(23) **Today**

Sections 4.3 – 4.8 Stability of Cycloalkanes and Conformations of Cyclohexanes

Sections 4.3 – 4.8 Stability of Cycloalkanes and Conformations of Cyclohexanes

Next Class (24)

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

(25) **Second Class from Today**

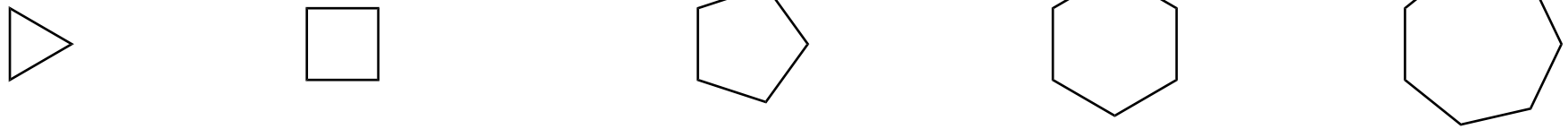
Sections 5.1 – 5.5 Chirality and Determining the Configuration of Chiral Centers

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

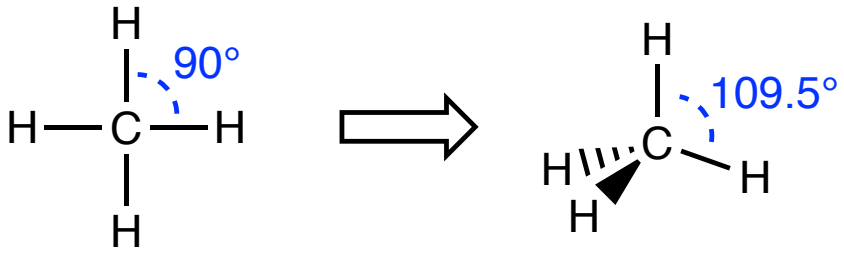
Third Class from Today (26)

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

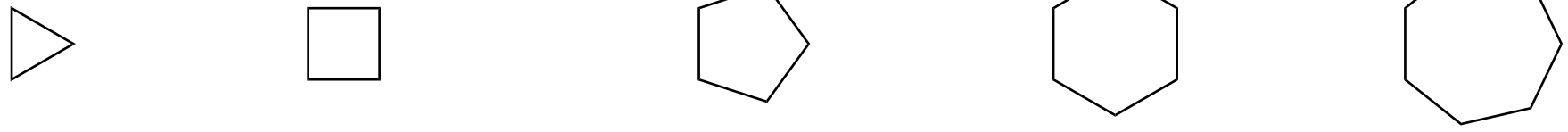
Chap 6



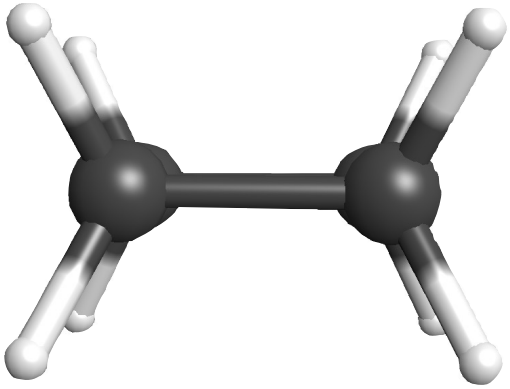
60 90 108 120 128



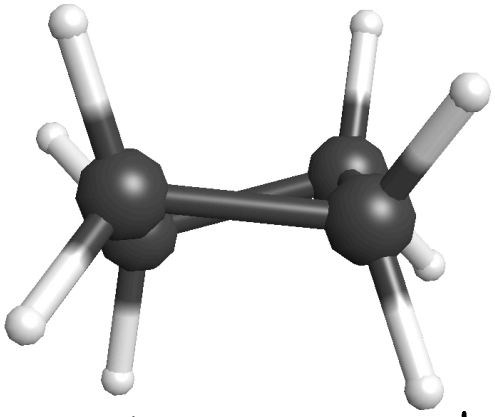
2-D thinking 3-D thinking



60 ~~90~~ ~~108~~ ~~120~~ ~~128~~



planar cyclobutane would have an eclipsed geometry which causes $e^- - e^-$ repulsion



puckered ring creates a slightly staggered structure

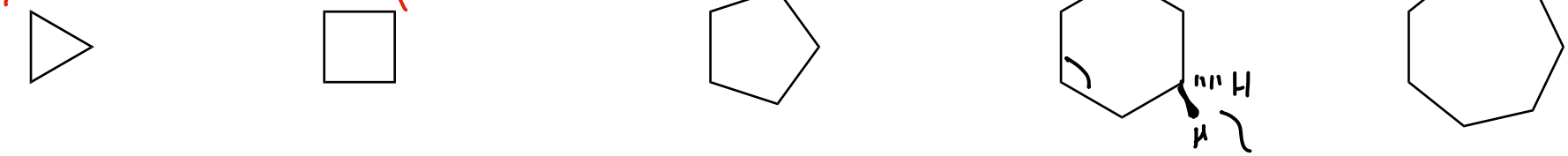
Ring Strain and the Structure of Cycloalkanes

Section 4.3 – 4.8

more reactive due to ring strain

regular polygon

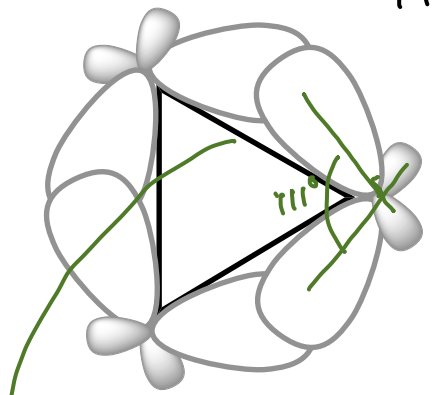
120°

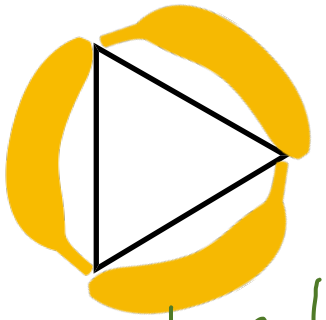


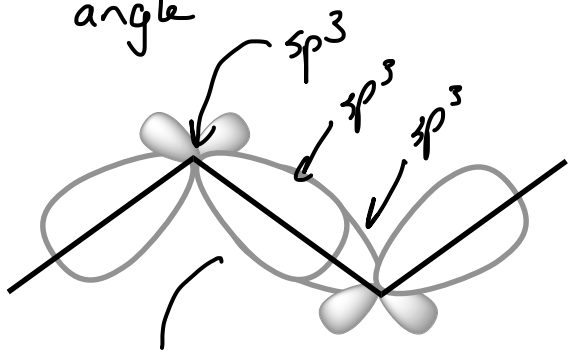
60	88	102 to 106	111° sp^3	115 to 116[1]

bond angles a bit tighter but eclipsing interactions some

linear alkanes have this bond angle







sometimes refred to as banana bonds

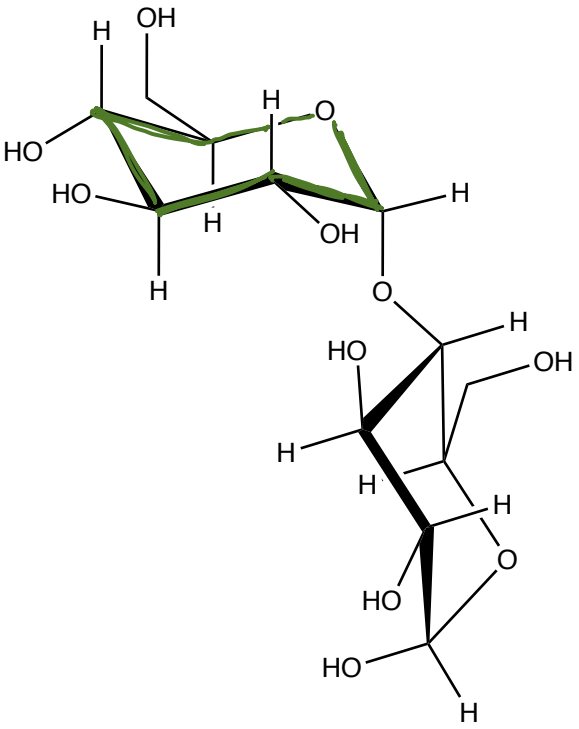
e^- density down in between C atoms ... stable

e^-'s in C–C bond of cyclopropane are not centered between the two nuclei... much more reactive

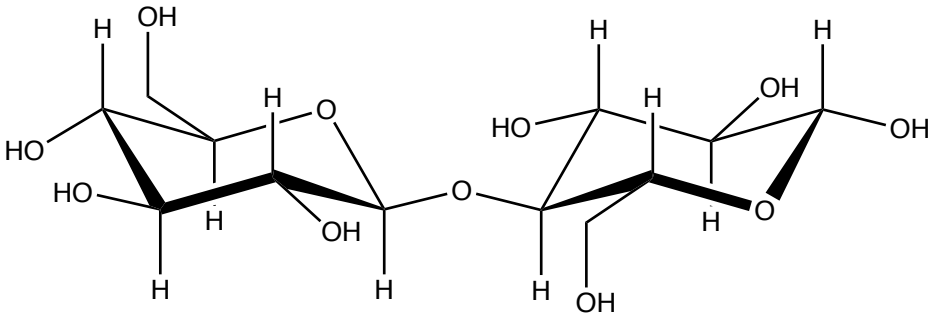
behave like acyclic alkanes

e^- density is also down between C atoms ... stable

[1] Based on quick mechanics calculations in WebMO

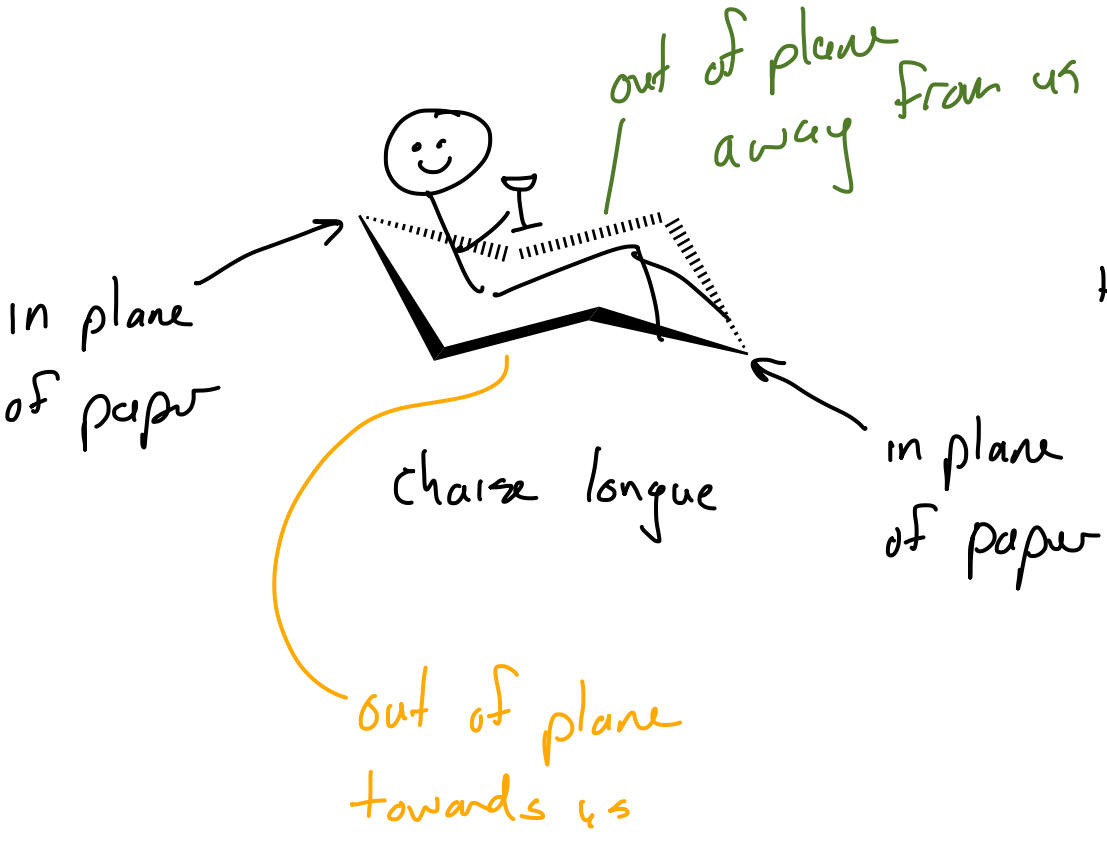


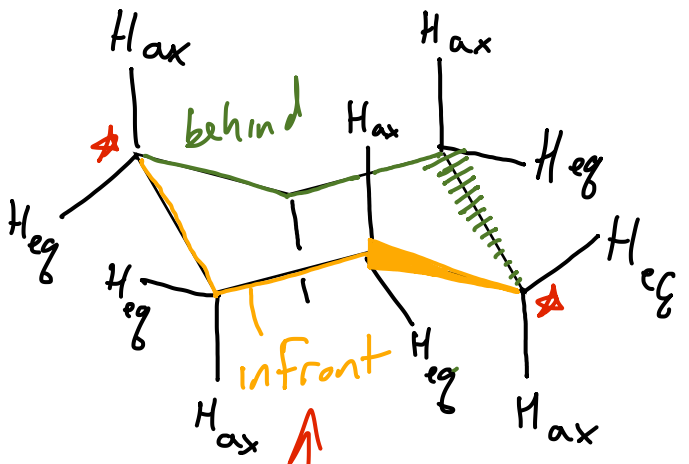
α-1,4 linkage



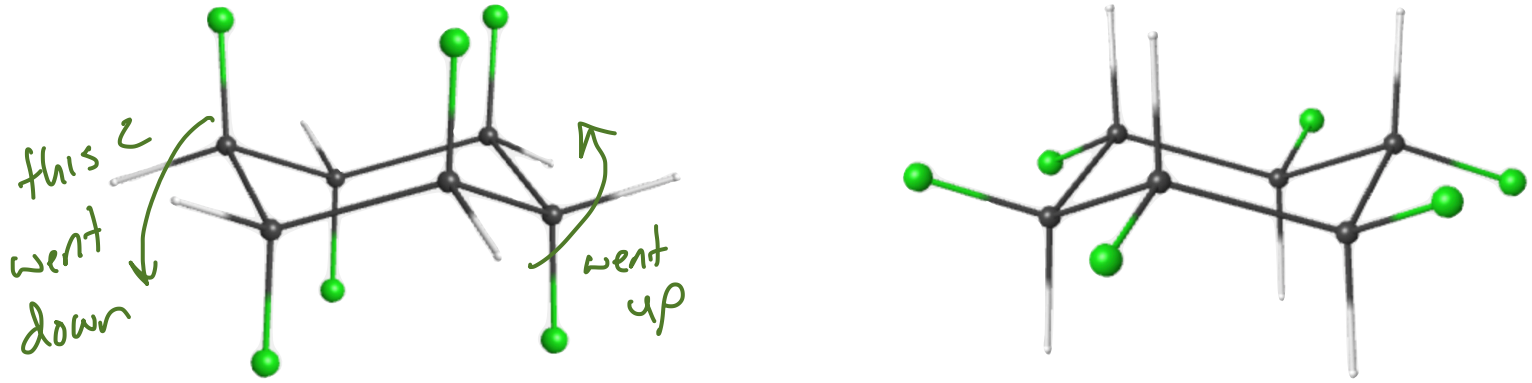
β-1,4 linkage

xhttps://www.westfield.ma.edu/cmasi/organic/cyclohexanes/cyclohexanes-plain.html





we draw it like this instead & remember that these two C atoms are in the plane of the screen/paper

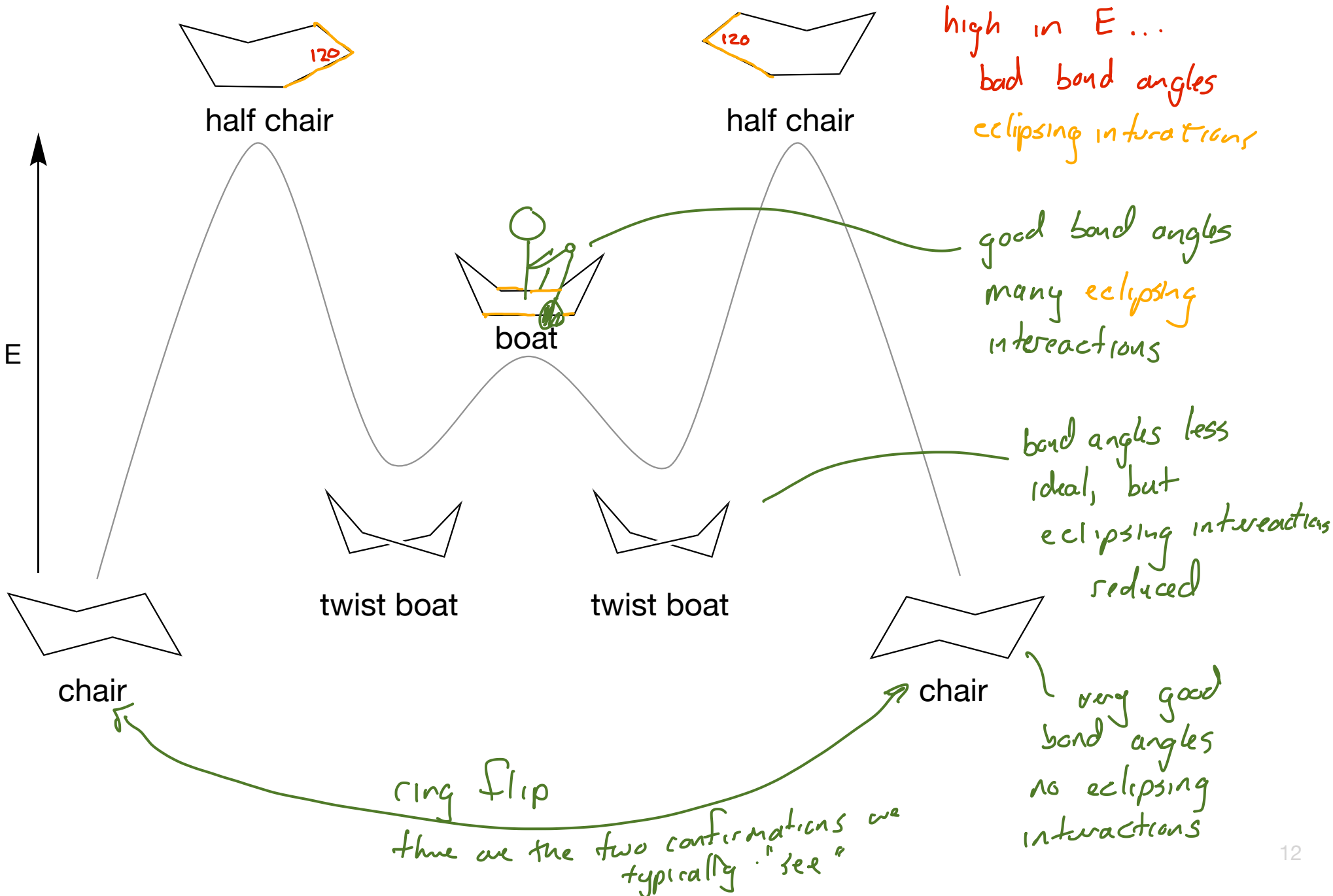


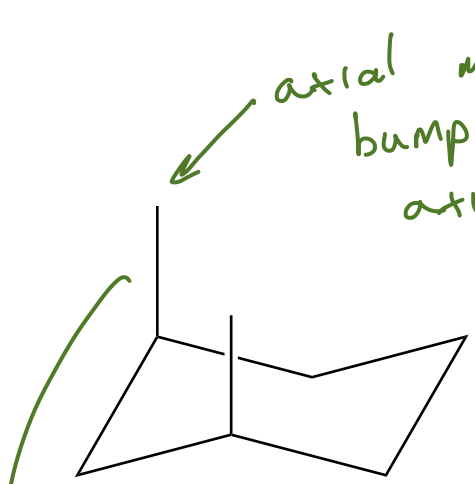
when the ring flips, the axial an equitorial positions change

https://www.westfield.ma.edu/cmasi/organic/cyclohexanes/cyclohexanes-plain.html

Conformations of Cyclohexane: summary

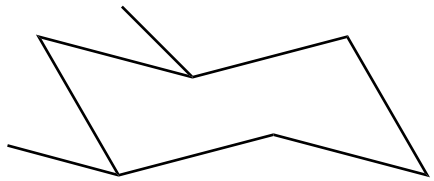
just like rotations of acyclic alkanes go through eclipsing structures, our rings do to





axial methyl groups bump into other axial groups

axial methyl groups have gauche interactions with ring



eq

equitorial positions have more room for substituents

no diaxial interactions

reduced gauche

https://www.westfield.ma.edu/cmasi/organic/cyclohexanes/sub_cyclohexanes-plain.html