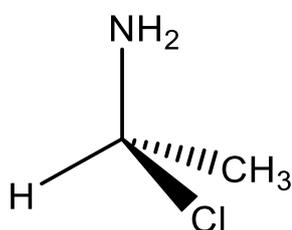


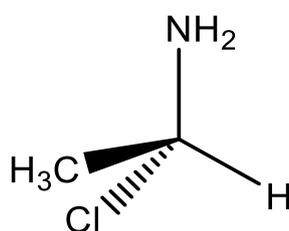
In the previous optical sheets we have explained optical isomers and identified chiral centres. These chiral centres have non-superimposable mirror images that look the same but differ in their 3D dimensions in space. These lead to different chemical effects for each isomer, therefore a way of identifying and naming each isomer is required.

## R and S Isomers

### R and S Isomers



R

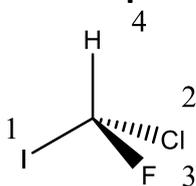


S

The way of identifying these stereoisomers is by labelling them. The arrangement of groups around the chiral centre is called the configuration, which is assigned as **R** or **S**. **R** comes from the Latin *rectus* for right, and **S** from the Latin *sinister* for left. There is a systematic way of working out the molecule's configuration shown below.

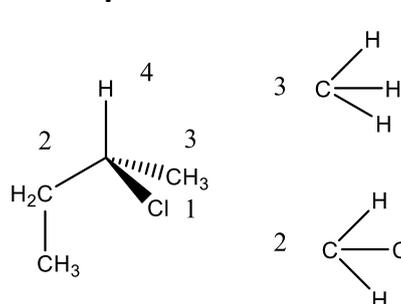
Before you begin it is required to assign priorities of the groups around the carbon using the Cahn-Ingold rules. Priority is based on **atomic number** of the atom next to the chiral centre. The lowest priority is assigned 4 the highest 1. If there are any substituents that are the same you look at the next elements along, (*these rules are explained in more depth in the geometric extension theory sheet*) some examples are shown below.

#### Example 1



H has the lowest atomic number so is labelled 4. The next lowest atomic number is labelled 3. This carries on down to the top priority which is labelled 1.

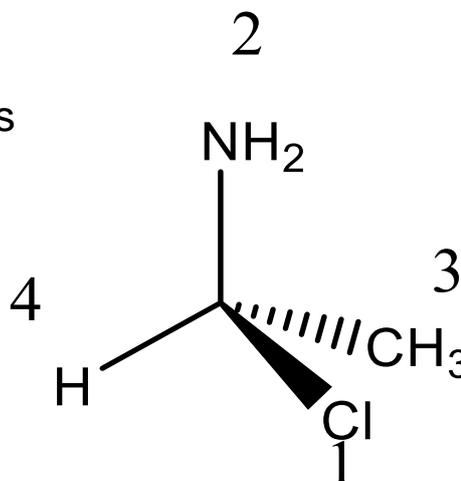
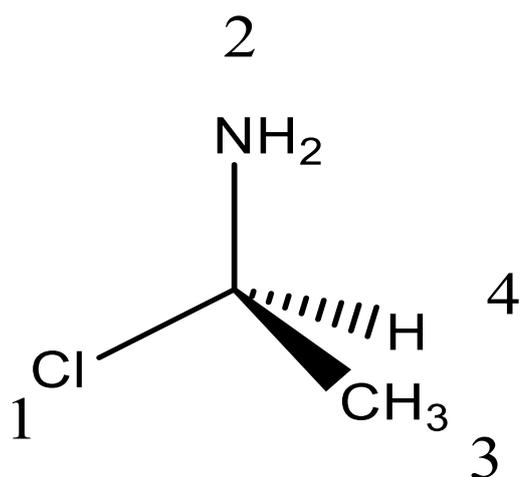
#### Example 2



Example 2 has 2 carbon elements attached to the chiral centre. The above example shows the atoms bonded to these carbons. The group assigned 2 has a higher atomic number than 3.

# R and S Assignment

**Step 1:** Assign priorities of the substituents surrounding the chiral centre.



**Step 2:** Arrange the molecule so the lowest priority group is pointing away from you.

**Step 3:** Follow the priorities drawing a line from 1 to 4 following in the same direction you started from. If the direction is clockwise the molecule is R and if it is anticlockwise it is S. **The arrows in the example are clockwise making it R**

