on the development of correct laboratory procedures as the student progresses through the study of chemistry.

The college-preparatory level chemistry curriculum covers a broad spectrum of chemistry topics, beginning with the definition of the five branches of chemistry and delving into the role of a chemist. Students learn to apply the scientific method and identify various tools used in laboratory settings while understanding the importance of thorough observations and safety precautions. They classify matter and explore methods to separate mixtures, discussing forms of energy and differentiating between chemical and physical properties. The curriculum also includes discussions on atomic theory, from contributions by Aristotle, Democritus, and Dalton to modern quantum mechanical models, along with the formation and properties of bonds. Students learn to balance chemical reactions, calculate stoichiometric quantities, and understand solution chemistry, including factors affecting solubility, concentration, and pH. Furthermore, they delve into gas laws and the kinetic molecular theory, gaining skills in predicting gas properties and behavior under different conditions. Through these comprehensive lessons, students develop a deep understanding of the principles and applications of chemistry.

STANDARDS

Pennsylvania - High School - Chemistry



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3.2.C.A1.a

3.2.C.A1.b

3.2.C.A1.c

3.2.C.A1.d

3.2.C.A2.a

3.2.C.A2.b

3.2.C.A2.c

3.2.C.A2.d

3.2.C.A2.e

3.2.C.A2.f

3.2.C.A2.h

3.2.C.A2.g

3.2.C.A3.a

3.2.C.A3.b

3.2.C.A3.c

3.2.C.A3.d

3.2.C.A4.a

3.2.C.A4.b

3.2.C.A4.c

3.2.C.A4.d

3.2.C.A4.e

3.2.C.A5.a

3.2.C.A5.b

3.2.C.B3.a

3.2.C.B3.b

COURSE OBJECTIVES

The objectives are the course are to meet the Pennsylvania State Standards in Science and Technology.

ASSESSMENT TYPES

The following assessment types will be used during the course:

- Curriculum Based Measures
- Formative Assessments
- Summative Assessments
- Performance Based Assessments

SUGGESTED METHODS OF INSTRUCTION

A science program demands the use of a variety of instructional strategies to foster scientific thinking. Below is a list of suggested strategies for high-quality instruction

- Instructional components outlined in Framework for Teaching by Charlotte Danielson
- Hands-on learning
- Posing questions for investigation
- Cooperative learning and collaboration
- Inquiry, engineering, and design



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RESOURCES

District Approved Program Resources	District Approved Supplemental Resources	District Approved Technology Resources
<p>Student Text Resources:</p> <p>Matta, M., Staley, D., Waterman, E., and Wilbraham, A. (2005). <i>Chemistry</i>. Prentice Hall</p> <ul style="list-style-type: none">• Student Edition Printed Version <p>Teacher Text Resources:</p> <p>Matta, M., Staley, D., Waterman, E., and Wilbraham, A. (2005). <i>Chemistry</i>. Prentice Hall</p> <ul style="list-style-type: none">• Teacher Edition Printed Version	<ul style="list-style-type: none">• Teacher Created Resources• District approved supplemental resources and labs	<ul style="list-style-type: none">• District approved supplemental technology• Explore Learning Gizmo Virtual Labs