

how a molecule is drawn, named, classified, and how its bonds break

Ways to draw the same molecule *

- dash formula : every atom and every covalent bond shown as a line
- e.g. CH_4 as four separate C-H dashes
- condensed formula : bonds hidden, identical groups collapsed with a subscript, e.g. ethane as CH_3CH_3
- bond-line (zig-zag) formula : carbon and hydrogen symbols dropped entirely
- each line end or kink is a carbon, hydrogens fill up to tetravalency
- a heteroatom, or any hydrogen bonded to one, is still written out

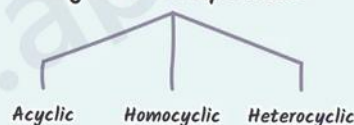
Drawing in three dimensions

- wedge formula : a solid wedge comes up out of the paper, toward the reader
- a dashed wedge goes back, a plain line lies in the plane of the paper
- Fischer projection : the main chain is drawn vertical
- horizontal bonds come toward the reader, vertical bonds go back, used mainly for carbohydrates
- Newman projection : sighting straight down a C-C bond
- the front carbon is a dot, three bonds from its centre
- the rear carbon is a circle, three bonds from its rim
- sawhorse (perspective) formula : the C-C bond is one long slanted line
- front carbon at the lower end, rear carbon at the upper end
- three bonds fan out from each carbon

Classifying by carbon skeleton *

- acyclic (aliphatic) : an open chain, straight or branched, no ring, e.g. propane
- cyclic compounds split into homocyclic (carbocyclic), a ring of only carbon
- and heterocyclic, a ring containing a heteroatom (O, N, S)
- homocyclic splits again: alicyclic behaves like an open chain, e.g. cyclohexene
- aromatic has benzene's special stabilised ring
- aromatic rings are benzenoid if they contain an actual benzene ring, e.g. naphthalene, phenol
- or non-benzenoid if they share benzene's stability without one, e.g. tropone

Organic compounds



three classes at a glance: open chain (acyclic), all-carbon rings (homocyclic), and rings with a non-carbon atom in them (heterocyclic)

Saturated carbons, by how many carbons they touch

Primary, 1° = bonded to exactly one other carbon

Secondary, 2° = bonded to two other carbons

Tertiary, 3° = bonded to three other carbons

Quaternary, 4° = bonded to four other carbons, e.g. the centre of neopentane