

### Section 22.3 Alkenes and Alkynes

In your textbook, read about alkenes, alkynes, and naming alkynes.

Use the following words to complete the statements.

alkene	alkyne	electron density	ethene	ethyne
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- An alkyne is a hydrocarbon that has one or more triple covalent bonds between carbon atoms.
- The unsaturated hydrocarbon ethene is the starting material for the synthesis of the plastic polyethylene.
- An alkene is a hydrocarbon that has one or more double covalent bonds between carbon atoms.
- Torches used in welding burn ethyne, which is commonly called acetylene.
- Alkenes and alkynes are more reactive than alkanes because double and triple bonds have greater electron density than single bonds have.

Circle the letter of the correct name for each of the following structures.

- $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}_2\text{CH}=\text{CH}_2$ 
  - 1,5-octadiene
  - 3,7-octadiene
  - 4,8-dioctene
- $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CCH}_2\text{CH}_3$ 
  - 3-hexene
  - 3-hexyne
  - 3-pentyne

Use the IUPAC rules to name the following structures.

- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{CH}=\text{CHCCH}_3 \\ | \\ \text{CH}_3 \end{array}$$

4,4-dimethyl-2-pentene
- 

4-butylcyclohexene
- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{CH}_2\text{CH}_2\text{CHCH}_2\text{C}\equiv\text{CCHCH}_2\text{CH}_3 \\ | \\ \text{CH}_2\text{CH}_3 \end{array}$$

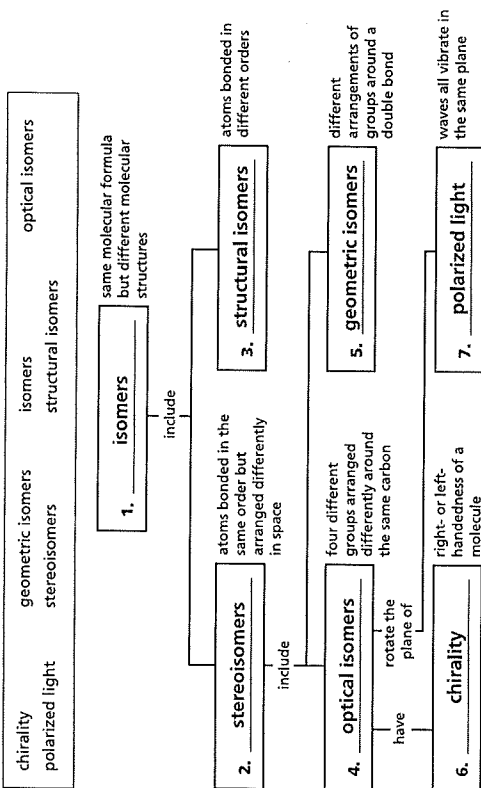
3,7-diethyl-4-decyne
- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{CH}_2\text{CH}_2\text{CHCH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$

6-ethyl-8-methyl-5-propyl-2-nonene

### Section 22.4 Isomers

In your textbook, read about structural isomers, stereoisomers, chirality, and optical isomers.

Complete the concept map by writing the term below that fits the description at the right of each box.



Identify the type of isomers represented by each of the following pairs of structures. Choose your answers from the following types: *geometric isomers*, *optical isomers*, *structural isomers*. (In item 8, the symbols W, X, Y, and Z represent hypothetical groups.)

- $$\begin{array}{c} \text{X} \quad \text{Y} \\ | \quad | \\ \text{W}-\text{C}-\text{Y} \quad \text{W}-\text{C}-\text{X} \\ | \quad | \\ \text{Z} \quad \text{Z} \end{array}$$

optical isomers
- $$\begin{array}{c} \text{H} \quad \text{CH}_2\text{CH}_3 \\ | \quad | \\ \text{C}=\text{C} \\ | \quad | \\ \text{CH}_3\text{CH}_2 \quad \text{H} \end{array}$$

geometric isomers
- $$\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{C}=\text{C} \\ | \quad | \\ \text{CH}_3\text{CH}_2 \quad \text{CH}_2\text{CH}_3 \end{array}$$

structural isomers

- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{CH}_2\text{CH}_2\text{CCH}_3 \\ | \\ \text{CH}_3 \end{array}$$

structural isomers