

LUKE
WILSON

LOGAN
LERMAN

BRIE
LARSON

It's time to stand up for the little guys.



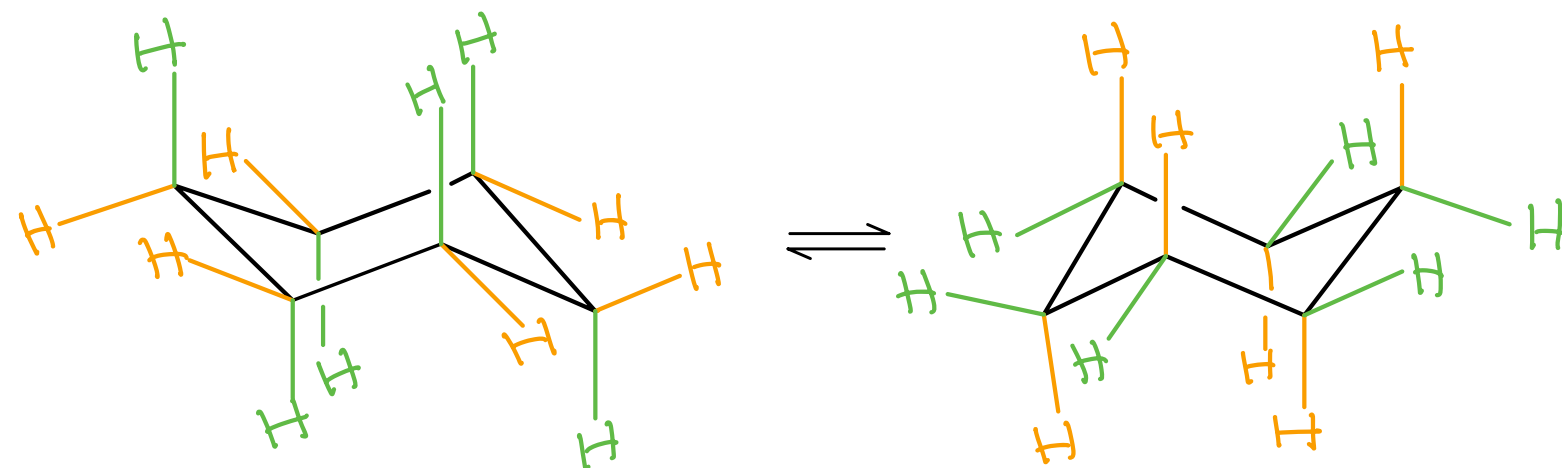
BASED ON THE BESTSELLING NOVEL

HOOT

NEW LINE CINEMA AND WALDEN MEDIA PRESENT A KENNEDY/MARSHALL COMPANY PRODUCTION "HOOT" LUKE WILSON LOGAN LERMAN BRIE LARSON TIM BLAKE NELSON
NEIL FLYNN AND ROBERT WAGNER CASTING BY AMANDA MACKAY CSA & CATHY SANDRICH GELFOND CSA MUSIC BY SAVANNAH JANE BUFFETT FEATURING JIMMY BUFFETT
ORIGINAL SCORE BY PHIL MARSHALL MICHAEL WILEY MACMANNALLY CO-PRODUCERS WIL SHRINER CARL HAASEN MARK KAUFMAN MICHAEL DISCO COSTUME DESIGNER CHRISTOPHER LAWRENCE
EDITED BY ALAN EDWARD BELL PRODUCTION DESIGNER STEPHEN LINEWEAVER DIRECTOR OF PHOTOGRAPHY MICHAEL CHAPMAN ASC EXECUTIVE PRODUCERS TOBY EMMERICH KEVIN REIDY GREGG TAYLOR
SOUNDTRACK AVAILABLE ON MALLBOAT RECORDS PRODUCED BY FRANK MARSHALL JIMMY BUFFETT BASED ON THE NOVEL BY CARL HAASEN SCREENPLAY BY WIL SHRINER DIRECTED BY WIL SHRINER
PG PARENTAL GUIDANCE SUGGESTED
SOME MATERIAL MAY NOT BE SUITABLE FOR CHILDREN
MILD BULLYING AND BRIEF LANGUAGE
WWW.HOOTMOVIE.COM
COMING SOON
WALDEN MEDIA
NEW LINE CINEMA



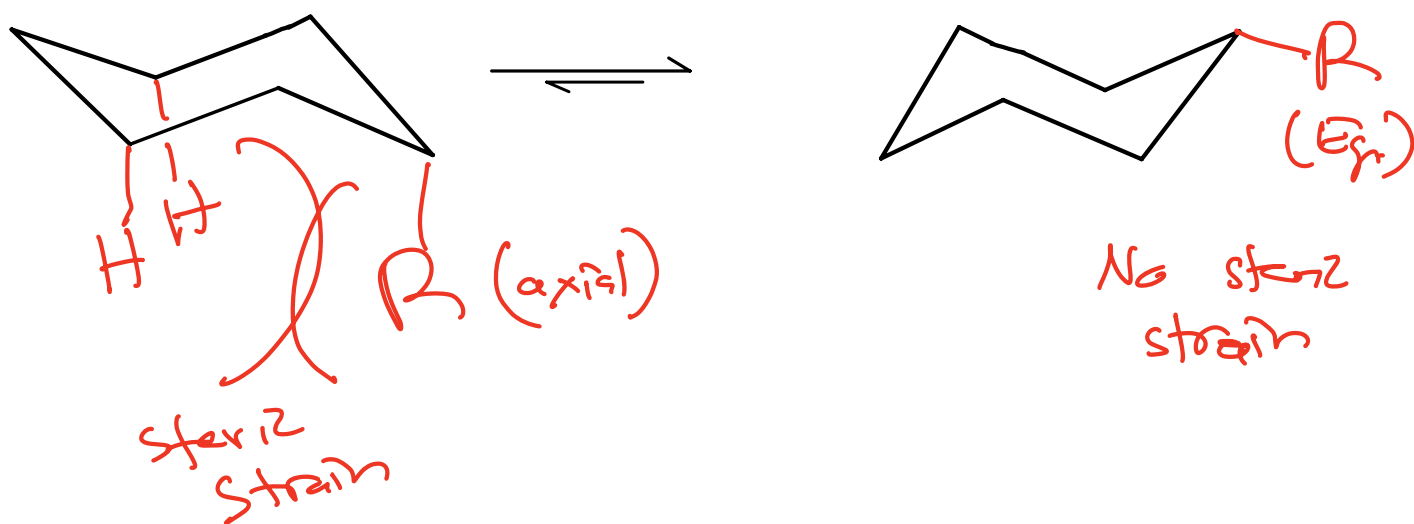
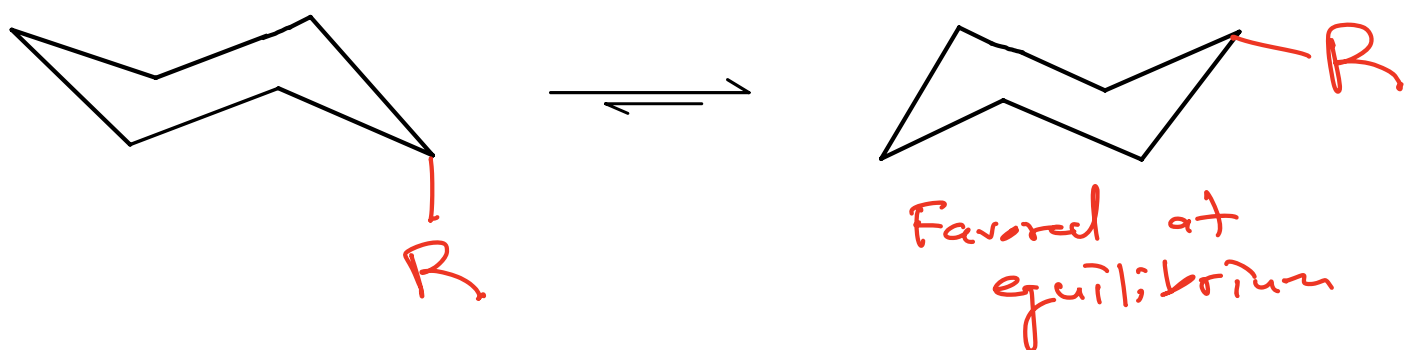
The cyclohexane chair can "flip"
at room temperature



When the chair flips the axial H atoms
become equatorial and the equatorial H atoms
become axial

As chairs flip, they go through a
"boat-like" intermediate conformation

In a cyclohexane chair conformation, any group larger than an H atom will prefer to be equatorial to avoid steric strain ("crunching") → the larger the group (R), the greater the preference for being equatorial

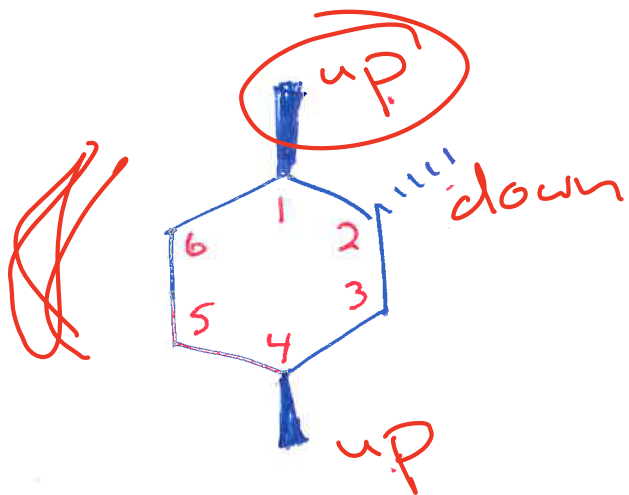


Drawing cyclohexane chairs all of the time can be difficult → so we draw different versions to describe the structures

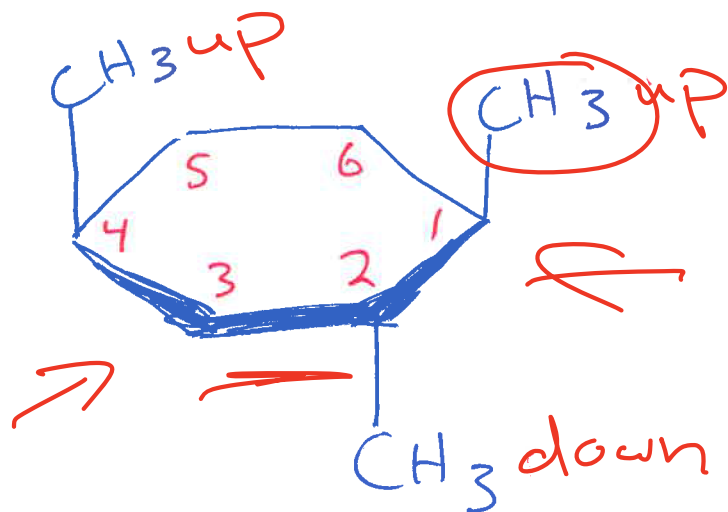
↳ "Flat"
↳ "Haworth Projections"

⇒ You will need to be able to convert between flat, Haworth and chairs for cyclohexanes

To do this conversion, remember:
"Up is up and down is down"



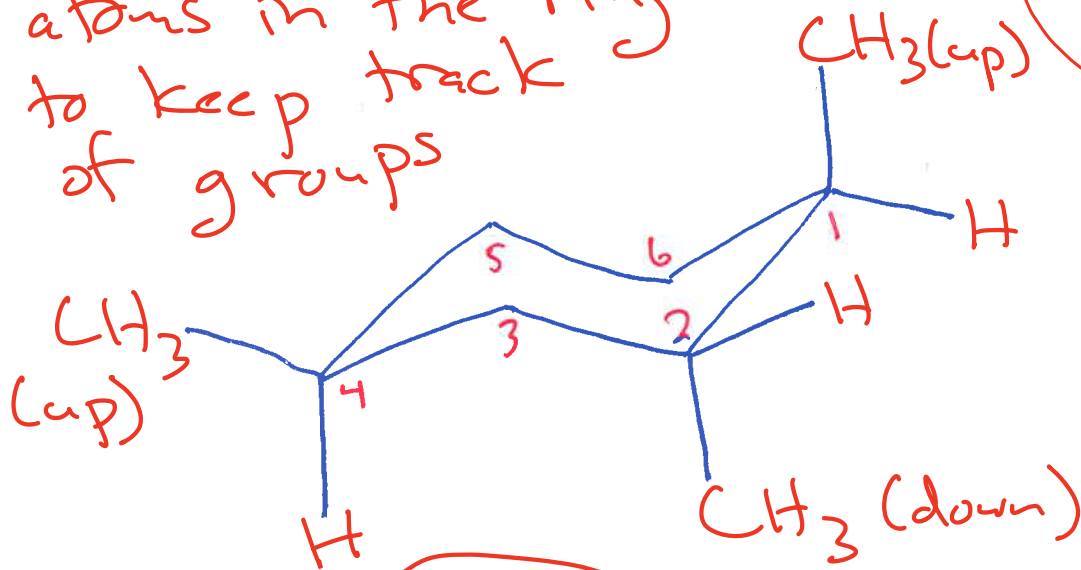
Drawn Flat



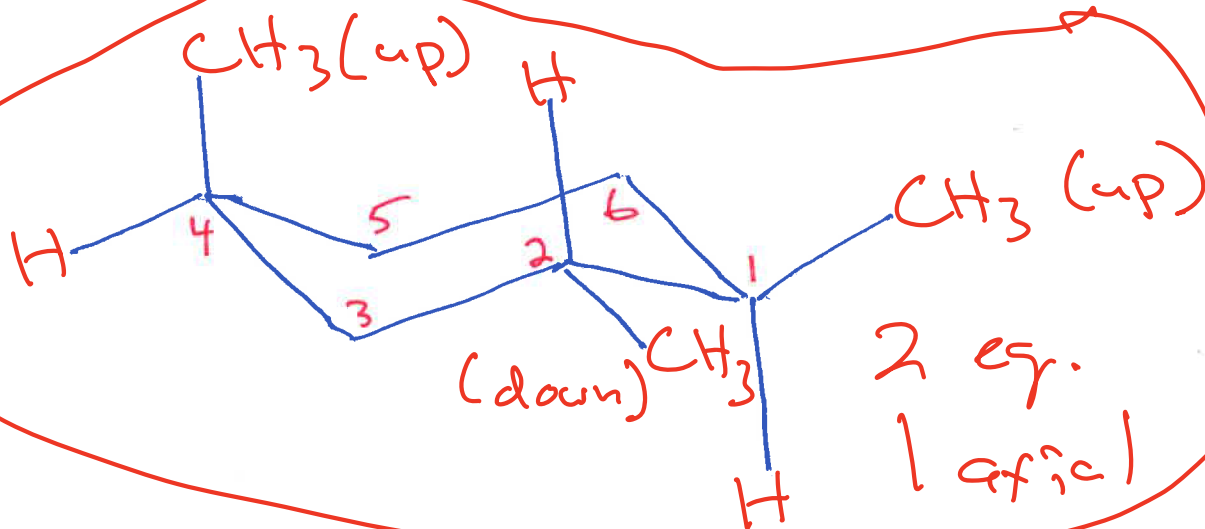
Haworth Projection

Pro tip: Always number the carbon atoms in the ring to keep track of groups

⇒ Number consistently so clockwise stays clockwise



2 axial
1 eq.



2 eq.
1 axial

The lower structure is more stable than the upper structure

Upper Structure $\rightarrow$ 2 axial and 1 equatorial methyl group

More axial
so more
steric strain



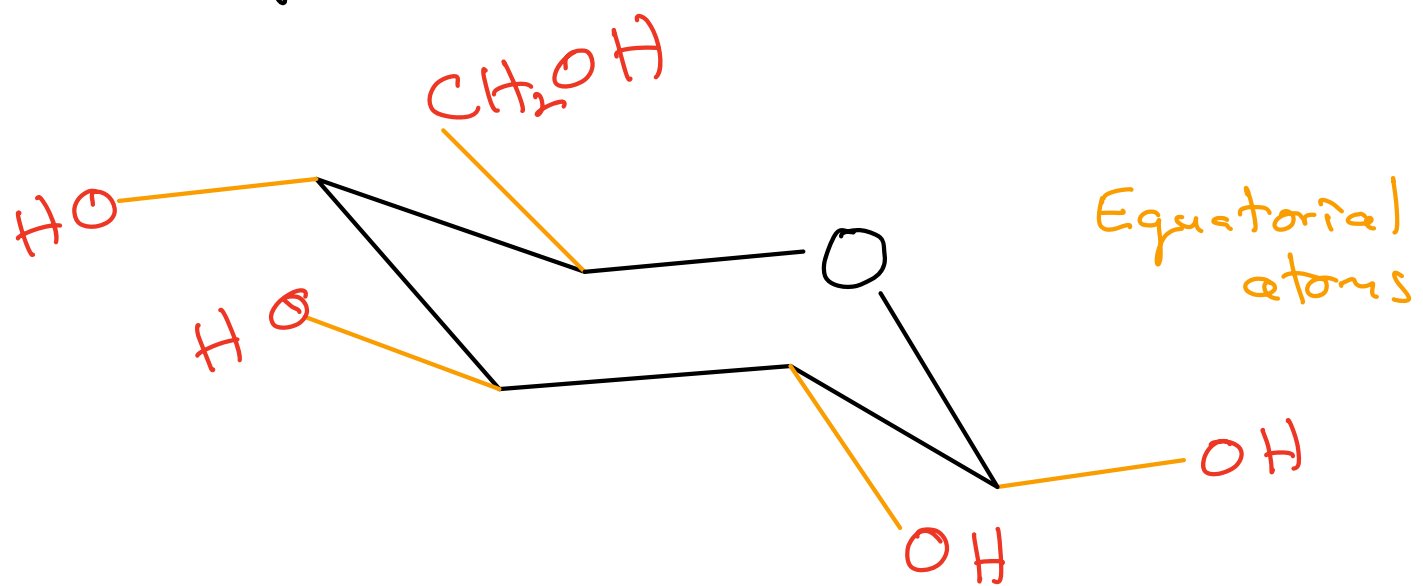
Lower Structure $\rightarrow$ 1 axial and 2 equatorial methyl group

Less steric
strain
so more
stable



Why do we care so much about chairs anyway?

Most common molecule in the biosphere:

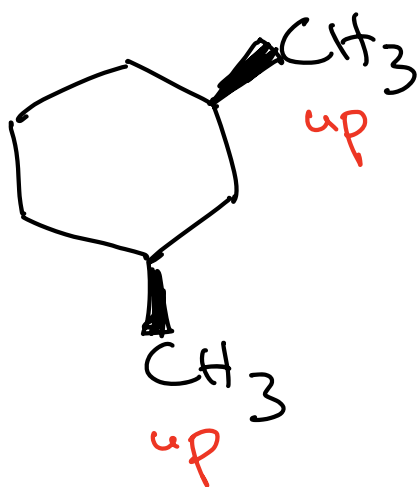


β -D-Glucose

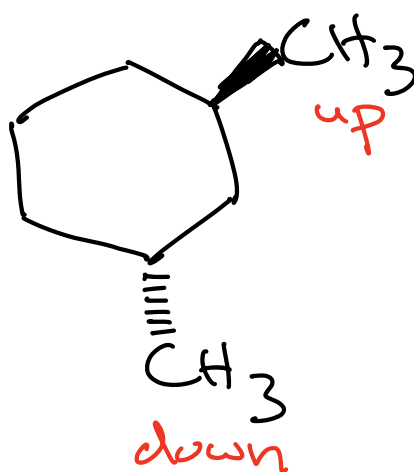
Stable because all of the groups are equatorial!!



Stereoisomers →
two molecules with
the same connectivity
of atoms, but
different orientations
of groups in
three-dimensional
space

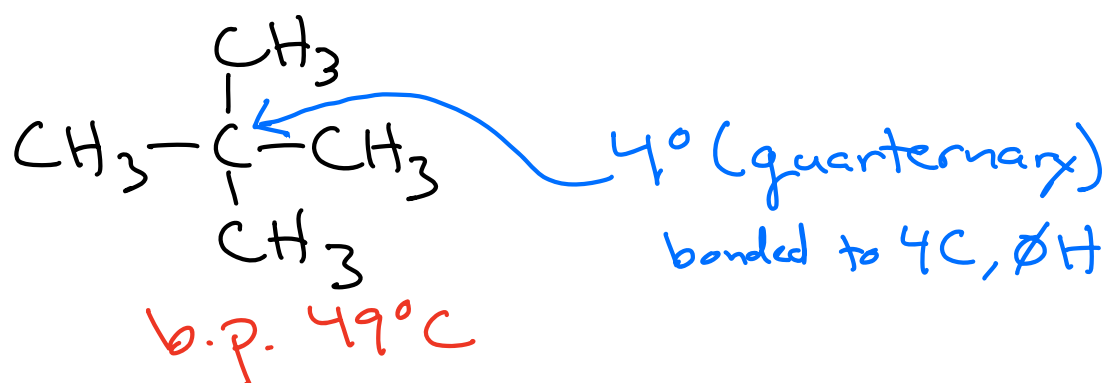
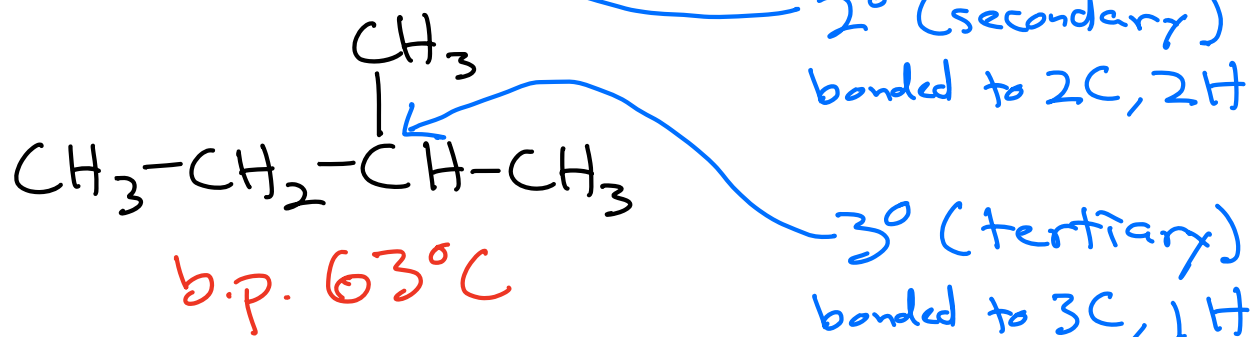
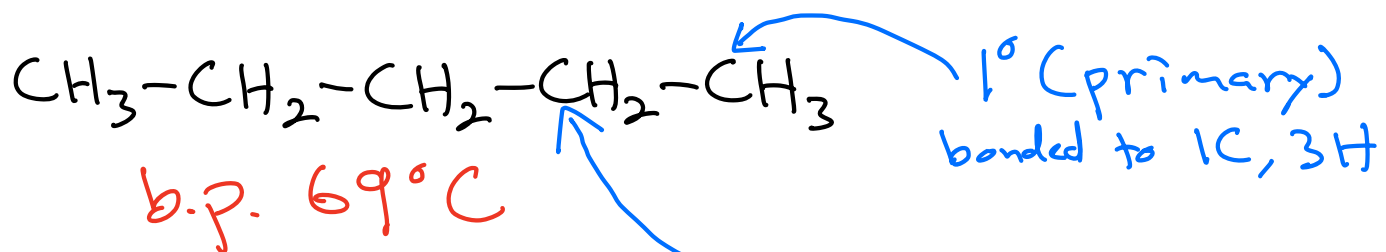


cis
"Same
Side"



trans
"opposite side"

Classification of carbon atoms

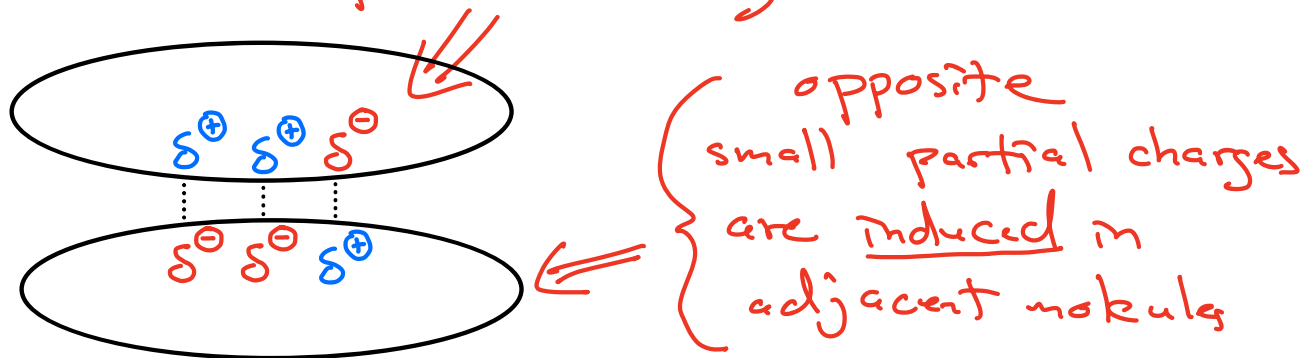


Boiling points (b.p.) of alkanes $\rightarrow$ More surface area of contact between molecules increases boiling point

$\rightarrow$ Branching of alkanes decreases boiling points by decreasing surface area of contact

Reason $\rightarrow$ Dispersion forces $\rightarrow$ attraction between temporary partial charges on adjacent molecules

Dispersion forces $\rightarrow$ molecules have small, fluctuating and temporary partial charges



These opposite small partial charges on adjacent molecules attract each other $\Rightarrow$ enough to provide small attraction between molecules that is proportional to the surface area of contact between molecules

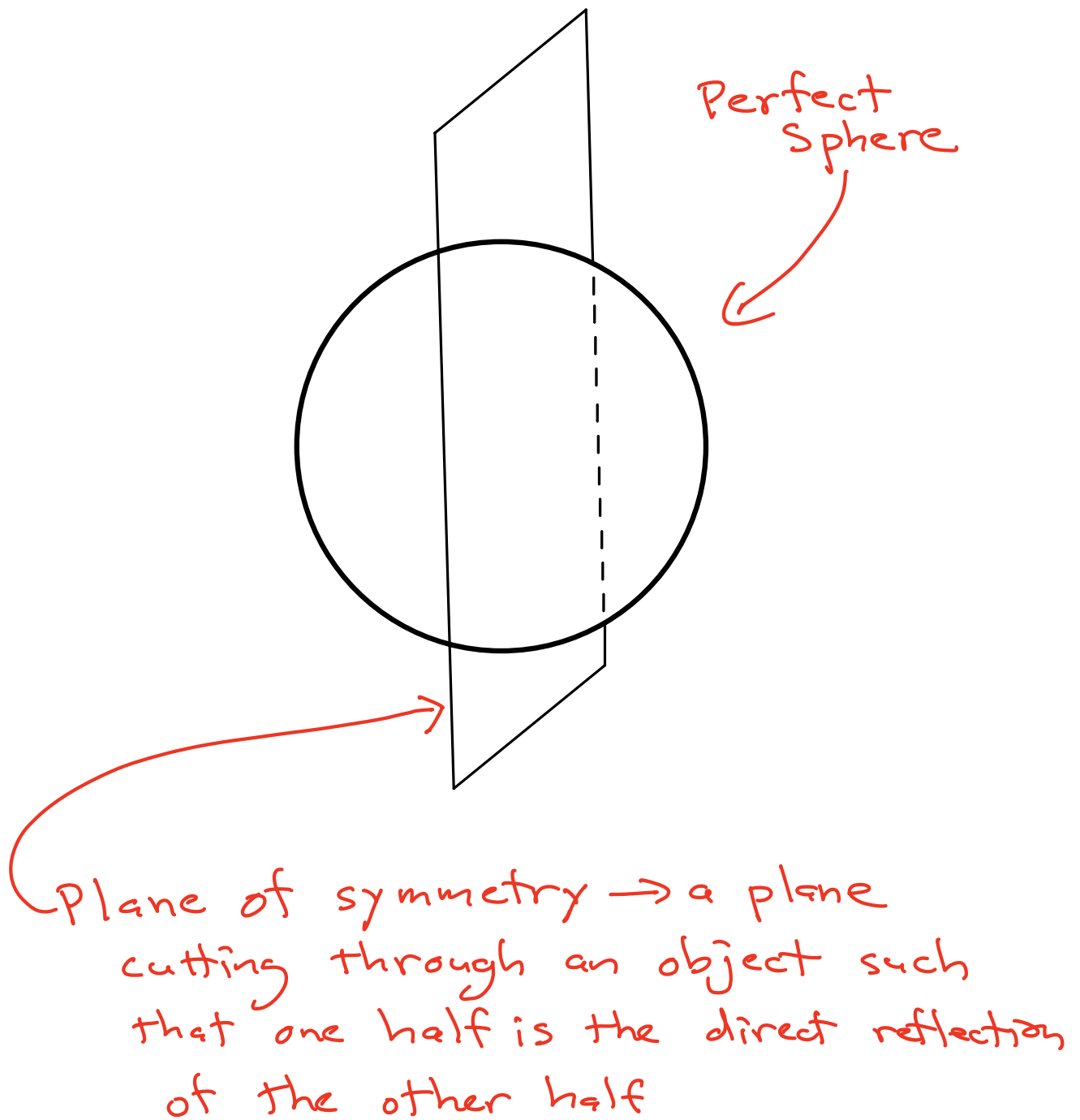
Stereochemistry

Chiral Object

Chiral Molecule

1) Not identical to its mirror image

2) Does not contain a symmetry element such as a plane of symmetry or a point of symmetry



Stereoisomers $\longrightarrow$ molecules with the same connectivity of atoms, but different orientations of groups in three-dimensional space

enantiomers

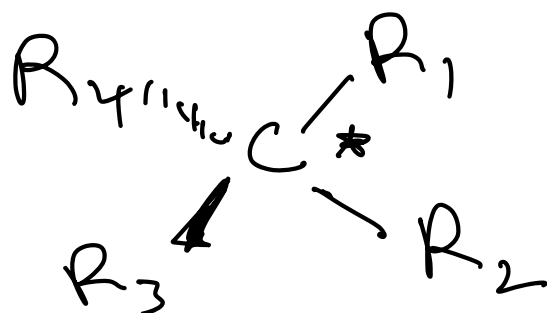


(Stereoisomers that are mirror images of each other but not identical)

diastereomers



stereoisomers that are NOT enantiomers

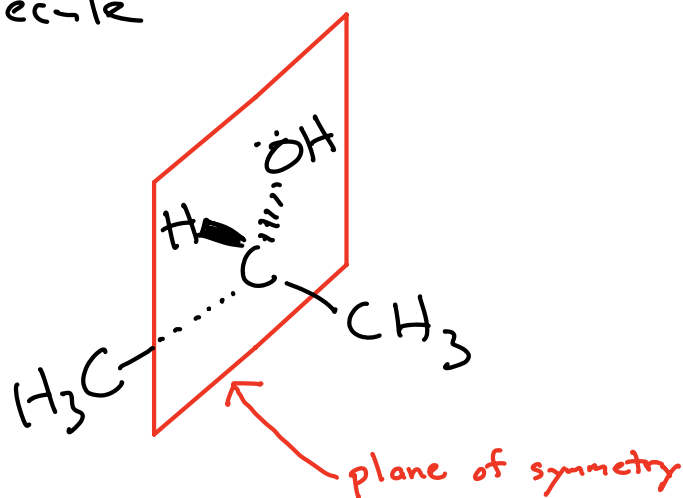


Not superimposable on its mirror images

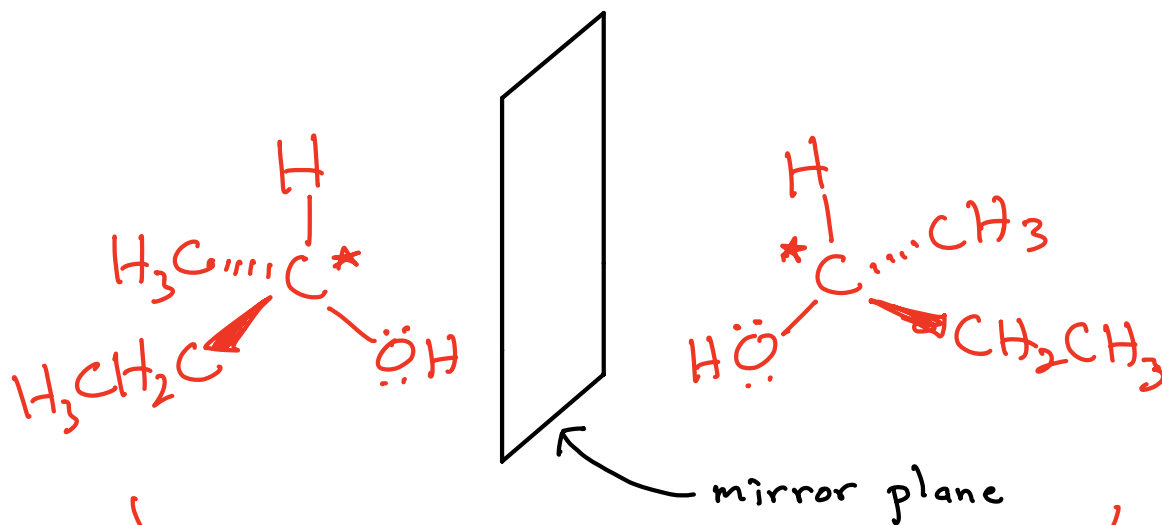
An sp^3 carbon atom that is tetrahedral with four different groups $\rightarrow$ it is chiral

$\Rightarrow$ Called a chiral center

A chiral object/molecule does NOT have a plane of symmetry $\rightarrow$ If a plane of symmetry is present the object/molecule is NOT chiral



A carbon atom that is not chiral will have a plane of symmetry

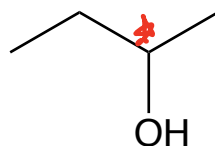
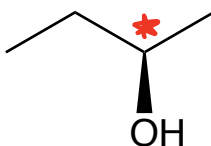
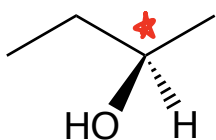


A pair of enantiomers



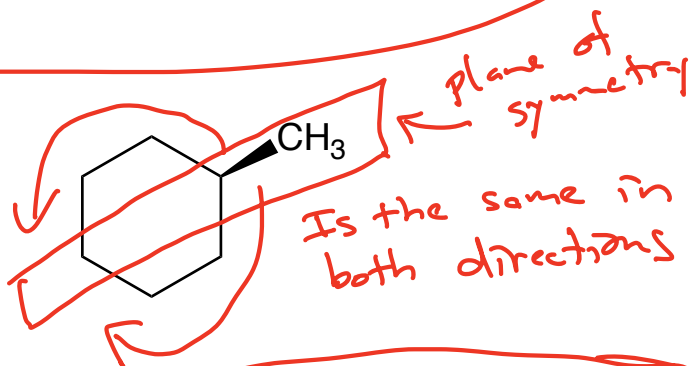
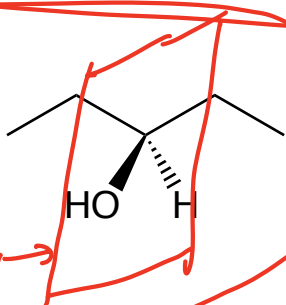
You need to be able to identify chiral centers in complex molecules $\rightarrow$ 4 different groups on an sp^3 carbon atom
Rings $\rightarrow$ track each direction for sp^3 carbon atoms in a ring to look for differences

Chiral

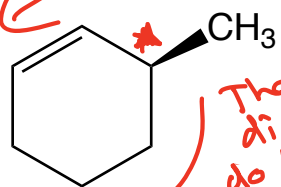


Not Chiral

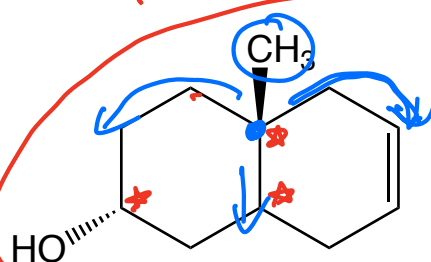
plane of symmetry $\rightarrow$



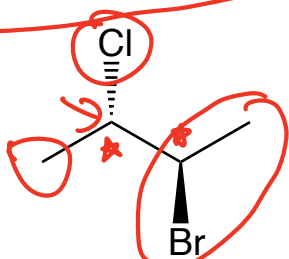
Chiral



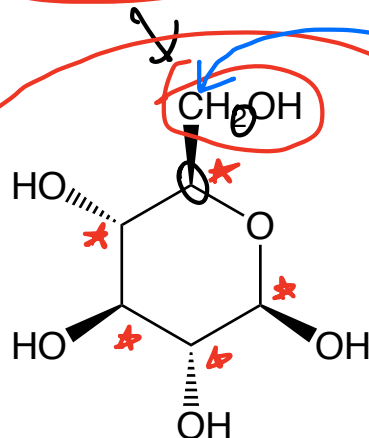
The two directions do NOT match



3 chiral centers
Chiral



Chiral



This carbon is not chiral (2 H's)

5 chiral centers!
Chiral