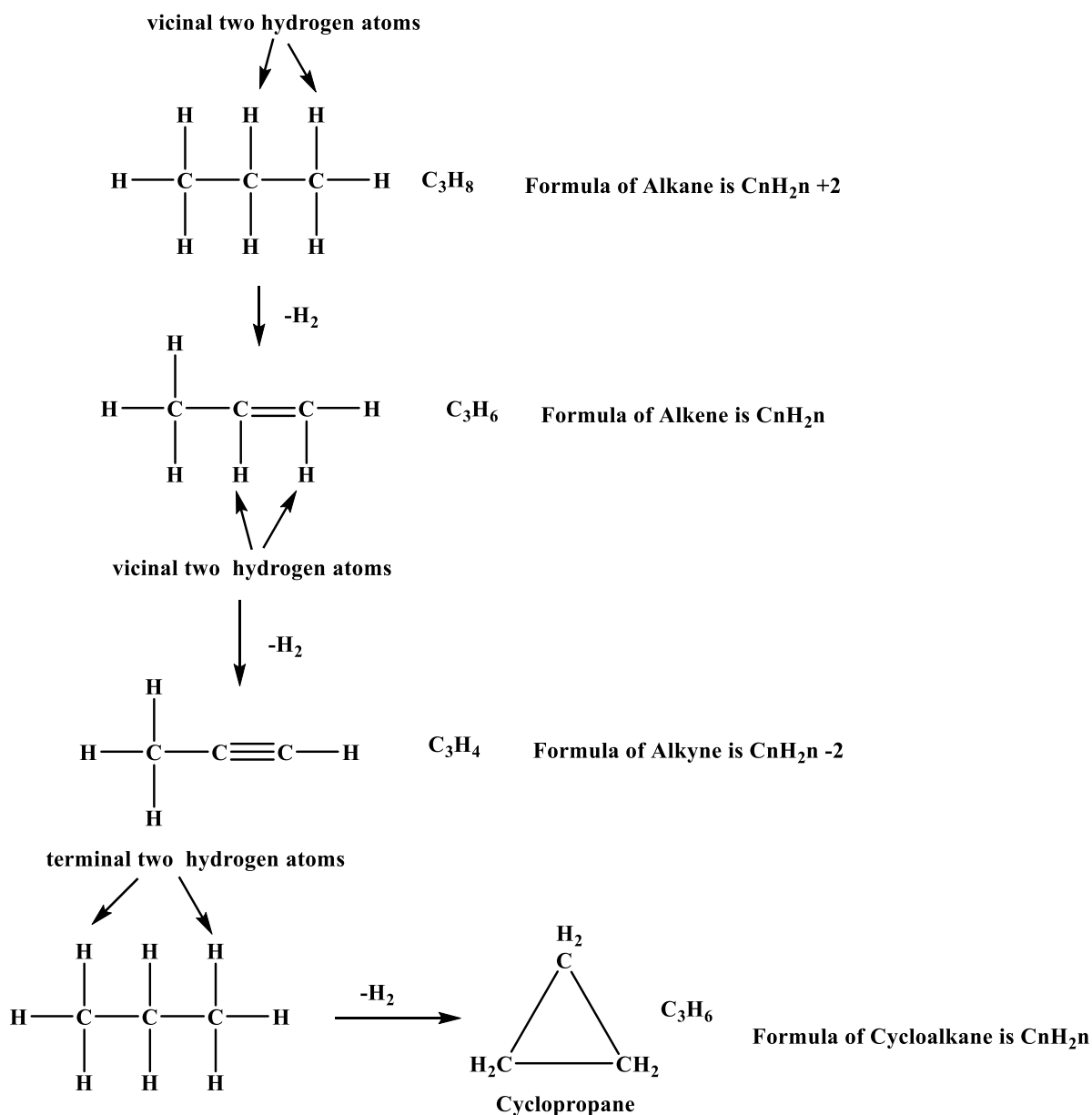
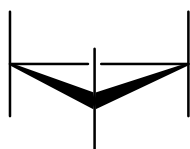


Cyclo Alkanes

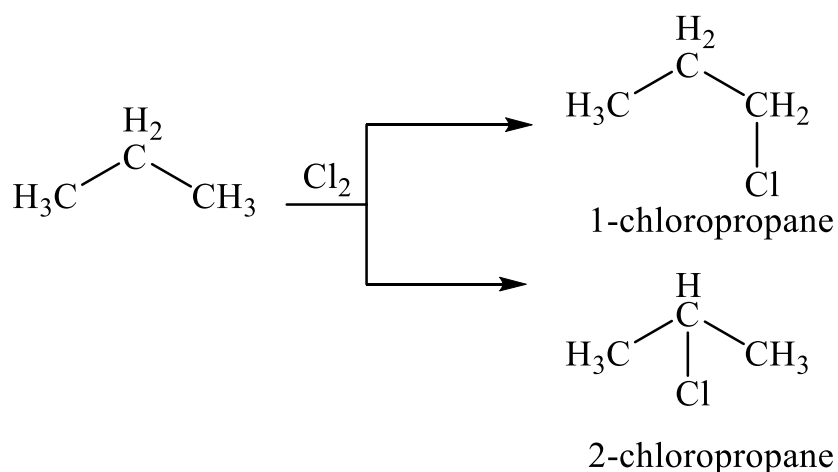
In the compounds that we have studied so far, the carbon atoms are attached to one another to form chains; these are called **open-chain** compounds. In many compounds however the carbon atoms are arranged to form rings; these are called **cyclic** compounds.



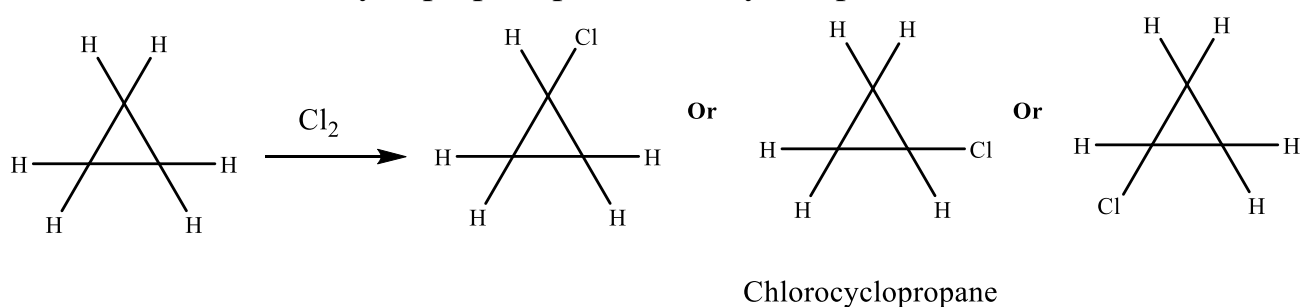
Alkenes and cycloalkanes they have the same formula C_nH_{2n} , and Shape of Cyclopropane is planer.



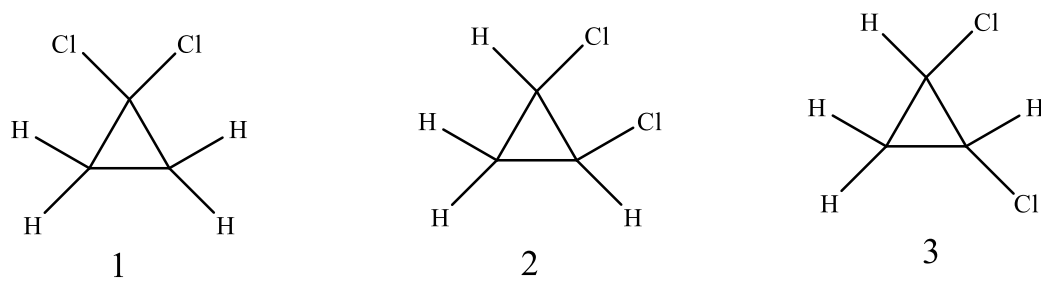
Mono chlorination of propane produces two only product



Mono chlorination of Cyclopropane produces only one product

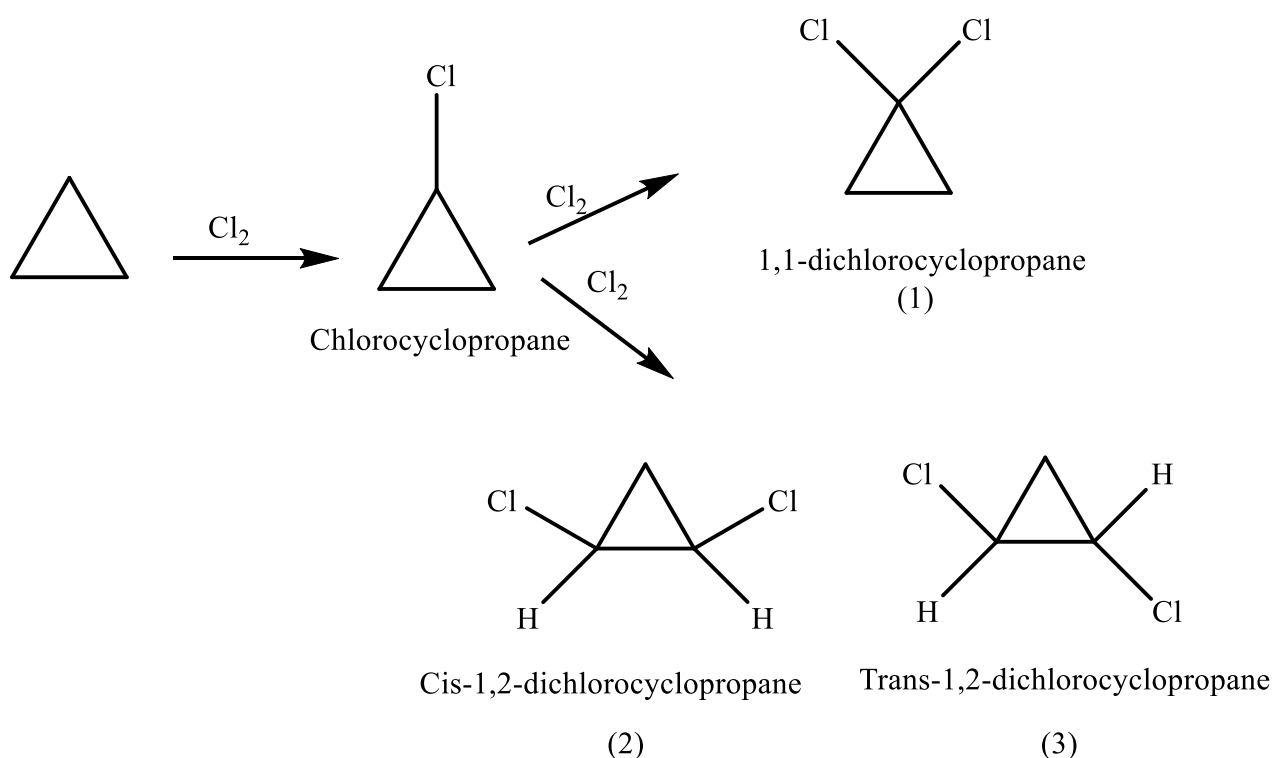


- The six hydrogen atoms of Cyclopropane are **equivalent** .
- Mono chlorination of Cyclopropane produces **only one product**
- Di chlorination of Cyclopropane produces **only three products**



1,1-dichlorocyclopropane

1,2- dichlorocyclopropane



- Stereochemistry divided many types from **Stereoisomers** and **structural isomers**
- They have the same bonding but different arrangement in space.as this name **Stereoisomers**.
- Stereoisomers divided into two types :
 - 1- Enantiomers
 - 2- Diastereomers

Relationship between compound (2) and compound (3) in stereoisomers is **Diastereoisomers** . but relationship between compound (1) and compound (2) in stereochemistry is **Structural isomers**

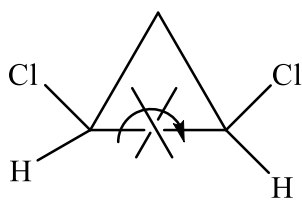
- They have the different bonding and different name.as this name **Structural isomers**.

Diastereoisomers :- they are non-mirror images stereoisomers.

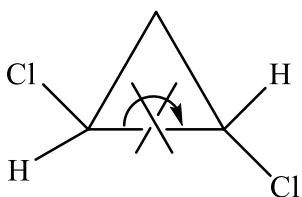
Enantiomers :- they are mirror images stereoisomers.

phenomenon appears the **cis** and **trans** in Cycles and Alkenes.

Cycles

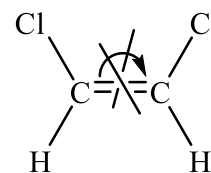


cis-1,2-dichlorocyclopropane

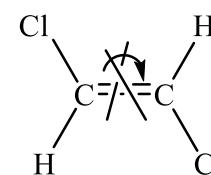


trans-1,2-dichlorocyclopropane

Alkenes



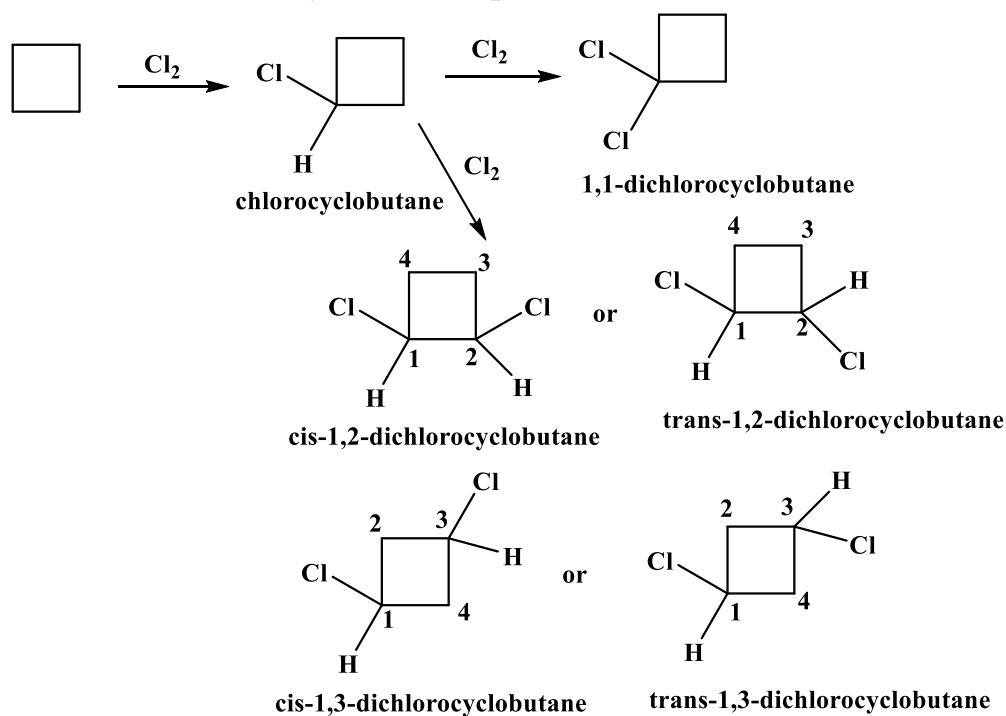
cis-1,2-dichloroethene



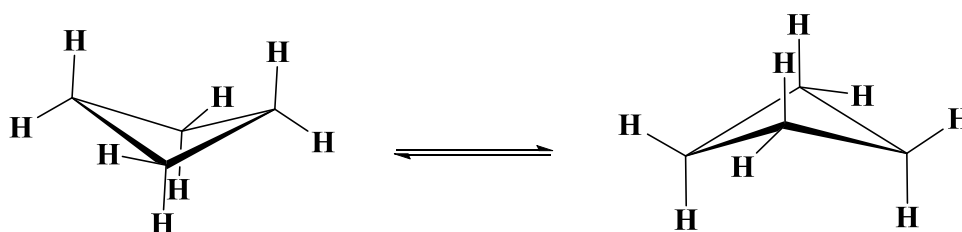
trans-1,2-dichloroethene

Cis compound can be converted to **trans** compound by bond breaking and bond formation.

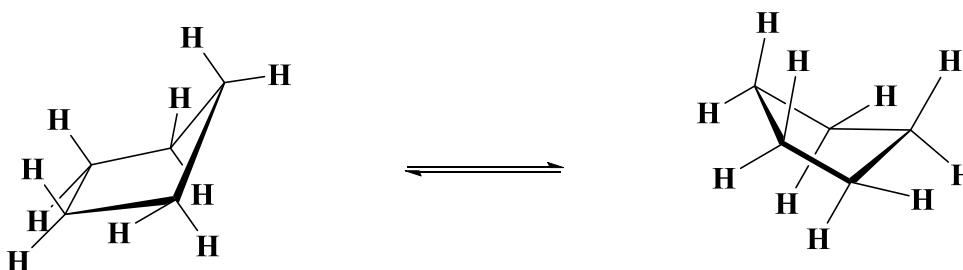
- The eight hydrogen atoms of cyclobutane are **equivalent** .
- Mono chlorination of cyclobutane produces **only one product**.
- Di chlorination of cyclobutane produces **five products**.



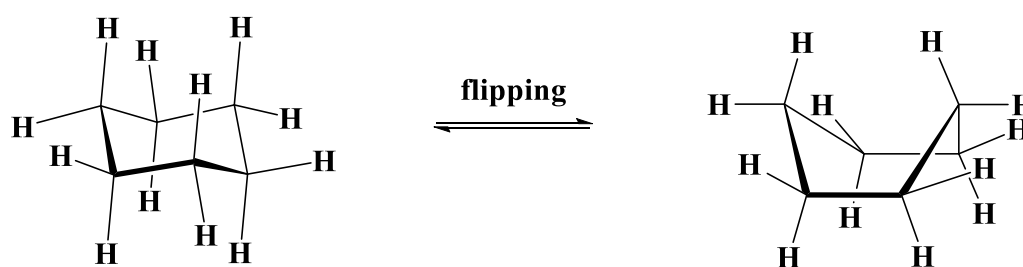
- Cyclobutane is not planer molecule but the cyclobutane shape is **puckered** and the same **butterfly**.



- Mono chlorination of cyclopentane produces **only one product**.
- Di chlorination of cyclopentane produces **more than** compound.
- The ten hydrogen atoms of cyclopentane are **equivalent** .
- Cyclopentane shape it's like **open envelop**.



- Cyclohexane exist in many conformations such as **boat conformation** and **chair conformation**.



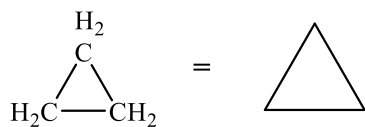
chair conformation

boat conformation

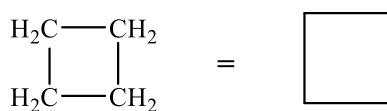
The chair conformation is **more stable** than the boat conformation.

Nomenclature

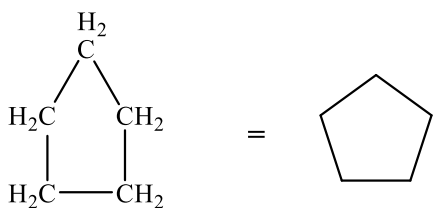
- Cyclic aliphatic hydrocarbons are named by prefixing **cyclo-** to the name of the corresponding open chain hydrocarbon having the same number of carbons as the ring.



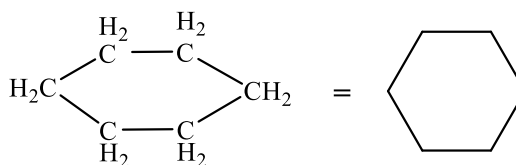
Cyclopropane



Cyclobutane



Cyclopentane

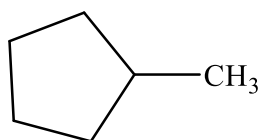


Cyclohexane

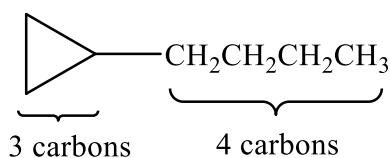
STEP 1

- Find the parent**

Count the number of carbon atoms in the ring and the number in the largest substituent. If the number of carbon atoms in the ring equal to or greater than the number in the substituent, the compound is named as an alkyl – substituted cycloalkane. If the number of carbon atoms in the largest substituent is greater than the number in the ring, the compound is named as a cycloalkyl-substituted alkane. For example:



Methylcyclopentane

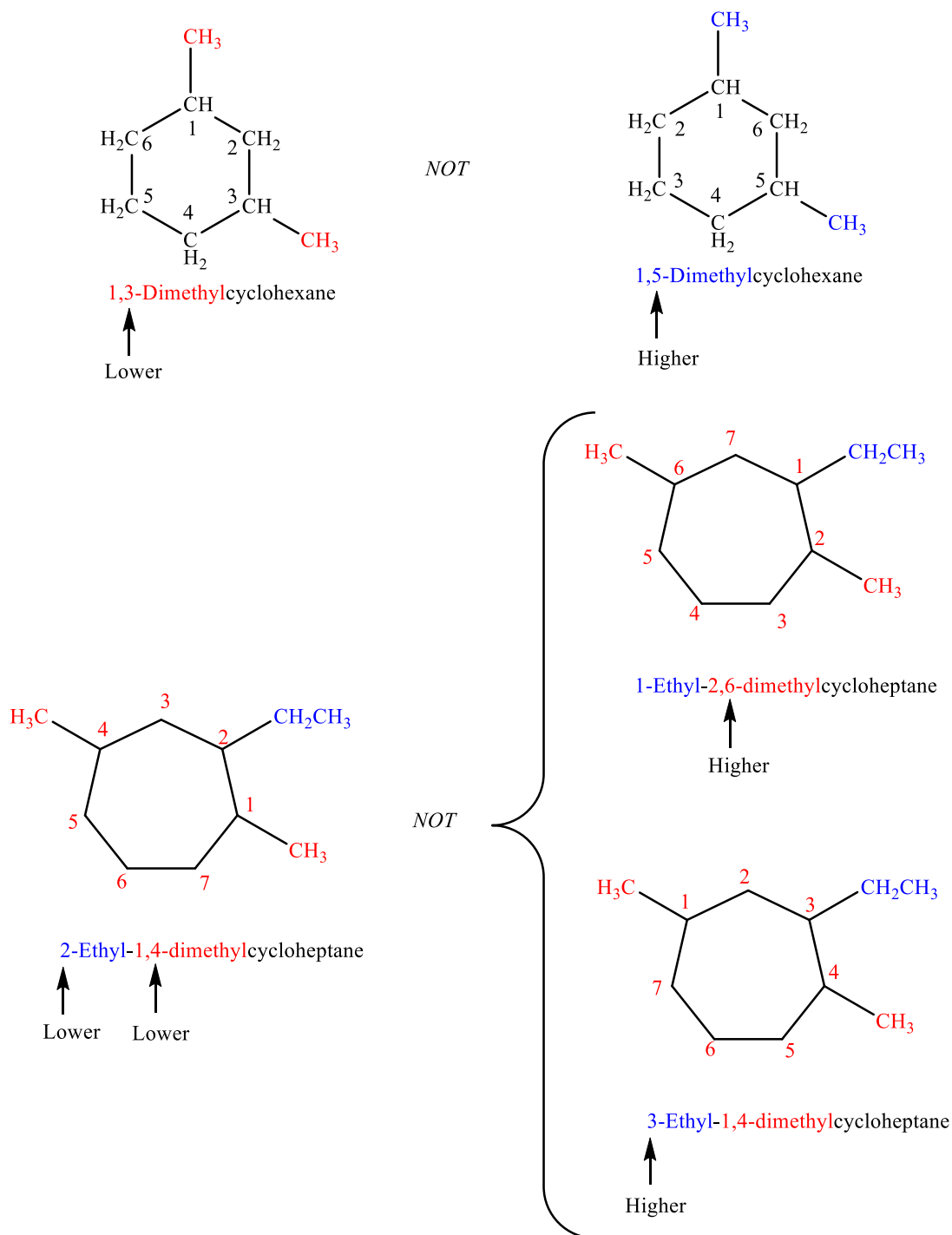


1-Cyclopropylbutane

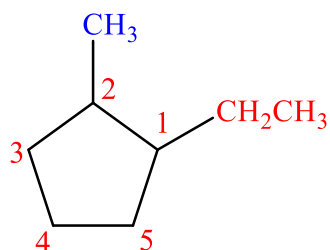
STEP 2

Number the substituents , and write the name

Substituents on the ring –alkyl groups , halogens- are named , and their positions are indicated by numbers . we assign position 1 to particular carbon and then number either clockwise or counter clockwise around the ring ; we do all this in such a way as to give the lowest combination of numbers . for example :

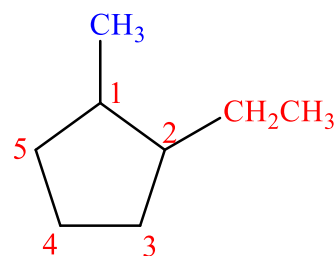


(a) When two or more different alkyl groups that could potentially receive the same numbers are present, number them in alphabetical priority.



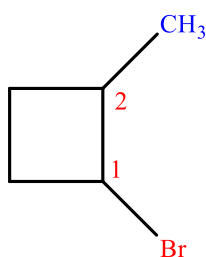
1-Ethyl-2-methylcyclopentane

NOT



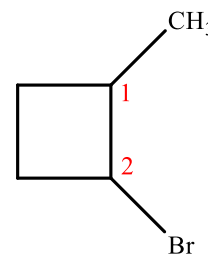
2-Ethyl-1-methylcyclopentane

(b) If halogens are present, treat them just like alkyl groups.

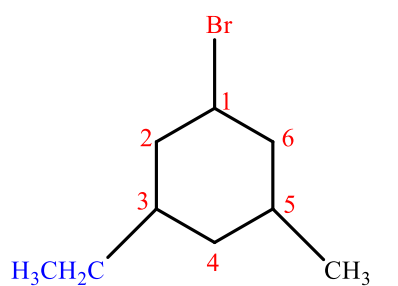


1-Bromo-2-methylcyclobutane

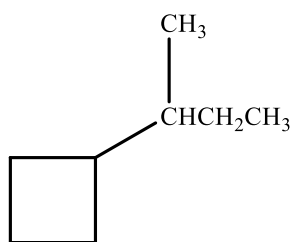
NOT



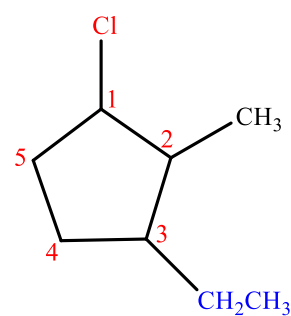
2-Bromo-1-methylcyclobutane



1-bromo-3-ethyl-5-methylcyclohexane



(1-Methylpropyl)cyclobutane



1-Chloro-3-ethyl-2-methylcyclopentane