

INVESTIGATING OPTICAL ISOMERISM

A molecule that is **chiral** or **optically active** has a non-superimposable mirror image. For example your hands are chiral (in fact *cheir* is the Greek for hand) as your left and right hands are mirror images but there is no way you can superimpose them.



Left hand



Right hand



Non-superimposable

In this exercise you are to determine what makes a molecule chiral. Your job is make molecular models of the following molecules and their mirror images and decide if the molecules are superimposable or not.

Molecule	Mirror image	Are the two superimposable?	Is the molecule chiral?
$\begin{array}{c} \text{OH} \\ \\ \text{H}_3\text{C}-\text{C}-\text{NH}_2 \\ \\ \text{H} \end{array}$			
$\begin{array}{c} \text{CH}_3 \\ \\ \text{H}-\text{C}-\text{CH}_3 \\ \\ \text{H} \end{array}$			
$\begin{array}{c} \text{Cl} \\ \\ \text{H}-\text{C}-\text{OH} \\ \\ \text{H} \end{array}$			
$\begin{array}{c} \text{Cl} \\ \\ \text{CH}_3\text{CH}_2-\text{C}-\text{OH} \\ \\ \text{H} \end{array}$			
$\begin{array}{c} \text{Cl} \\ \\ \text{H}_3\text{C}-\text{C}-\text{OH} \\ \\ \text{H}_3\text{C} \end{array}$			
$\begin{array}{c} \text{OH} \\ \\ \text{H}_3\text{C}-\text{C}-\text{C}\equiv\text{N} \\ \\ \text{H} \end{array}$			

Arrange the molecules into groups depending on if they show chirality or not. What is the connection between all the molecules that show chirality?