

Different forms of representing molecules

We obtain information about a molecule by various means.

Molecular formulas and structural formulas supply us information about the composition of the molecule, the latter providing structural information as well, albeit in a two-dimensional manner. Models help us to visualize chemical molecules three-dimensionally. A ball-and-stick model can rapidly provide you information about the spatial organization of a molecule. Space-filling models are more realistic, but time-consuming. (In Organic chemistry, which will be covered in later chapters, the name of the molecule can provide structural information too).

Name	Molecular formula	Structural formula	Ball and spring model	Space-filling model
Hydrogen	H ₂	H—H		
Hydrogen chloride	HCl	H—Cl		
Water	H ₂ O	$\begin{array}{c} \text{O} \\ / \quad \backslash \\ \text{H} \quad \text{H} \end{array}$		
Methane	CH ₄	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$		
Ethane	C ₂ H ₆	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$		
Propane	C ₃ H ₈	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$		
Butane	C ₄ H ₁₀	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$		
2-methylpropane	C ₄ H ₁₀	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{C} \quad \text{H} \\ / \quad \backslash \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$		
Ethanol	C ₂ H ₅ OH	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$		