

Wilson Area School District Planned Course Guide

Title of planned course: Organic Chemistry

Subject Area: Chemistry

Grade Level: 11-12

Course Description: This course will provide students the basic skills and knowledge required for a college level first semester organic chemistry course. Organic Chemistry is an essential prerequisite for those entering the science, pre-medical, and pharmaceutical fields in college. The course would focus on topics including: nomenclature, atomic theory of orbitals and bonding, hybridization, analysis of isomerism in organic molecules, analysis of infrared spectroscopy to identify organic molecules, and the basic nucleophilic substitution and elimination reactions (SN_1 , SN_2 , E_1 , E_2). It is highly recommended and expected that the student taking this course will have successfully completed a first year course in chemistry.

Time/Credit for this Course: 0.5 Academic Year / 0.5 Credits

Curriculum Writing Committee: Liam Browne, Paul Stewart, Carolyn Evans

Curriculum Map

August: Special Nature of Carbon

September: Molecular Orbitals and Hybridization Theory

October: Isomerism and Alkanes

November: Introduction to Organic Reactions

December: Alkenes

January: Alkynes

Wilson Area School District Planned Course Materials

Course Title: Organic Chemistry

Supplemental Books:

- <https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/intro1.htm>
- <https://unl.libguides.com/c.php?g=51744&p=334311>

Teacher Resources:

- Wade, L. *Organic chemistry*; 8th ed.; Prentice Hall.
- Molecular Model Kits
- <https://www.masterorganicchemistry.com/organic-1/#sn1sn2>
- <https://www.bbc.co.uk/education/topics/zx7mn39>
- www.vimeo.com/channels/organicchemistry/page:4

Curriculum Scope & Sequence

Planned Course: Organic Chemistry

Unit: Special Nature of Carbon

Time frame: 1 week

State Standards: 3.1.C.B6, 3.2.C.A1

Anchor(s) or adopted anchor: CHEM.B.1.2, CHEM.B.1.3, CHEM.A.2.1, CHEM.A.2.2, CHEM.A.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Review the basic nature of bonding for elements.
- Differentiate between organic and inorganic compounds.
- Apply the historical facets of organic chemistry to the understanding of carbon-based systems as they are understood today.

Core Activities: Students will complete/participate in the following:

- Warm Up
- Guided notes
- Supplemental Review Sheets

Extensions:

- Students will take notes.
- Book problems/Homework

Remediation:

- Students will have access to tutoring if they need it.
- <http://ochem.com/>

Instructional Methods:

- Direct Instruction
- Demonstration
- Independent Practice
- Manipulatives

Materials & Resources:

- Notes
- Excerpts from textbooks

Assessments:

- Weekly - Biweekly Quizzes

Curriculum Scope & Sequence

Planned Course: Organic Chemistry

Unit: Molecular Orbitals and Hybridization Theory

Time frame: 3 weeks

State Standards: 3.1.C.B6, 3.2.C.A1, 3.2.C.A2

Anchor(s) or adopted anchor: CHEM.B.1.2, CHEM.B.1.3, CHEM.A.2.1, CHEM.A.2.2, CHEM.A.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Predict the hybridization and geometry of organic molecules based on their bonding.
- Identify general classes of organic molecules based on their bonding (alkanes, alkenes, alkynes)

Core Activities: Students will complete/participate in the following:

- Warm Up
- Guided notes
- Supplemental Review Sheets
- Molecular Model Construction

Extensions:

- Students will take notes.
- Book problems/Homework

Remediation:

- Students will have access to tutoring if they need it.
- <http://ochem.com/>

Instructional Methods:

- Direct Instruction
- Demonstration
- Independent Practice
- Manipulatives

Materials & Resources:

- Notes
- Excerpts from textbooks

Assessments:

- Weekly - Biweekly Quizzes
- Unit Test

Curriculum Scope & Sequence

Planned Course: Organic Chemistry

Unit: Isomerism and Alkanes

Time frame: 5 weeks

State Standards: 3.1.C.B6, 3.2.C.A1

Anchor(s) or adopted anchor: CHEM.B.1.2, CHEM.B.1.3, CHEM.A.2.1, CHEM.A.2.2, CHEM.A.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Draw and name the isomers of alkanes, and explain the trends in their physical properties.
- Draw alkane conformations, compare their energies, and predict the most stable conformations.
- Draw and name the isomers of cycloalkanes, and explain ring strain.
- Recognize structures that have stereoisomers, and identify relationships between stereoisomers.
- Recognize chiral structures, draw their mirror images, and identify features that may suggest chirality.

Core Activities: Students will complete/participate in the following:

- Warm Up
- Guided notes
- Supplemental Review Sheets

Extensions:

- Students will take notes.
- Book problems/Homework

Remediation:

- Students will have access to tutoring if they need it.
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Instructional Methods:

- Direct Instruction
- Demonstration
- Independent Practice
- Manipulatives

Materials & Resources:

- Notes
- Excerpts from textbooks

Assessments:

- Weekly - Biweekly Quizzes
- Unit Test

Curriculum Scope & Sequence

Planned Course: Organic Chemistry

Unit: Introduction to Organic Reactions

Time frame: 5 weeks

State Standards: 3.1.C.B6, 3.2.C.A1, 3.2.C.A2

Anchor(s) or adopted anchor: CHEM.B.1.2, CHEM.B.1.3, CHEM.A.2.1, CHEM.A.2.2, CHEM.A.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Propose mechanisms and explain the steps for simple reactions such as free-radical halogenation.
- Use the mechanism, thermodynamics, and kinetics of a reaction to predict which of several possible products is the major product.
- Name alkyl halides, explain their physical properties, and describe their common use.
- Predict the products of substitution and elimination reactions, and explain what factors favor each type of reaction.
- Identify the differences between first-order and second-order substitutions and eliminators.

Core Activities: Students will complete/participate in the following:

- Warm Up
- Guided notes
- Supplemental Review Sheets
- Molecular Model Construction

Extensions:

- Students will take notes.
- Book problems/Homework

Remediation:

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Instructional Methods:

- Direct Instruction
- Demonstration
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- Manipulatives

Materials & Resources:

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Assessments:

- Weekly - Biweekly Quizzes
- Unit Test

Curriculum Scope & Sequence

Planned Course: Organic Chemistry

Unit: Alkenes

Time frame: 2 weeks

State Standards: 3.1.C.B6, 3.2.C.A1

Anchor(s) or adopted anchor: CHEM.B.1.2, CHEM.B.1.3, CHEM.A.2.1, CHEM.A.2.2, CHEM.A.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Draw and name alkenes and cycloalkenes
- Show how alkenes can be synthesized by eliminations from alkyl halides and alcohols.

Core Activities: Students will complete/participate in the following:

- Warm Up
- Guided notes
- Supplemental Review Sheets

Extensions:

- Students will take notes.
- Book problems/Homework

Remediation:

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Instructional Methods:

- Direct Instruction
- Demonstration
- Independent Practice
- Manipulatives

Materials & Resources:

- Notes
- Excerpts from textbooks

Assessments:

- Weekly - Biweekly Quizzes

Curriculum Scope & Sequence

Planned Course: Organic Chemistry

Unit: Alkynes

Time frame: 2 weeks

State Standards: 3.1.C.B6, 3.2.C.A1, 3.2.C.A2

Anchor(s) or adopted anchor: CHEM.B.1.2, CHEM.B.1.3, CHEM.A.2.1, CHEM.A.2.2, CHEM.A.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Draw and name alkynes, cycloalkynes, and their derivatives.
- Predict the products of reactions of alkynes, including the orientation of the reaction (regiochemistry) and the stereochemistry.

Core Activities: Students will complete/participate in the following:

- Warm Up
- Guided notes
- Supplemental Review Sheets
- Molecular Model Construction

Extensions:

- Students will take notes.
- Book problems/Homework

Remediation:

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