Year 11
Subject: Chemistry
Topic/Unit: Organic Chemistry
When: Half Term 2 and 3

Huntington School
Learn and succeed

Overview: Why this? Why now?
This unit explores organic chemistry, which is the study of carbon-based compounds found in living things and fossil fuels. Students examine how crude oil provides the raw materials for modern society, from transportation fuels to life-saving medicines and plastics.

Building on...building to:
The unit builds on prior knowledge of covalent bonding, molecular structures, and the conservation of mass. It serves as a foundation for understanding biochemistry and the environmental impact of synthetic materials.

Sequence summary:
- **Crude Oil and Alkanes:** Students learn that crude oil is a finite mixture of hydrocarbons formed from ancient plankton under high pressure and temperature. They study the alkane homologous series and their general formula.
- **Separation and Properties:** Through fractional distillation, crude oil is separated into useful fractions based on boiling points. Students investigate how chain length affects viscosity, flammability, and volatility.
- **Cracking and Alkenes:** To meet demand, long-chain molecules are broken down via thermal decomposition into shorter alkanes and unsaturated alkenes.
- **Polymers and Reactions:** Students explore addition polymerisation, where alkene monomers join to form long-chain polymers like plastics. They also study functional group reactions, including the production of alcohols and carboxylic acids, (separate science only).
- **Biological Molecules:** The unit concludes with condensation polymerisation, examining polyesters, amino acids, and natural polymers such as DNA, starch, and cellulose.

Key Vocabulary:
Hydrocarbon, Homologous series, Cracking, Monomer, Polymer, Fermentation, Ester, Nucleotide.

Assessments:
- **Formative:** Regular drawing of displayed formulas and balancing combustion equations.
- **Summative:** A practical investigation on hydrocarbon viscosity and an end-of-unit examination covering all organic families.

Able and interested:
Learners will evaluate the industrial production of ethanol, comparing fermentation to the steam hydration of ethene. They will also research the history of scientific discovery, such as Rosalind Franklin's role in identifying the double-helix structure of DNA.

Inclusion, Personal Development and Wider Skills:
Practical work develops safety awareness regarding flammable substances and toxic carbon monoxide. Students discuss the environmental threat of non-biodegradable plastics to wildlife and the importance of recycling.

Homework and Independent Learning:
Students will complete a task set on the SPARX online platform. The task is based on the current topic but also includes consolidation on previous topics. It will automatically adjust the level of challenge as the student complete the activities.