



# HOMework BOOKLET

**C7 & C8 Challenge**

# Fractional Distillation

Homework 1

Use the words in the box to complete the following;

\_\_\_\_\_ oil is a mixture of \_\_\_\_\_ which can all be used for different things. This ranges from oil for ships to \_\_\_\_\_ for cars and lorries, to tar which is used to surface roads. All the chemicals \_\_\_\_\_ at different temperatures. This mixture can be separated in a \_\_\_\_\_ column in a process called \_\_\_\_\_.

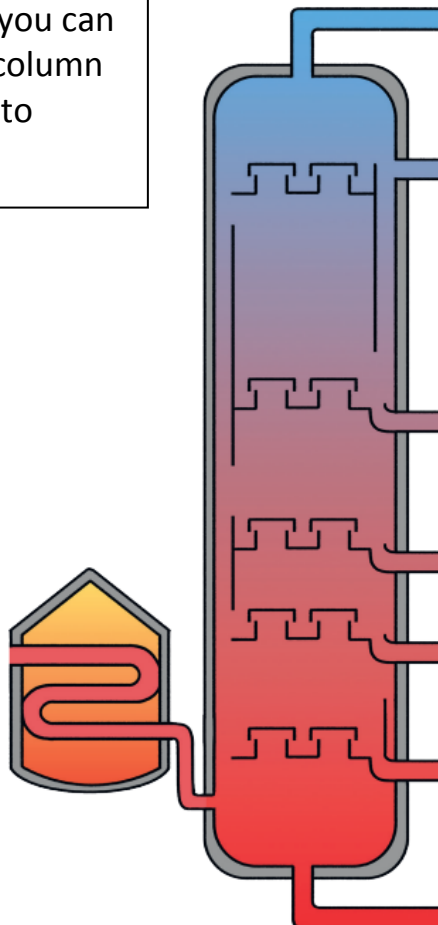
Crude oil is heated to about \_\_\_\_\_ – at this temperature most of the oil has \_\_\_\_\_ (turned into a gas). It is when the chemicals are all liquids that it is placed into the column to be \_\_\_\_\_ into the different fractions. The gases cool as they rise up the tower. The different gases all have different boiling \_\_\_\_\_.

Having different boiling points means that as each one \_\_\_\_\_ down below its boiling point it turns back into a \_\_\_\_\_. These liquids collect at different \_\_\_\_\_ up the tower – allowing us to remove them and use them in that particular state.

For example the fraction that boils at  $180^{\circ}\text{C}$  is called \_\_\_\_\_. This is often used as fuel for \_\_\_\_\_. Residue is used for road \_\_\_\_\_ and the \_\_\_\_\_ of engines – it boils at  $340^{\circ}\text{C}$ .

**Crude separated aeroplanes tar points fractional distillation cools**  
**kerosene liquid heights evaporated petrol lubrication boil chemicals**  
**distillation  $350^{\circ}\text{C}$**

**Task:** Add as much detail as you can to the fractional distillation column used to separate crude oil into different fractions.



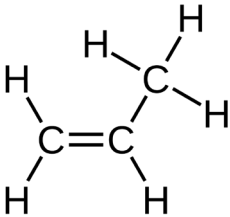
# Identifying Alkanes

Homework 1

Alkane	Structure	Structural Formula	Chemical Formula
methane			
	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$		
		$\text{CH}_3\text{CH}_2\text{CH}_3$	
			$\text{C}_4\text{H}_{10}$
pentane			
	$\begin{array}{cccccccc} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \\ &   &   &   &   &   &   & \\ \text{H} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{H} \\ &   &   &   &   &   &   & \\ & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \end{array}$		
		$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$	

# Identifying Alkenes

Homework 1

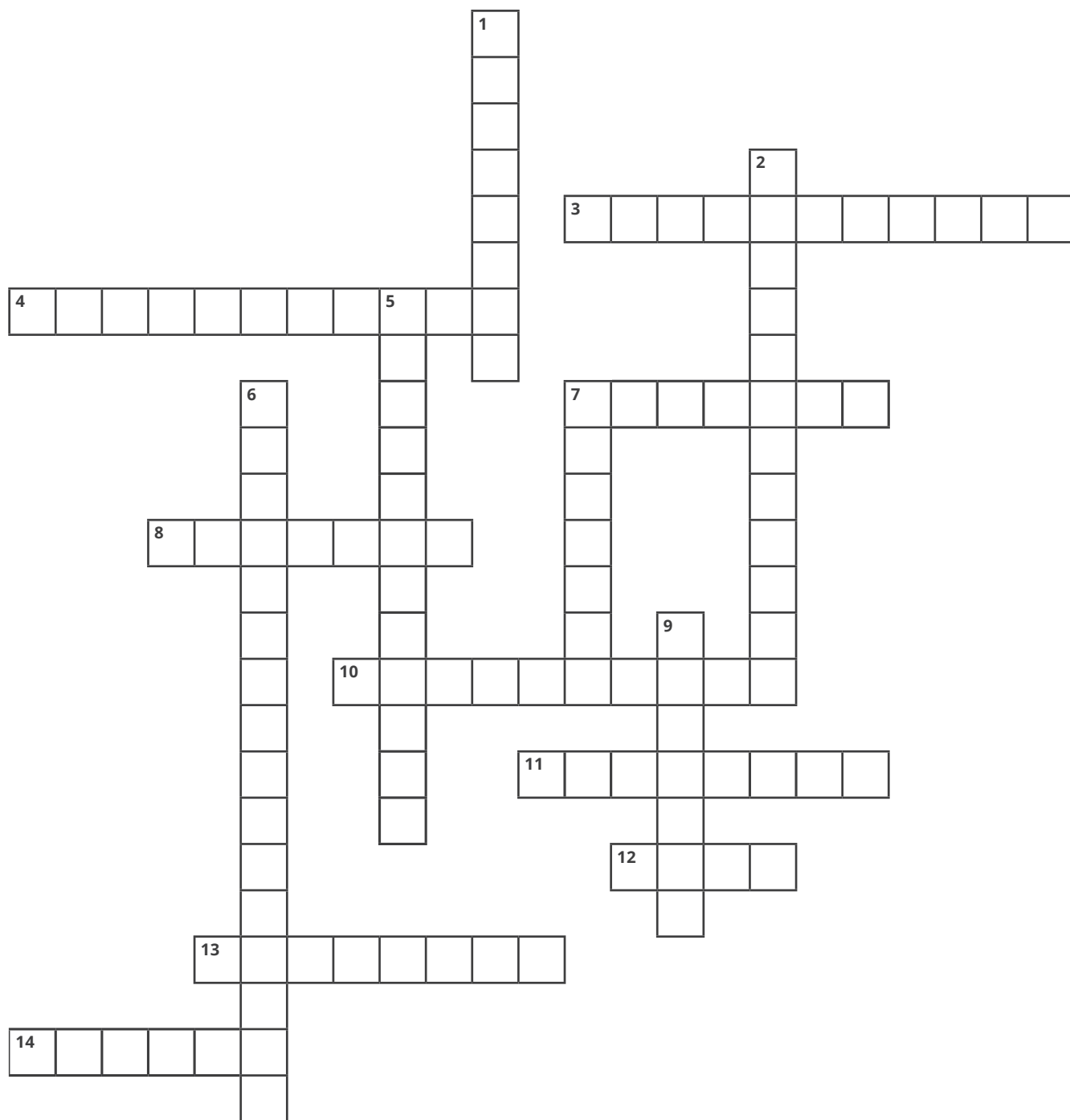
Alkene	Structure	Structural Formula	Chemical Formula
ethene			
			
		$\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$	
			$\text{C}_5\text{H}_{10}$
hexene			



# Organic Chemistry Crossword

Homework 2

Solve the clues to complete the crossword. Each of the answers to the clues relates to organic chemistry. The number of letters in each word has been given to help you.



**Across**

- A change of state from a liquid to a gas. (11)
- A molecule made of hydrogen and carbon atoms only. (11)
- A series of hydrocarbons that are more reactive than alkanes and can decolourise bromine water. (7)
- An alkane molecule containing three carbon atoms. (7)
- A reaction between a substance and oxygen in the air. The scientific word for burning. (10)
- A group of hydrocarbons, with molecules containing a similar number of carbon atoms, that condense together when crude oil is separated by fractional distillation. (8)
- A chemical substance, such as petrol, diesel or kerosene, that releases energy when burned. (4)
- A fossil fuel formed from the remains of an ancient biomass consisting mainly of plankton that was buried in mud. (5,3)
- A word to describe a limited resource that isn't replenished or replaced quickly enough to be considered renewable. (6)

**Down**

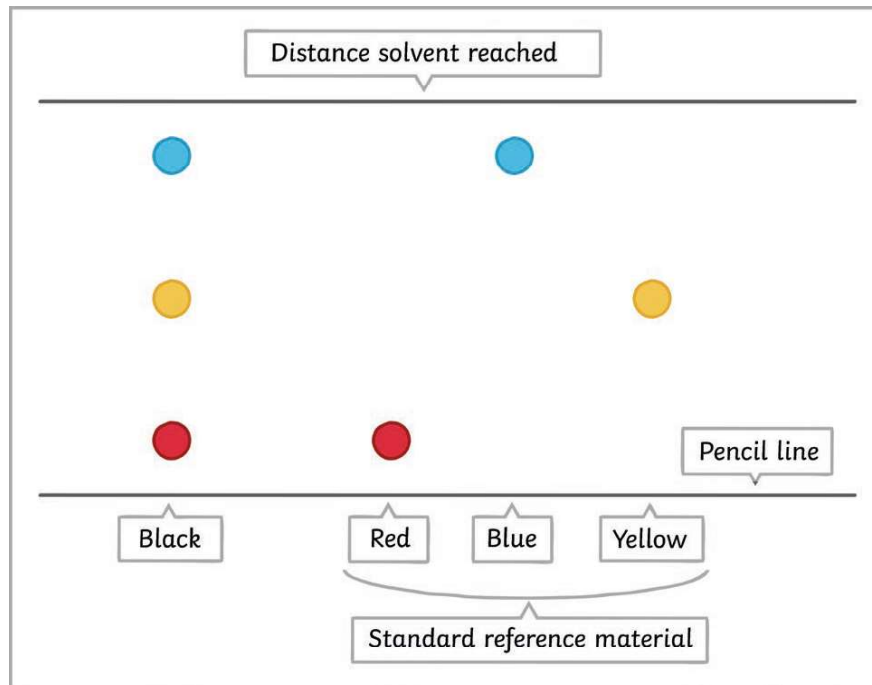
- A process used to convert long-chain hydrocarbons into shorter, more useful molecules. (8)
- A change of state from gas to liquid. (12)
- The temperature at which a substance changes from a liquid to a gas or from a gas to a liquid. This temperature increases as the size of a molecule increases. (7,5)
- A series of compounds which have the same general formula and functional group, and react in a similar way. (10,6)
- A series of hydrocarbons with the general formula  $C_nH_{2n+2}$ . (7)
- A word to describe a substance that does not flow easily, e.g. a long-chain hydrocarbon. (7)

# Investigating the Separation of a Mixture of Dyes by Paper Chromatography **Exam Style Questions**

Homework 3

1. A student carried out a chromatography investigation to separate the different dyes in coloured inks.

The diagram below shows her results:



1(a) Calculate the  $R_f$  value of yellow ink and complete the table of results below. [2 marks]

Ink	Distance travelled (mm)		$R_f$ Value
	Solvent	Compound	
Red			
Blue			
Yellow			

1(b): What can you conclude about black ink from the information from the table and the chromatogram? [2 marks]

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# Gas Tests - Activity Sheet

Homework 3

Draw a line to match the gas with the gas test result.

**Carbon Dioxide**

Relights a glowing splint.

**Hydrogen**

A lighted splint makes a popping sound.

**Oxygen**

This gas turns limewater cloudy.