

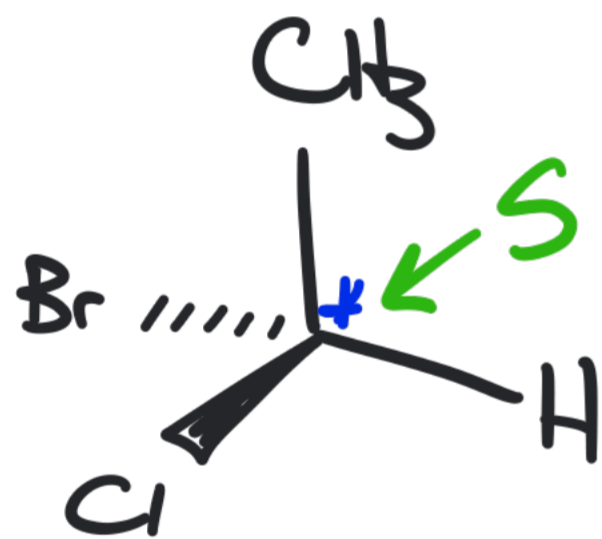
Describing Chiral Centers - R/S Assignments

Cahn-Ingold-Prelog System

↳ way to prioritize groups

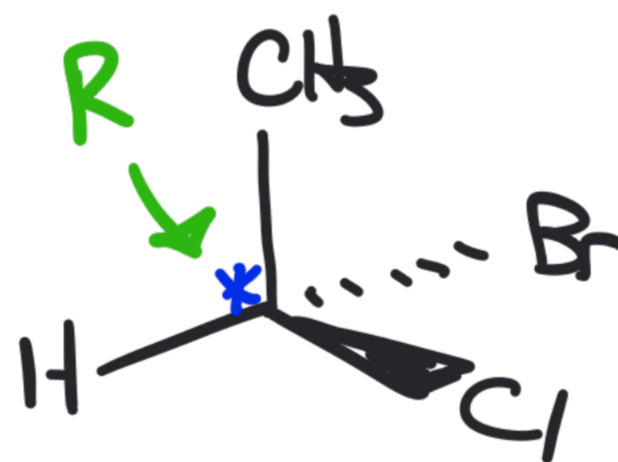
- Chiral centers
- double bond configuration

Consider:



S-1-bromo-1-chloroethane

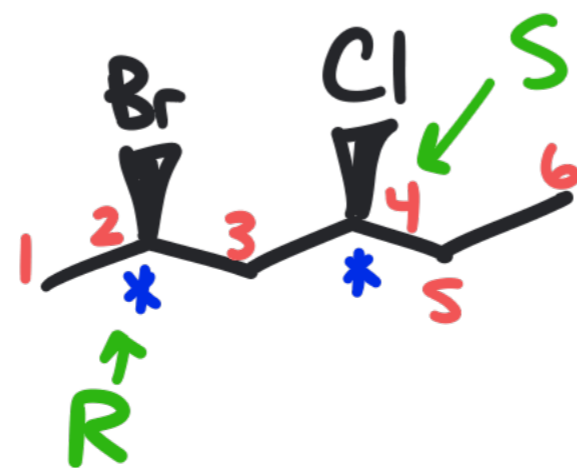
enantiomers



R-1-bromo-1-chloroethane

* enantiomers have opposite R/S assignment

Multiple Chiral Centers



(2R, 4S) - 2-bromo-4-chlorohexane

Steps for R/S Assignment

① Identify the four atoms directly attached to the chiral center.


② Prioritize by atomic #

1 = highest atomic #

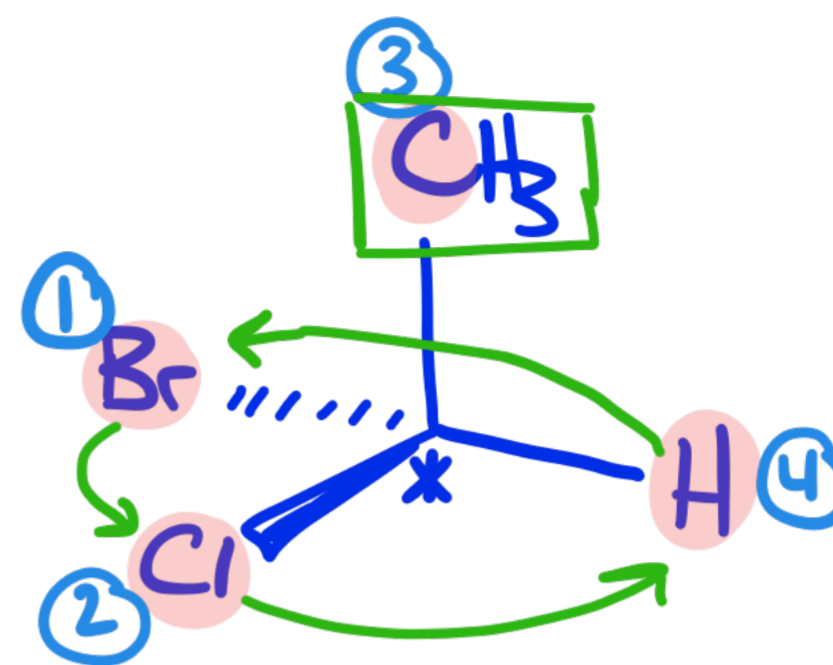
4 = lowest atomic #

③ Rotate molecule so priority "4" group is back (||||).

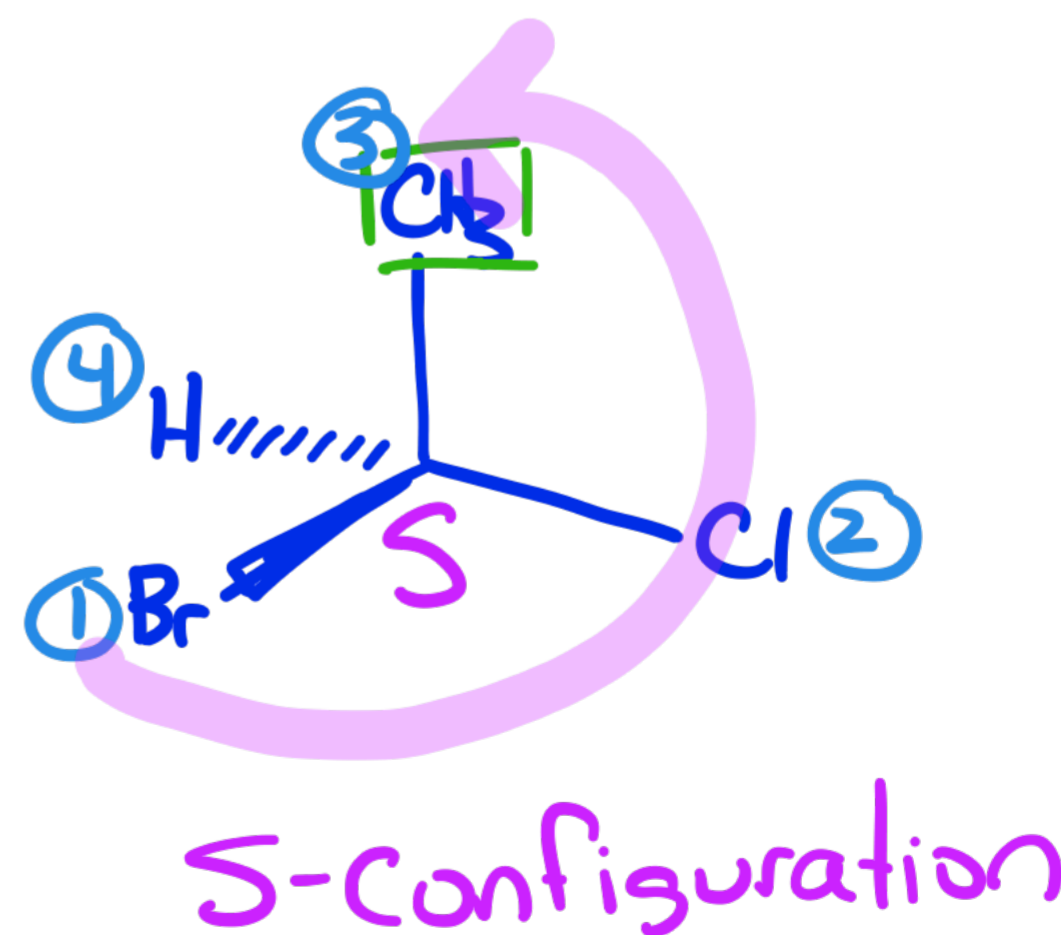
④ Draw a curved arrow from 1 → 2 → 3

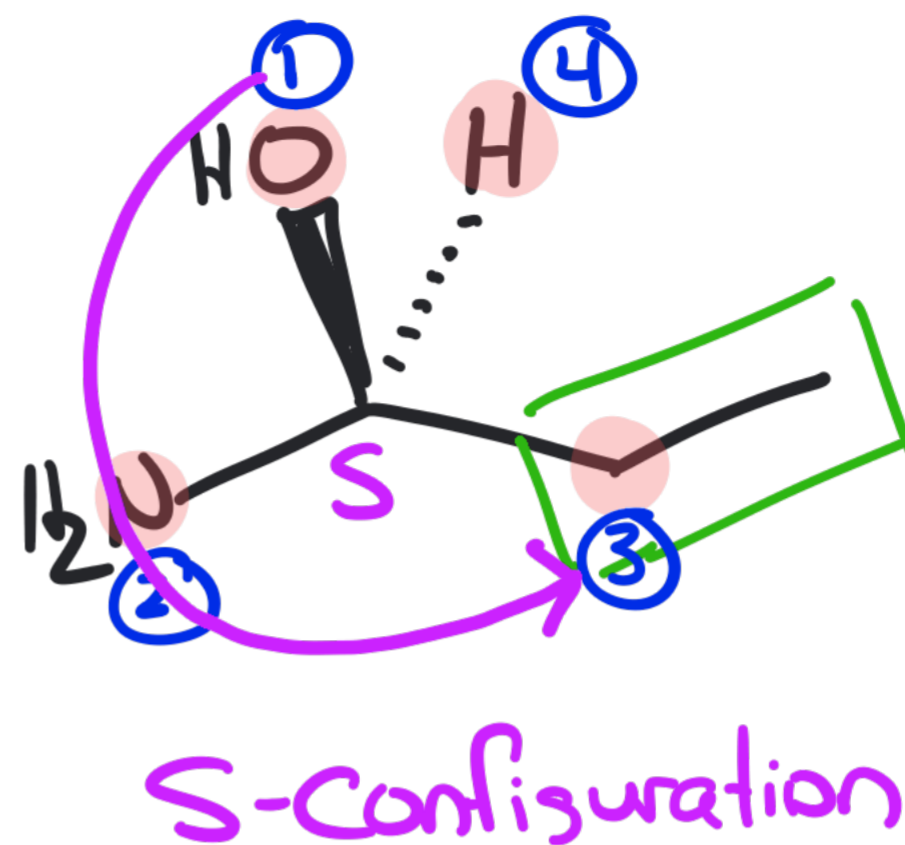
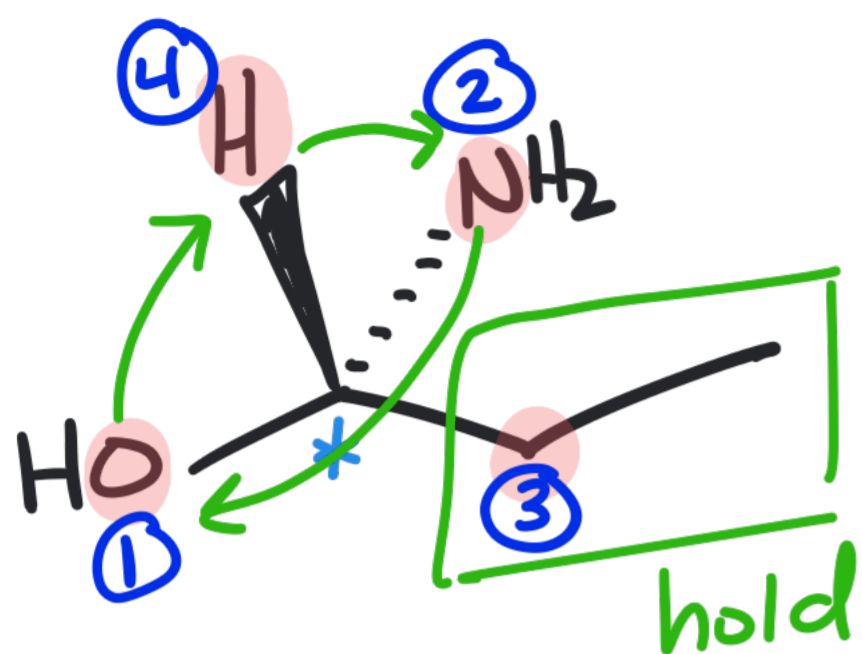

Clockwise


Counterclockwise



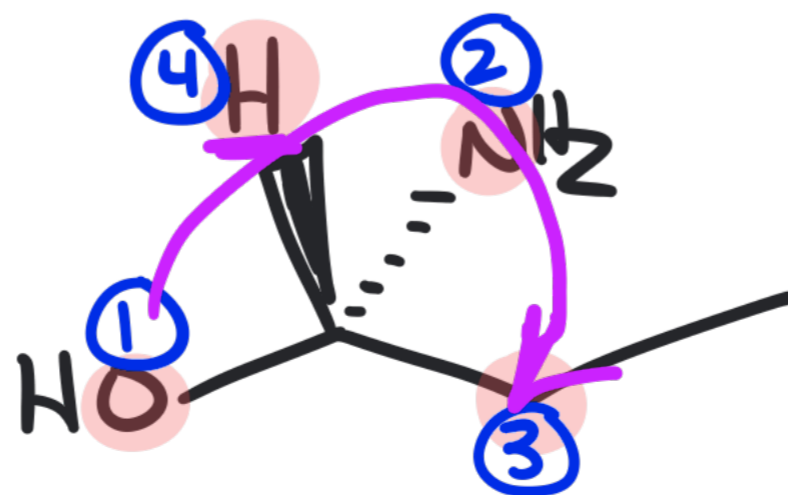
Rotate 3 groups while holding one constant





Trick: If and only if priority 4 group is out. 

Draw arrows from 1 → 2 → 3 and give opposite assignment of what it appears.



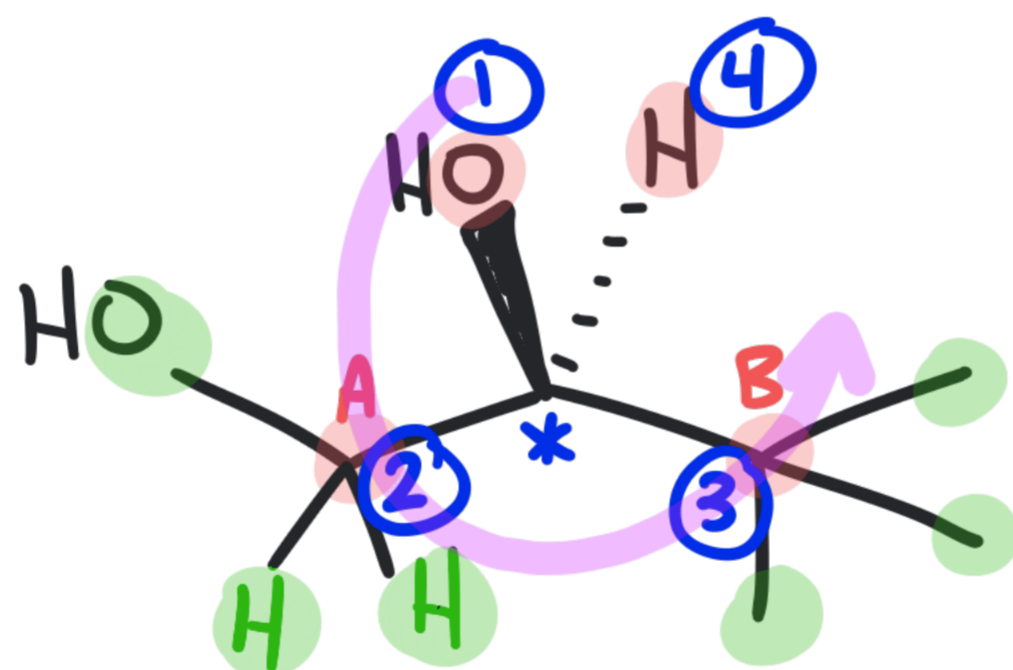
Looks R
but "4" is out
Actual S

What if two atoms have the same atomic number?

- Compare the attached atoms

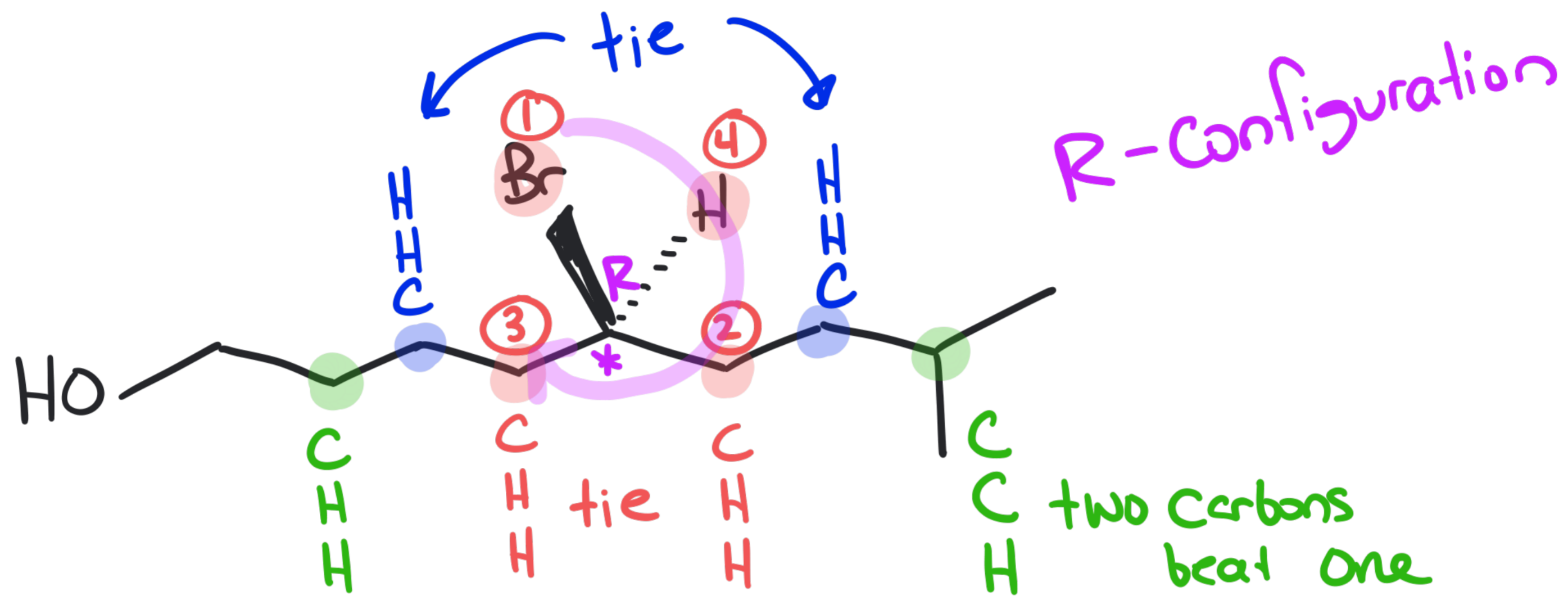
↓ Still a tie

- move out one atom and compare

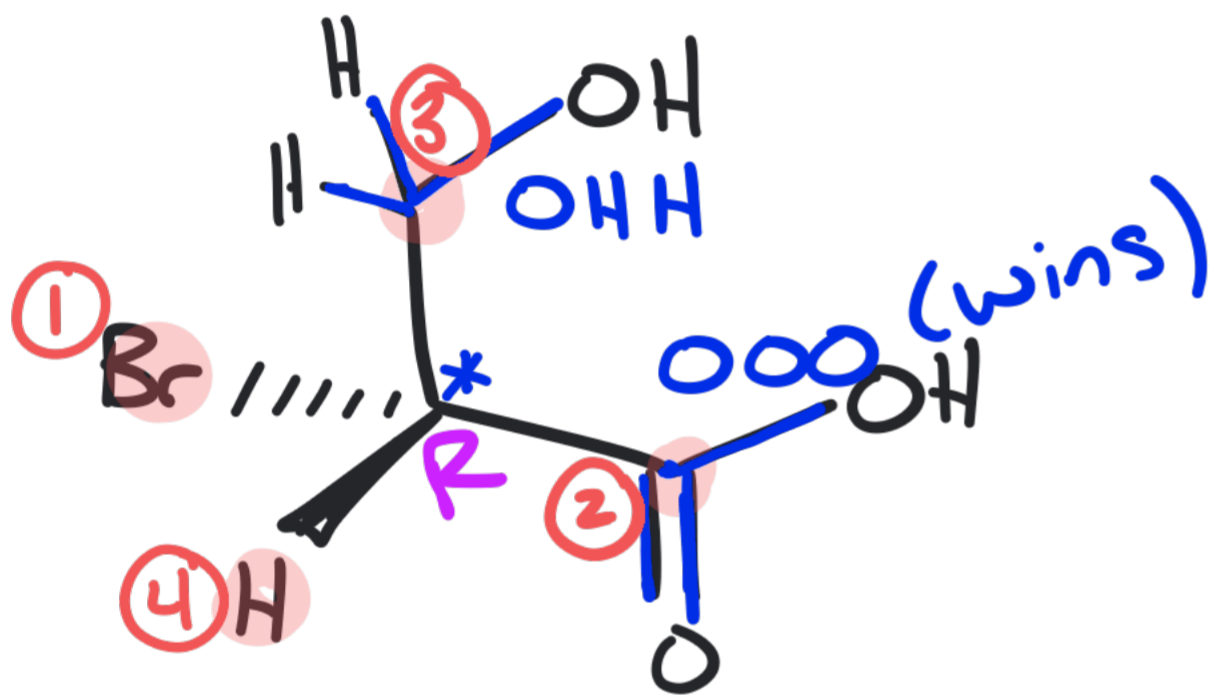
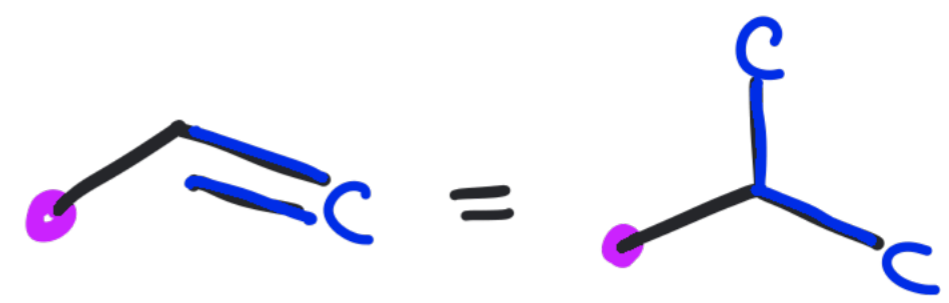


S-configuration

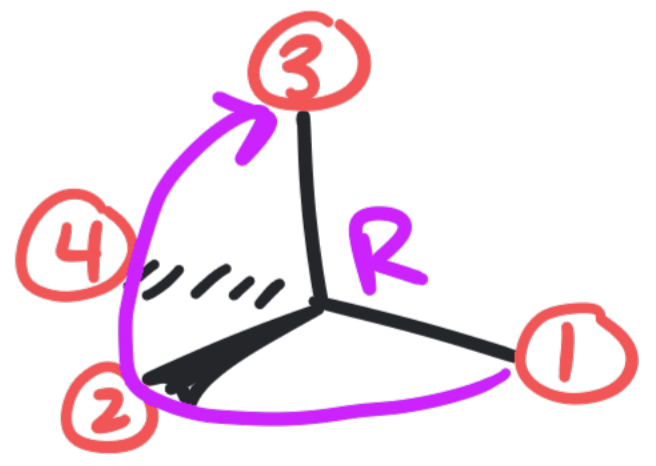
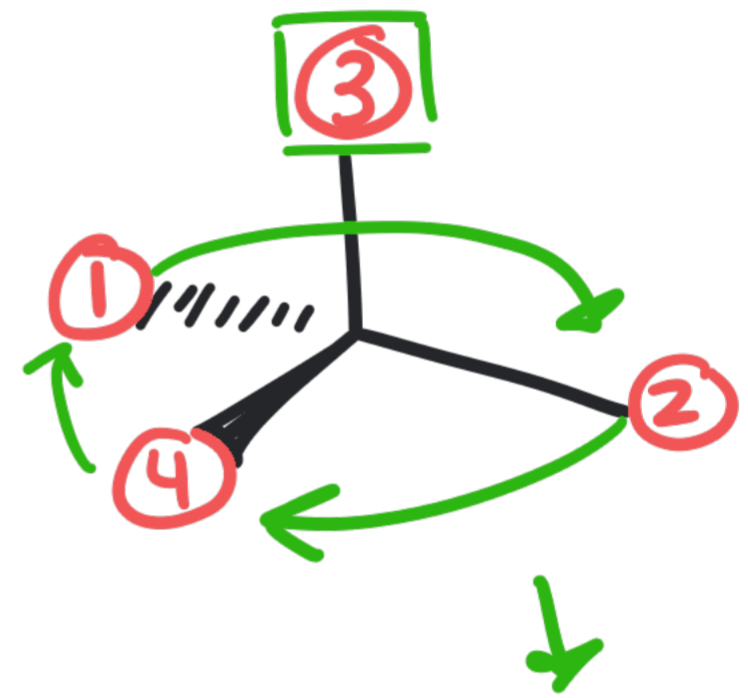
O	1
H	4
C _A	[O] H H 2
C _B	C C C 3



Consider double bonds as two separate single bonds to that atom.
 triple bonds as three



Simplify
 =



Special case:

