



Learning Grids

For GCSE (9–1) Edexcel Biology

*Topics 1–5: Key Concepts in Biology; Cells and Control;
Genetics; Natural Selection and Genetic Modification;
Health, Disease and the Development of Medicines*

zigzageducation.co.uk

POD
7679a

Publish your own work... Write to a brief...
Register at publishmenow.co.uk

Contents

Thank You for Choosing ZigZag Education	ii
Teacher Feedback Opportunity	iii
Terms and Conditions of Use.....	iv
Teacher’s Introduction	v
Topic 1 – Key Concepts in Biology.....	1
Required Practical 1.....	9
Quick Quiz.....	10
Required Practical 2.....	13
Required Practical 3.....	15
Quick Quiz.....	16
Required Practical 4.....	22
Quick Quiz.....	23
Topic 2 – Cells and Control	24
Quick Quiz.....	27
Quick Quiz.....	31
Quick Quiz.....	38
Topic 3 – Genetics	39
Quick Quiz.....	47
Quick Quiz.....	56
Topic 4 – Natural Selection and Genetic Modification	57
Quick Quiz.....	62
Quick Quiz.....	67
Topic 5 – Health, Disease and the Development of Medicines	68
Quick Quiz.....	74
Required Practical 5.....	78
Quick Quiz.....	82

Teacher's Introduction

These learning grids are designed to help your students independently learn content and will help you to assess their knowledge during teaching of each section of **Topics 1 – 5: Key concepts in biology, Cells and control, Genetics, Natural selection and genetic modification, and Health, disease and the development of medicines**, within the **Edexcel GCSE Paper 1 Biology** specification. The concept is that your students are assigned a set of pages to read from the relevant book and are then 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 also contain some thought-provoking reasoning questions which will stimulate highly engaged students.

Each learning grid is closely linked to the Edexcel 2016 specification and to the approved textbooks. Relevant textbook page numbers are provided at the top of each worksheet, to allow easy cross-referencing.

This resource directly references:

Edexcel GCSE (9 – 1) Biology
Levesley and Kearsey (Pearson)

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

- **Quick-testing questions** – these may be a phrase, a definition or a numeric response.
- **Labelling questions** – designed to introduce structural and anatomical concepts to the student.
- **Missing information / Match-terms-to-definitions questions** – test key knowledge quickly.
- **Explain-a-process questions** – encourage students to recognise cause and effect in biological processes.
- **Applied knowledge questions** – challenge students to apply knowledge in unfamiliar situations.
- **Experiment Time** – asks 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 on average take 20 – 30 minutes each. However, this resource includes substantial opportunities to develop mathematics skills, and students who find maths challenging may find that these resources take longer to complete.

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

All resources can be photocopied in black and white.

We hope you and your students enjoy this resource!

Free Updates!

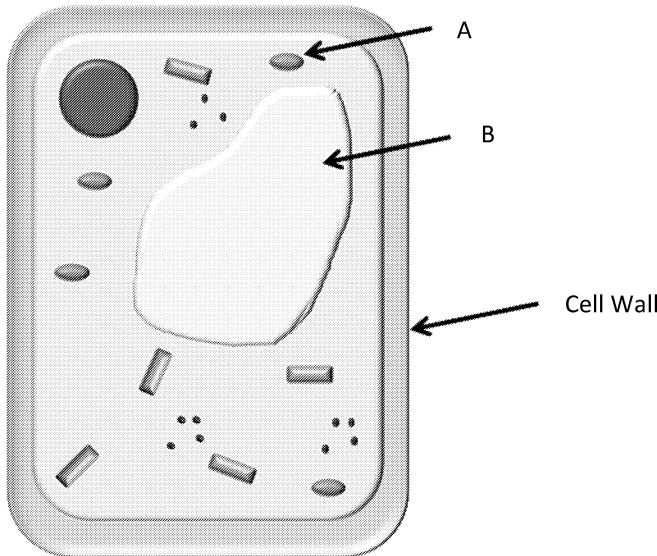
Register your email address to receive any future free updates* made to this resource or other Biology resources your school has purchased, and details of any promotions for your subject.

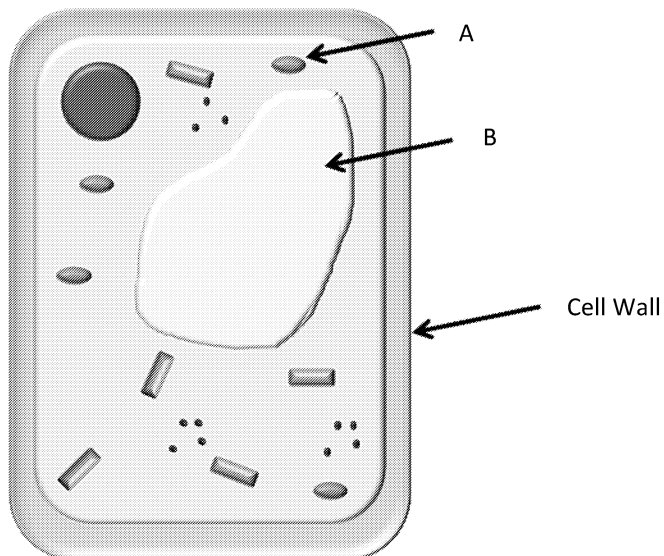
* resulting from minor specification changes, suggestions from teachers and peer reviews, or occasional errors reported by customers


Go to [zzed.uk/freeupdates](https://www.zzed.uk/freeupdates)

Selected Question and Answer Pages

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

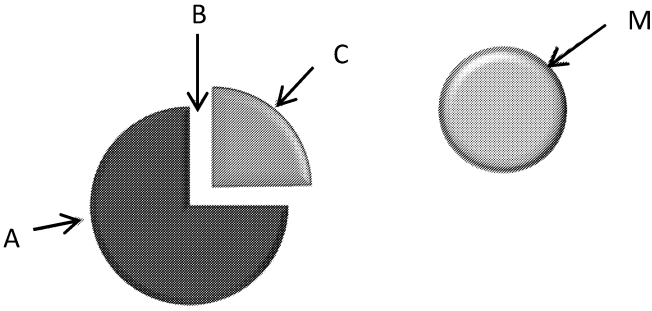
	Questions	Answers										
1.1 Cell Structure (Continued)	a) What type of cell is labelled here?											
												
	b) What are the parts labelled A and B, that are specific to this cell type?											
	What is the function of mitochondria?											
	Complete this table on the role of sub-cellular structures.	<table><tr><th>Part</th><th>Role</th></tr><tr><td>Nucleus</td><td></td></tr><tr><td></td><td>Performs photosynthesis</td></tr><tr><td></td><td>Can make bacteria resistant to antibiotics</td></tr><tr><td>Cell membrane</td><td></td></tr></table>	Part	Role	Nucleus			Performs photosynthesis		Can make bacteria resistant to antibiotics	Cell membrane	
Part	Role											
Nucleus												
	Performs photosynthesis											
	Can make bacteria resistant to antibiotics											
Cell membrane												

1.1 Cell Structure (Continued)	Questions	Answers									
	a) What type of cell is labelled here?	<div></div>									
	b) What are the parts labelled A and B, that are specific to this cell type?										
	What is the function of mitochondria?	Mitochondria provide energy for cells.									
	Complete this table on the role of sub-cellular structures.	<table><tr><th>Part</th><th>Role</th></tr><tr><td>Nucleus</td><td>Carries genetic information</td></tr><tr><td>Chloroplast</td><td>Performs photosynthesis</td></tr><tr><td>Plasmid</td><td>Can make bacteria resistant</td></tr><tr><td>Cell membrane</td><td>Controls what comes in and</td></tr></table>	Part	Role	Nucleus	Carries genetic information	Chloroplast	Performs photosynthesis	Plasmid	Can make bacteria resistant	Cell membrane
Part	Role										
Nucleus	Carries genetic information										
Chloroplast	Performs photosynthesis										
Plasmid	Can make bacteria resistant										
Cell membrane	Controls what comes in and										

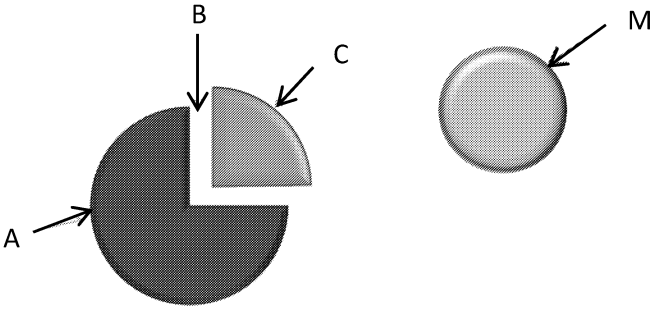


© ZigZag Education



		Questions	Answers
1.8–1.9 Manipulating enzyme productivity		Select the correct enzyme reaction rate for the following temperatures. Choose either a fast, medium or slow rate. a) 15 °C b) 35 °C c) 55 °C	
		Which of these is the correct meaning of 'denatured'? <ul style="list-style-type: none">• The enzyme is killed• The enzyme is artificially made• The enzyme's shape is altered by a change in temperature or pH• The enzyme works at a faster rate	
		Explain the reason for the enzyme working on substrate C, but not on substrate M. 	
		What is meant by the term 'specificity'?	
		How can the rate of an enzyme reaction be increased?	



	Questions	Answers
1.8–1.9 Manipulating enzyme productivity	<p>Select the correct enzyme reaction rate for the following temperatures. Choose either a fast, medium or slow rate.</p> <p>a) 15 °C b) 35 °C c) 55 °C</p>	<p>a) Medium b) Fast c) Slow</p>
	<p>Which of these is the correct meaning of 'denatured'?</p> <ul style="list-style-type: none"> • The enzyme is killed • The enzyme is artificially made • The enzyme's shape is altered by a change in temperature or pH • The enzyme works at a faster rate 	<p>The enzyme's shape is altered by a change in temperature or pH</p>
	<p>Explain the reason for the enzyme working on substrate C, but not on substrate M.</p> 	<p>Substrate M is not complementary to the active site, while substrate C is.</p>
	<p>What is meant by the term 'specificity'?</p>	<p>An enzyme is specific and fits exactly</p>
	<p>How can the rate of an enzyme reaction be increased?</p>	<p>Either:</p> <ul style="list-style-type: none"> • increase temperature to optimal (• increase the concentration of subs • alter pH of the enzyme environment



© ZigZag Education



	Questions	Answers
5.23–5.25 Non-communicable diseases	Name a factor that is likely to cause a non-communicable disease.	
	How does obesity affect the whole of society?	
	Suggest why there is rarely a 'single cause' of cardiovascular disease.	
	A rugby player is 1.77 m tall and weighs 107.00 kg. Use the equation below to calculate the rugby player's BMI: $BMI = \frac{Weight\ (kg)}{(Height\ (m))^2}$	
	Why is BMI a poor indicator of health in muscular athletes, such as the rugby player above?	
	Alcohol and smoking can have adverse effects on the body. Outline the adverse effects caused by these lifestyle choices.	



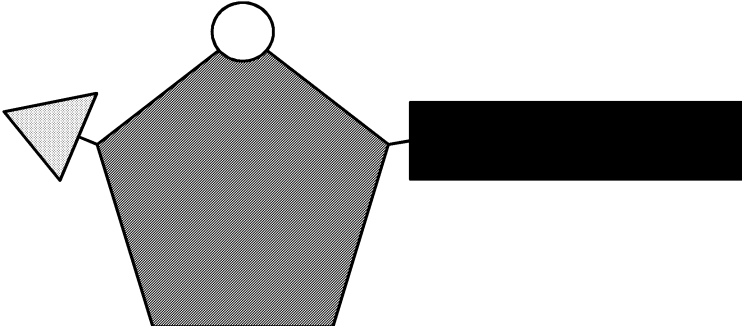
	Questions	Answers
5.23–5.25 Non-communicable diseases	Name a factor that is likely to cause a non-communicable disease.	Poor diet; smoking; genetics; alcohol, etc.
	How does obesity affect the whole of society?	Costs of treatment, pressure on healthcare systems, loss of workers from work force, etc.
	Suggest why there is rarely a 'single cause' of cardiovascular disease.	Many interacting factors, such as poor diet and lack of exercise, work together to cause the disease.
	A rugby player is 1.77 m tall and weighs 107.00 kg. Use the equation below to calculate the rugby player's BMI:	$BMI = \frac{107}{1.77 \times 1.77}$ $BMI = \frac{107}{3.1329} = 34.15$
	Why is BMI a poor indicator of health in muscular athletes, such as the rugby player above?	BMI assumes that being heavy means that you are obese, while muscular athletes are very heavy, but carry very little fat.
	Alcohol and smoking can have adverse effects on the body. Outline the adverse effects caused by these lifestyle choices.	<p>Alcohol can cause liver disease, as well as some cardiovascular diseases.</p> <p>Smoking can cause cardiovascular diseases as well as lung cancer.</p>




Additional Selected Question Pages



		Questions	Answers	
3.3 Meiosis		Fill in the table showing the differences between mitosis and meiosis.		
	Complete the gaps in this description of the process of meiosis:		During meiosis, the _____ is copied first, and the cells divide. After division, the cells _____ again, to form four _____. Each of these is genetically different and contains _____ chromosomes.	
	How does the number of chromosomes in a daughter cell compare to a parent cell before undergoing meiosis?			
	What are the equivalent of sperm and eggs in flowering plants?			
	Meiosis is vital for asexual reproduction. True or false?			

	Questions	Answers
3.4–3.5 DNA	What is the shape of a DNA molecule?	
	What type of bond forms between complementary bases in DNA?	
	What name is given to the collection of all information carried by DNA?	
	<p>The figure on the right shows a nucleotide. Label the components of a nucleotide.</p>	

		Questions	Answers
3.4-3.5 DNA (Continued)	What is the name of this structure? What is it made from?		
	Complete the blanks in this description:	<p>DNA is composed of elements called _____, each of which codes for a particular sequence of _____. These are the building blocks of proteins that perform most of the body's functions.</p> <p>Faults in the sequence of _____ can cause problems with the proteins and lead to diseases.</p>	



	Questions	Answers
3.6 Extracting DNA	<p>Bethany is isolating DNA from a strawberry. She mixes a mashed up strawberry with a salt/detergent mixture.</p> <p>What is the function of:</p> <p>a) the salt?</p> <p>b) the detergent?</p>	
	<p>Towards the end of Bethany's protocol, she adds ethanol to the mix.</p> <p>Why is ethanol used?</p>	