
PETERS TOWNSHIP HIGH SCHOOL

COURSE SYLLABUS: CHEMISTRY ACADEMIC

Course Overview and Essential Skills

Chemistry Academic is the study of matter, how matter changes, and the energy associated with those changes. It is a fascinating course that will be investigated through inquiry, discussion, experimentation and detailed analysis of student collected data. I truly believe that an understanding of chemistry leads to a better understanding of the world around us. I promise to do my best to show you how the chemistry we are learning in class applies to the things surrounding you every day. Chemistry is involved in all aspects of our lives, the skills of observation, data collection, analysis and being able to communicate your findings to others will be beneficial far beyond the walls of our classroom.

Course Textbook and Required Materials

- HMH Modern Chemistry (Sarquis & Sarquis, print 2017), USA (ISBN#: 978-0-544-81784-5)
- Other: <http://www.HMHScience.com>

Course Outline of Material Covered:

Unit	Topic	Concepts/Skills/Resources	Timeframe
Foundations of Chemistry	Introduction & Lab Safety Matter & Change Measurements & Calculations	Be able to identify, locate and correctly use common lab and safety equipment, observe an experiment and identify the aspects of the Scientific Method being employed, collect and analyze data using the correct number handling protocols. Students will be able to differentiate between classifications of matter, using intensive properties to indirectly measure characteristics, explore the connection between temperature change, particle energy and characteristics of each physical state, explore the common signs that provide evidence of chemical changes	5 Weeks
The Atom	Atomic Theory & Changes Electron Arrangements Periodic Law	Explore the process of how the model of the atom was developed over time and how key experiments added to our understanding of the atom. Explore the result of changing each of the subatomic particles and be able to explain the benefits and dangers involved in with each change. Nuclear reactions are discussed in this section to expose students to the difference between normal chemical change and a nuclear change. Investigate the patterns in properties that dictate the arrangement of the elements on the periodic table, the students will learn to use patterns to make predictions about how atoms will interact with one another as the foundation for bonding and reactions	7 Weeks

Compounds	Bonding Nomenclature Formula Analysis	Explore the types and characteristics of ionic and covalent bonds & formation. Be able to generate Lewis Dot Structures to illustrate stable compounds & determine geometry. Explore how compounds are named, calculate % composition, empirical and molecular formulas from provided and collected data.	5.5 Weeks
Chemical Reactions	Chemical Equations & Reactions Stoichiometry	Explore how elements and compounds combine, break apart and rearrange through chemical reactions, write and balance the reaction equations, identify reaction types and predict the products of a reaction. Explore the quantitative relationships that exist between substances in a chemical reaction. Utilize a balanced equation to find the needed relationships and use dimensional analysis to carry out stoichiometry calculations that are in both ideal and non-ideal situations.	5.5 Weeks
Phases of Matter	States of Matter Gases	Explore properties of each physical state using KMT and the effect of changing conditions on the movement through the three common physical states. Develop mathematical models/equations to show how pressure, temperature volume and molar amount of gases impact gas properties and behavior. Qualitatively and quantitatively explore the gas laws through experimentation and analysis. Investigate stoichiometric relationships when gases are in the reaction.	5 Weeks
Solutions	Solutions & Colligative Properties Acids & Bases	Students will be able to identify the parts of a solution, calculate concentration, the amount of solute and solvent needed to make a solution and efficiently make a solutions. Students will apply solubility rules to predict and/or identify insoluble products. Students will explore how solution concentration affects physical properties. Students will be asked to quantitatively analyze various solutions and be able to articulate reasons for observed phenomena. Explore the properties of acids and bases, common household or familiar substance that exhibit these properties, how acids and bases together will neutralize. Determine strength and potency of an acid or base using pH/pOH.	7 Weeks

**Depending on the needs of the class or changes in the school year, the course outline is subject to change.*