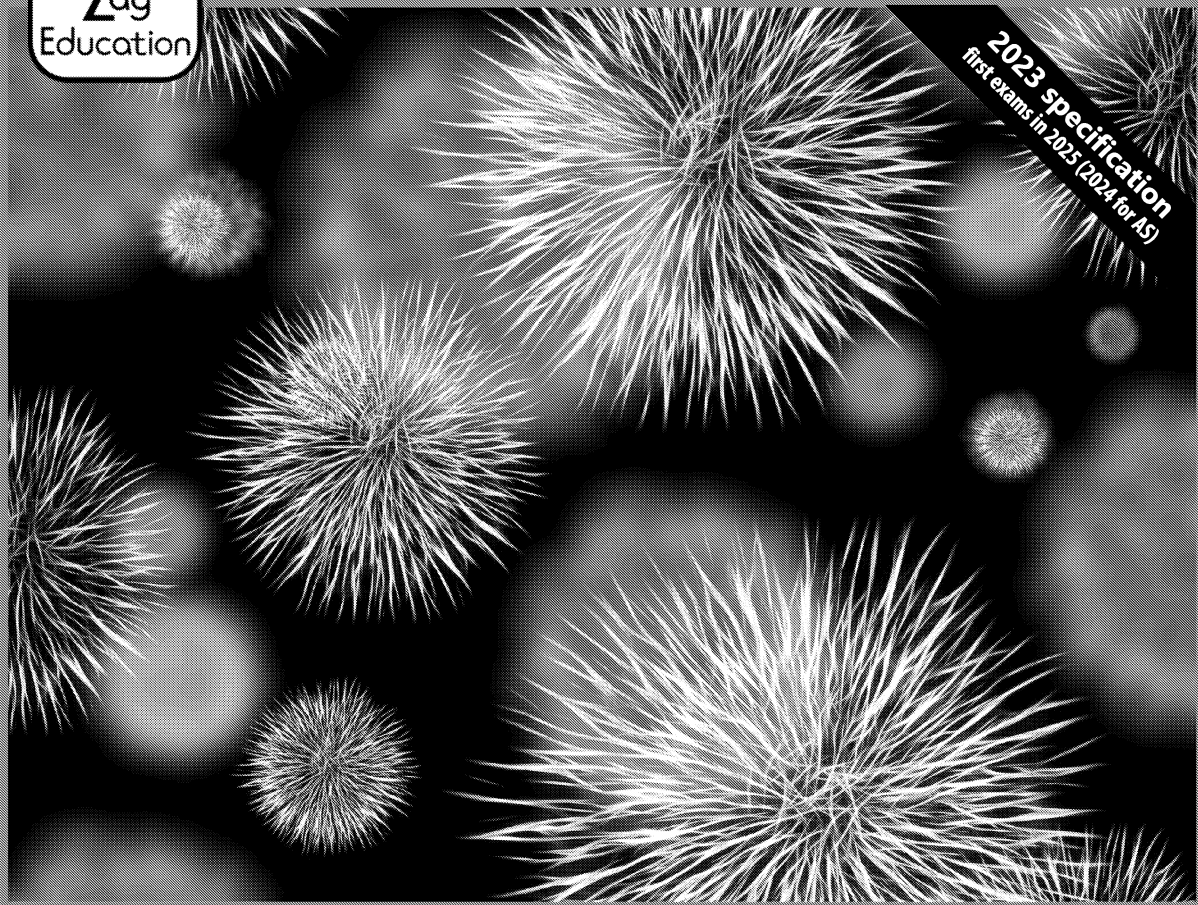




Biology

AS and A Level | OCR A | H020 and H420



Topic Tests

for OCR AS / A Level Year 1 Biology A

Update v1.2, May 2024

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Teacher's Introduction

These topic tests have been designed to help you and your students assess their knowledge of a topic after you have taught each section of the **OCR AS Level / A Level Year 1 Biology A specification**. Each topic test is closely tied to the OCR A specification, ensuring all aspects of the course will be covered including relevant practical and mathematical skills.

Topic Tests contain the following question types:

- **Quick-testing questions** – these test basic understanding and knowledge of terminology, and allow immediate identification of weaker topics
- **Long-answer questions** – these are exam-style questions that require use of comprehensive knowledge and aid practice of writing skills and exam technique
- **Missing information questions** – these allow key knowledge to be tested without it being time-consuming and provide context for further questions
- **Diagram and graph-dependent questions** – these require identification of features, interpretation of data and application of knowledge, as well as testing mathematical skills
- **Practical questions** – cover aspects of practicals from planning and risk awareness to data analysis and evaluation, as well as testing all mathematical skills.
- **Context-dependent questions** – these push students to apply their knowledge to unfamiliar situations, spot key points within provided information and draw on multiple aspects of the course.

Tests have been aimed to take approximately 30 minutes and contain on average between 25 and 35 marks, though please note that this has not been possible where topics are brief and introductory or require more detailed knowledge and assessment. Larger topics have often been split into multiple tests, with each test containing a variety of questions (see next page for details). All information for a question is provided within the test; however, some questions will require use of a calculator and ruler.

Students are able to see the number of marks allocated for each question, allowing them to judge the detail required in their answers as in exam conditions. Full answers are at the end of the resource and are accompanied with marker instructions, providing quick guidelines on what answers would and would not be accepted in exam conditions.

All diagrams and graphs have been designed with black-and-white photocopying in mind, so key features will not be lost.

We hope you find these tests useful during your teaching.

December 2015

Update v1.1, November 2018

Changes have been made to questions and/or mark schemes to correct and improve the resource:

2.1.1 (i), question 8 a), page 37; 2.1.1 (ii), question 1 a) and b), pages 4 and 38; 2.1.2 (iv), question 3 d), page 43; 2.1.2 (iv), question 7 a), page 43; 2.1.5, question 6, page 47; 3.1.2 (i) question 5, page 52; 3.1.2 (i), question 4 b), page 23 and 52; 3.1.2 (iii), question 4 b), page 54

The following questions have had alternative answers added to the mark scheme:

2.1.1 (iii), question 2 b), page 39; 2.1.2 (iii), questions 2 b) and 9, page 42; 2.1.2 (iv), questions 3 b) and 8, page 43; 2.1.3 (i), question 2 b), page 44; 3.1.2 (ii), questions 2 a) vi) and 3 a), page 53; 3.1.2 (iii), questions 1 b), c) and d), page 54; 3.1.3 (ii), question 4, page 56; 4.2.1, question 5, page 61; 4.2.2 (i), question 1 a), page 62; 4.2.2 (ii), question 6 d), page 64

The following questions have been reworded for clarity:

2.1.1 (i), question 6 a), page 3; 2.1.2 (ii), question 7 d), page 7; 2.1.2 (iv), questions 6 a) and 7 a), page 9; 2.1.4 (i), question 4, page 13; 2.1.4 (i), question 6 a), page 14; 2.1.5, question 3, page 17; 2.1.5, question 10, page 17; 3.1.1 (i), question 4, page 21 (and 50); section 3.1.1 (ii), question 1 b), page 22; 4.1.1 (ii), question 1 b), page 30; 4.1.1 (iii), question 6, page 31

Diagrams updated:

2.1.1 (iii), questions 1 and 3, page 5; 2.1.2 (iv), question 3, page 44; 2.1.5, question 3, page 17; 2.1.6 (iii), question 5, page 49; 3.1.2 (ii), questions 2 and 3, page 24; 3.1.3 (i), question 1, page 54

Other minor changes:

2.1.1 (i), question 6 a), page 3; 2.1.2 (ii), question 5, page 41; 2.1.4 (i), question 4, page 45; 2.1.5, question 2, page 47; 3.1.2 (i), question 3, page 51; 3.1.3 (i), question 8, page 2; 4.1.1 (i), question 5 a), page 57

Update v1.2, May 2024:

Changes have been made to reflect the 2023 accessibility and clarity amendments to the specification.

The following questions (and associated answers) have been removed as they are no longer covered by the specification. The table on page 2 and test totals on any subsequent pages have also been updated to reflect the new number of marks for the affected tests:

2.1.1 (i) question 4, pages 3 and 37; 2.1.2 (ii) question 7 d), pages 7 and 41; 2.1.4 (i) question 2 a), pages 13 and 45; 2.1.4 (ii) question 6 c), pages 16 and 46; 4.1.1 (i) question 5 b), pages 29, 57 and 58 (student's t-test formula provided and question 5 c) reworded as a result); 4.2.1 question 2 a), pages 32 and 61 (Simpson's Diversity Index provided)

The following questions have been amended for clarity in matching the specification:

2.1.2 (i) question 8 b), page 6; 2.1.2 (iv) question 8, pages 10 and 43; 4.1.1 (i) question 2 a), pages 28 and 57; 4.2.2 (ii) question 5 b), pages 35, 36, 63 and 64

Other minor changes:

2.1.4 (ii) question 2 b), page 15; 3.1.2 (i) questions 3 and 4 b), pages 23 and 52; 3.1.3 (i) question 2, page 26; 4.1.1 (i) answer 1, page 57; 4.2.2 (i) answers 3 and 7, page 62

Split of Topics between Tests

Several topics are split into multiple tests to keep tests at a manageable length while ensuring all specification content and skills are covered.

Tests are split as follows. Number of marks can be taken as a proxy for number of minutes to complete.

Module	Spec. Point	Topic Tests	Marks
2 Foundations in Biology	2.1.1	Cell Structure (i)	29
		Cell Structure (ii)	29
		Cell Structure (iii)	18
	2.1.2	Biological Molecules (i)	26
		Biological Molecules (ii): Glucose and Starch	30
		Biological Molecules (iii): Lipids	32
Biological Molecules (iv): Proteins		37	
2.1.3	Nucleotides & Nucleic Acids (i)	23	
	Nucleotides & Nucleic Acids (ii)	23	
2.1.4	Enzymes (i)	30	
	Enzymes (ii)	33	
2.1.5	Biological Membranes	35	
2.1.6	Cell Division, Diversity and Organisation (i)	30	
	Cell Division, Diversity and Organisation (ii)	19	
	Cell Division, Diversity and Organisation (iii)	26	
3 Exchange and Transport	3.1.1	Exchange Surfaces (i)	28
		Exchange Surfaces (ii): Fish and Insects	25
	3.1.2	Transport in Animals (i)	26
		Transport in Animals (ii): The Human Heart	29
		Transport in Animals (iii): ECGs and Haemoglobin	24
	3.1.3	Transport in Plants (i): Water and Xylem	40
Transport in Plants (ii): Adaptations and Phloem		39	
4 Biodiversity, Evolution and Disease	4.1.1	Communicable Diseases, Prevention and Immunity (i): Pathogens and Transmission	32
		Communicable Diseases, Prevention and Immunity (ii): The Immune Response	35
		Communicable Diseases, Prevention and Immunity (iii): Natural and Artificial Immunity, Vaccines and Antibiotics	33
	4.2.1	Biodiversity	35
	4.2.2	Classification and Evolution (i): Taxonomy and Phylogeny	31
Classification and Evolution (ii): Adaptation and Evolution		39	

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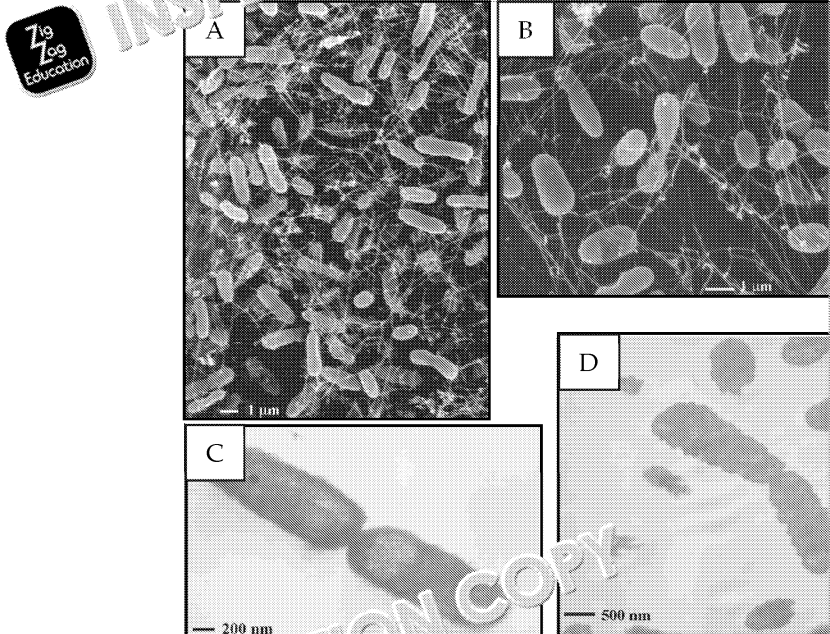
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* resulting from minor specification changes, suggestions from teachers and peer reviews, or occasional errors reported by customers

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2.1.1 Cell Structure (i)

- State three differences between optical and electron microscopy.
- What two stages are needed to prepare a large tissue specimen for electron microscopy?
 - Why do most specimens need the second stage?
- State the type of electron microscopy used on the pictures below.
 - Compare the advantages and disadvantages of both types of microscopy.



- Name two pieces of equipment used to measure a cell under a light microscope.
 - One new unit is introduced.
- One unit on a micrometer is equivalent to 10 μm. Calculate what one unit equals (to one decimal place) if 10 units on the micrometer scale equals 1 mm on the eyepiece graticule scale.
 - A calibrated eyepiece graticule gives the length of a muscle cell as 150 units. Calculate the actual length of the cell in millimetres (to 3 sf).
- An onion cell was observed through an optical microscope. The microscope has an objective lens of x20 magnification and an eyepiece lens of x50 magnification. The diameter of the cell is 25.4 μm.

 - Calculate the total magnification.
 - Work out the actual length of the onion cell in micrometres.
- Optical microscopes can distinguish between points 200 nm apart, while electron microscopy can distinguish between points 0.5 nm apart.

 - What is the difference between magnification and resolution?
 - Calculate the percentage increase in resolution with the development of electron microscopy.

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Preview of Questions Ends Here

This is a limited inspection copy. Sample of questions ends here to avoid students previewing questions before they are set. See contents page for details of the rest of the resource.

2.1.2 Biological Molecules (i)

1. a) Hydrogen bond (1)
b) Positively charged hydrogen atoms (1) form hydrogen bonds with the slightly negative oxygen atoms (1) of other water molecules (1)
2. 'Water is a solvent (1); therefore, substances can dissolve and move freely from one place to another (1). Cohesion (1) of water molecules causes surface tension and allows for water to move up plant xylem (1)'
3. a) Water has a high heat capacity (1) meaning the water film acts as a temperature buffer (1)
b) Evaporation of surface water (1) insulates water beneath meaning it is less likely to freeze (1) than surface water when above-surface conditions are freezing (1)
4. [Any from:] (1)
 - Basic molecular unit
 - Small single unit
 - Building block of polymers
5. Monomers form polymers through a condensation (1) reaction which releases a water molecule (1)
6. Hydrolysis reaction (1) which requires a water molecule (1)
7. [1 mark for each correct column]

	Carbohydrates	Lipids	Proteins	Nucleic acids
C	X	X	X	X
H	X	X	X	X
O	X	X	X	X
N			X	X
S			X	
P				X

8. a) Inorganic means does not contain carbon (1)
Ion means they have gained or lost an electron (1)
Therefore, they are positively or negatively charged / have a charge (1)
- b) [Cation –any one from:]
 - Calcium ion
 - Sodium ion
 - Potassium ion
 - Hydrogen ion
 - Ammonium ion

[Anion – any one from:]

 - Nitrate ion
 - Chloride ion
 - Phosphate ion
 - Hydrogencarbonate ion

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Preview of Answers Ends Here

This is a limited inspection copy. Sample of answers ends here to stop students looking up answers to their assessments. See contents page for details of the rest of the resource.