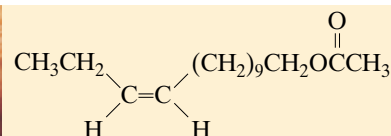
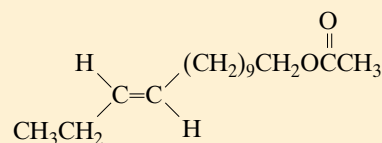


FIGURE 5 Males of the Iowa strain of the European corn borer respond most strongly to mixtures of the female sex attractant pheromone that are 96% *cis* isomer. But males of the New York strain respond most strongly to mixtures containing 97% *trans* isomer.



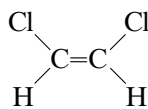
cis-11-tetradecenyl acetate



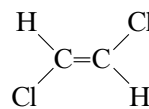
trans-11-tetradecenyl acetate

Geometric Isomers

Geometric isomers are isomers in which the order of atom bonding is the same but the arrangement of atoms in space is different. Consider the molecule 1,2-dichloroethene, which contains a double bond. The double bond prevents free rotation and holds groups to either side of the molecule. This means there can be two different 1,2-dichloroethene geometric isomers, as shown below.



cis

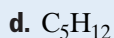
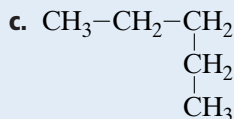
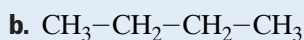
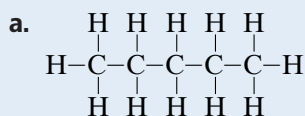


trans

The geometric isomer with the two chlorine atoms on the same side of the molecule is called *cis*. The isomer with the chlorine atoms on opposite sides of the molecule is called *trans*. **Figure 5** shows an example of geometric isomers that occur in nature.

SECTION REVIEW

- Which of the following represent the same molecule?



- What are three characteristics of carbon that contribute to the diversity of organic compounds?
- Define the term *isomer*, and distinguish between structural and geometric isomers.
- Which of the following types of molecular representations can be used to show differences between isomers? Explain why each can or cannot.
 - molecular formula
 - structural formula
 - three-dimensional drawing or model

Critical Thinking

- INTERPRETING CONCEPTS** Can molecules that have molecular formulas C_4H_{10} and $\text{C}_4\text{H}_{10}\text{O}$ be isomers of one another? Why or why not?