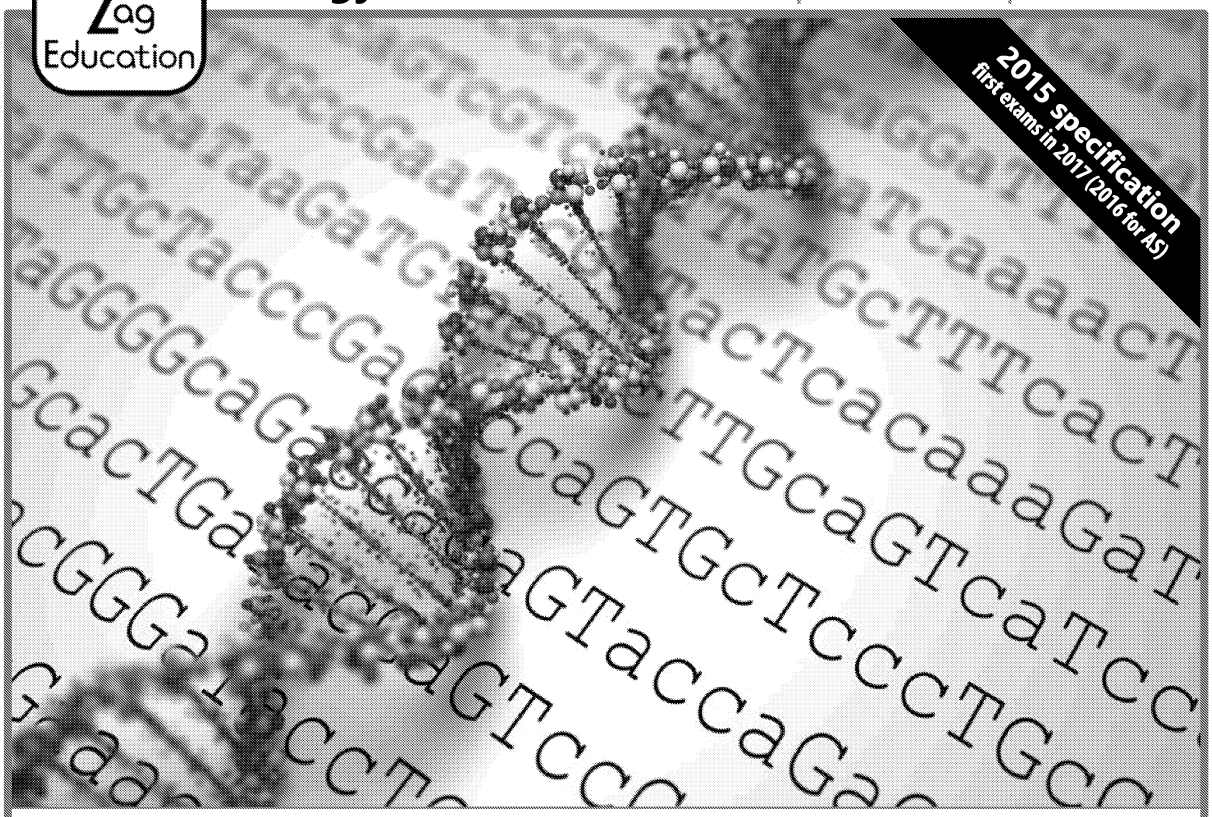
Zig Zag Education

Biology AS and A Level | Edexcel B | 8BI0/9BI0



Learning Grids

For AS and A Level Year 1 Edexcel B Biology

Topic 1: Biological Molecules

zigzageducation.co.uk **POD 8082a**

Contents

Teacher's Introduction

These learning grids are designed to help your student independently learn content and help you to assess their knowledge during teaching of each section of **Topic 1: Biological Molecules**, within the **Edexcel (B) AS Level / A Level Year 1 Biology** specification. The concept is that your students are assigned a set of pages to read from the relevant book and then are asked to complete the relevant learning grids, possibly for homework or as a refresher for a topic. These activities are particularly useful for students who need more support, but they contain some thought-provoking reasoning questions which will stimulate more engaged students.

This resource references:
EdExcel A Level Biology 1;
Lees, Rowland & Clegg;
Hodder Education 2015
Pearson, 2015
And
Edexcel AS/A Level Biology (B) 1;
Ann Fullick;
Pearson (2nd Edition), 2015

Each learning grid is closely linked to the Edexcel B 2015 specification and to the approved textbooks. Skills for **Working Scientifically** are developed throughout the resource, with in particular in the Experiment Time section which covers Core Practical 1. Relevant textbook page numbers are provided at the top of each worksheet, to allow easy cross-referencing. Separate resources cover the other units.

Each learning grid contains a range of question styles, including:

- **Quick-testing questions** – these may be a phrase, a definition or a numeric response.
- **Missing information/Anagrams/Match-terms-to-definitions questions** – test key knowledge quickly.
- **Explain-a-process questions** – encourage students to recognise cause and effect in Biological processes.
- **Drawing questions** – will develop knowledge of molecular structure and how this relates to function.
- **Graph interpretation questions** – will require drawing, annotation and explanation of key features, interpretation/analysis of data, and understanding of how to calculate initial rate of reaction.
- **Applied knowledge questions** – challenge students to apply knowledge in unfamiliar situations.
- **Experiment Time questions** – ask students to analyse a practical, interpret its results and recognise strengths and weaknesses.
- **Quick Quiz** at the end of each topic assesses understanding and can be used to confirm students are ready to move on to the next topic.

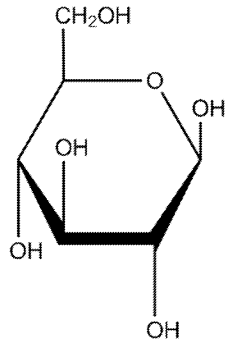
Learning grids in this section will take about 25–40 minutes each. Some questions will require use of a calculator.

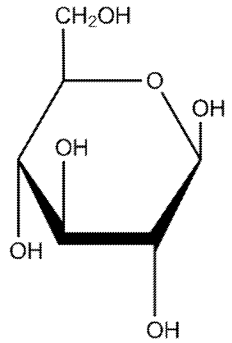
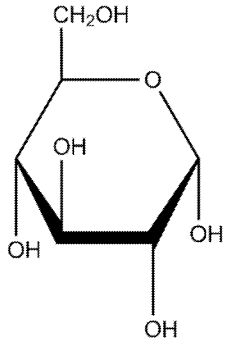
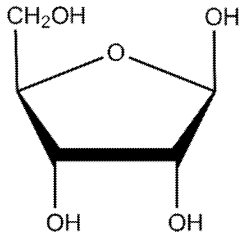
These resources can be used to allow those who have missed lessons to catch up quickly. They can be the basis for a homework exercise, and the answer scheme allows them to be easily used in cover lessons. Students could also use the sheets as an independent learning and revision resource, using the answers to assess their own work.

All resources can be photocopied into black and white. We hope you and your students enjoy this resource!

Selected Question and Answer Pages

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

	Question	Answer
1.1 – Carbohydrates I: Small Sugars (continued)	**5) i) Name this monomer.**  **ii) Draw and name its isomer.** **iii) How do the structure and properties of glucose make it useful as an energy source?**	**i)** **ii)** **iii)**
	6) The molecule shown in question 5) is a hexose sugar. Explain what this means.	
	7) Draw a molecular diagram of the ring form of the sugar ribose.	

1.1 – Carbohydrates I: Small Sugars (continued)	Question	Answer
	5) i) Name this monomer.  **ii) Draw and name its isomer.** **iii) How do the structure and properties of glucose make it useful as an energy source?**	**i)** β-glucose **ii)** α-glucose  **iii)** Bonds contain lots of energy; glucose is small and soluble in water, so it is easy to transport to where it is needed.
	6) The molecule shown in question 5) is a hexose sugar. Explain what this means.	It is a sugar (a molecule with the general formula $(CH_2O)_n$), which contains six carbon molecules. Alternatively, it is a sugar with the formula $C_6H_{12}O_6$.
	7) Draw a molecular diagram of the ring form of the sugar ribose.	

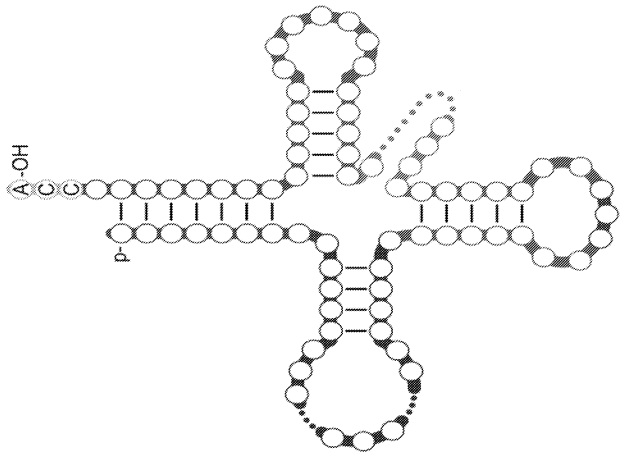
1.4 – Proteins (continued)

Question	Answer
4) What is a polypeptide, and how is it formed?	
5) Circle the two phrases which have the same meaning.	Sequence of amino acids in a peptide / Secondary protein structure Multiple peptides joining together / Sequence of DNA bases used to produce a peptide Primary protein structure / Covalent bonding
6) Describe how the secondary structure of proteins is formed.	
7) i) Match the bonds with their properties. ii) These bonds all form part of the tertiary structure of a protein. Describe tertiary structure.	i) Ionic bonds – Strong bonds that aren't easily broken Disulphide bridges – Numerous, very weak bonds Hydrogen bonds – Moderate strength, broken by pH changes ii)

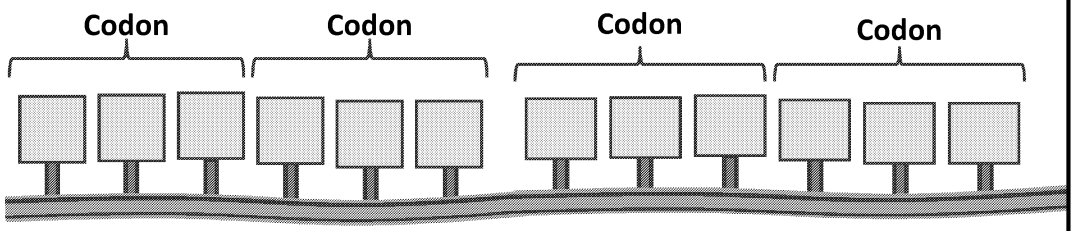
	Question	Answer
1.4 – Proteins (continued)	**4) What is a polypeptide, and how is it formed?**	A polypeptide is a polymer formed from multiple amino acids, with each pair joined together by peptide bonds. It is formed through a series of condensation reactions, each of which releases one molecule of water.
	5) Circle the two phrases which have the same meaning.	**Sequence of amino acids in a peptide** (circled) — **Secondary protein structure** **Multiple peptides joining together** — **Sequence of DNA bases used to produce a peptide** **Primary protein structure** (circled) — **Covalent bonding**
	6) Describe how the secondary structure of proteins is formed.	The amino group has an overall positive charge and the carboxyl group has an overall negative charge; therefore, hydrogen bonds form between adjacent amino acids which twist the polypeptide chain into a regular structure (an α-helix or a β-pleated sheet).
	7) i) Match the bonds with their properties. **ii) These bonds all form part of the tertiary structure of a protein. Describe tertiary structure.**	**i)** **Ionic bonds** → **Strong bonds th** **Disulphide bridges** → **Numerou** **Hydrogen bonds** → **Moderate streng** **ii)** The secondary structure folds because of bo 3D shape which determines the protein's fun

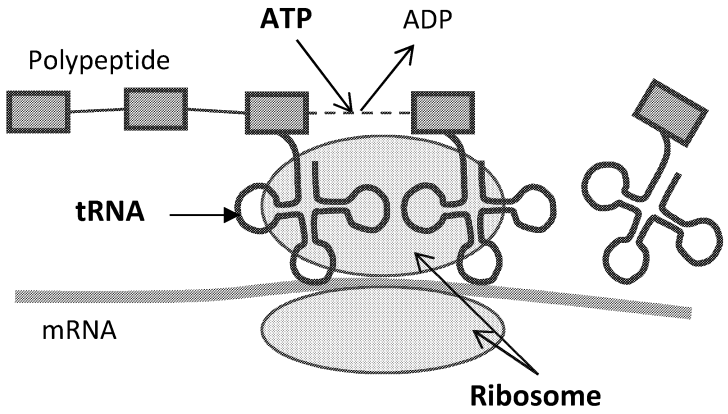
Additional Selected Question Pages

2.3 – RNA and Protein Production

Question	Answer
1) a) Tick which bases are in each molecule in the table. b) Compare the shape and average size of DNA and mRNA molecules.	a) b)
2) Identify two differences between the structure of mRNA and tRNA.	1. 2.
3) The diagram to the right shows a tRNA molecule. Label: the 3' end, the 5' end, the anticodon.	

	Adenine	Cytosine	Guanine	Thymine	Uracil

2.3 – RNA and Protein Production (continued)	Question	Answer
	4) Give two differences between the nucleotides which make up DNA and those which make up mRNA.	
	5) *'Transcription creates proteins from genes.'* How could you change this statement to make it more accurate?	
	6) Fill in the gaps to complete the paragraph.	During transcription, the _____ or coding strand of DNA is used to make a molecule of _____. DNA is 'unzipped' by the enzyme _____, which separates the coding and _____ strands of the double helix so that DNA can be used for transcription. The enzyme _____ then causes _____ to join to the DNA molecule. When the enzyme reaches the end of the gene, it stops transcribing, and a full _____ molecule breaks away from its DNA template.
	7) This sequence of bases is transcribed by RNA polymerase: ACGGGTAACGTA Fill in the mRNA sequence created by this transcription.	

	Question	Answer
2.3 – RNA and Protein Production (continued)	**8) Each three letter codon on mRNA associates with an anticodon on tRNA.** **Compare this anticodon to the original DNA triplet sequence.**	
	9) Study the diagram below. **What role does each of the components in *bold* play in translation?**  	
	10) Give a summary of the process of protein synthesis in no more than three sentences.	

