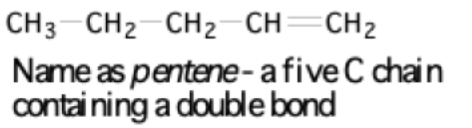
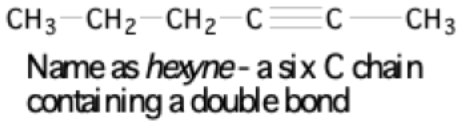
Naming Alkenes and Alkynes

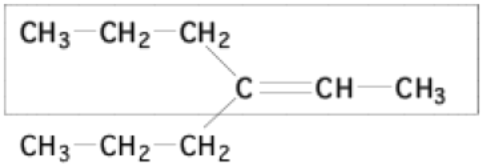
STEP 1: Name the main chain. Find the *longest continuous chain of carbons containing the double or triple bond*. The names of alkenes end with –ene, and the names of alkynes end with -yne. When there is more than one multiple bond, use numerical prefixes (diene, diyne, triene, triyne, etc.)



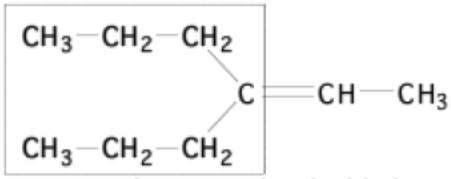
Name as *pentene* - a five C chain containing a double bond



Name as *hexyne* - a six C chain containing a double bond

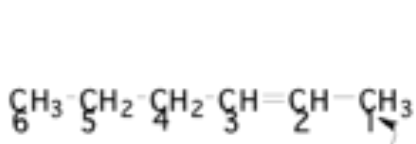


Name as *hexene* - a six C chain containing a double bond...

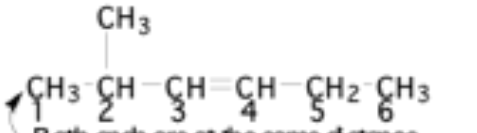


not as a *heptene* - the double bond is not contained on the seve C chain.

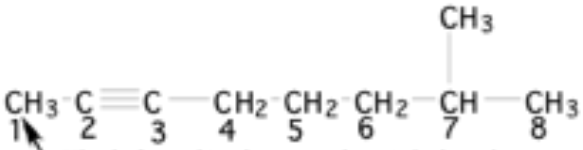
STEP 2: Number the carbon atoms in the main chain. *Begin at the end nearer the multiple bond*. If the multiple bond is at the same distance from both ends, begin numbering at the end nearer the first branch point.



This end is closer to the double bond.

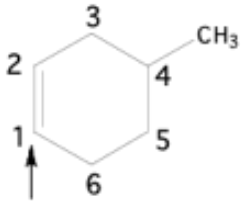


Both ends are at the same distance from the double bond, but this is closer to the branch.

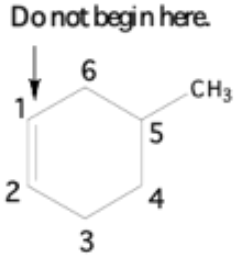


The left end is closer to the triple bond.

The double-bond carbon atoms in substituted cycloalkenes are numbered 1 and 2 so as to give the first substituent the lowest number:

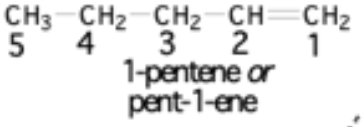


If we start here the brach gets the lowest possible number

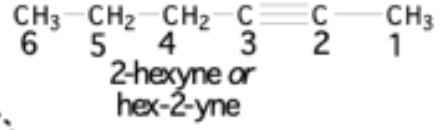


Do not begin here.

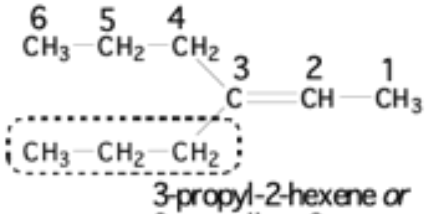
STEP 3: Write the full name. Assign numbers to the branching substituents, and list the substituents alphabetically. Indicate the position of the multiple bond(s) in the chain by giving the number of the first multiple-bonded carbon. If more than one multiple bond is present, identify the position of each multiple bond and use the appropriate ending diene, triene, tetraene, and so forth.



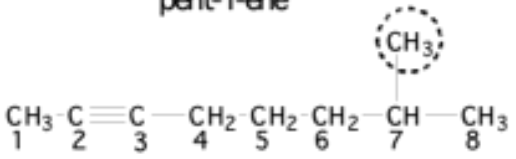
1-pentene *or* pent-1-ene



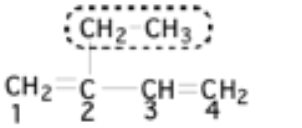
2-hexyne *or* hex-2-yne



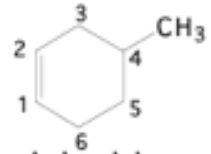
3-propyl-2-hexene *or* 3-propylhex-2-ene



7-methyl-2-octyne *or* 7-methyloct-2-yne



2-ethyl-1,3-butadiene *or*

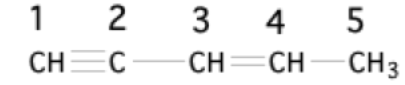


4-methylcyclohexene

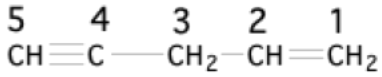
Assigning Priority

What happens when double and triple bonds appear in the same molecule?

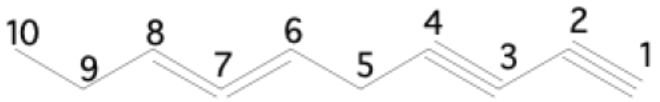
- Alkenes and alkynes are considered to have equal priority.
- In a molecule with **both** a double and a triple bond, whichever is closer to the end of the chain determines the direction of numbering.
- In the case where each would have the same position number, the double bond takes the lower number.
- In the name, “ene” comes before “yne” because of alphabetization.



pent-3-en-1-yne
("yne" closer to end of chain)



pent-1-en-4-yne
("ene" goes first in the alphabet and takes priority over "yne")



deca-5,7-dien-1,3-diyne

- Notice how in the names the last letter of the “—en*e*” ending is dropped to let people know that the molecule has more functional groups (triple bonds in the examples above).