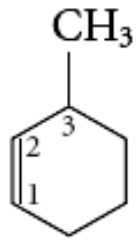
Naming Cyclic Hydrocarbons

- **Identify the root:**
  Determine the number of carbon atoms in the ring. The root name is the same as the straight chain alkane, alkene, or alkyne, with the same number of carbons atoms, preceded by *cyclo*.
- **Identify the suffix:**
  Determine whether the molecule has all single bonds, at least one double bond, or at least one triple bond. The suffix is −*ane*, −*ene*, or −*yne*, respectively. There are no numbers to indicate the location of the double or triple bonds because they are always assumed to be between carbon atoms number one and two.
- **Identify the prefix:**
  The names for the alkyl prefixes are the same as they are for the straight-chain hydrocarbons. They are given in alphabetical order. However, there are a special set of rules for numbering the carbon atoms in the ring to which side groups are attached.
  - If there are no side groups or only one side group on an alkane, the carbon atoms are not numbered.
  - If the molecule is a cycloalkane and there are two or more side groups, the numbering must result in the lowest possible numbers. The carbon atom to which one of the side groups is attached is carbon atom number one. Numbering goes in the direction to make the numbers of any other side groups as small as possible. You can choose any carbon atom with a side group to start numbering.
  - If the molecule is an alkene or alkyne, the multiple bond takes highest priority. The carbon atom on one side of the multiple bond is carbon atom number one and the one on the other side is number two. If there is a side group, the numbering starts in the position that will make the number of the carbon atom with the side group as small as possible.

Sample Problem



Identify the root: The ring has six carbon atoms so the root is cyclohex−.

Identify the suffix: The ring has one double bond so the suffix is −ene.

Assign the position numbers: The carbon atoms beside the double bond must be numbered 1 and 2. The numbering must proceed in the direction of the side group. Therefore, the lower left carbon atom must be number one and the numbering then goes clockwise giving the side group the number 3. Because the numbering of carbon atoms one and two is mandatory, the numbers are not included in the name.

Identify the prefix: The side group has one carbon atoms so the prefix is methyl.

Solution: The name of the compound is 3-methylcyclohexene.