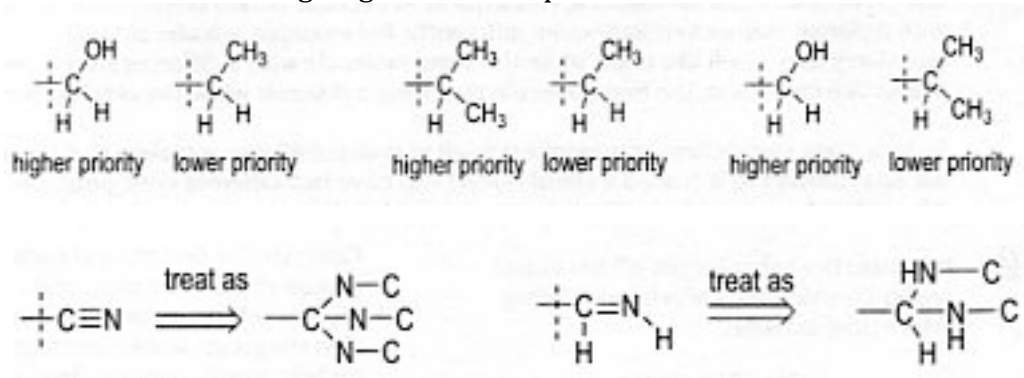
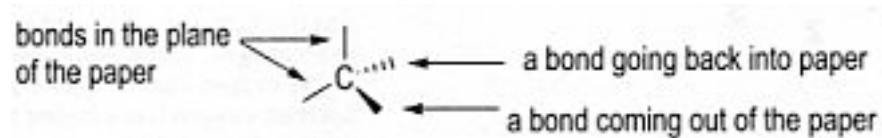


## ORGO/BIO CHAPTER 6 HW

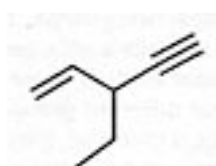
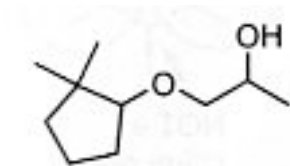
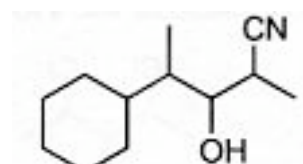
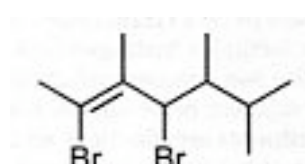
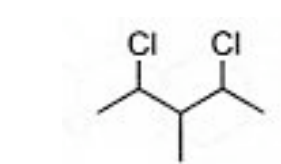
Reminders about assigning substituent priorities:



And remember how to draw molecules in 3D:



1. Denote each of the chiral centers in the following molecules with a star:



CH<sub>4</sub>

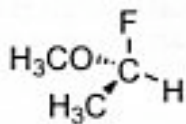
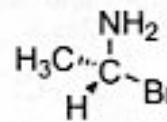
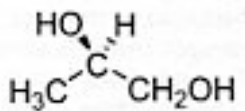
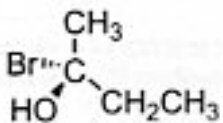
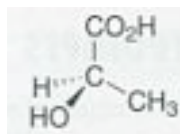
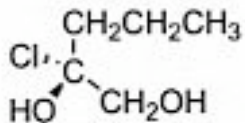
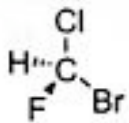
CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CHOHCH<sub>3</sub>

CH<sub>3</sub>CH<sub>3</sub>

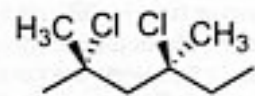
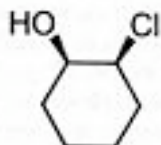
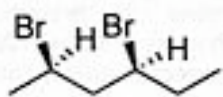


06.27.08  
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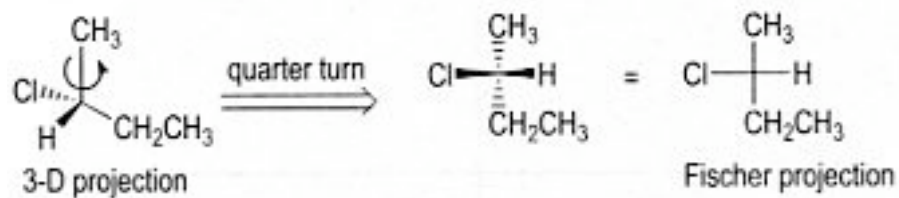
2. Assign the chiral center in the following molecules as either *R* or *S*.



3. Identify any chiral center(s) in the following molecules, and then label each chiral center as *R* or *S*.

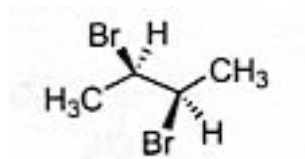
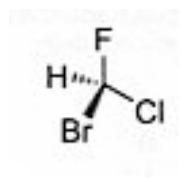
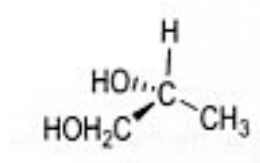


Here's another way to envision how Fischer projections are made from 3D depictions:

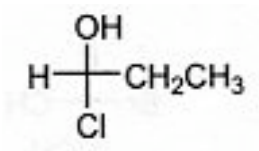
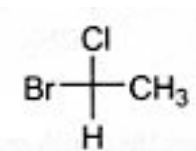
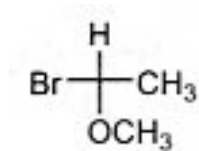


(HINT: It's much easier if you have a model of the molecule to literally hold in your hand!)

4. Convert the following molecules into their Fischer projections.



5. Assign *R* or *S* stereochemistry to each chiral center in the following Fischer projections.



Now it's time to deal with enantiomers, diastereomers, meso compounds, identical compounds, and the like....

Quick recap of some funky vocabulary:

**Stereoisomers:** Molecules with the same formula (this accounts for the *-isomer* part of the word) but different arrangements of their atoms in space. Stereoisomers consist of enantiomers (optical isomers) and diastereomers.

**Chirality:** The word chiral refers to any object that cannot be directly superimposed on its mirror image. Chirality can be thought of in terms of "handedness" because chiral molecules are asymmetric in the same way that each of your hands is. A *chiral* molecule has no plane of symmetry, which renders it nonsuperimposable on its mirror image. A molecule with a plane of symmetry is said to be *achiral*. Achiral molecules will always have superimposable mirror images.

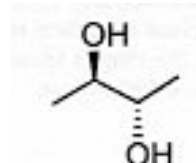
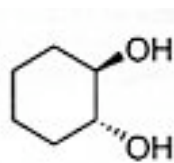
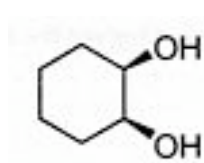
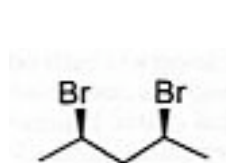
**Enantiomers:** Stereoisomers that are chiral. If a molecule is chiral, then it's not superimposable on its enantiomer. One of the physical characteristics of enantiomers (chiral molecules) is that they are "optically active" (they rotate, or bend, light differently). If the light is rotated to the left (counterclockwise), the enantiomer is said to be *levorotatory*. A rotation to the right (clockwise) is called *dextrorotatory*.

**Diastereomer:** Stereoisomers of the same molecule that are *not* mirror images of one another. This is a common occurrence when molecules have more than one stereocenter (or chiral center, typically an asymmetric carbon atom, which is a carbon atom with four different groups bonded to it). If a molecule has only one stereocenter, it is always a chiral molecule.

**Meso Compounds:** Compounds that contain two or more stereocenters (chiral centers) but also contain a plane of symmetry are referred to as meso compounds. Meso compounds are achiral!

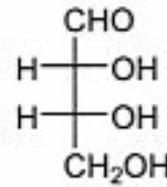
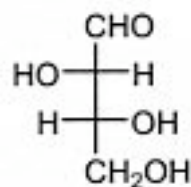
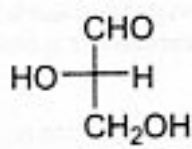
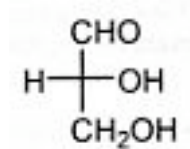
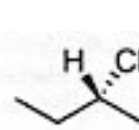
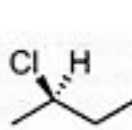
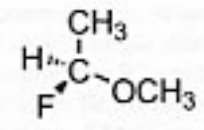
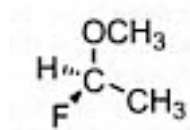
Racemic mixture: Do you really care?

6. Identify the following molecules as being chiral or achiral. Also, state whether they are meso or not.



(Be careful here!)

7. Identify the relationship between the pairs of molecules below (identical molecules, enantiomers, or diastereomers).



(Tricky alert!)