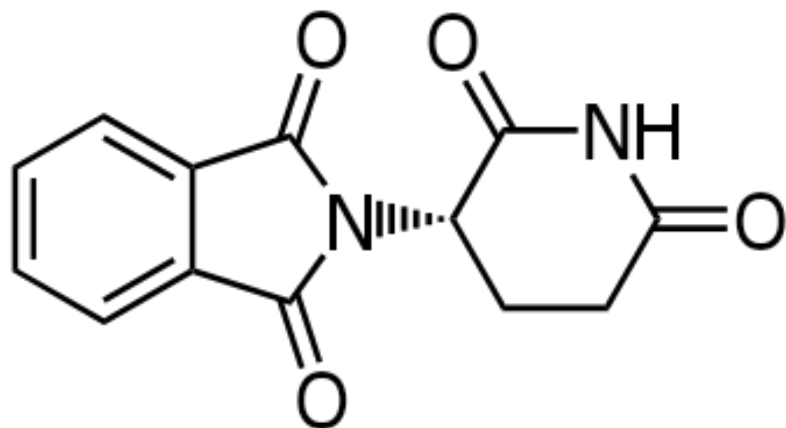


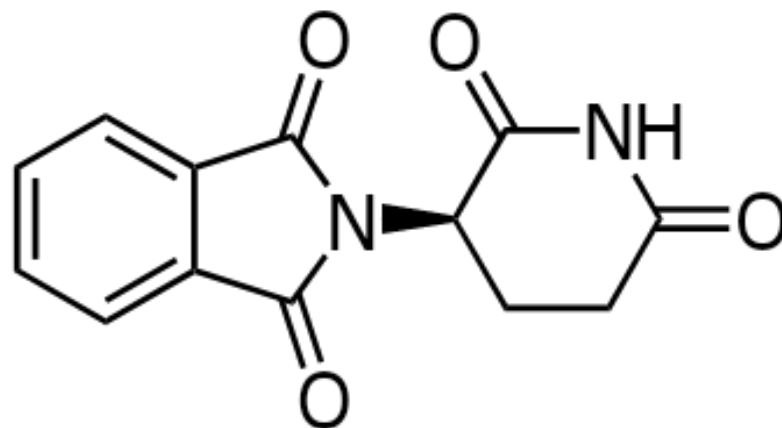
Thalidomide

- ❖ The activity of drugs containing chirality centers can vary between enantiomers, sometimes with serious or even tragic consequences
- ❖ For several years before 1963 thalidomide was used to alleviate the symptoms of morning sickness in pregnant women

- ❖ In 1963 it was discovered that thalidomide (sold as a mixture of both enantiomers) was the cause of horrible birth defects in many children born subsequent to the use of the drug



Thalidomide
(cures morning sickness)



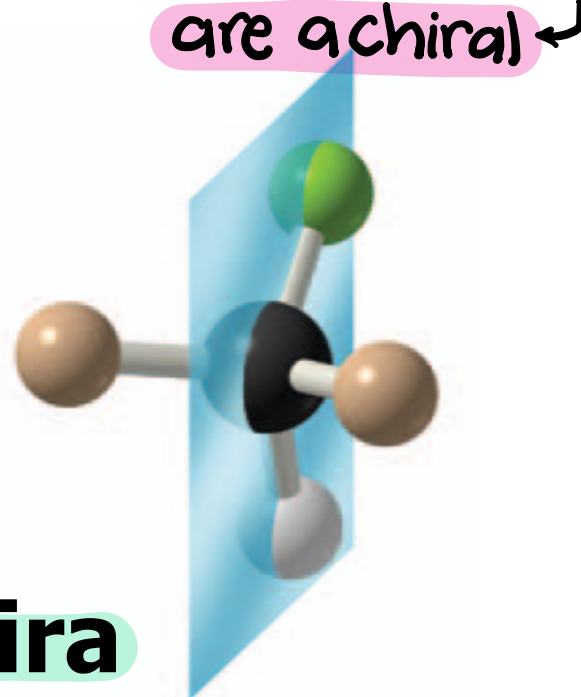
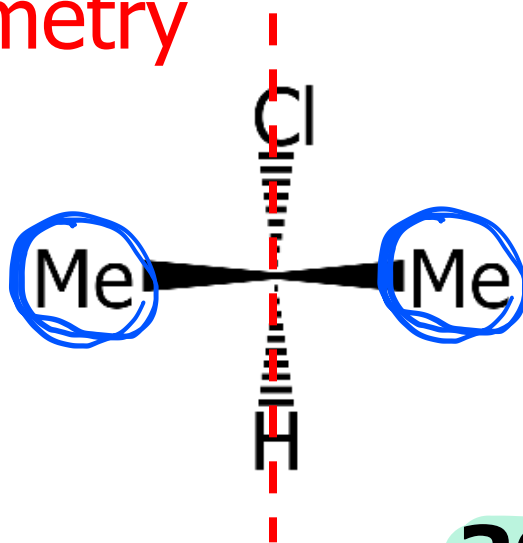
enantiomer of
Thalidomide
(causes birth defects)

5. How to Test for Chirality:

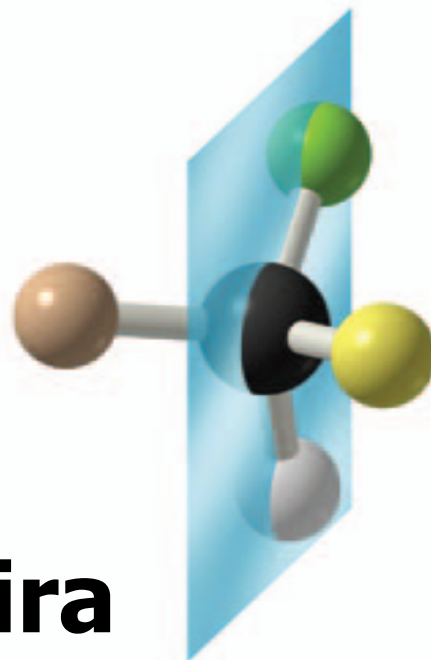
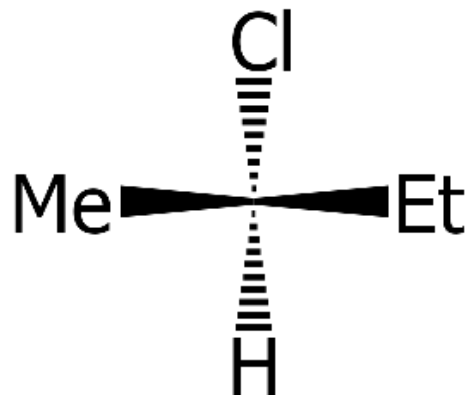
Planes of Symmetry خط التماثل

- ❖ A molecule will not be chiral if it possesses a plane of symmetry
- ❖ A **plane of symmetry** (mirror plane) is an **imaginary plane** that **bisects** a **molecule** such that the **two halves** of the molecule are **mirror images** of **each other**
- ❖ All molecules with a plane of symmetry in their most symmetric conformation

Plane of symmetry



achiral
 ← ما بينج enantiomer



No plane of symmetry

chiral

6. Naming Enantiomers: *R,S*-System



- ❖ Using only the IUPAC naming that we have learned so far, these two enantiomers will have the same name:
 - **2-Butanol**
- ❖ This is undesirable because each compound must have its own distinct name

6A. How to Assign (R) and (S) Configurations

❖ Rule 1

- **Assign priorities** to the four different groups on the stereocenter from highest to lowest (**priority bases on atomic number**, the higher the atomic number, the higher the priority)

at the
periodic table
the atomic number increase

بقاہ الامین
للأسفل

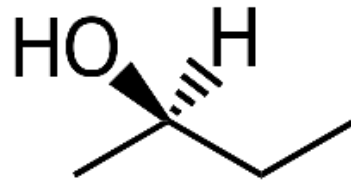
❖ Rule 2

- When a priority cannot be assigned on the basis of the atomic number of the atoms that are directly attached to the chirality center, then the next set of atoms in the unassigned groups is examined. This process is continued until a decision can be made.

❖ Rule 3

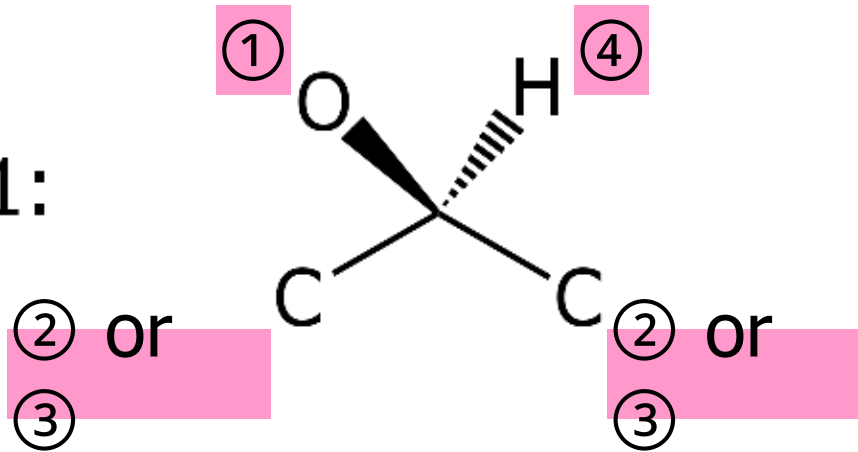
- Visualize the molecule so that the lowest priority group is directed away from you, then trace a path from highest to lowest priority. If the path is a clockwise motion, then the configuration at the asymmetric carbon is (*R*). If the path is a counter-clockwise motion, then the configuration is (*S*)

❖ Example

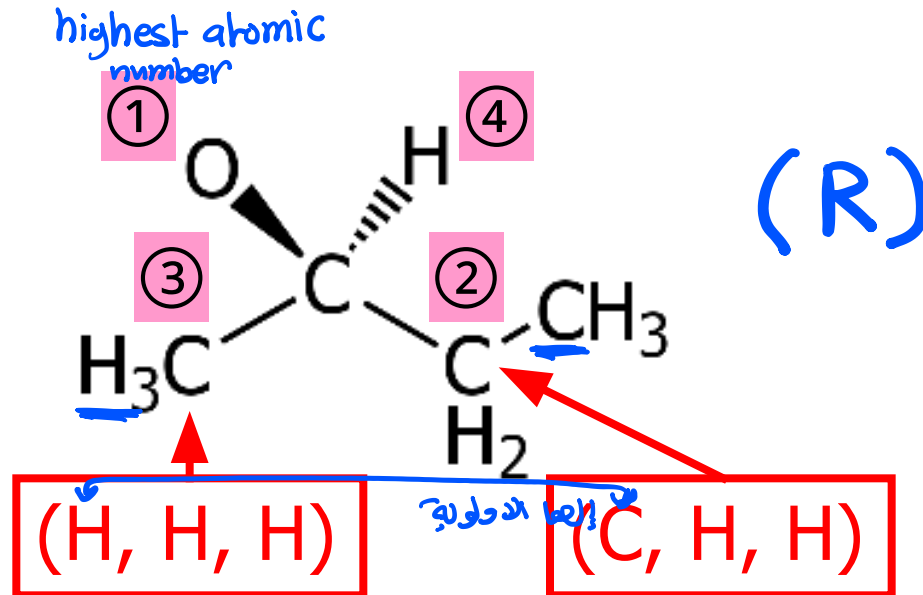


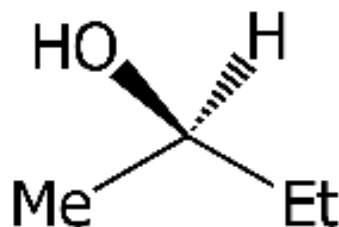
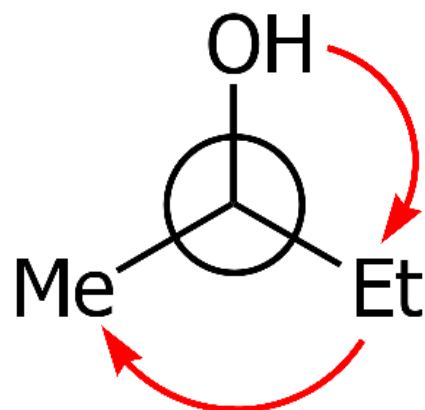
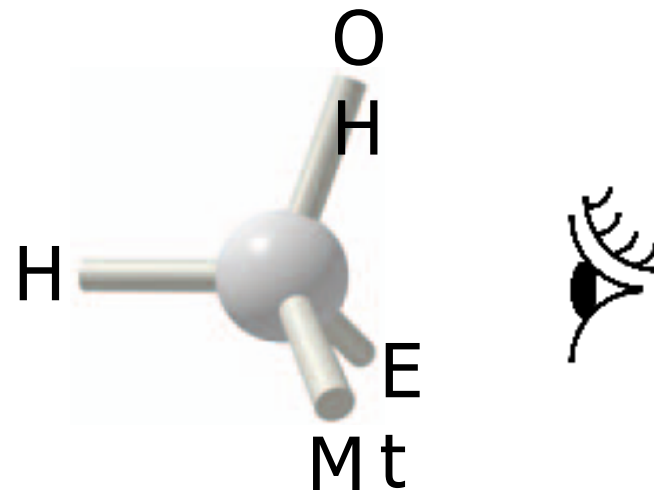
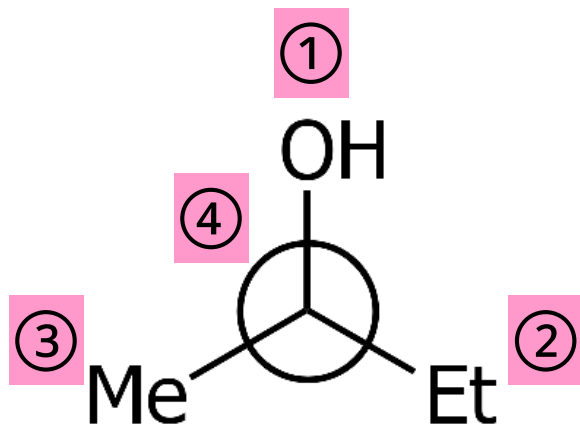
(2-Butanol)

Step 1:

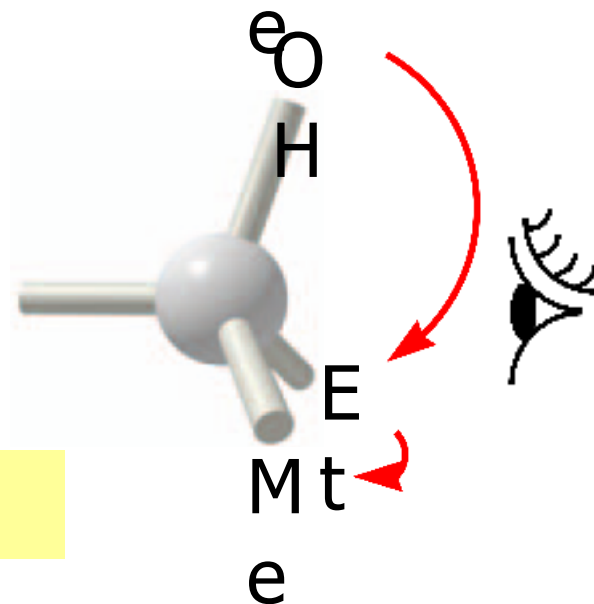


Step 2:





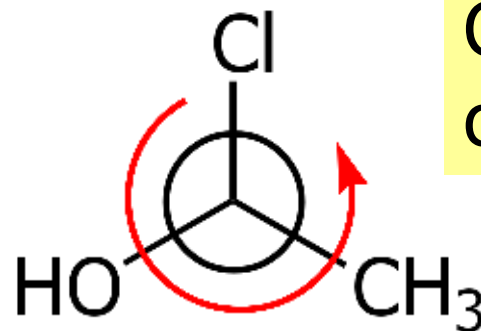
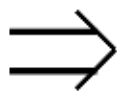
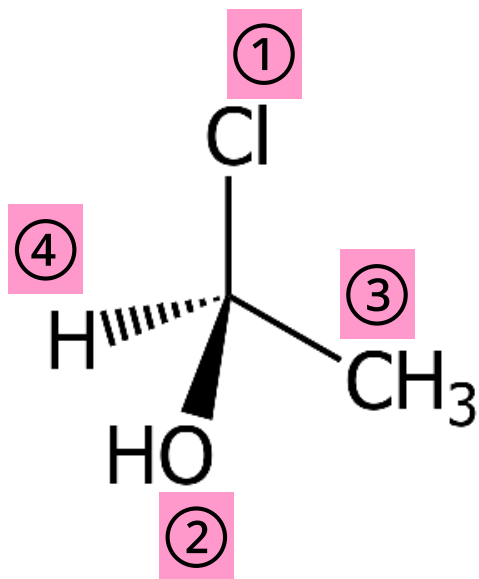
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Arrows are
clockwise

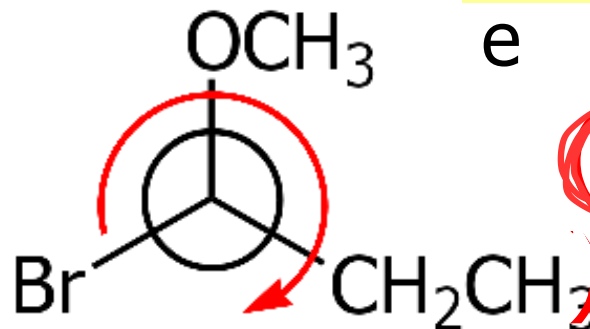
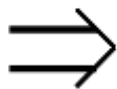
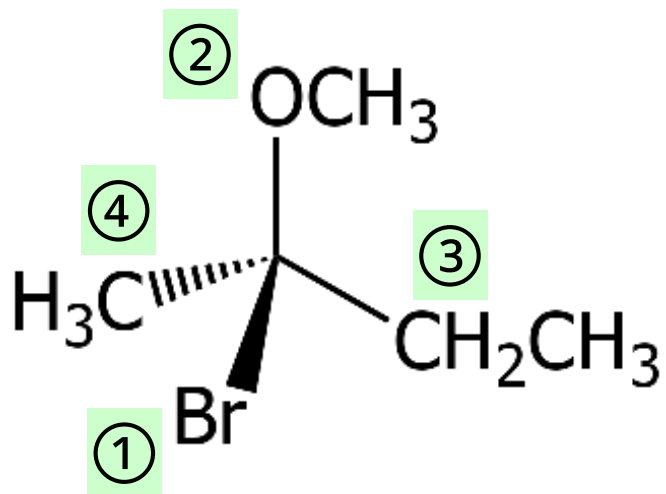
(R)-2-
Butanol

❖ Other examples



Counter-clockwise

S



Clockwise

R