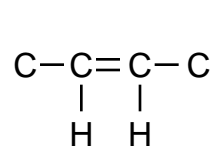
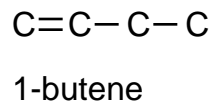
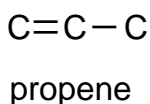
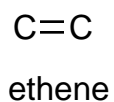


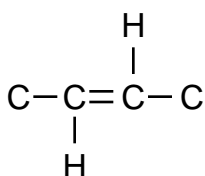
## Alkenes and Alkynes : Notes/W.S. - 60

The **alkenes** and **alkynes** are **unsaturated hydrocarbons**. The alkenes are similar to the alkanes but have a double bond. The alkynes have a triple bond. They are unsaturated because they can contain more hydrogen if one of the double or triple bonds are broken.

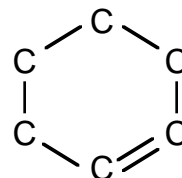
A few of the simplest alkenes are shown below. Most hydrogen atoms and their bonds have been omitted for clarity.



cis-2-butene

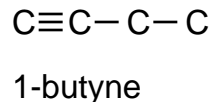
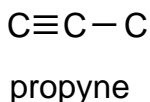
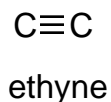


trans-2-butene



cyclohexene

In the case of butene, there are three isomers. The double bond cannot rotate as a single bond can, so for 2-butene, the positions of the hydrogen atoms can be on the same side (cis) or on opposite sides (trans) of the double bond. The number of the carbon atom that the double (or triple) bond is attached to, must be specified. A few of the simplest alkynes are shown below.



Problems:

1) Draw the structures.

a) 2-pentyne

b) trans-3-hexene

c) 3-chloropropyne

d) 3-methylcyclopropene

e) 3,4-dibromo-1-butene

f) cis-1,2-dibromo-1-butene

g) 2,5-dimethyl-3-heptene

h) 4-ethyl-cyclopentene

2)a) Give the general formula for an alkene.

b) Give the general formula for an alkyne.

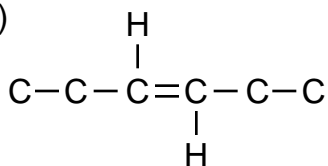
Answers:

1)

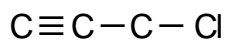
a)



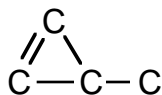
b)



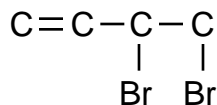
c)



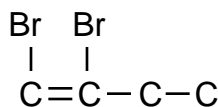
d)



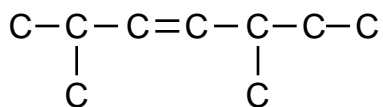
e)



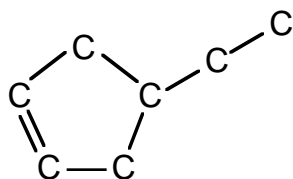
f)



g)



h)



2)a)  $\text{C}_n\text{H}_{2n}$ , b)  $\text{C}_n\text{H}_{2n-2}$ .