Skip:

4.16

4.17

Note that 4.18 is SODAR.

Read 4.19; but won't be tested on it until after Chapter 9.

chapter 5 - Stereochemistry
chemistry in 3D.

Biological significance

* all but one of the 20 essential amino acids are "left-handed" — your body can't use a "right handed" one!

* DNA is chiral

* many drugs are chiral.

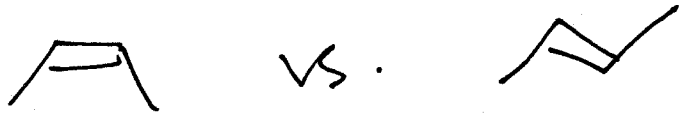
* enzyme rens — "lock + key"

* everyday objects are chiral

Isomers -

1. constitutional isomers - same mol. formula
different connectivity

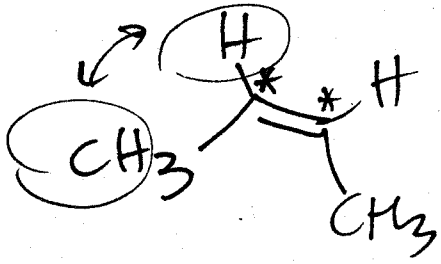
2. stereoisomers - same formula, same connectivity, different 3D arrangement.



cis trans

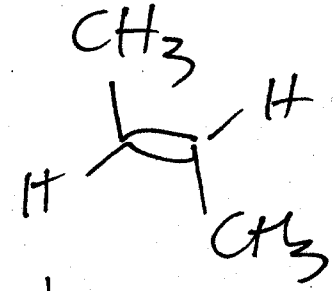
* stereoisomers cannot be interconverted by simple bond rotation. (NOT conformers)

a. stereogenic center - an atom bearing groups such that switching two groups produces a stereoisomer



swap the CH_3 for the H

get



cis

trans

comparisons

Types of stereoisomers

b. enantiomers - nonsuperimposable mirror images

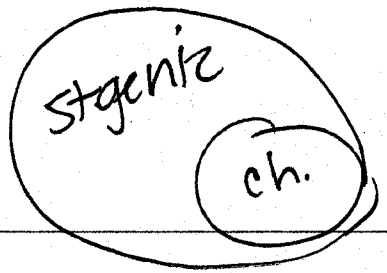
c. diastereomers - nonsuperimposable not mirror images

(cis/trans)

A chiral molecule is defined as one that is not superimposable on its mirror image.

This is a property of an individual thing.

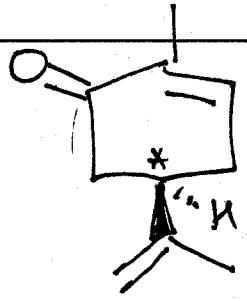
A chirality center – a tetrahedral atom w/ 4 different groups attached.



* if a molecule contains only one chirality center it will have an enantiomer.

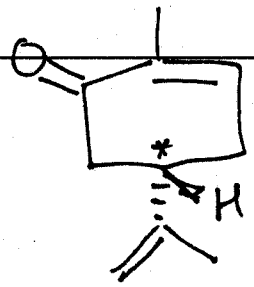
* if a molecule contains >1 chirality centers, now both enantiomers + diastereomers are possible.

carvone



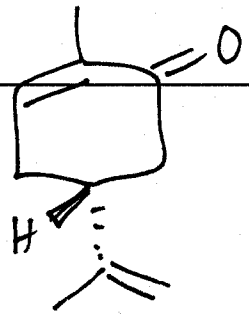
(R)

spearmint



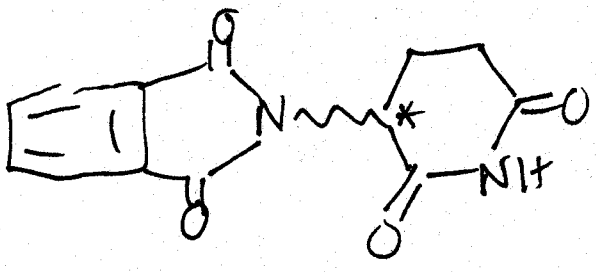
(S)

caraway



mirror image of (S)

Thalidomide



organically produced as a pair (mix) of enantiomers:

enant. A. treatment for morning sickness

enant. B. caused major birth defects.