### Review C1.5 Other useful substances from crude oil

#### C1.5.1 Obtaining useful substances from crude oil

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**Describe ‘cracking’ as thermal decomposition with heat and either a catalyst or steam**

**Explain why hydrocarbons from crude oil are cracked in this way**

**Identify the products of cracking, and recognise the general formula for alkenes as \( C_nH_{2n} \)**

**Describe alkenes as unsaturated hydrocarbons**

Represent unsaturated hydrocarbons in the following forms:

\[
C_3H_6
\]

- Recognise that = represents a double bond in displayed structures
- Describe the colour change seen when alkenes react with bromine water
- State that some of the products of cracking are useful as fuels
- State that crude oil, which is a limited resource, is used to produce fuels and chemicals

#### C1.5.2 Polymers

**Describe how monomer molecules can join together to form very large polymer molecules, and recognise the molecules involved in the following form:**

Describe some of the useful applications of polymers including: packaging materials, waterproof coatings for fabrics, dental polymers, wound dressings, hydrogels, and smart materials such as shape memory polymers

State that many polymers are not biodegradable, and explain what this means

State that biodegradable plastics made from cornstarch have been developed, and can be used to make plastic bags

Evaluate the social and economic advantages and disadvantages of using products from crude oil as fuels or as raw materials for plastics and other chemicals

Evaluate the social, economic and environmental impacts of the uses, disposal and recycling of polymers

#### C1.5.3 Ethanol

**Describe how ethanol can be produced by hydration of ethene with a catalyst**

**Describe how ethanol can be produced by fermentation of sugar by yeast, and represent the reaction in the following form:**

\[
sugar \rightarrow \text{carbon dioxide} + \text{ethanol}
\]

Evaluate the advantages and disadvantages of making ethanol from renewable and non-renewable resources. You should be able to compare the environmental impact of different ways of producing ethanol