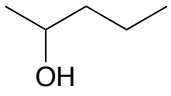
Chemistry 2551 Models Lab (20 pts)

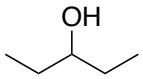
9/23/2022

Name:_____ **Lab Day/Time**:_____

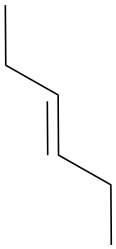
1. Build the following molecular models and compare with three friends by superimposing the models:



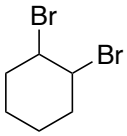
Name of Friend:	Superimpose?
_____	Yes No
_____	Yes No
_____	Yes No



Name of Friend:	Superimpose?
_____	Yes No
_____	Yes No
_____	Yes No

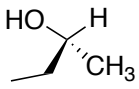


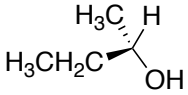
Name of Friend:	Superimpose?
_____	Yes No
_____	Yes No
_____	Yes No



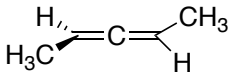
Name of Friend:	Superimpose?
_____	Yes No
_____	Yes No
_____	Yes No

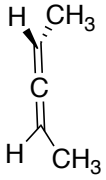
2. Build the following molecular models and compare. Are they identical, diastereomers, or enantiomers?



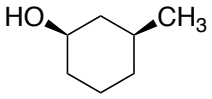


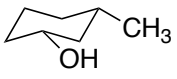
identical diastereomers enantiomers



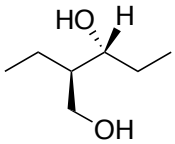


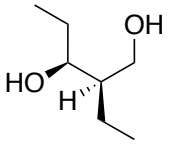
identical diastereomers enantiomers





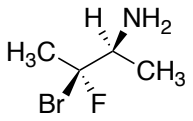
identical diastereomers enantiomers



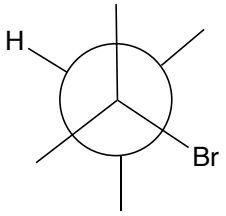


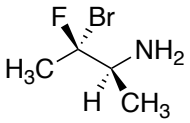
identical diastereomers enantiomers

3. Build a model of the following: Compound A, named: (2*S*,3*S*)-3-bromo-3-fluorobutane-2-amine).
Put it in the conformation and orientation shown
Complete the Newman projection for Comformation 1 with the appropriate groups
Rotate the bonds of the molecule (aka. change the conformation) to fit conformation 2.
Complete the Newman projection for Comformation 2 with the appropriate groups

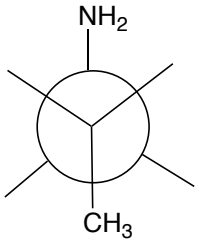


Compound A, Conformation 1

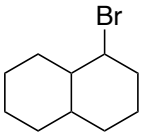




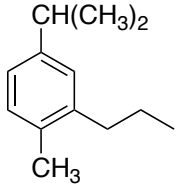
Compound A, Conformation 2



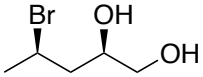
4. How many **tetrahedral stereocenters** in each of the molecules below? Also, how many stereoisomers (2^n rule) are possible for the compounds? Making models may help in a few of the cases.



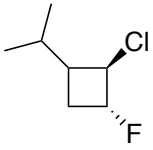
stereocenters_____ stereoisomers_____



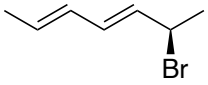
stereocenters_____ stereoisomers_____



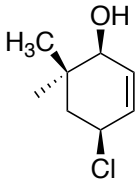
stereocenters_____ stereoisomers_____



stereocenters_____ stereoisomers_____

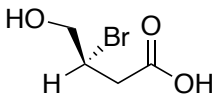


Review these 2 with your instructor or TA before proceeding

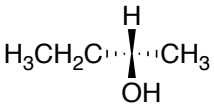


stereocenters_____ stereoisomers_____

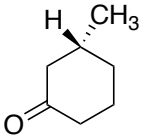
5. Assign the priorities to each of the groups attached to the chiral centers drawn



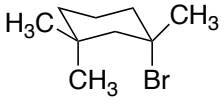
Compound 5a



Compound 5b



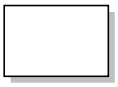
Compound 5c



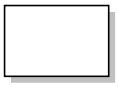
Compound 5d

6. Make models of each of the stuctures above. Using them, redraw the structures below so the 4th priority group is furthest from you.

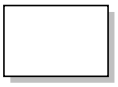
7. Assign the absolute stereochemistry to each of the compounds (i.e. write *R* or *S* in the boxes below)



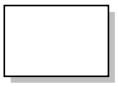
Compound 5a



Compound 5b



Compound 5c

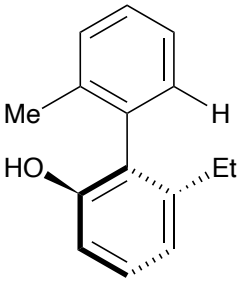


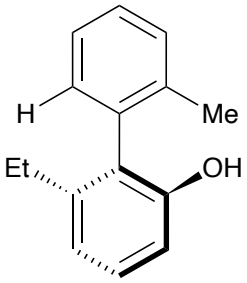
Compound 5d

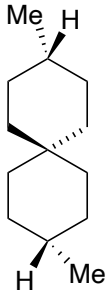
8. Draw the stucture **(3*S*,5*S*)-5-bromo-3-methyloctane** below. Use models to check your assignment of the absolute stereochemistry then draw the compound a second time in a different conformation.

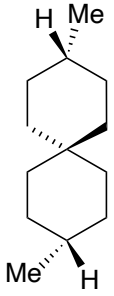
If time allows, complete the following exercises

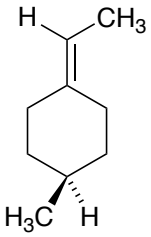
9. With a friend or friends, build models of the following compounds and convince each other that the pairs are nonsuperimposable mirror images of each other and therefore enantiomers.

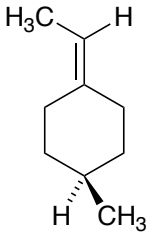


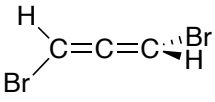


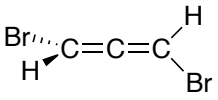




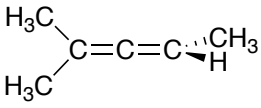


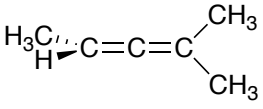


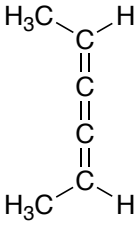


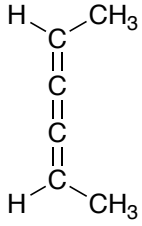


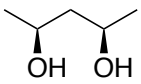
10. With a friend, build models of the following compounds and convince each other that the pair is identical.

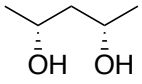


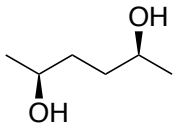


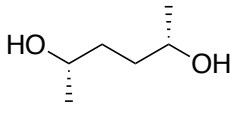












11. Circle the one compound on this page that is a meso compound.