

IUPAC Rules for Naming Alkanes

I. Unbranched (straight) chain alkanes

- Indicate the number of carbon atoms in the chain with a prefix followed by the ending *-ane*.

II. Branched chain alkanes

- Identify the longest chain of carbon atoms; this “parent chain” provides the root name.

When there are two or more parent chains of identical length, choose the parent chain with the greater number of substituents.

- Identify and name the substituent(s).
- Number the parent chain.

- **One substituent:** number from the end that gives the substituent the lower number.

Use a hyphen to connect the number to the name.

- **Two or more identical substituents:** number from the end that gives the lower number to the substituent encountered first.

The number of times the substituent occurs is indicated by a prefix di-, tri-, tetra-, penta-, hexa-, and so on.

A comma is used to separate position numbers.

- **Two or more different substituents:** list the substituents in alphabetical order and number from the end that gives the lower number to the substituent encountered first. If there are different substituents in equivalent positions at opposite ends of the parent chain, give the substituent of lower alphabetical order the lower number.

Prefixes such as di-, tri-, tetra-, penta-, hexa-, and so on are not included in alphabetizing.

III. Cycloalkanes

- Prefix the name of the corresponding straight chain alkane with *cyclo-*.
- Identify and name the substituent(s) on the ring.
- Number the ring.
- One substituent: no number necessary (i.e., “1” is assumed).
- Two substituents: number so that substituent with lower alphabetical order given lower number.
- Three or more substituents: number in order to give the substituents the *lowest set* of numbers.