▶ Video explanation (YouTube Short)

IUPAC Naming: Root, Suffix and Prefix

Every IUPAC name is read straight off the molecule, like an identity card. The **root** says how long the main carbon chain is, the **suffix** says what kind of compound it is, and the **prefix** says what else is attached.

1. Root: count the parent chain

The root word gives the number of carbon atoms in the **parent chain** (the longest chain that contains the principal functional group), not every carbon in the molecule.

Carbons	1	2	3	4	5	6
Root	meth	eth	prop	but	pent	hex

2. Suffix: bonds and the principal group

- **Primary suffix** (the bonds in the chain): **-ane** all single, **-ene** C=C, **-yne** C≡C.
- **Secondary suffix** (the principal functional group): **-ol** –OH, **-al** –CHO, **-one** C=O inside the chain, **-oic acid** –COOH.
- The final "e" of -ane drops before a vowel: propane → propan-1-ol, propanal, propanone.

Same root, different endings: propane, propene, propyne, propan-1-ol, propanal, propanone.

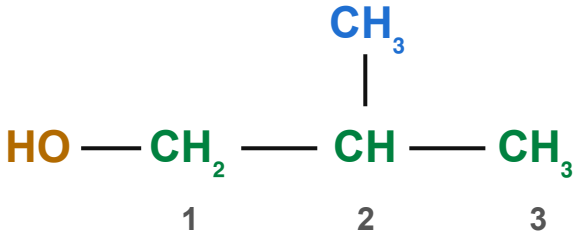
3. Prefix: what is attached

Groups attached to the parent chain are written in front, with their position (locant): **methyl** CH_3–, **ethyl** C_2H_5–, **chloro** Cl–, **bromo** Br–, **nitro** NO_2–.

4. Numbering

Number the parent chain from the end that gives the **principal functional group the lowest locant**; if there is none, the multiple bond; then the substituents. Locants that cannot vary are left out (ethanol, propanal, propanone, propene).

Worked example: 2-methylpropan-1-ol



green: parent chain (prop) · amber: –OH (ol) · blue: methyl bran

Parent chain with the –OH: 3 carbons → **prop**. All single bonds → **an**. –OH → **ol**, numbered from the –OH end so it is on C1 → propan-1-ol. CH_3 on C2 → **2-methyl**. Name: **2-methylpropan-1-ol**.

Solved example

Q. Name CH_3–CH(OH)–CH_2–CH_3.
A. Four carbons → but. All single bonds → an. –OH → ol. Numbered from the left (nearer) end the OH is on C2. Name: **butan-2-ol** (not butan-3-ol).

Key takeaways

- Root = carbons in the parent chain.
- Primary suffix = bonds (an, en, yn); secondary suffix = principal group (ol, al, one).
- Prefix = attached groups with their locants.
- Number so the principal group gets the lowest locant.

Practice questions

1. (MCQ) The root for a five-carbon parent chain is: (a) but (b) pent (c) hex (d) prop
2. (MCQ) The IUPAC name of CH_3CH_2CHO is: (a) propanone (b) propan-1-ol (c) propanal (d) propene
3. (Very short) What does "an" mean in propan-1-ol?
4. (Very short) Write the prefix for a Br atom on the chain.
5. (Short) Give the IUPAC name of $CH_3CH(CH_3)CH_3$ and explain each part.
6. (Short) Why is $CH_3CH(OH)CH_2CH_3$ named butan-2-ol and not butan-3-ol?
7. (Application) Name: (i) CH_2=$CHCH_2CH_3$ (ii) $CH_3CHClCH_3$ (iii) CH_3COCH_3
8. (Application) Draw the structure of 2-methylbutane.

Answer key

1. (b) pent.
2. (c) propanal.
3. All C–C bonds in the chain are single (primary suffix).
4. bromo.
5. 2-methylpropane: 3-carbon chain (prop), all single bonds (ane), CH_3 on C2 (2-methyl).
6. The OH must get the lowest locant: numbering from the nearer end puts it on C2.
7. (i) but-1-ene (ii) 2-chloropropane (iii) propanone.
8. CH_3–$CH(CH_3)$–CH_2–CH_3.

▶ Watch the video explanation