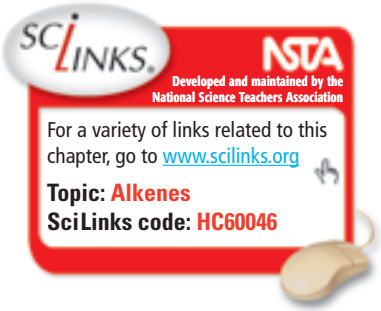
Unsaturated Hydrocarbons

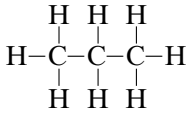
Hydrocarbons that do not contain the maximum amount of hydrogen are referred to as *unsaturated.* **Unsaturated hydrocarbons** *are hydrocarbons in which not all carbon atoms have four single covalent bonds.* An unsaturated hydrocarbon has one or more double bonds or triple bonds. Carbon atoms can easily form double and triple bonds to other carbon atoms, so multiple bonds between carbon atoms are common in organic compounds.



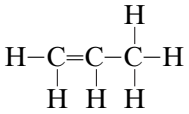
Alkenes

Alkenes *are hydrocarbons that contain double covalent bonds.* Some examples of alkenes are given in **Table 7.** Notice that because alkenes have a double bond, the simplest alkene, ethene, has two carbon atoms.

Carbon atoms linked by double bonds cannot bind as many atoms as those that are linked by only single bonds. An alkene with one double bond has two fewer hydrogen atoms than the corresponding alkane.



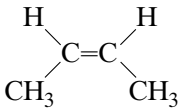
C_3H_8



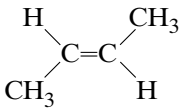
C_3H_6

Thus, the general formula for noncyclic alkenes with one double bond is C_nH_{2n}.

Because alkenes have a double bond, they can have geometric isomers, as shown in the examples below.

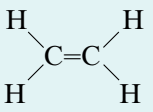
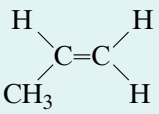
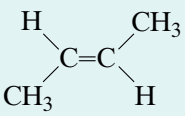
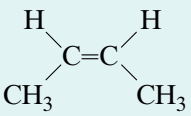


cis-2-butene



trans-2-butene

TABLE 7 *Structures of Alkenes*

	ethene	propene	*trans*-2-butene	*cis*-2-butene
Structural formula				
Ball-and-stick model