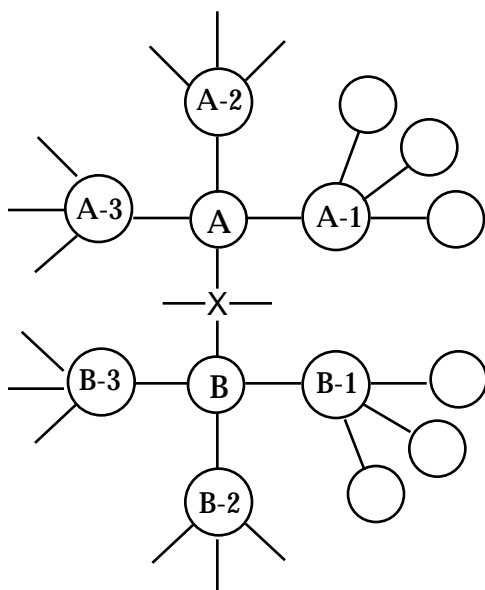


Cahn-Ingold-Prelog Priority Rules

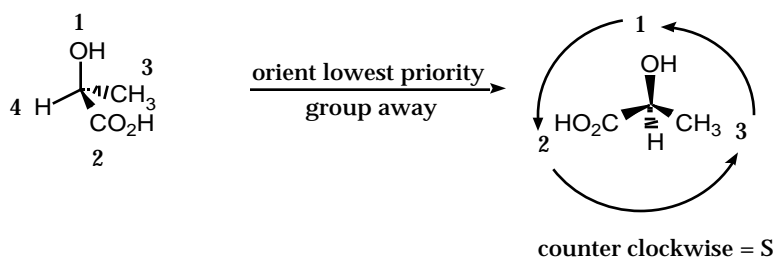
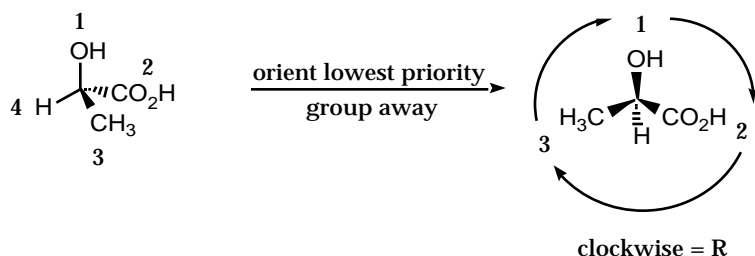
1. Look at the four atoms directly attached to the stereogenic center (X). Assign priorities based on atomic number to all four atoms. Priority 1 is assigned to the atom or group of highest atomic number, priority 4 to the lowest.
2. If two or more atoms are identical (designated A and B below), look at all the atoms directly attached to the identical atoms in questions (designated A-1, A-2, A-3 and B-1, B-2, B-3). Assign priorities to all these atoms based on atomic number (1 is the highest priority, 3 the lowest).
3. Compare the highest priority atoms, i.e. compare A-1 with B-1. If A-1 is a higher priority atom than B-1, then A is higher priority than B. If A-1 and B-1 are the same atom, then compare the second highest priority atoms directly bonded to A and B (A-2 with B-2); if A-2 is a higher priority atom than B-2, then A is higher priority than B. If A-2 and B-2 are identical atoms, compare A-3 with B-3.



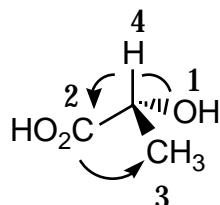
4. If a difference still can not be found, move out to the next highest priority group (A-1 and B-1 in the diagram) and repeat the process.
5. Multiple bonds are considered as an equivalent number of single bonded atoms.

Assigning the Configuration

1. Use the Cahn-Ingold-Prelog Rules to assign priority to the four groups. Orient the molecule so that the lowest priority group is in the back (away from you).
2. Look at the remaining three groups of priority 1-2-3. If the remaining three groups are arranged so that numbering the priorities 1-2-3 are in a *clockwise* fashion, then assign the stereogenic center as **R** (“rectus” or right). If the remaining three groups are arranged 1-2-3 in a *counterclockwise* manner, then assign the stereogenic center **S** (“sinister” or left).



2. -or- use the “Hand Rule”. Orient the lowest priority group up. Point your thumb in the direction of the lowest priority group. If you need to use your *right hand* so that your fingers point in the direction of the group priorities in the order 1-2-3, then the stereogenic center is assigned **R** (“rectus” or *right*). If your *left hand* is required so that your fingers point in the direction of the group priorities 1-2-3, the the stereogenic center is assigned **S** (“sinister” or *left*).



(R)-(-)-Lactic acid
(Right Hand)



(S)-(+)-Lactic acid
(Left Hand)

