(18) **Today**

Section 3.5 - 3.7: Properties and Conformations of Alkanes

Chap 4 Cycloalkanes
Section 4.1 Naming Cycloalkanes and Halogen Substituents

Sections 4.3 – 4.8 Stability of Cycloalkanes and Conformations of Cyclohexanes

Next Class (19)

Sections 4.3 – 4.8 Stability of Cycloalkanes and Conformations of Cyclohexanes

Sections 5.1 – 5.5
Chirality and Determining the Configuration of Chiral Centers

(20) **Second Class from Today**

Sections 5.1 – 5.5
Chirality and Determining the Configuration of Chiral Centers

Sections 5.6 – 5.12
Diastereomers, N,P, and S, and Prochirality

Third Class from Today (21)

Sections 5.1 – 5.5
Chirality and Determining the Configuration of Chiral Centers

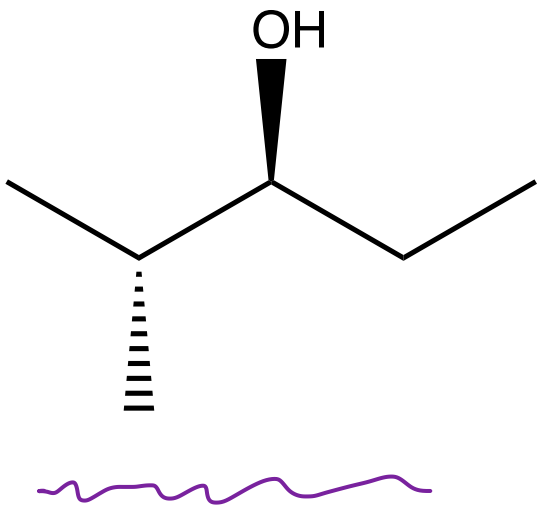
Sections 5.6 – 5.12
Diastereomers, N,P, and S, and Prochirality

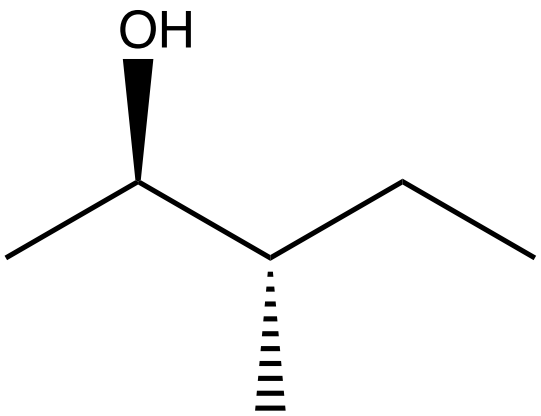
Office Hours moved back to 12:20 to 1:20!

Please hand in reworked Test 1.

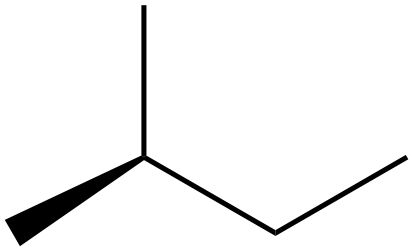
Chemistry Club informational meeting today at 12:30pm in Wilson 309.

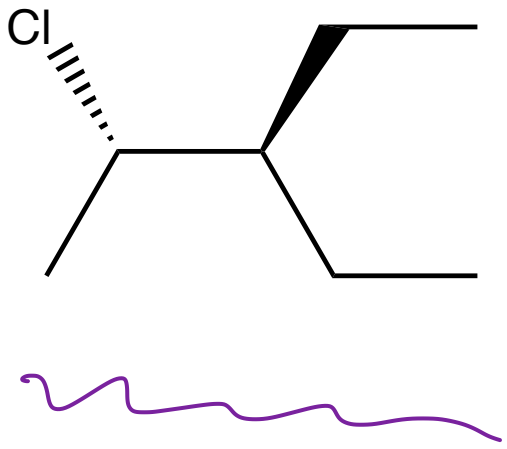
Draw the Newman projection along the C_2 to C_3 bond in the following structures



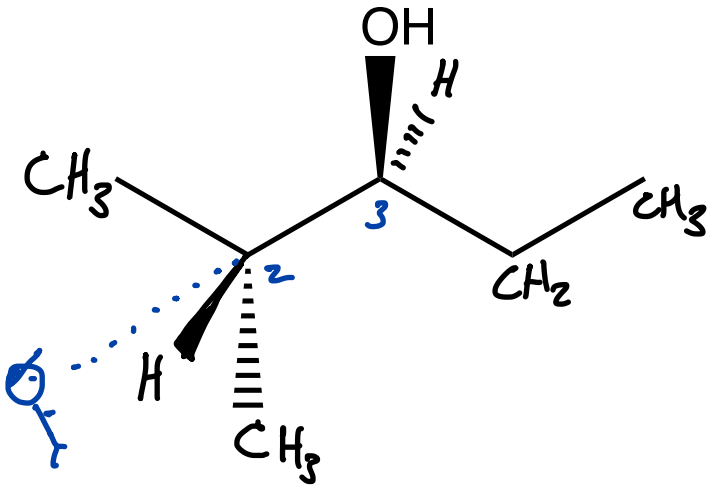


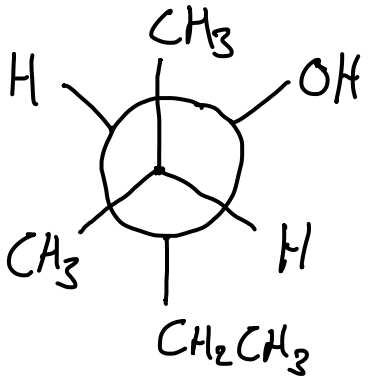
Draw the Newman projection along the C_3 to C_2 bond in the following structures





Draw the Newman projection along the C_2 to C_3 bond in the following structure





find bond of interest

add in labels & "missing" H's

draw stick figure

draw in-plane bond on front C atom (vertical bond)

add in other 2

draw circle for back C atom

draw in-plane bond (vertical)

add in other 2

Draw the Newman projection along the C_2 to C_3 bond in the following structure

locate bond of interest

draw stick figure

add in "missing" H atoms & labels

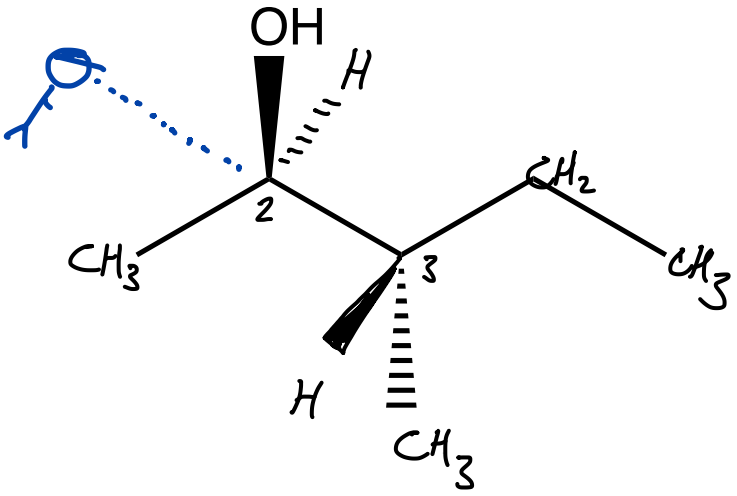
draw vertical bond on 1st C

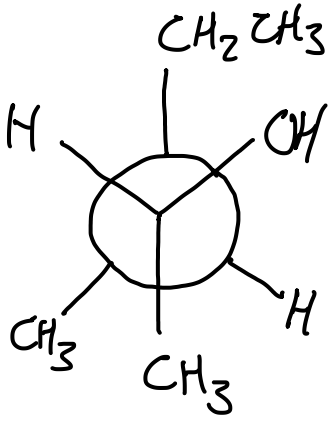
add in other 2

draw big circle for 2nd C

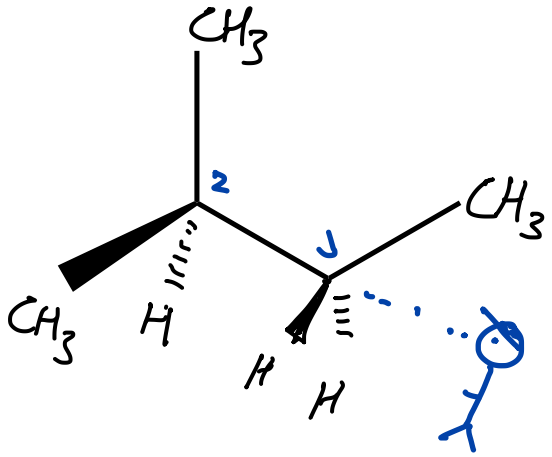
draw vertical bond

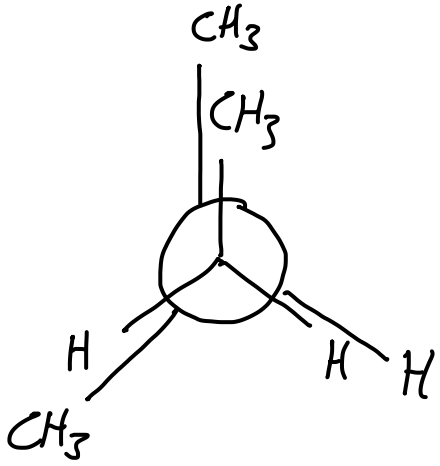
add in other 2



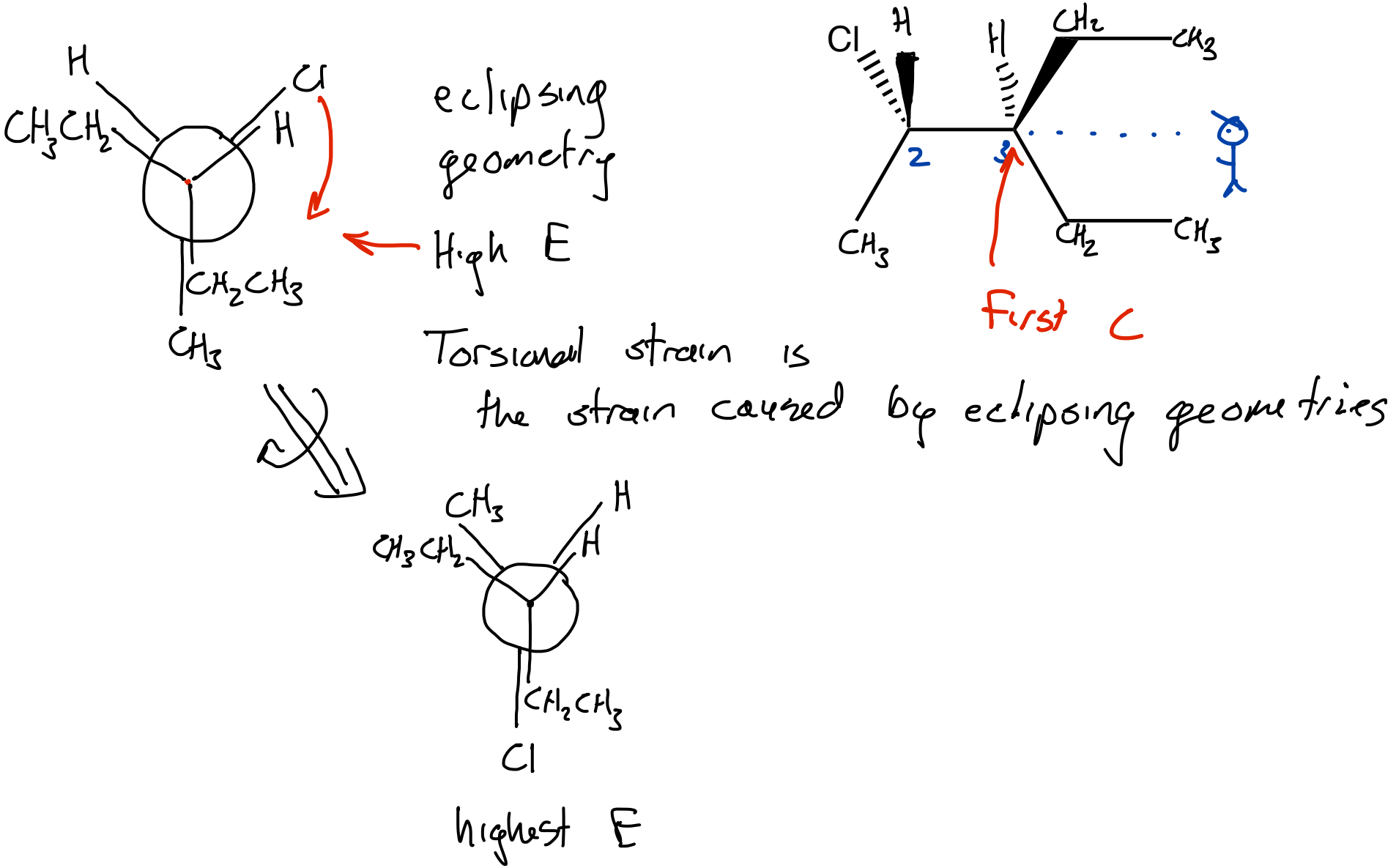


Draw the Newman projection along the C_3 to C_2 bond in the following structure



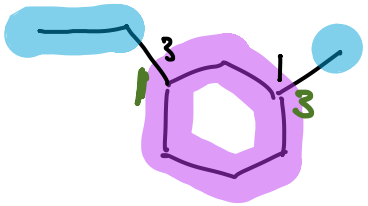


Draw the Newman projection along the C_3 to C_2 bond in the following structure

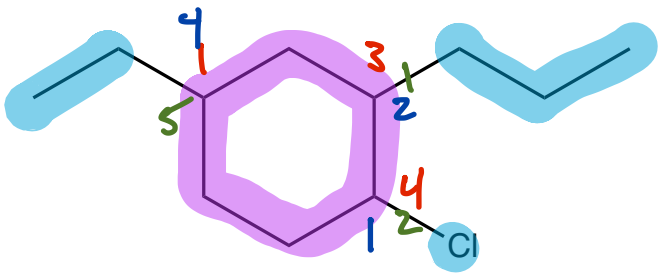


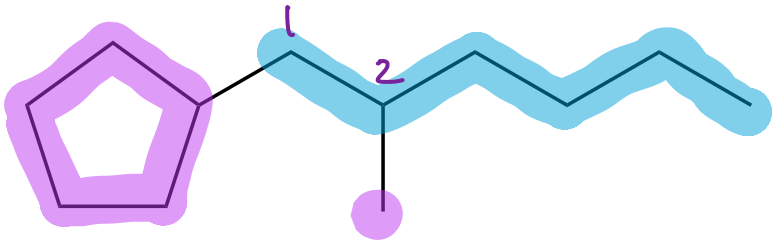
Cycloalkanes

- Determine the name of the parent alkane
  - Ring is the parent hydrocarbon unless the alkyl substituent has more carbons; in that case the acyclic part becomes the parent hydrocarbon
  - cyclo(number of carbons)ane
    - cyclohexane
    - cyclopentane
- Cite the name of substituent before the name of the parent cycloalkane
  - one substituent, no need to give it a number
  - two substituents
    - alphabetical order
    - first substituent is given the number 1
    - numbers counted (clockwise or counterclockwise) to give lowest 2nd substituent number
  - more than two substituents
    - not necessarily in alphabetical order
    - starting point (substituent with number 1) and direction of the counting (clockwise or counterclockwise) is decided by finding the combination that gives the lowest possible numbers for all of the substituents

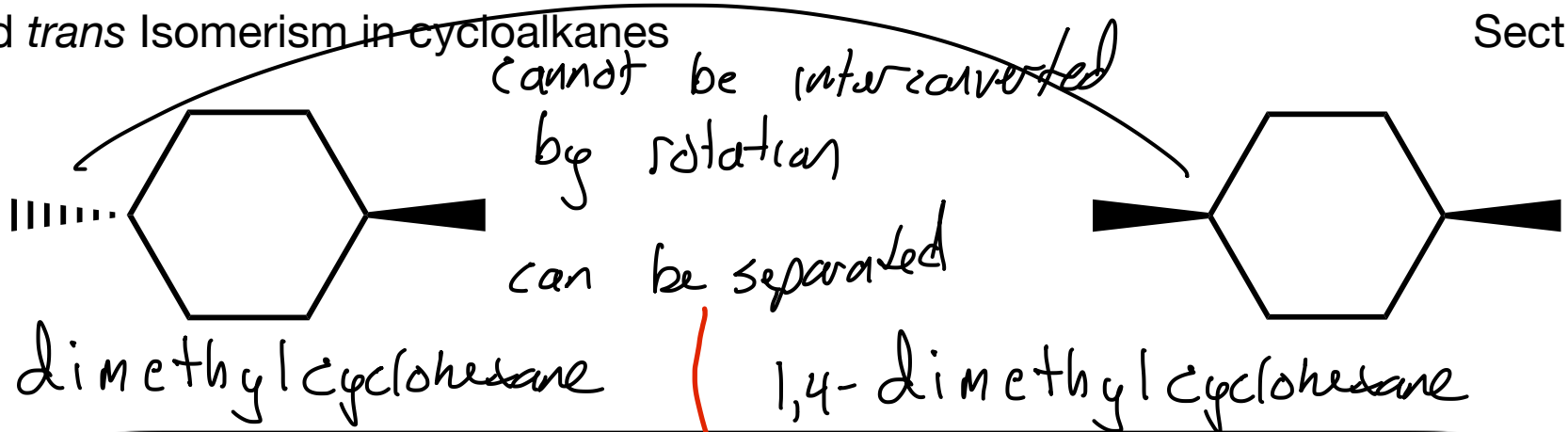


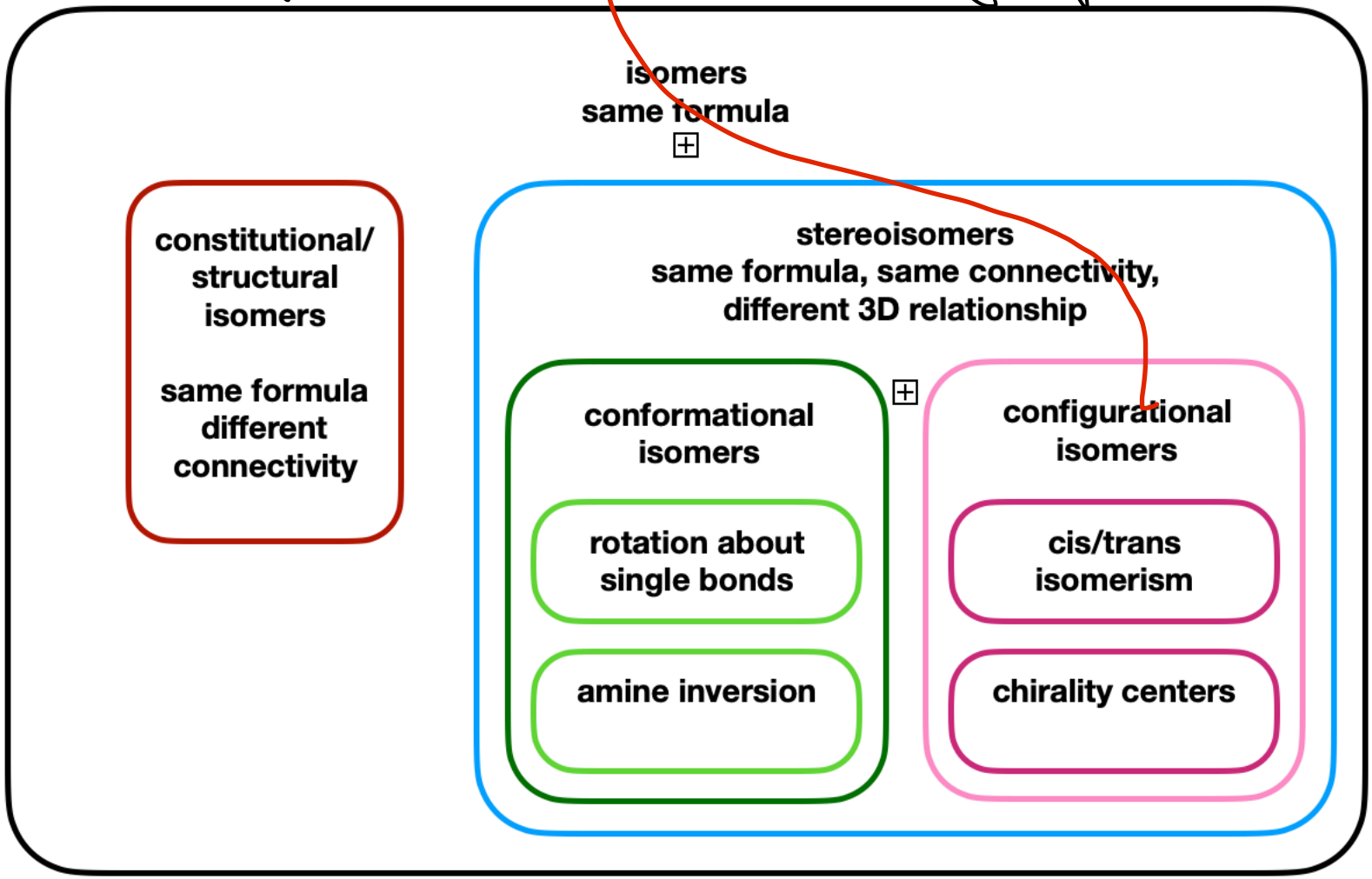
1-ethyl-3-methylcyclohexane

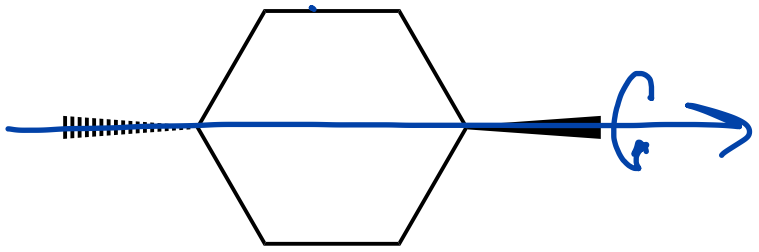




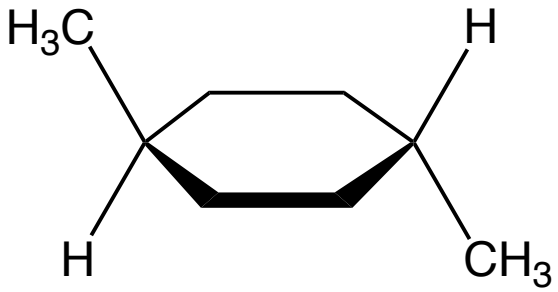
longest chain/ring: 6	longest chain/ring: 6 (5)
parent alkane name: hexane	parent alkane name: hexane
functional group (?) and position: cyclo	functional group (?) and position: none
substituent names: ~~1~~ 2 ~~3~~ propyl ~~5~~ 4 ~~1~~ ethyl; ~~2~~ 1 ~~4~~ chloro	substituent names: methyl; ? cyclopentyl
substituent positions: 1, 2, 4	substituent positions
full name: 1-chloro-4-ethyl-2-propylcyclohexane	full name: 1-cyclopentyl-2-methylhexane


cannot be interconverted
by rotation
can be separated
1,4-dimethylcyclohexane
1,4-dimethylcyclohexane


isomers
same formula
⊞
constitutional/
structural
isomers
same formula
different
connectivity
stereoisomers
same formula, same connectivity,
different 3D relationship
conformational
isomers
rotation about
single bonds
amine inversion
⊞
configurational
isomers
cis/trans
isomerism
chirality centers

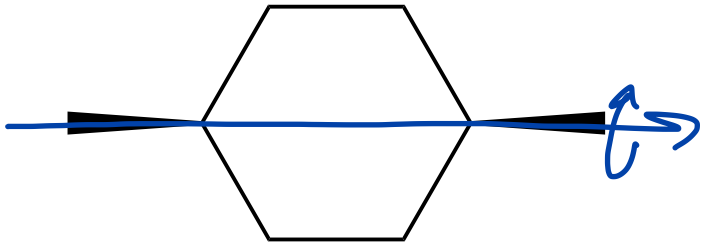


rotate 90°

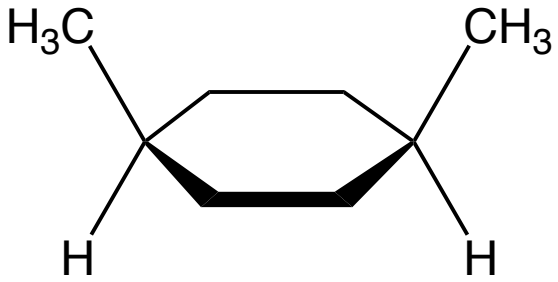


stereoisomers

3D relationship



rotate 90°

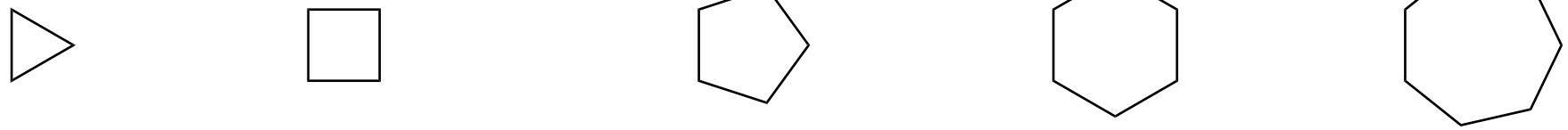


substituents are on opposite sides of the plane defined by the ring

trans-1,4-dimethylcyclohexane

substituents are on same side of the plane defined by the ring

cis-1,4-dimethylcyclohexane

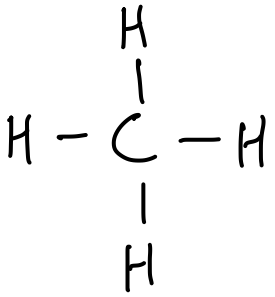


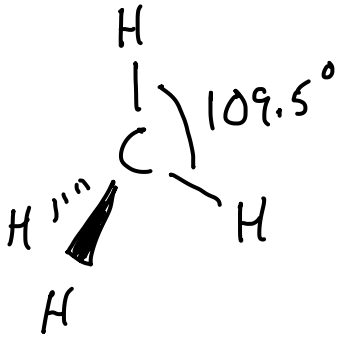
60 90 108 120 128

bond angles

↑

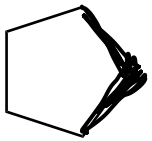
Bayer thought this are would be lowest in E



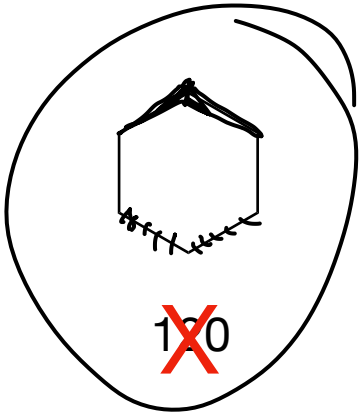


60

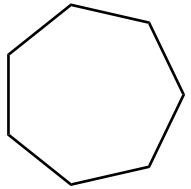
~~90~~



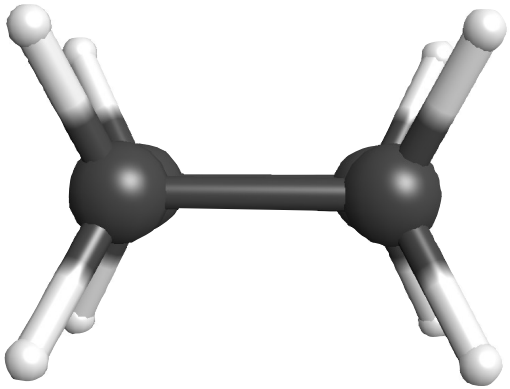
~~108~~



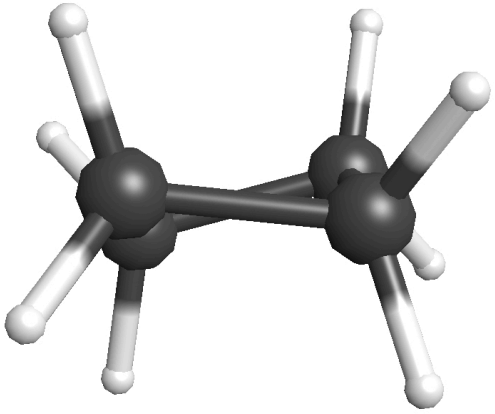
~~120~~



~~128~~



torsional strain



much less torsional strain