(23) **Today**

Sections 5.1 – 5.5
Chirality and Determining the Configuration of Chiral Centers, Enatiomers, Diastereomers, and Meso Complexes

Next Class (24)

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

(25) **Second Class from Today**

Chap 6

Third Class from Today (26)

Chap 6

Definitions

front-back mirror – in & out changes top-bottom left-right don't

top-bottom mirror – top & bottom change everything else stays

left-right mirror – switches left & right

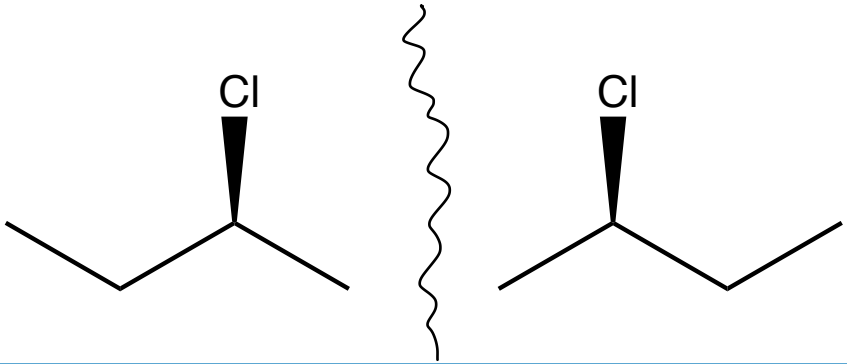
stereoisomers are molecules that have the same connectivity but different 3-D relationships between parts of the molecules

e.g. (*R*)-2-chlorobutane vs (*S*)-2-chlorobutane

The word **enantiomer** describes the relationship between two stereoisomers.

enantiomers are stereoisomers that are nonsuperposable mirror images of each other and an object must be chiral to have an enantiomer

e.g. (*S*)-2-chlorobutane vs (*R*)-2-chlorobutane



left-right mirror

Definitions

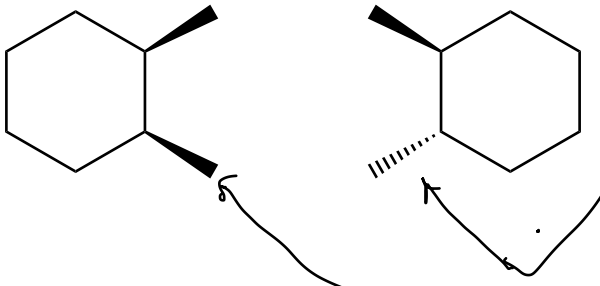
stereoisomers are molecules that have the same connectivity but different 3-D relationships between parts of the molecules

e.g. (*cis*)-1,2-dimethylcyclohexane vs (*trans*)-1,2-dimethylcyclohexane

The word **diastereomer** describes the relationship between two stereoisomers.

Diastereomers are stereoisomers that are nonsuperposable but are **NOT** mirror images of each other

kinda, sorta.. looks like a left right mirror, but its not.



this is behind the screen whereas it is in front of the screen here.

A mirror cannot change front-back & left-right.

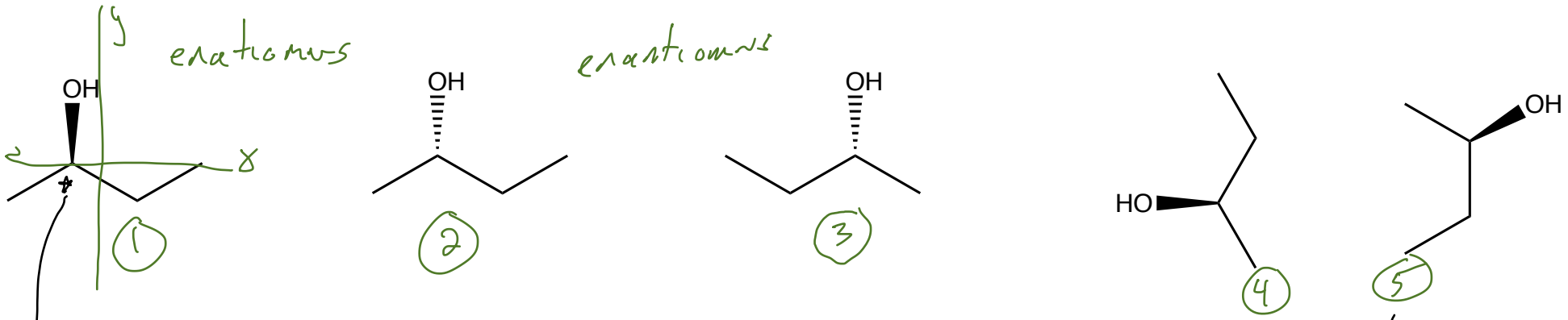
Enatiomers have the same physical properties. Same melting points, same boiling points, same solubilities.

Enatiomers, interact with polarized light differently, and with other chiral molecules differently.

Diastereomers have different BP, MP, and solubilities.

What's the Relationship?

Section 5.1 – 5.5



enantiomers

enantiomers

chiral C atom ... a molecule with one chirality center is a chiral molecule.

Cannot find a mirror plane within the molecule. = chiral

1 + 2 front back mirror? Do left + right stay the same? ✓ yes } enantiomers
Do top + bottom stay the same? yes

2 + 3 left-right mirror? yes enantiomers

1 + 3 are the same molecule. 3 is just 1 rotated 180° on the y axis

4 + 5 are also 1

Assign Priorities

highest priority is given to the group with the highest atomic number for the atom directly bonded to the chirality

in a tie, consider the atomic numbers of the atoms attached to the atom that is bonded to the chirality center

if the atom that is attached to the chirality center has a doubly bonded or triply bonded atom attached to it the atom is treated like there are two or three atoms

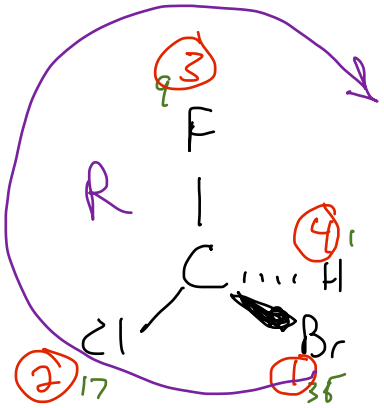
for isotopes, the mass number is used (D vs H, 12C vs 13C)

Point lowest priority group away

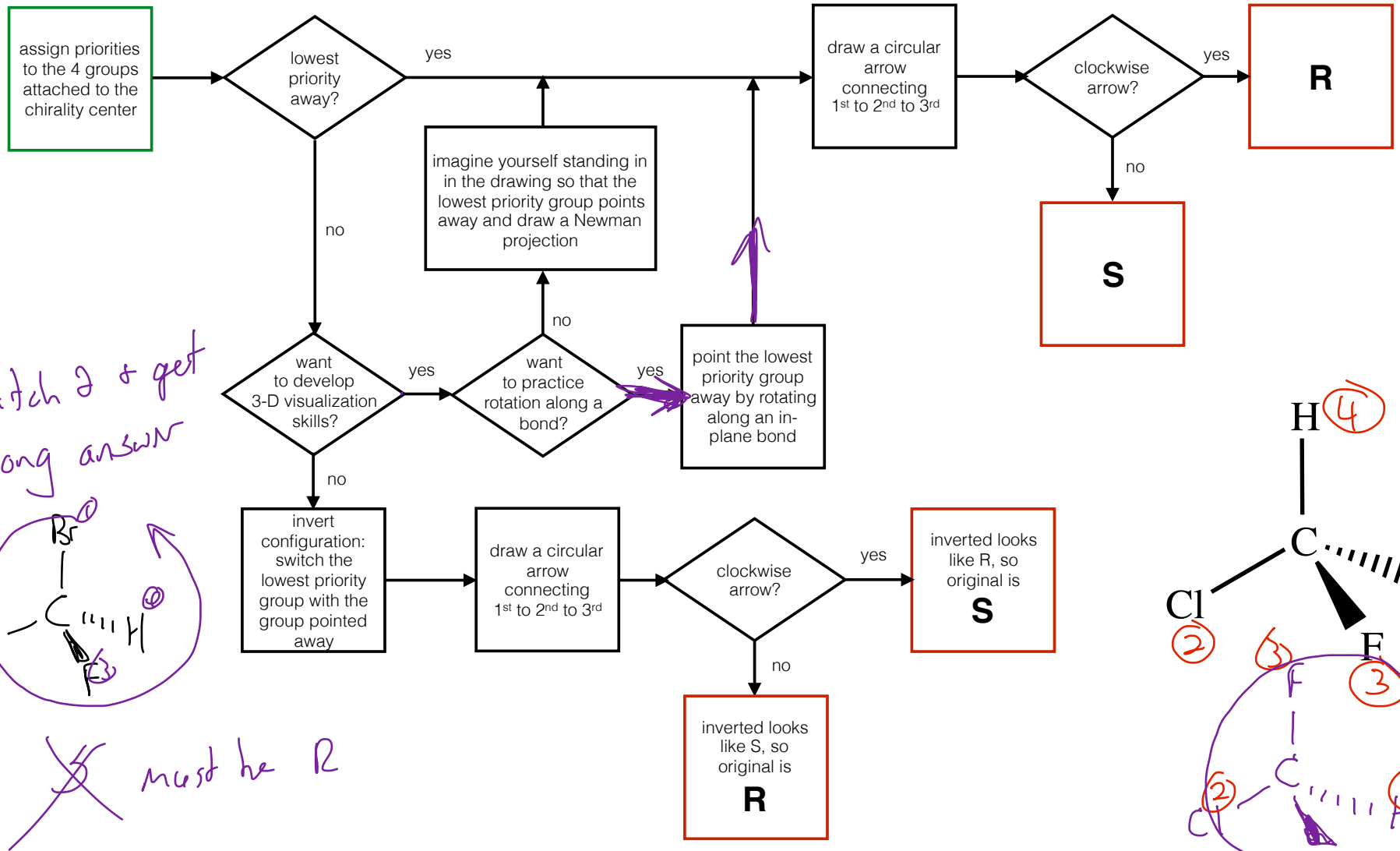
Draw a circle from 1st to 2nd to 3rd priority groups

Clockwise circle is **R** configuration

Counter Clockwise circle is **S** configuration



Determining Configuration (*R* vs *S*)



switch 2 & get wrong answer

must be R

Practice determining the configuration of centers of chirality Section 5.1 – 5.5

Priorities are based on the atomic number of the atoms bonded to the chiral center.

Highest atomic number is 1st place to lowest atomic number in 4th place

In a tie, go one bond further out.