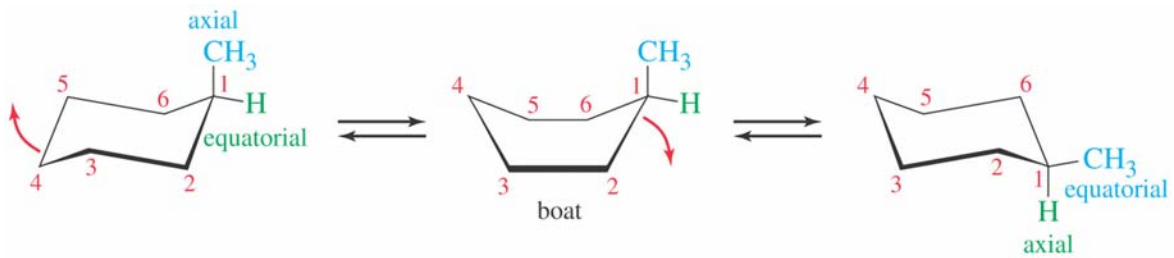
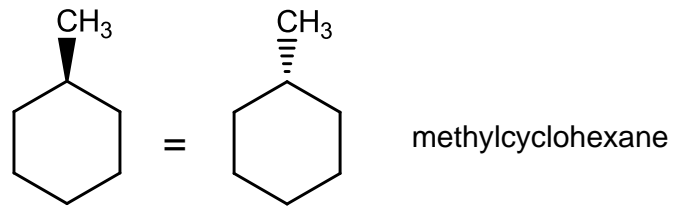


Substituted Cyclohexanes



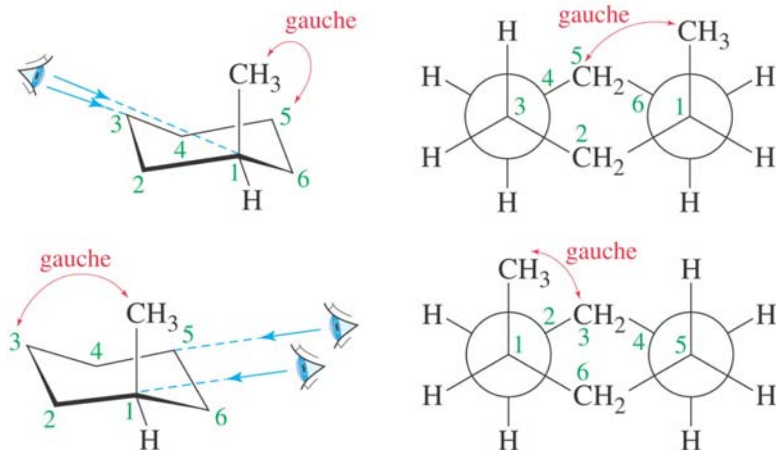
These two chair conformations are not identical.

Which is more stable?

Conformations of Methylcyclohexane

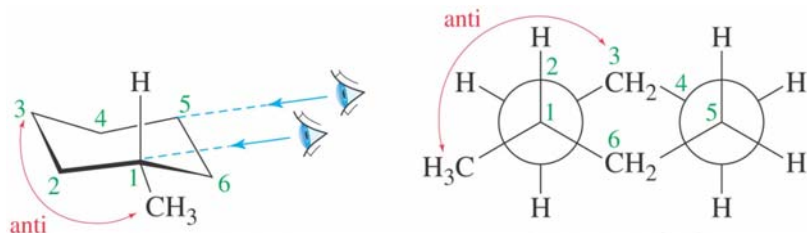
axial methyl

multiple gauche interactions between methyl and cyclohexane ring make this conformer **less** stable



equatorial methyl

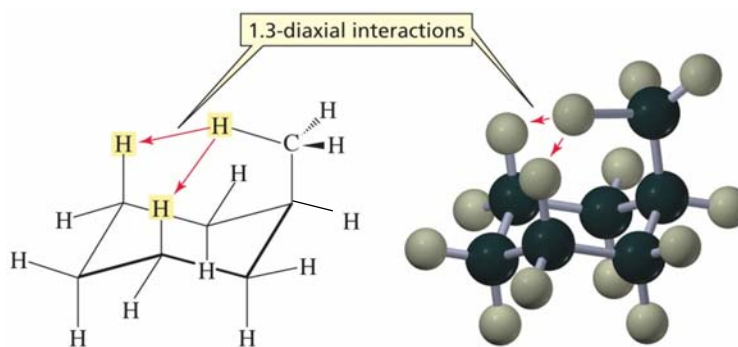
no adverse interactions; **more** stable



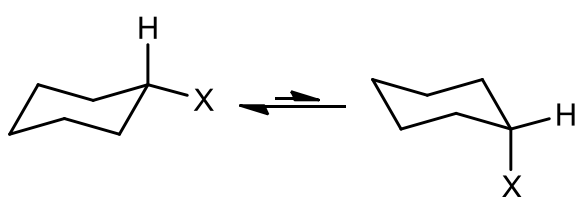
Substituted Cyclohexanes

Another effect: 1,3-diaxial interactions are *destabilizing*.

Conformer with equatorial substituent doesn't have this problem.



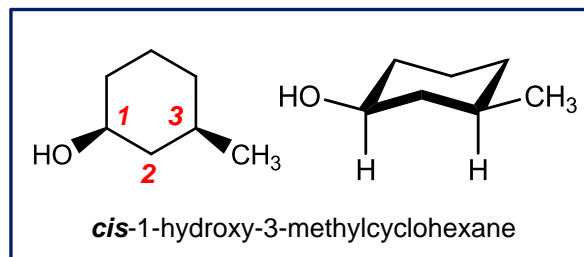
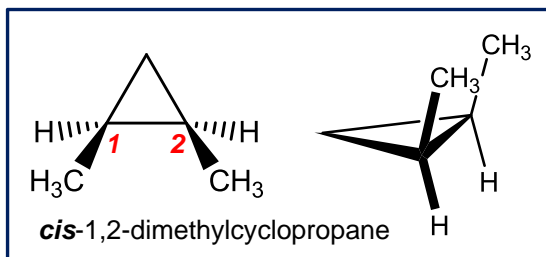
The larger the group, the bigger the preference.



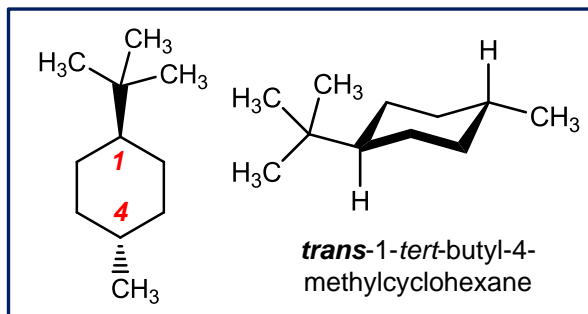
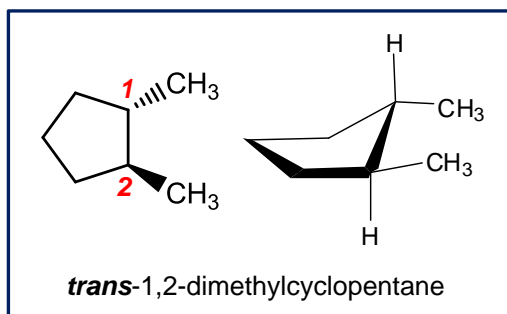
X	ΔG (kcal/mol)	[eq]/[ax]
-H	0	1
-F	0.2	1.5
-OH	1.0	5.4
-CH ₃	1.8	18
-C(CH ₃) ₃	5.4	4800

Naming Disubstituted Cycloalkanes

cis-substituted: Substituents on same side of ring.



trans-substituted: Substituents on opposite side of ring.



Multiply Substituted Cyclohexanes

Chair conformations flip to minimize total 1,3-diaxial interactions.

