Fractional Distillation Lesson

Learning Outcomes:
By the end of this lesson, you will be able to:
• Describe the trends in properties of hydrocarbons (6)
• Explain how fractional distillation works (7)
• Write balanced symbol equations for the complete combustion of hydrocarbons with a given formula (8)

Lesson Objectives:
• To understand the process of fractional distillation and the molecules involved
• Link boiling point, viscosity and flammability to chain length

Settler Activity – Solve the Anagram!

What is fractional distillation – Fill in the gaps

_________ ________is the process by which
______ ____ is ______ into different, more useful ____________.

The ______ can be ________ to produce
____ and __________ (feedstock) used in the
______________ industry.

The majority of _______ produced are hydrocarbon chains called ________.

What is crude oil? - Fill in the gaps

______ _____ is a ______ resource made of the remains of
____________ that were alive millions of ______ ago.
We ______ for it and ________ it from deep underground.

Many ________ materials on which modern life depends are produced by crude oil, such as ________, lubricants, ________, detergents.
Crude Oil is made of lots of ________ of ______________ of different lengths.
Fractional Distillation separates these.

Complete the labels on the diagram
Complete these sentences:
The shorter the hydrocarbon chain the .................................................................

The longer the hydrocarbon chain the .................................................................

Longest to shortest chain length observations:

<table>
<thead>
<tr>
<th>Molecule</th>
<th>Carbons</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Ethane</td>
<td>C₂</td>
<td></td>
</tr>
<tr>
<td>Propane</td>
<td>C₃</td>
<td></td>
</tr>
<tr>
<td>Butane</td>
<td>C₄</td>
<td></td>
</tr>
<tr>
<td>Pentane</td>
<td>C₄</td>
<td></td>
</tr>
</tbody>
</table>

Chemical Formulas for Fractions (from Nano Simbox):
propane petrol kerosene diesel

……………………… ………………… ………………… ………………… …………………

Chemical Formulas for Fractions – Complete the table

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What is the rule for alkanes?

………………………………………………………………

………………………………………………………………

Chemical Formulas for combustion (from Nano Simbox):
propane oxygen carbon dioxide water

……………………… ………………… ………………… ………………… …………………

Propane combustion word equation

+ → + + (+ )

Propane combustion balanced chemical equation

+ → +

Other alkane combustion balanced chemical equations

Methane (CH₄)

Ethane (C₂H₆)

Butane (C₄H₁₀)

Write one thing you enjoyed about this lesson

Write one thing you would change to improve this lesson