MD5

CHECK YOUR KNOWLEDGE AND UNDERSTANDING

This activity helps you to check your knowledge and understanding of the new topics that you have covered in this module.

Introduction

The checklist below covers the key points in **Chemical Storylines MD1** to **MD5**.

The statements listed correspond to learning outcomes in the specification for the A2 examinations. They are listed in the order in which they occur in this module.

You will probably have made summary notes of the main ideas that you have met. Now is a good time to make sure that your notes cover all the points you need. If you feel that you are not yet able to meet the requirements of all of the statements in the list, you should look again at the areas concerned, seek help from your teacher if necessary and develop your notes accordingly.

Most of the points are covered in **Chemical Ideas**, with supporting information in **Chemical Storylines** or the activities. However, if the main source of information is in a storyline or an activity, this is indicated.

What you do

Read and think about each of the statements in the checklist. Put a tick in the column that best represents your current ability to do what is described.

A – I am confident that I can do this
B – I need help to clarify my ideas on this
C – I am not yet able to do this

You will be sharing this information with your teacher so that you can work together to improve your understanding.

At the end of Chemical Storylines MD1 to MD5 you should be able to:	A	B	C
• describe and explain how proton nuclear magnetic resonance spectra (n.m.r.) can be used for the elucidation of molecular structure (*including splitting patterns up to quartets – using the 'n + 1' rule*)			
• explain how a combination of spectroscopic techniques [m.s., i.r. (synoptic) and n.m.r.] can be used to elucidate the structure of organic molecules			
• describe and explain the structure and action of a given pharmacologically active material in terms of: – the pharmacophore and groups that modify it – its interaction with receptor sites – the ways that species interact in three dimensions (size, shape, bond formation, orientation) **Chemical Storylines MD3**			
• make predictions about the properties of a polyfunctional molecule			
• use organic reactions and reaction conditions mentioned elsewhere in the specification (AS and A2) with any further given reactions, to suggest and explain synthetic routes for preparing organic compounds, including simple examples of retrosynthesis			
• describe and explain the role of chemists in: – designing and making new compounds for use as pharmaceuticals – ethical testing – the application of computer modelling techniques in the design of medicines **Chemical Storylines MD2, MD3**			

continued

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Synoptic statements The following statements describe the knowledge and understanding that you have covered in more detail in earlier modules, but that you have met or used again when studying **Medicines by Design.** Check that you are confident about these learning outcomes – they may be assessed in the A2 examinations in questions that require you to *apply* your knowledge and understanding from different areas of the subject.	**A**	**B**	**C**
• recall and use systematic nomenclature for naming and interpreting names of compounds met earlier in the specification (AS and A2)			
• recognise and draw structures for individual functional groups mentioned elsewhere in the specification (AS and A2) within a polyfunctional molecule			
• recall organic reactions and reaction conditions mentioned elsewhere in the specification (AS and A2)			
• use the following terms to classify organic reactions: *addition, condensation, elimination, substitution, oxidation, reduction, hydrolysis*			
• use and explain the following terms: *radical, electrophile, nucleophile, carbocation, saturated, unsaturated*			
• use the following terms to classify organic reactions according to their reaction mechanisms: – *radical substitution** – *electrophilic addition** – *nucleophilic substitution** – *electrophilic substitution* – *nucleophilic addition** *be able to describe and explain the mechanisms of these processes in terms of bond polarisations and 'curly arrows'			
• draw and interpret skeletal, structural and full structural formulae as representations of molecules • relate molecular shape to structural formulae and use wedges and dotted lines to represent 3D shapes • use the concept of repulsion of areas of electron density to deduce the bond angles in organic molecules (including double bonds) (no treatment required of small deviation of angle due to lone-pair repulsion) • recognise where *E/Z* isomerism occurs, explaining it in terms of lack of free rotation about C=C bonds when there are two different groups on each carbon • draw and interpret diagrams to represent *E/Z* isomers for alkenes which have the same groups on both sides of the double bond (*E* – opposite sides of bond; *Z* – same side of bond) • in such molecules, describe '*E*' as 'trans' and '*Z*' as 'cis' and extend this cis-trans nomenclature to other, more complicated alkenes • explain and use the term chiral as applied to a molecule • explain that enantiomers are non-superimposable mirror-image molecules **Chemical Ideas 3.3, 3.4, 3.5**			

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