Alkanes: IUPAC Naming

UCI Chem 51A
Dr. Link
Goals

☐ After this lesson you should be able to

☐ Name alkanes using IUPAC rules
How to Name an Alkane

- Organic molecules have logical names (usually)

Prefix + Parent Name + Suffix

- Substituents (what & where)
- Longest C chain
- Not needed for alkanes
- Functional group
Naming, Step-by-Step

1. Identify and name the longest contiguous carbon chain
2. Identify and name substituents
3. Compile full name
Longest C Chain

Identify the longest carbon chain!
Numbering the Chain

- Number the chain starting from the end that gives lowest substituent location numbers.

2 options with same # of C? Choose the one with the least substituents
Substituents

- If it’s not part of the longest chain, it’s a substituent!

- Alkyl groups
  - $-\text{CH}_3$ methyl
  - $-\text{CH}_2\text{CH}_3$ ethyl
More Substituents

Attach at 1° C

Attach at 2° C
Even More Substituents!

H H H H H
H
H H H H

Attach at 1° C

H H H H
H
H H H H

Attach at 2° C

H H H H
H
H CH₃

Attach at 1° C

H H H H
H
H CH₃

Attach at 3° C
Substituent Practice

- Identify the longest carbon chain, then identify substituents.
Compiling the Name

- Remember substituents need locations, too!
- Arrange in alphabetical order. Ignore all prefixes EXCEPT “iso”.
- Add parent name to the end.
Naming Examples

☐ Name these alkanes.
Naming Cyclic Alkanes

- Cyclic portion is parent name (cycloane)
- Number in direction that gives lowest numbers.
- Lowest number goes to highest priority alphabetically
Cyclic Alkane Examples

Name these cyclic alkanes
Cyclic and Straight-Chain Portions?

- Greater number of carbons takes priority.
- If equal number of carbons, go with the cyclic portion as parent name.

1-cyclobutylhexane?
1-hexylcyclobutane?
Wrapping Up

- Practice naming acyclic and cyclic alkanes using IUPAC rules.