
PETERS TOWNSHIP HIGH SCHOOL

COURSE SYLLABUS: ORGANIC CHEMISTRY

Course Overview and Essential Skills

Unlike general chemistry where students are introduced to a large number of basic chemical concepts, organic chemistry deals exclusively with the chemistry of the compounds of a single element, carbon. Carbon is unique among elements in that it can form up to 4 stable bonds with other carbon atoms and with such other elements as hydrogen, oxygen, nitrogen, sulfur, phosphorus, and the halogens. We will be investigating how this phenomenon governs 3-dimensional shapes of organic molecules, and how the shape can influence various characteristics. Students will be recognizing how hybridization of bonding creates various shapes. Students will learn organic chemical nomenclature, and will be able to draw structural models of molecules using principles of organic chemistry.

Course Textbook and Required Materials

- Brown, William H., and Thomas Poon. *Introduction to Organic Chemistry*. 5th ed. Vol. 1. Hoboken: John Wiley & Sons, 2014. Print. ISBN#: 978-1118-083383
- Organic Model Kit (provided)
- 3-Ring binder

Course Outline of Material Covered:

Unit or Topic	Concepts/Skills/Resources	Timeframe
Chapter 1	Covalent Bonding and Molecular Geometry. Students will recall chemistry basics, including electron configurations, lewis structures, and orbital shapes. Students will construct 3-dimensional models of how orbital hybridization determines molecular geometry.	Weeks 1-2
Chapter 2	Acid-base mechanics. Students will learn how to calculate the strength of an acid/base. They will learn how a number of different scientists molded how acids and bases are defined through detailed equations.	Weeks 2-4
Chapter 3	Alkanes and Cycloalkanes. Students will investigate isomerism, IUPAC nomenclature, and geometrical conformations of aromatic hydrocarbons.	Weeks 5-7
Chapter 4	Alkenes and Alkynes. Students will learn how double and triple bonds determine characteristics of alkenes and alkynes. Investigation of poly-unsaturated oils (alkenes) in food.	Weeks 7-9
Chapter 5	Reaction mechanics of alkenes and alkynes. Overview of reaction types	Weeks 9-11

	and thermodynamics involved with reaction mechanics.	
Chapter 6	Chirality: Investigation of “mirror-imaged” molecules (stereoisomerism). How does mirror image location of functional groups in organic molecules determine characteristics? Special investigation : Children of Thalidomide, how stereoisomerism created birth defects.	Weeks 12-15
Chapter 7	Halogenated Organics: Naming and reactionary mechanisms involving organics and halogen elements.	Weeks 15-16
Chapter 8	Alcohols, Ethers, and Thiols. How does the addition of oxygen in organic molecules influence chemical characteristics? How can sulfur-containing thio groups be used in medical roles?	Weeks 16-18

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