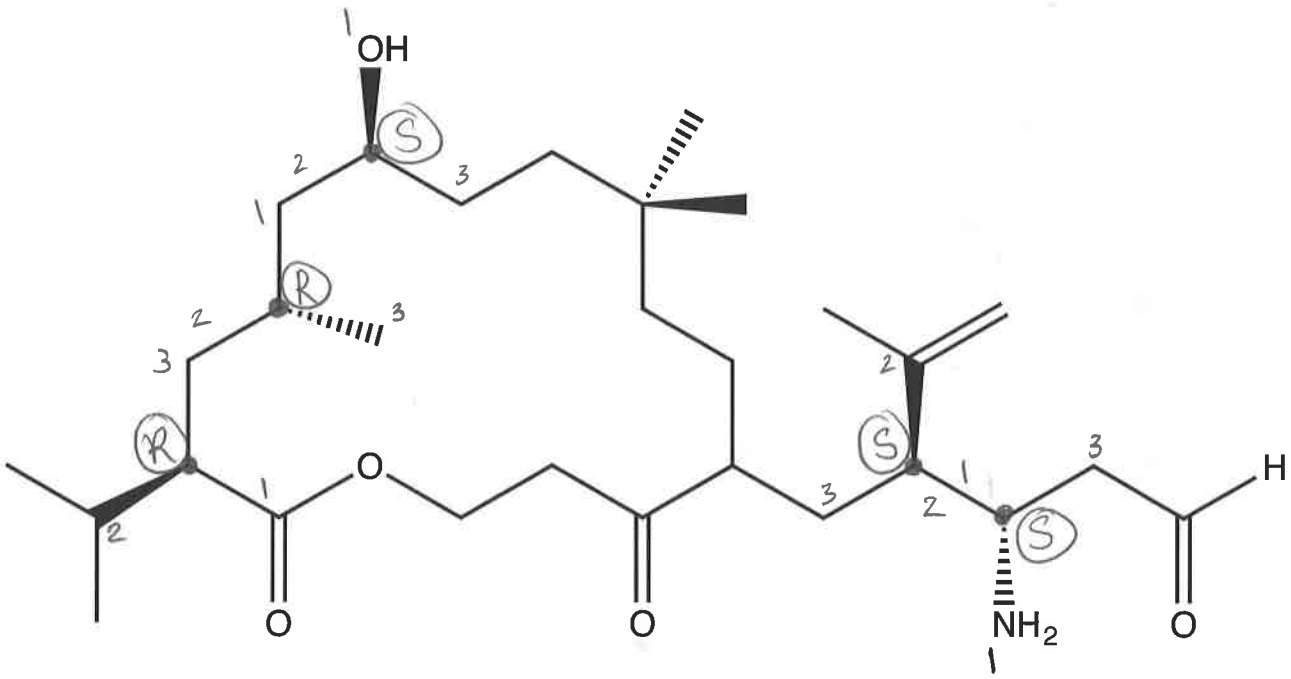
Stereochemistry #2: Stereoisomers and More R&S Practice

I know the last worksheet was a little tedious and excessive, but stereochemistry is one of those organic concepts that continually comes back. So it's important that we understand it and are absolute bosses at assigning R & S.

In this worksheet, we'll assign a little more R & S, but we'll focus more on stereochemical relationships between pairs of molecules I give you. Again, none of this is impossible as long as you can stay organized and remember the rules of R & S. Having said that, let's dive in.

1.) So since you are all R & S pros, we'll kick it up a notch. Below is a random molecule I whipped up juuuuust for you (don't feel the need to thank me/buy me a present/compliment me—the pleasure was all mine ☺). I haven't identified anything for you: You have to pick out each stereocenter (remember, an atom attached to 4 different substituents) and correctly assign R & S.

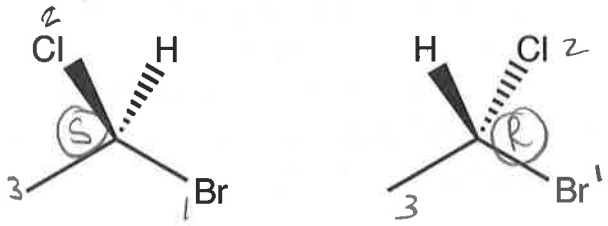


2.) Alrighty—now that we're warmed up and in a stereochemical state of mind, let's keep rollin'.

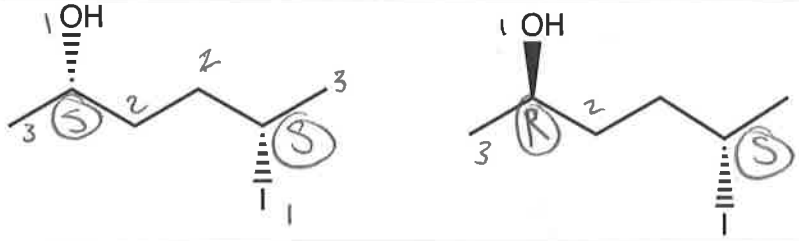
So, if you recall from the last stereochem video lesson, we discussed some forms of isomerism. Below, I've given you many pairs of organic structures. What I need you to do is determine what the relationship between the molecules are. The molecule relationships will be one of the following:

- **Enantiomers, Diastereomers, The Same Molecule, or Completely Different Molecules** (Remember: ASSIGN R & S FIRST !!!!!)

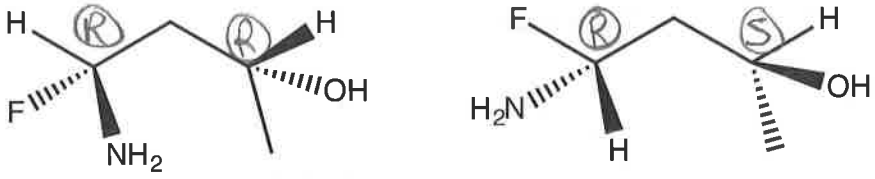
Relationship:



Enantiomers



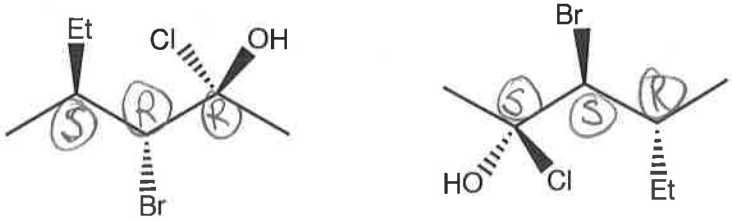
Diastereomers



Diastereomers

Same molecule!

* Not bonded to 4 different things: achiral



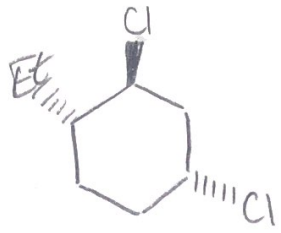
Enantiomers

No matter how the molecules are given to you, as long as you can stay organized, recognize the atom-atom bonds, pick out the stereocenters, and assign R & S, there is no structure-pair relationship you can't identify.

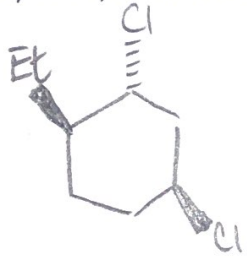
3.) Okay, last problem. It'll be one problem made of a few little ones, so let's finish strong.

(1S,2S,4R)-2,4-dichloro-1-ethylcyclohexane

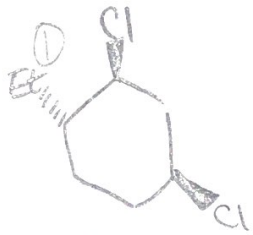
a.) Draw ~~(1R,3R)-1,3-dichlorocyclohexane~~ below.

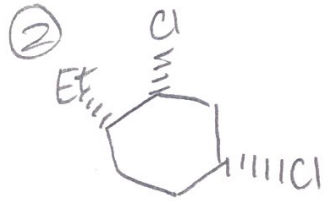


b.) Then, draw the structure's enantiomer as well as two of its diastereomers.



Enantiomer





Diastereomers

c.) Consider the following generic halogenation reaction. List all of the unique products that this reaction could produce. **Take stereochemistry into account here.**