Plymouth Public Schools' Science and Technology/Engineering Program Honors Chemistry Course Syllabus

STE0032 Chemistry Honors

Full year course intended for students in grades 10 through 12 worth 5 credits

Course Description

This laboratory course provides a rigorous overview of general chemistry. To be successful in this course, students must be highly motivated and academically talented. The course emphasizes the strong connection between mathematics and science as all aspects are treated in an in-depth approach centering on disciplinary core ideas within matter and its interactions; motion and stability; forces and interactions; and energy. Students will be required to perform and design laboratory experiments and to communicate their findings through formal technical writing. Class work is supplemented by extensive laboratory work. Particular emphasis will be placed on science and engineering practices related to design and evaluation as well as investigation and modeling. The prerequisites include successful completion of Biology, completion/enrollment in Algebra 2, and departmental recommendation.

Instructional Objectives

Students will independently and collaboratively:

1. Engage in scientific inquiry and engineering design through the use of science and engineering practices.
2. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to answer a question or solve a problem.
3. Draw evidence from literary or informational texts to support analysis, reflection, and research.
4. Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.
5. Demonstrate proficiency in phenomena related to matter and its interactions; the motion and stability of forces and their interactions; and energy.

Themes and Topics

1. Matter and Its Interactions – Matter is developed as a model from the subatomic to the molecular level. The Periodic Table is a powerful tool that may be used to predict the properties of elements and compounds. When combined with an understanding of Coulomb's Law, the periodic table helps students to predict and explain bond energies. Chemical reactions can be quantified, using stoichiometric relationships based on the Law of Conservation of Matter. Topics include atomic structure, periodic table and trends, nomenclature, chemical reactions and stoichiometry.
2. Motion and Stability: Forces and Interactions – Matter is dynamic, always moving. The forces present are a result of the structure of matter and system conditions. The energetic

stability of structures can be related to observable properties. Topics include: Kinetic Molecular Theory, rates of reaction, gas laws, solutions, and acids and bases.

3. Energy – Interactions, reactions, and motions involve energy. Understanding the transfer and dissipation of energy is central to relating macroscopic phenomena to particle level models. Chemical bonding as well as intermolecular forces of attraction involve a transfer of energy. Observations of phase changes, temperature changes and the formation of new products helps to connect these energy transformations occurring at the particle level to the macroscopic world. Topics include: bonding, thermochemistry, and intermolecular forces

Text and Instructional Materials

Stacy, Angelica M. *Living by Chemistry (Updated 2nd Edition)*. New York, NY: WH Freeman, 2018.
Zumdahl, Steven S, Susan A. Zumdahl, and Donald J. DeCoste. *Chemistry*. Boston, MA: Cengage, 2017

Cheating/Plagiarism

The excerpt from the Plymouth Public Schools' Student Handbook on plagiarism and copyright infringement states, "Existing copyright law will govern the use of material accessed through network. The user will not plagiarize works found on the Internet. Plagiarism is taking the ideas or writings of others and presenting them as if they were yours. All copyrighted material used must have the express written permission of the person or organization that owns the copyright. Any student who has cheated on any academic exercise will receive no credit for that exercise. Plagiarism is a form of cheating. A parent/guardian will be notified by the involved teacher in all instances of cheating. The investigation of the claim of cheating and plagiarism will involve the student, teacher, and administration."

Grading Policy and Assessment

Levels of proficiency on various tasks and assignments determine student grades. During each grading term, students' grades will be based upon the following:

30% Learning Experiences: class work, homework, demonstrations, activities, etc.
70% Assessments: laboratory experiments, tests, quizzes, etc.

The final year average will be calculated as follows:

22.5% Term 1 Grade
22.5% Term 2 Grade
22.5% Term 3 Grade
22.5% Term 4 Grade
10% Final Exam