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## 1 Hydrocarbons

### 1.1 Properties of Hydrocarbons

Melting and boiling point increase as the carbon chain gets longer. Melting and boiling points can only be compared between molecules in the same homologous series. **This is because different homologous series may have different intermolecular bonds than others.**

## 1.2 Alkanes

### 1.2.1 Different Ways of Representing the Alkanes

Name	Molecular formula	Full Structural Formula	Condensed Formula
Methane	CH <sub>4</sub>	<pre>       H             H C H               H           </pre>	CH <sub>4</sub>
Ethane	C <sub>2</sub> H <sub>6</sub>	<pre>       H H               H C C H                 H H           </pre>	CH <sub>3</sub> CH <sub>3</sub>
Propane	C <sub>3</sub> H <sub>8</sub>	<pre>       H H H                 H C C C H                   H H H           </pre>	CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>
Butane	C <sub>4</sub> H <sub>10</sub>	<pre>       H H H H                   H C C C C H                     H H H H           </pre>	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>
Pentane	C <sub>5</sub> H <sub>12</sub>	<pre>       H H H H H                     H C C C C C H                       H H H H H           </pre>	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>
Hexane	C <sub>6</sub> H <sub>14</sub>	<pre>       H H H H H H                       H C C C C C C H                         H H H H H H           </pre>	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>
Heptane	C <sub>7</sub> H <sub>16</sub>	<pre>       H H H H H H H                         H C C C C C C C H                           H H H H H H H           </pre>	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>
Octane	C <sub>8</sub> H <sub>18</sub>	<pre>       H H H H H H H H                           H C C C C C C C C H                             H H H H H H H H           </pre>	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>

### 1.2.2 Skeletal Formulae

- Propane
- Butane
- Pentane
- Hexane
- Heptane
- Octane

### 1.2.3 Cyclic Carbon Chain

Cyclopentane (C<sub>5</sub>H<sub>10</sub>)



Alkanes can also occur as circular molecules. In this case their general formula is C<sub>n</sub>H<sub>2n</sub>

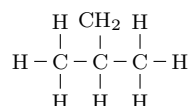
## 2 IUPAC Naming Conventions

### 2.1 The Rules

1. Find the longest continuous carbon chain. This will be the base of the name.
2. Check if there are any groups of atoms/atoms that are not part of the longest carbon chain. These groups are called *substituent groups*.
3. Number the individual carbon atoms on the longest carbon chain so that the substituent groups are attached to the lowest number possible.
4. If there is more than one substituent group, they must be sorted in alphabetical order.
5. If there are two identical substituent groups, add the prefix *di* for 2, *tri* for 3, *tetra* for 4, *penta* for 5, and so on.

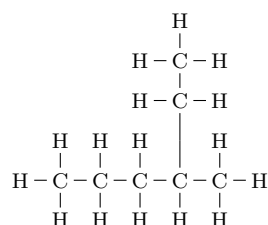
### 2.2 Examples

1. Name this molecule:



*Answer:* 2methyl-propane, as there is a methyl group on the 2nd carbon of the propane.

2. Name this molecule:



*Answer:* 2ethyl-pentane, as there is an ethyl group on the 2nd carbon of the pentane, from the right.