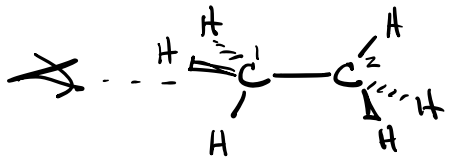
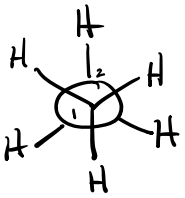
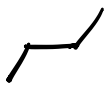
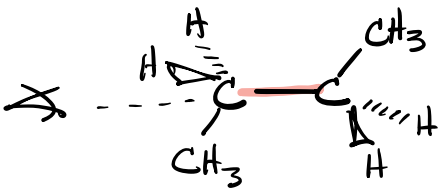
Conformations

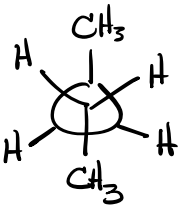
CH_3-CH_3

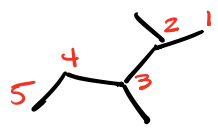




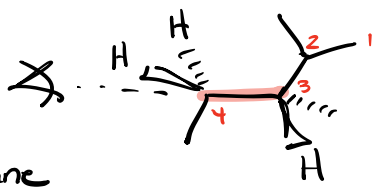


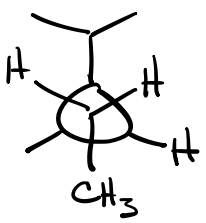






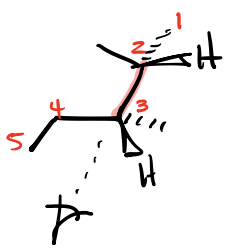
2,3-dimethylpentane

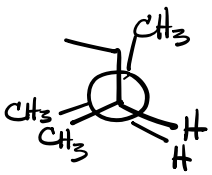




Staggered

down 4-3 bond

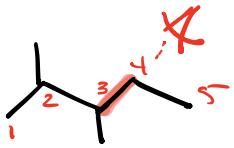


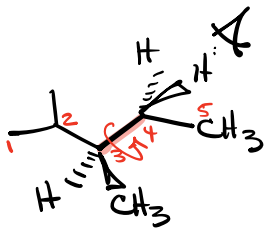


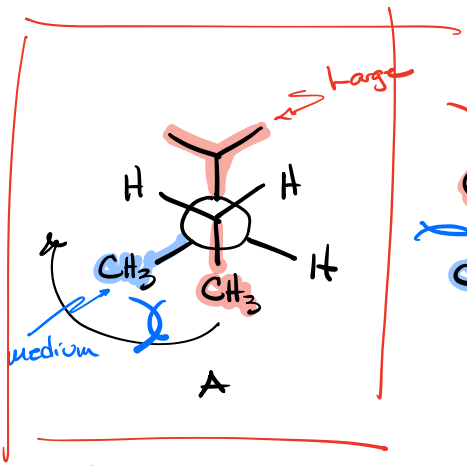
eclipsed

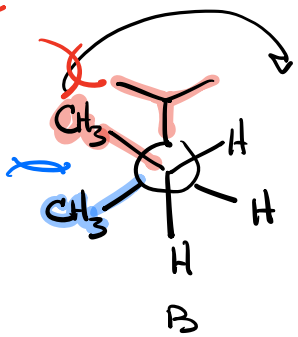
down 3-2 bond

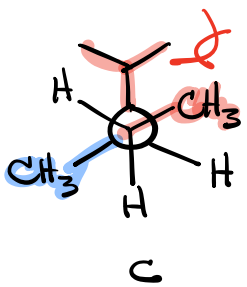
Looking down the 4-3 bond on 2,3-dimethylpentane draw the lowest energy conformation.











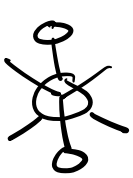
isopropyl & methyl anti

methyl & methyl gauche

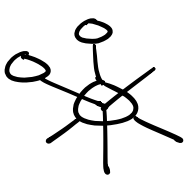
Two largest groups anti & Lowest energy. Has lowest steric repulsions

All 3 gauche

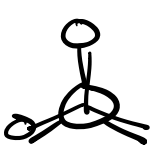
isopropyl & methyl gauche
methyl & methyl anti



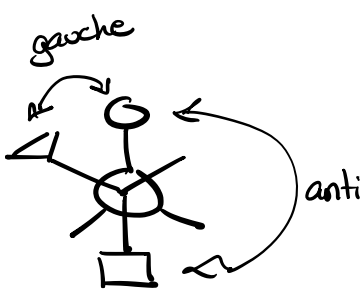
anti



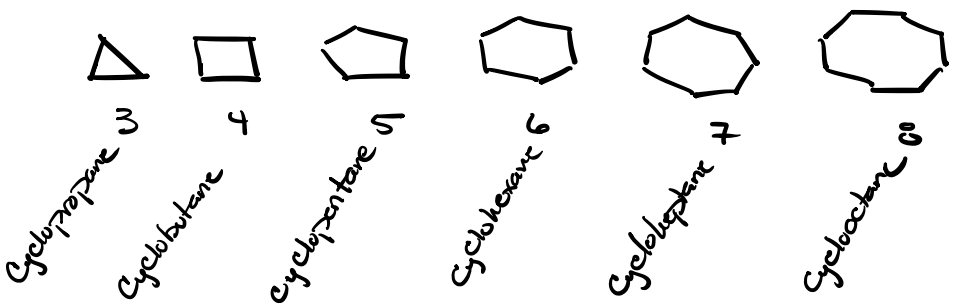
gauche



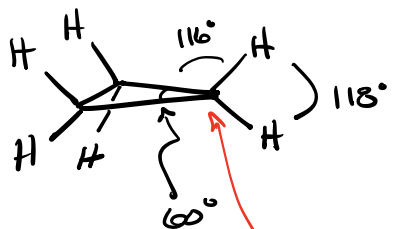
eclipsed

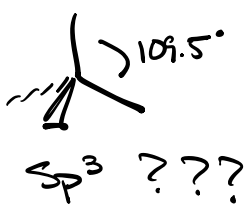


Cycloalkanes

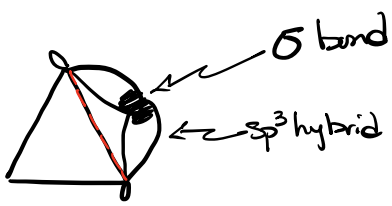


Cycloprapane

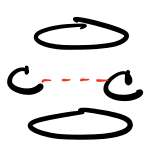


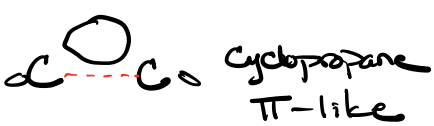


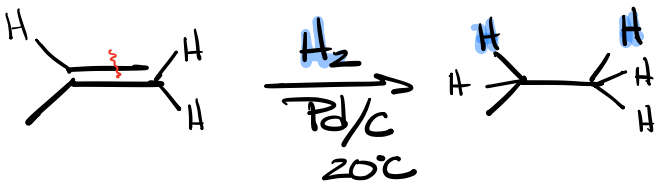
hybridization?
Sp^3?

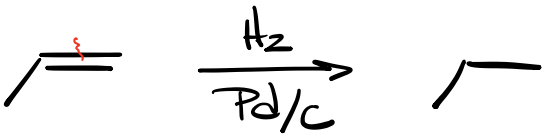


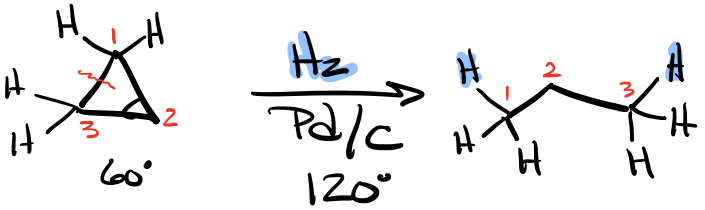
Normal 





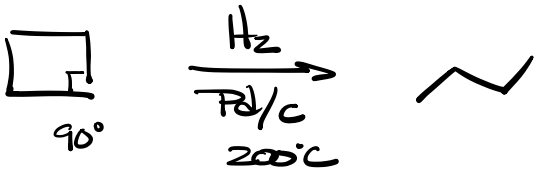


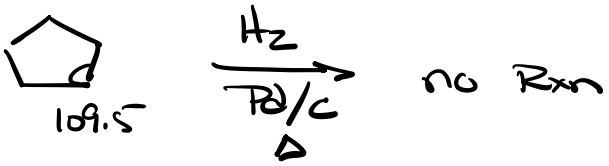




Ring Strain

Pbond is π-like and Pd has access to σ-bond



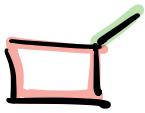


Ring Strian is the steric Strain created by having Small bond angles in Small rings.

Cyclobutane

puckered slightly

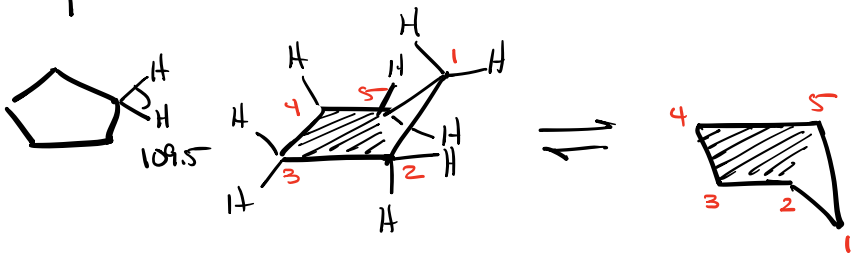
Rings can be main chain for nomenclature and can also be a substituent



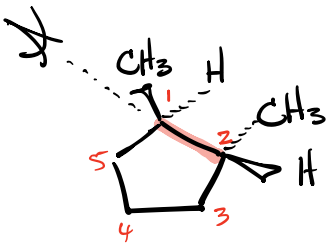
methyl cyclobutane

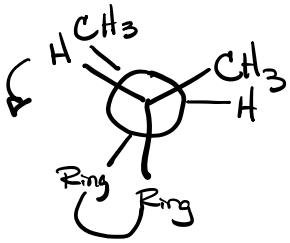
2-cyclopropylhexane

Cyclopentane

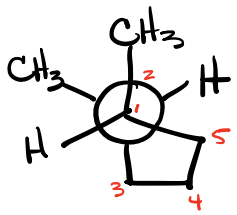


Pseudorotation
different conformations of the ring.



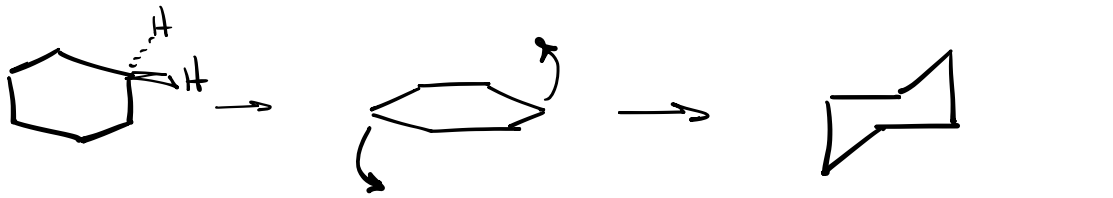


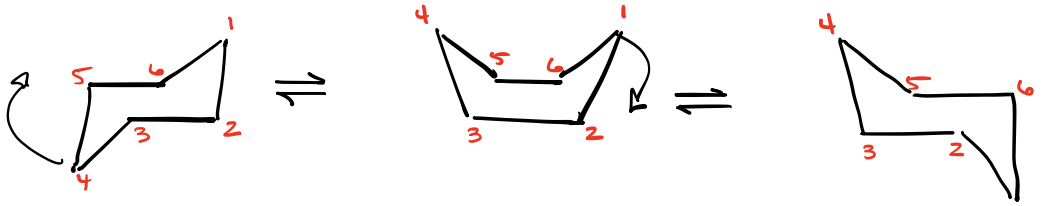
eclipsed



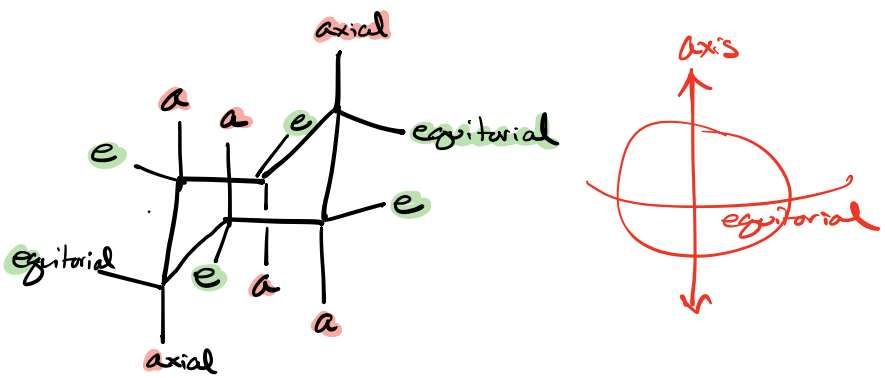
gauche

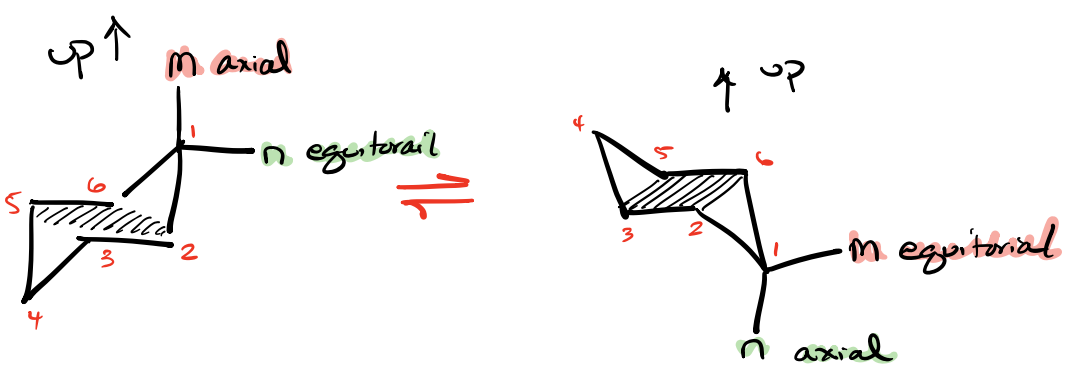
Cyclohexane





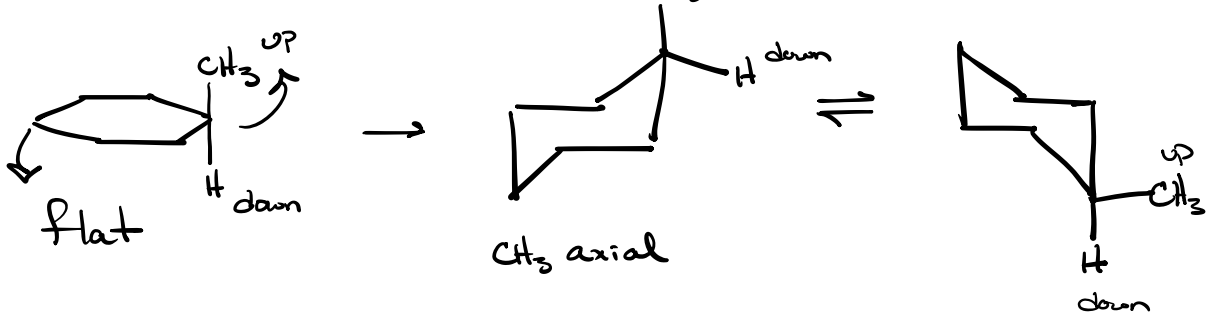
Pseudorotation





Substituent & Conformation

methylcyclohexane



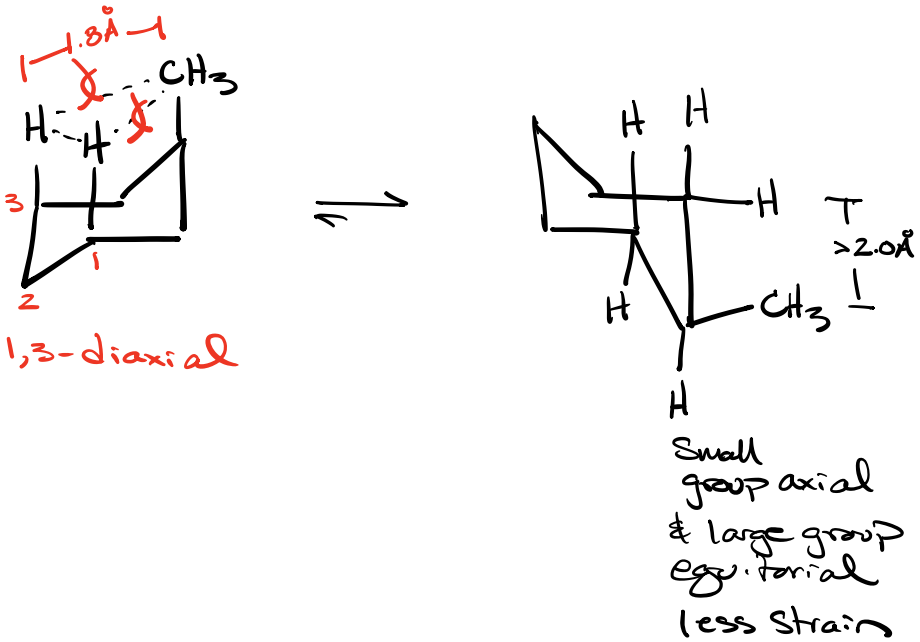
5% ← observation → 95%

Lowest energy

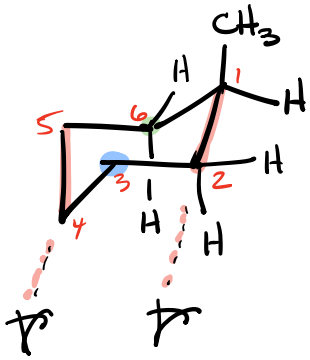
Why?

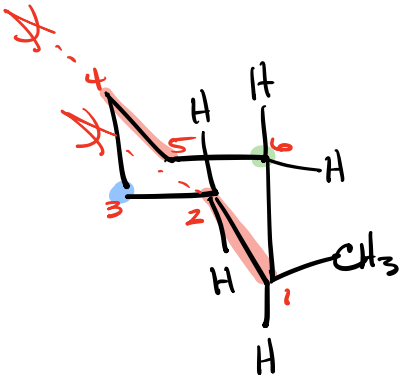
Why is it lower energy to have the large group equitorial

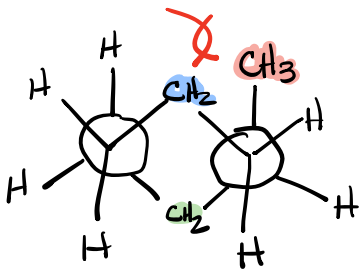
① 1,3-diaxial interactions



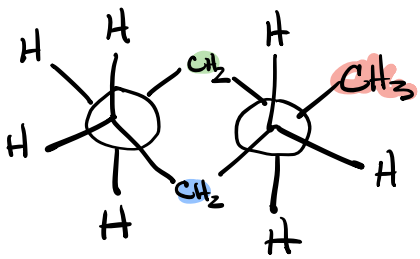
② Newman anti vs. gauche







Methyl & Ring are gauche
⇒ higher Sterics



Methyl & Ring are anti
⇒ Lower Sterics
⇒ Lower energy

Substituents are lower energy in equitorial position because lower 1,3-diaxial & substituent is anti to ring making the system lower energy.