02 Unsaturated Hydrocarbons: Nomenclature & Reactions

Content Area: **Science**
Course(s): **Organic Chemistry H**
Time Period: **Semester 1**
Length: **5 weeks**
Status: **Published**

Standards

HS-PS1-1	Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
PS1.A	Structure and Properties of Matter
PS2.B	Types of Interactions
HS-PS1-2	Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
PS1.B	Chemical Reactions
	Patterns
HS-PS1-3	Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
	Planning and Carrying Out Investigations
	Stability and Change
HS-PS2-6	Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.
	Structure and Function
	Developing and Using Models
	Constructing Explanations and Designing Solutions

Enduring Understandings

1. Understanding the structure and bonding of organic molecules is fundamental to being able to understand their properties and reactions.
2. Organic molecules can be categorized by the presence of functional groups.
3. Organic molecules are systematically named according to IUPAC rules.
4. Organic molecules can be represented in multiple ways.
5. Organic compounds participate in three main types of chemical reactions.
6. A reaction mechanism is a precise sequence of steps resulting in the conversion of reactants into products.
7. Curved arrows are used in organic chemistry to represent the movement of electrons.

Essential Questions

1. How do organic chemists name and categorize organic molecules?
2. How do the chemical names and formulas of compounds relate to their physical and chemical behaviors?
3. How do organic chemists draw and depict molecules?
4. How do molecules react to make new substances?
5. How does one characterize and explain reactions and make predictions about them?
6. What factors dictate whether a reaction will occur or not?
7. Why is it important to be able to predict the outcome of a reaction?
8. Why are isomers important in organic molecules?
9. How do organic chemists show the movement of electrons?
10. What is the importance of reaction mechanisms?
11. Why do molecules have different reactivity?

Knowledge and Skills

Knowledge: Students will...

1. List and explain both physical and chemical properties of alkenes and alkynes.
2. Define unsaturated and give examples of alkenes and alkynes.
3. Explain the orientation of the double bond including hybridization, the formation of sigma bonds and the formation of pi bonds.
4. Describe the triple bond and explain its hybridization.
5. Define substitution, elimination, and addition reactions.
6. Describe the information a reaction mechanism can give.
7. Describe the difference between transition state and reaction intermediate.
8. Describe the difference between homolytic and heterolytic cleavage of a bond.
9. Recognize the difference between an electrophile and nucleophile.

10. Recognize Lewis acid & base sites on molecules.
11. Describe an addition polymer and discuss their importance.

Skills: Students will be able to...

1. Name a variety of alkenes and alkynes using IUPAC nomenclature rules.
2. Recognize and use common names for alkenes.
3. Name organic molecules based on different functional groups present (carboxylic acids, aldehydes, ketones, alcohols, ethers, and amines) using IUPAC nomenclature rules.
4. Differentiate between cis and trans isomers and explain how they form.
5. Draw geometric isomers of alkenes.
6. Classify and write general equations for substitution, elimination, and addition reactions.
7. Write halogenation reactions of alkenes to form alkyl halides.
8. Write hydrogenation reactions of alkenes to form alkanes.
9. Predict the products of addition reactions for acids across a double bond using Markonikov's Rule.
10. Predict the products of hydration reactions for alkenes using Markonikov's Rule.

Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit?usp=sharing

Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit