# Year 10 Chemistry | Term 1

## How do we obtain fuel from the remains of living organisms?

**Topic Overview:** The chemistry of carbon compounds is so important that it forms a separate branch of chemistry. A great variety of carbon compounds is possible because carbon atoms can form chains and rings linked by C-C bonds. This branch of chemistry gets its name from the fact that the main sources of organic compounds are living, or once-living materials from plants and animals. These sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents.

| | Lesson Exploration | Knowledge & Skills | Key Words |
|---|---|---|---|
| Week 1: Lesson 1 | **Why is crude oil made from?** | Students should be able to:<br>● explain how crude oil is formed<br>● recognise substances as alkanes given their formulae in these forms.<br>● know the names of specific alkanes: methane, ethane, propane and butane<br>● draw the displayed formula of the first 4 alkanes | ● Crude Oil<br>● Plankton<br>● Methane<br>● Ethane<br>● Propane<br>● Butane<br>● Alkane<br>● Alkene<br>● Boiling Point<br>● Viscosity<br>● Flammability<br>● Combustion<br>● Fractional Distillation<br>● Evaporation<br>● Condensation<br>● Catalytic Cracking |
| Week 2: Lesson 1 | **How does the size of molecules affect their properties?** | Students should be able to:<br>● recall how boiling point, viscosity and flammability change with increasing molecular size.<br>● write balanced equations for the complete combustion of hydrocarbons with a given formula. | |
| Week 3: Lesson 1 | **How do we obtain fuels from crude oil?** | Students should be able to explain how fractional distillation works in terms of evaporation and condensation. | |
| Week 4: Lesson 1 | **How do we make more useful products from crude oil?** | Students should be able to:<br>● describe in general terms the conditions used for catalytic cracking and steam cracking.<br>● recall the colour change when bromine water reacts with an alkene | |

| | | | |
|---|---|---|---|
| | | • balance chemical equations as examples of cracking given the formulae of the reactants and products<br>• give examples to illustrate the usefulness of cracking. They should also be able to explain how modern life depends on the uses of hydrocarbons. | • Thermal Cracking<br>• Bromine Water<br>• Formulation<br>• Pure Substance |
| Week 5: Lesson 1 | **Assessment** | Students should be able to complete a 60 Minute Assessment on C7 Organic Chemistry topic. | |
| Week 6: Lesson 1 | **What is a formulation?** | Students should be able to:<br>• define formulation<br>• identify formulations given appropriate information.<br>• use melting point and boiling point data to distinguish pure from impure substances. | |

| Literacy Links | Numeracy Links |
|---|---|
| **Reading list for the course:**<br>**Books:**<br>• Jack Challoner – The Elements: the New Guide to the Building Blocks of Our Universe<br>• Theodore Gray – The Elements: A Visual Exploration of Every Known Atom in the Universe<br>• Eric R Scerri – The Periodic Table: A Very Short Introduction<br>• Denise Walker – Metals and Non-Metals<br>• Denise Walker – Materials<br>**Websites:**<br>• Young Scientist Journal - www.butrousfoundation.com/ysjournal<br>• School Science - www.schoolscience.co.uk<br>• www.abpischools.org.uk/page/modules/solids-liquids-gases/<br>• Chemistry World Online: www.rsc.org/chemistryworld/<br>• BBC Science and Nature programmes: www.bbc.co.uk/sn/ | • Understanding algebraic expressions to determine the molecular formula of alkanes using a general formula.<br>• Balancing equations |