

## ENANTIOMERS

A stereoisomer is a compound with the same molecular formula and same sequence of atoms bonded together but with a different arrangement in space.

A stereoisomer that has a non-superimposable mirror image is called an enantiomer.

Requirements for a molecule to have a non-superimposable mirror image:

1. Must contain at least one **chiral** carbon (4 bonds to 4 different groups)
2. C=X are not chiral (where X=C, O, or N)
3. Symmetry negates chirality.

Enantiomers are "**optically active**". They rotate plane polarized light either clockwise (+) or counterclockwise (-). Enantiomers are identified using a (+) or (-) preceding the name. Other designations like "D" and "L", "r" and "s", or "d" and "l" are also used.

Molecules that are optically active (have a non-superimposable mirror image) are said to be "**chiral**".

Molecules that are not optically active are **achiral**.

Stereoisomers that are not mirror images (i.e., not enantiomers) are called "**diastereoisomers**". Diastereoisomers can include a chiral and an achiral pair of molecules.

A mixture that consists of equal amounts of enantiomers is called a "**racemate**".

Racemates are not optically active because the optical rotations of each isomer cancel each other.

Chiral molecules are represented with Fischer projections. Fischer projections of sugars are designated D or L.

Compounds are most easily compared using their Fischer projections:

Odd number of swaps makes the enantiomeric (mirror image) chiral carbon

Even number of swaps makes the same chiral carbon. (practice worksheet)

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*another kind of stereoisomer*

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# Stereochemistry worksheet

*"chiral carbon"*

1. Put a \* next to each stereocenter in each molecule
2. Identify which molecules are chiral (C) or achiral (A)
3. Determine the R or S configuration of each stereocenter.

