

**Nomenclature** "Organic Chemistry", G. Marc Loudon, 3rd Edition, Benjamin/Cummings; Redwood City, CA; 1995 and in comparison to "Organic Chemistry", Maitland Jones, Jr, 3<sup>rd</sup> Edition, W. W. Norton; New York; 2005. Please see changes in red and do not use the table 2.5 on pg 81 but use comment 9 on alkanes.

### Alkanes

1. The unbranched alkanes are named according to the number of carbon.
2. For alkanes containing branched carbon chains, determine the longest chain, the parent chain, which is the longest continuous chain in the molecule.
3. If two or more chains within a structure have the same length, choose as the parent chain the one with the greater number of branches.
4. Number the carbons of the parent chain consecutively from one end to the other in the direction that gives the branch the lower number.
5. Name each branch and identify the carbon number of the parent chain at which it occurs.
6. Construct the name by writing the carbon number of the parent chain at which the substituent occurs, a hyphen, the name of the branch, and the name of the alkane corresponding to the parent chain.
7. When there are multiple substituent groups on the parent chain, each substituent receives its one number. The prefixes are di, tri, tetra, etc., are used to indicate the number of identical substituents.
8. When there are substituent groups at more than one carbon of the parent chain, alternative numbering schemes are compared number by number, and the one is chosen that gives the lower number at the first point of difference.
9. **Substituent groups are cited in alphabetical order regardless of their location in the parent chain. The numerical prefixes di, tri, etc., as well as the prefixes sec- and tert- are ignored in alphabetizing, but the prefixes iso, neo, and cyclo are considered in alphabetizing substituent groups. Therefore, ignore di- and then look at the group afterwards. Or molecular or atomic weight may be used for the priority as long as it is consistent and unambiguous. (E.g., 1,2-dibromo-1,2-dichloroethane is consistent using both atomic weight and alphabetization.)**
10. When the numbering of different groups is not resolved by the other rules, the first-cited group receives the lower number.

### Alkenes

1. The parent chain is defined as the carbon chain containing the greatest number of double bonds, even if this is not the longest chain.
2. **Nomenclature of Stereoisomers: the E,Z system**  
**Step 1:** Examine the atoms directly attached to a given carbon of the double bond, and then follow the first rule that applies.  
**Rule 1a** Assign the priority to the group containing the atom of higher atomic #.  
**Rule 1b** Assign the priority to the group containing the isotope of higher atomic mass.  
**Step 2:** If the atoms directly attached to the double bond are the same, then, working outward from the double bond, consider within each group the set of attached atoms. You'll have two sets - one for each group on the double bond.  
**Rule 2** Arrange the attached atoms within each set in descending priority order, and make a pairwise comparison of the atoms in the two sets. The higher priority is assigned to the atom of higher atomic number (or atomic mass in the case of isotopes) at the first point of difference.)  
**Step 3:** If the sets of attached atoms are identical, move away from the double bond within each group to the next atom following the path of highest priority and identify new sets of attached atoms. Then apply Rule 2 to these new sets. Keep following this step until a decision is reached. Remember that a priority decision must be made at the first point of difference.

### Alkynes

1. When double bonds and triple bonds are present in the same molecule, the parent chain is the carbon chain containing the greatest number of double and triple bonds.

2. *The numerical precedence of a double or triple bond within the parent chain is decided by the first point of difference rule; precedence is given to the bond that gives the lowest number in the name of the compound, whether it is a double or triple bond.*
3. *The double bond, however, is always cited first in the name by dropping the terminal e from the -ene suffix.*
4. *When the foregoing rules do not completely specify the name, the double bond takes precedence in the numbering.*

### **Substitutive Nomenclature**

1. *Identify the parent group (later on in the course). When a structure has several candidates for the parent group, the group chosen is the one giving the highest priority by the IUPAC. The IUPAC specifies that the -OH receives precedence over an -SH group.*
2. *Identify the parent carbon chain using the following order:*
  - a. *greatest number of parent groups;*
  - b. *greatest number of double and triple bonds*
  - c. *greatest length*
  - d. *greatest number of other substituents.*
3. *Number the parent chain consecutively from one end.*
  - a. *lowest numbers for the parent groups;*
  - b. *lowest numbers for the multiple bonds, with double bonds having priority over the triple bonds.*
  - c. *lowest numbers for other substituents;*
  - d. *lowest number for the substituent cited first in the name.*
4. *Begin construction of the name with the name of the hydrocarbon corresponding to the parent chain.*
  - a. *Cite the parent group by its suffix and number; its number is the last one cited in the name.*
  - b. *If there is no parent group, name the compound as a substituted hydrocarbon.*
  - c. *Cite the names and numbers of the other substituents in alphabetical order at the beginning of the name.*