

Learning Grids for OCR AS and A Level Year 1 Chemistry A

Module 4: Core Organic Chemistry

Update v1.1, May 2018

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Teacher's Introduction

These learning grids are a tool designed to help you deliver **AS and A Level Year 1 OCR Chemistry A Module 4: Core Organic Chemistry** (for first teaching in September 2015). The concept is that your students are assigned a set of pages to read from their notes or a textbook, possibly for homework, and then asked to complete the relevant learning grids. These activities may be particularly useful for your weaker learners, who may benefit from both the requirement to read all the notes to find the information and the act of writing down the answers.

The grids are designed to ask questions in sufficient detail that your students are able to study the relevant sections and find the correct answers. Completed grids are provided so that your students' answers can be marked or checked. It may also be useful to hand them out to students during their revision to assist them with answers they cannot find.

This edition supports students using and is cross-referenced to:

- *A Level Chemistry A for OCR Year 1 and AS Student Book; Ritchie and Gent; Oxford University Press, 2015; ISBN 978-0198351962*
- *OCR AS/A Level Year 1 Chemistry A; Holyman, Scott and Stutt; Pearson Education Limited, 2015; ISBN 978 1447990789*

Advantages of using these learning grids are:

- Some students will find this method of studying of great value, particularly if they find it difficult to absorb information in class.
- Resulting grids contain a bullet-point summary that may be useful for revision.
- They are an easy-to-set yet valuable homework.
- They are a useful catch-up tool to help students who have missed a lesson.
- They can be used as a basis for cover lessons that require minimal preparation and no interaction from the cover teacher.
- They are an independent learning resource.

You may want to photocopy the sheets onto A3 paper, particularly for students with reading or writing difficulties.

Some questions will require use of a calculator.

Remember!

Always check the exam board website for new information, including changes to the specification and sample assessment material.



Word + PDF

Note that there is the option to pay an additional 30% to get this resource in PDF format or an additional 50% to get this resource in Word format. The latter allows you to edit the resource to adapt it for your students, and also to put it on your intranet or VLE so students can fill in the grids electronically.

For all formats the licence terms are that the purchasing institution can make unlimited copies on a single site, for students and teachers officially registered at that site.

We hope you find these grids useful during your teaching.

Update v1.1, 11 May 2018

Images of the haloalkanes in Q1 a) and b) corrected on page 21 of the question booklet.

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* resulting from minor specification changes, suggestions from teachers and peer reviews, or occasional errors reported by customers

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Selected Question and Answer Pages

For demonstration only, the sample answer pages immediately follow their corresponding question pages

	Question	Answer
Continued	<p>Draw the displayed formula of the following alkenes:</p> <p>a) but-2-ene</p> <p>b) but-1-ene</p> <p>c) hept-3-ene</p>	<p>a)</p> <p>b)</p> <p>c)</p>
	An organic compound has the formula CH_3CHO . Identify its functional group.	
	What is the functional group in an alcohol?	
	<p>Name this compound:</p> <pre> H H H O H — C — C — C — C \ H H H OH </pre>	

Question	Answer
<p style="text-align: center;"><i>Continued</i></p> <p>Draw the displayed formula of the following alkenes:</p> <p>a) but-2-ene b) but-1-ene c) hept-3-ene</p>	<p>a)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> $\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{H} \\ & & & & & & & \\ \text{H} & - \text{C} & - & \text{C} = & \text{C} & - & \text{C} & - \text{H} \\ & & & & & & & \\ & \text{H} & & & & & \text{H} & \end{array}$ $\begin{array}{ccccccc} & \text{H} & & \text{H} & & & & \text{H} \\ & & & & & & & \\ \text{H} & - \text{C} & - & \text{C} = & \text{C} & - & \text{C} & - \text{H} \\ & & & & & & & \\ & \text{H} & & & & & \text{H} & \end{array}$ </div> <p>b)</p> $ \begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{H} \\ & & & & & & & / \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} = & \text{C} & \\ & & & & & & & \backslash \\ & \text{H} & & \text{H} & & & & \text{H} \end{array} $ <p>c)</p> $ \begin{array}{ccccccccccc} & \text{H} & & \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{C} & - \text{H} \\ & & & & & & & & & & & & \\ & \text{H} & & \text{H} & & & & & \text{H} & & \text{H} & & \text{H} \end{array} $
An organic compound has the formula CH ₃ CHO. Identify its functional group.	Aldehyde
What is the functional group in an alcohol?	OH
Name this compound: $ \begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{O} \\ & & & & & & & \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - & \text{C} \\ & & & & & & & \backslash \\ & \text{H} & & \text{H} & & \text{H} & & \text{OH} \end{array} $	Butanoic acid

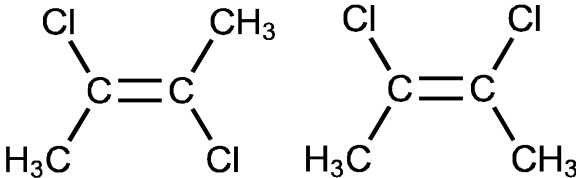


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	Question	Answer
Stereoisomerism	Complete the following definition of stereoisomers:	Compounds that have the same _____ but a different _____.
	What causes E/Z isomerism to occur?	
	Draw and label the E and Z isomers of 2,3-dichlorobut-2-ene	
	How is cis-trans isomerism different to E/Z isomerism?	



	Question	Answer
Stereoisomerism	Complete the following definition of stereoisomers:	Compounds that have the same <u>structural formula</u> but a different <u>spatial arrangement</u> .
	What causes E/Z isomerism to occur?	The inability of the C=C bond to rotate and different groups attached to each carbon atom.
	Draw and label the E and Z isomers of 2,3-dichlorobut-2-ene	 <p style="text-align: center;"> <i>Z</i> <i>E</i> </p>
	How is cis-trans isomerism different to E/Z isomerism?	<p><i>Cis-trans isomerism requires two different groups attached to each end of the C=C bond; however, the two ends of the C=C bond must have the same groups attached to each other (often this is hydrogen). E/Z isomerism is not restricted to the same groups attached to the double bond, or the same groups on each side, as in cis-trans isomerism.</i></p>



Additional Selected Question Pages

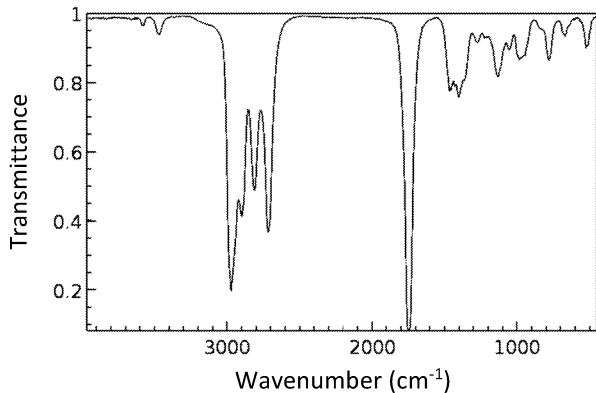
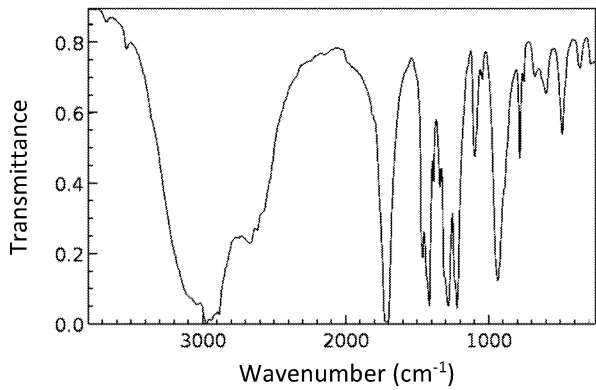


	Question	Answer
Synthetic Routes	<p>Identify the functional groups in the following molecules:</p> <p>a)</p> $\begin{array}{ccccccc} & \text{H} & \text{H} & \text{H} & \text{H} & & \text{O} & \text{H} & \text{O} \\ & & & & & & & & \\ \text{H} & - \text{C} & - \text{C} = & \text{C} & - \text{C} & - \text{O} & - \text{C} & - \text{C} & - \text{C} - \text{OH} \\ & & & & & & & & \\ & \text{H} & & & \text{H} & & & \text{H} & \end{array}$ <p>b)</p> $\begin{array}{cccc} & \text{O} & \text{OH} & \text{H} & \text{H} \\ & & & & \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{C} - \text{I} \\ & & & & \\ & \text{H} & \text{H} & \text{H} & \end{array}$	<p>a)</p> <p>b)</p>
	Using your knowledge of reactions from this course, describe how a chemist could create a ketone from an alkene.	
	Describe how a haloalkane could be converted into an alkene.	

4.2.4 Analytical techniques



	Question	Answer
Infrared Spectroscopy	What effect does infrared radiation have on the bonds in a covalent molecule?	
	Explain how absorption of infrared radiation can be used to determine the identity of a bond.	
	How does emission of infrared radiation contribute to global climate change?	
	How do organic chemists use infrared spectroscopy to identify molecules?	
	Where would you find the fingerprint region of an infrared spectrum?	
	Describe the key differences between an infrared spectrum of an alcohol and a carboxylic acid.	

		Question	Answer
Continued		All organic compounds will have a peak in which region and why?	
		In what circumstances do the police use infrared spectroscopy?	
		<p>A chemist has two products from a reaction. One of the products is an aldehyde and one is a carboxylic acid. The following IR spectra were acquired of the two substances. Identify which spectrum belongs to the aldehyde and which belongs to the carboxylic acid.</p> <p>A</p>  <p>Wavenumber (cm^{-1})</p> <p>B</p>  <p>Wavenumber (cm^{-1})</p>	<p>A =</p> <p>B =</p>