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A LEVEL

Assessment story

BIOLOGY A

H420

For first assessment in 2015

Exploring our question papers Version 1.0

Version 1.0 (November 2024)

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Contents

Introduction

We have produced this guide to help you prepare your students successfully. In this guide, we share the story of our assessment approach and explore our question papers with you.

Principles for our question papers:

- Keep presentation clear (font type, space for working)
- Keep the language of our questions simple (assessing understanding of the science rather than language)
- Use clearly defined Command Words.

> *We have found the UEA-developed Maths for OCR A-Level Biology immensely useful. We began using them in small group intervention, to help students who had forgotten the basics of their Maths GCSE and were therefore struggling with the high maths content of Biology A-level. The feedback from both staff and students was so positive that we have now incorporated the 'packs' into our scheme of work, so each unit has a matching maths skills pack which students are required to complete. In terms of a high quality, comprehensive resources which is aligned very well with current developments in cognitive science they are un-rivalled by anything else I have seen produced by the exam board or otherwise.*

Specification content

The specification content determines the content that can be assessed. The A Level specification content is made up of six modules:

Module 1 – Development of practical skills in biology

1.1 Practical skills assessed in a written examination

1.2 Practical skills assessed in the practical endorsement

Module 2 – Foundations in biology

2.1.1 Cell structure

2.1.2 Biological molecules

2.1.3 Nucleotides and nucleic acids

2.1.4 Enzymes

2.1.5 Biological membranes

2.1.6 Cell division, cell diversity and cellular organisation

Module 3 – Exchange and transport

3.1.1 Exchange surfaces

3.1.2 Transport in animals

3.1.3 Transport in plants

Module 4 – Biodiversity, evolution and disease

4.1.1 Communicable diseases, disease prevention and the immune system

4.2.1 Biodiversity

4.2.2 Classification and evolution

Module 5 – Communication, homeostasis and energy

5.1.1 Communication and homeostasis

5.1.2 Excretion as an example of homeostatic control

5.1.3 Neuronal communication

5.1.4 Hormonal communication

5.1.5 Plant and animal responses

5.2.1 Photosynthesis

5.2.2 Respiration

Module 6 – Genetics, evolution and ecosystems

6.1.1 Cellular control

6.1.2 Patterns of inheritance

6.1.3 Manipulating genomes

6.2.1 Cloning and biotechnology

6.3.1 Ecosystems

6.3.2 Populations and sustainability

Modules 1 and 2 are the fundamental skills Biologists require throughout the course.

Modules 3 and 4 are designed as the year 12 content.

Modules 5 and 6 are designed as the year 13 content.

All of the assessments are taken at the end of year 13 so the order of teaching can be flexible.

Navigating the specification content

The specification is your first port of call for finding out what needs to be taught. The examples below summarise the information available within the main content area of the specification

This column tells you the principles that must be covered in your teaching.

This column clarifies what can be tested and tells you how deeply a topic needs to be studied.

3.1.2 Transport in animals

As animals become larger and more active, transport systems become essential to supply nutrients to, and remove waste from, individual cells.

Controlling the supply of nutrients and removal of waste requires the coordinated activity of the heart and circulatory system.

	Learning outcomes	Additional guidance
	Learners should be able to demonstrate and apply their knowledge and understanding of:	
(a)	the need for transport systems in multicellular animals	To include an appreciation of size, metabolic rate and surface area to volume ratio (SA:V).
		M0.1, M0.3, M0.4, M1.1, M2.1, M4.1 HSW1, HSW3, HSW5, HSW8
(b)	the different types of circulatory systems	To include single, double, open and closed circulatory systems in insects, fish and mammals.
(c)	the structure and functions of arteries, arterioles, capillaries, venules and veins	To include the distribution of different tissues within the vessel walls. **PAG2**

The M codes (i.e., M0.1) refer to different types of mathematical skills. See Appendix 5d of the specification for more details.

There are 12 PAGs (Practical Activity Groups). Different groups refer to different types of practical activity that fit in with the teaching of topics. See Appendix 5f of the specification for further details.

The HSW codes (i.e., HSW 1) stands for 'How Science Works' statements. All HSW statements can be tested across the three Assessment Objectives, AO1 to AO3. The examples and guidance within the specification are not exhaustive but give a flavour of opportunities for integrating HSW within the course. See Appendix 5c of the specification for more details.

Assessment overview

The A Level Biology assessment consists of three examined components (1, 2 and 3) and a Practical Endorsement component (see Appendix 5f in the specification).

Students must sit all three examined components and complete the Practical Endorsement.

The qualification is marked out of a **total of 270 marks**. The performance of candidates on the examined components determines their overall grade. An A Level qualification is awarded on the scale: A*, A, B, C, D, E, where A* is the highest grade. The result for the Practical Endorsement assessment is reported separately.

Components	Modules	Marks	Duration	Weighting
Paper 1 - Biological processes	1, 2, 3, 5	100	2 hours 15 minutes	37%
Paper 2 - Biological diversity	1, 2, 4, 6	100	2 hours 15 minutes	37%
Paper 3 - Unified Biology	All	70	1 hour 30 minutes	26%
Practical Endorsement Non-exam assessment	1	Assessed internally through a minimum of 12 practical activities		Reported separately

Overview of content in our exams

All of the examined components assess candidates' knowledge of practical skills (module 1) and foundations in biology (module 2).

In our science A specifications we have split the content assessed in the first two papers. This reduces the cognitive load for candidates early in the assessment series. It also expands the breadth of content that can be assessed, helping to fairly reward candidates for their knowledge of the specification.

The final paper assesses all the content, so candidates can demonstrate their knowledge of the whole specification and the synoptic nature of biology.

Paper 1: Biological Processes
The paper focuses on assessing content from module 4; Exchange and transport, and module 5; Communication, homeostasis and energy. This allows candidates to see how the exchange processes and transport in organisms can be used to achieve communication and ensure a stable environment within the organisms.

Paper 2: Biological diversity
The paper focuses on assessing content from module 4; Biodiversity, evolution and disease, and module 6; Genetics, evolution and ecosystems. This gives the candidates a natural progression from studying the biodiversity of organisms and the basics of ecology and evolution in module 4, to looking at the role of genes and the mechanisms of evolution in module 6.

Paper 3:
This paper assesses content from all teaching modules.

Assessment objectives

Every question must test one or more of the assessment objectives. Assessment objectives and their approximate weightings for science qualifications are defined by Ofqual.

	Assessment Objective (AO) elements	Qualification weighting (%)
AO1	**Demonstrate knowledge and understanding of:** • Scientific ideas and processes • Scientific techniques and procedures.	**31–34**
AO2	**Apply knowledge and understanding of scientific ideas, processes, techniques and procedures:** • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data.	**40–43**
AO3	**Analyse, interpret and evaluate scientific information, ideas and evidence to:** • make judgements and reach conclusions • develop and refine practical design and procedures.	**25–28**

Assessment objectives for each question paper

The approximate weighting for each assessment objective for each paper is shown below.

Paper	Approximate (%) weighting		
	AO1	AO2	AO3
1	34–38	40–44	20–24
2	34–38	40–44	20–24
3	19–23	40–44	34–39

Paper 3 has a greater emphasis on analysing, interpreting and evaluating (AO3) and less emphasis on knowledge and understanding (AO1).

Ofqual has set a maximum limit of 10% of the qualification for marks that can be used to test recall only items *as part of AO1*.

Recall only items:

- is awarded solely for recalling facts or other knowledge that is part of the specification.
- is not awarded for selecting appropriate knowledge (for example, to evidence an argument), or for applying knowledge to a particular context.

Practical skills assessed in question papers

It is an Ofqual requirement that an overall minimum of 15% of the marks in our science question papers involve assessment of practical skills.

Practical skills are assessed throughout the three written papers and the Practical Endorsement *.

The table below summarises the practical skills assessed within papers.

Practical skills assessed within papers
Planning
Designing experiments Identifying variables Evaluating that method meets expected outcomes
Implementing
Use wide range of practical apparatus and techniques Measuring with appropriate units Recording results in an appropriate format
Analysis
Processing, analysing and interpreting results Analysing quantitative data using mathematical skills Using appropriate significant figures Plotting and interpreting graphs from experimental results: • axes, scales, quantities and units • measurement of gradients and intercepts
Evaluation
Evaluating results and drawing conclusions Identifying anomalies in measurements Identifying limitations in procedures Assessing precision and accuracy, including error and uncertainties Refining experimental design to improve procedure and apparatus

Further details are shown in Module 1.1 of the specification.

*** Practical Endorsement**

The experiments and skills required for the Practical Endorsement will allow learners to develop and practise their practical skills, preparing learners for the written examinations.

Papers 1 to 3 will test candidates' understanding of practical skills and the use of apparatus and techniques from the specification in a wide range of practical contexts. The contexts are not limited to OCR's suggested practical activities.

The Practical Skills Handbook and the Biological Drawing skills Handbook has a lot of useful guidance on practical skills for teachers and students.

Mathematical requirements

Across all papers, a minimum of 10% of the marks assess mathematical skills in the context of biology.

The following might be included:

- application and understanding, requiring choice of data or of equation to be used
- problem solving involving use of skills from different areas of maths and decisions about direction to proceed
- questions involving use of A Level mathematical content, e.g. use of logarithmic equations.

Mathematical skills will always be tested in a biology context, and questions testing mathematical skills can test any of the three assessment objectives, AO1 to A03. A question testing mathematical skills could also be testing, for instance, understanding of practical skills.

The subject content section of the specification indicates where there are opportunities to incorporate these maths skills into teaching.

The key mathematical requirements (with examples of skills) are shown below. Further details are shown in Appendix 5d of the specification and the Mathematical Skills Handbook.

- M0 – Arithmetic and numerical computation
- M1 – Handling data
- M2 – Algebra
- M3 – Graphs
- M4 – Geometry and trigonometry

Synoptic assessment

Synoptic assessment involves the drawing together of knowledge, understanding and skills learned in different parts of the A Level course. All papers within Biology A will have questions containing an element of synoptic assessment.

A synoptic question will require candidates to construct their answer, using knowledge, skills and understanding from a number of parts of the specification. For example by:

- applying knowledge and understanding of more than one area to a particular situation or context
- using knowledge and understanding of principles and concepts in planning experimental and investigative work and in the analysis and evaluation of data.

Level of difficulty

Our aim is to ensure that all students can access all question papers.

We estimate the level of difficulty of each mark as being low (L), medium (M) or high (H) demand. There are approximately equal amounts of each demand type (L, M and H). About one-third of the high demand questions are classified as being 'stretch and challenge', i.e. targeting A* grade standard.

Our question papers

Candidates are required to respond to a variety of question types in the examined components.

Paper 1 and 2 – 100 marks each paper

Both papers have a similar format and are divided into two sections, A and B. Candidates answer all questions.

Section A: Multiple choice questions (MCQs) 15 marks

There are 15 MCQs, 1 mark each. MCQs allow assessment of a wide range of content, whilst keeping the overall assessments as short as possible. MCQs are in a separate section of the paper. Research shows that candidates find MCQs more accessible when they are grouped together in this way.

We recommend that candidates spend no more than 20 minutes on Section A. Only AO1 and AO2 are tested in MCQs.

Section B: 85 marks

Short answer response questions – these consist of structured questions featuring problem-solving, calculations, and practical skills. These types of question are marked by a points-based mark scheme.

Extended response questions – there may be a small number of longer response questions (4–6 marks). These questions are marked using a points-based mark scheme.

Two 6 or 9 mark questions – these questions are flagged with an asterisk (*) in the paper. These questions are marked by a levels-based mark scheme, and they are usually referred to as 'Level of response questions'. The questions test the ability of the candidate to construct and develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Paper 3 – 70 marks

Candidates should answer all questions. Candidates will be assessed across all modules of the specification by a combination of question types. There are no multiple-choice questions in paper 3.

The question types are:

Short answer response questions
Two 6-mark level of response (LoR) questions
One or two extended response question (4–6 marks) which are marked conventionally by a points-based mark scheme.

Command words

The most frequently used command words used in our examination papers are listed below. **It is not an exhaustive list.** The definitions provide guidance to teachers and students about what is expected when these words are used in exams.

Command word	Meaning …
Calculate	Work out the numerical value. Show your working when asked to.
Compare	Give an account of the similarities and/or differences between two (or more) items or situations, referring to both (all) of them throughout.
Complete	Add words, numbers, labels or plots to complete a sentence, table, diagram, graph etc.
Define	Use your knowledge to state the meaning of a given term.
Describe	Give an account using relevant concepts, processes, characteristics and, if necessary, examples.
Discuss	Give an account that addresses a range of ideas and arguments.
Draw	Produce a diagram/drawing/graph with sufficient detail/annotation and labels to illustrate the answer.
Estimate	Assign an approximate value.
Evaluate	Using available knowledge/experience/evidence to identify for and against arguments (pros and cons, positives and negatives) to come up with a qualitative conclusion/judgment.
Explain	Use relevant knowledge and/or evidence and/or ideas to demonstrate understanding of why something is the case or how something happens.
Name	Provide appropriate word(s) or term(s).
Outline	Provide a description setting out the main characteristics/points.
Plot	Mark points accurately for a given range of values, using labelled axes.
Show that	Write down sufficient details, structured steps or calculations to prove a fact or answer.
Sketch	Produce a simple, freehand drawing to illustrate the general point(s) being conveyed, using annotations as required.
State	Express clearly and briefly.
Suggest	There is often no single correct answer. Candidates will be given credit for sensible reasoning based on correct chemistry.

Accessibility principles

We believe that candidates should be fairly rewarded for what they know and they can do. Our aim is to ensure that no student is disadvantaged by not being able to access questions or tasks in an assessment.

We've developed accessibility principles that we use to write our assessment materials and develop new qualifications. We continually review our principles to ensure they meet the latest research and feedback.

Look and feel of the paper

Students can engage quickly and accurately with our assessment materials.

To ensure our assessment material is easy to read we:

- avoid visual overloading by providing adequate white space
- write questions in plain English and avoid jargon and complicated language
- left-align text, diagrams and tables to align with our modified papers to help with a range of visual impairments.

Assessment approach

Students are assessed by a consistent and research proven approach to assessment.

To ensure our materials are as accessible as possible we:

- use command words clearly and consistently
- use short sentences, often bulleted or numbered for ease of reference
- use emboldening for key words or instructions.
- avoid the use of confusing contexts in questions
- minimise the use of names or gendered pronouns.

Scientific conventions

Students are supported by presenting scientific information based on accepted conventions, consistent with our specifications.

To ensure students can confidently interpret scientific terminology we:

- present units in a consistent, conventional form, without use of a solidus, e.g. $\mathrm{m\ s^{-1}}$
- separate units from the name of the physical quantity in tables and graphs with a solidus, e.g. time / s
- use alternative formatting (e.g. italics for physical quantities) only where scientifically justified
- are consistent in our use of the language of measurement
- providing equations required for calculations involving statistical analysis when required.

Question type examples and comments

Multiple choice questions (MCQs)

In papers 1 and 2, Section A comprises 15 multiple choice questions.

- All questions will contain four answer options, **A**, **B**, **C** and **D**.
- Questions require candidates to select a single option.
- A small number of questions contain three statements. Candidates select the option (A, B, C, or D) which identifies the correct statement.
- All options will be covered by the specification (or will be covered by learning from a previous Key Stage).
- MCQs may check for common misconceptions or for common errors.
- Questions are usually grouped into topics, so students can focus on one topic at a time.
- Options will always be in alphabetical/numerical order unless there is a scientific basis for departing from this rule.
- There is a box at the end of the options for candidates to indicate their answer.
- MCQs **do not** test AO3.

All examples have been chosen from the past exam papers, available from Teach Cambridge

Example 1

During which stage of the cell cycle does semi-conservative DNA replication take place?

A first growth phase

B prophase

C second growth phase

D synthesis phase

Your answer ☐

[1]

Correct answer **D**.

This is a single choice type of MCQ.

The question is testing knowledge and understanding of an idea (AO1). The level of demand is low.

Example 2

Turtle doves, *Streptopelia turtur*, were once common in farmland in the UK but their numbers have recently been in decline.

Farmers can claim money from the UK government if they farm in ways that encourage the survival of species such as the turtle dove.

Which of the following agreements is/are relevant to the example described above?

1 The Convention on International Trade in Endangered Species (CITES)

2 The Rio Convention on Biological Diversity (CBD)

3 The Countryside Stewardship Scheme (CSS)

A 1, 2 and 3

B Only 1 and 2

C Only 2 and 3

D Only 1

Your answer ☐ **[1]**

Correct answer is **C**.

This is a multiple completion type of MCQ, where 3 statements are given, and the candidate must select the correct ones.

The question tests knowledge and understanding of scientific ideas (AO1). The level of demand is high.

Short answer questions

These question types can assess any Assessment objective (AO1, AO2 and AO3) and will include:

- 1, 2 or 3 mark objective style questions
- 1, 2 or 3 mark free-response questions
- 1, 2 or 3 mark calculations.

We use short answer questions because they allow broad coverage of the specification, while keeping the length of the examination manageable. In Biology, these may include tick boxes or tables to complete, gap- fill text and use of diagrams or photomicrographs for identification e.g. of tissues.

Example 3

(b) The image shows a cross section of the root of an onion plant.

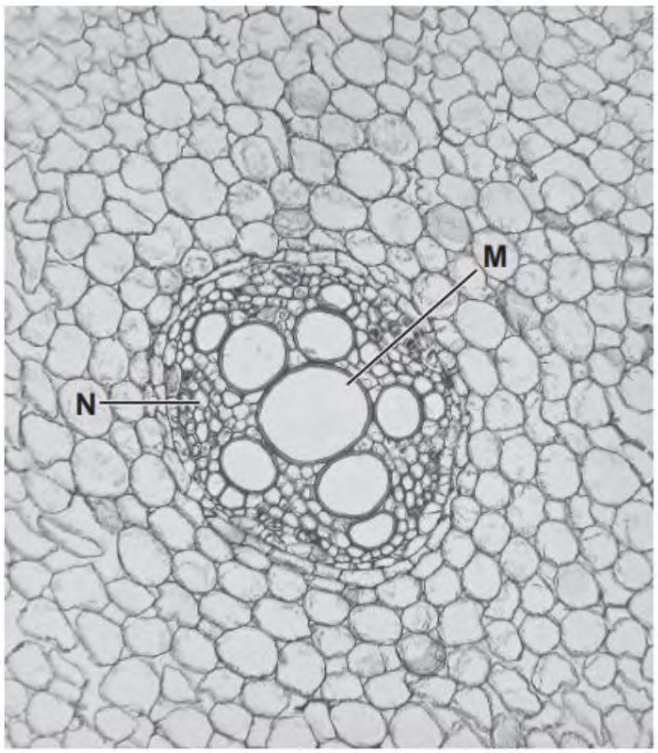

Fig. 1

Identify the **tissues** shown at **M** and **N**.

M .....

N .....

[2]

Question assesses knowledge and understanding of scientific ideas (AO1) and is a high demand.

In Biology short answer questions might include photomicrographs for candidates to identify (i.e., different tissues).

Identifying tissues from micrographs is not 'knowledge in isolation', as the micrographs have not been previously seen by students.

Example 4

(ii) Suggest **two** ways a woman with gestational diabetes can manage her condition.

1 .....

....

2 ....

....

[2]

An objective style question requiring knowledge and understanding of scientific ideas (AO2).

We embolden words in the question to help candidates. And were appropriate we give prompts for students in the answer lines.

The number of answer lines given is often a good indication of the length of the answer required.

Mark Scheme

Mark schemes are positive, and we try to expand them to **ALLOW** alternatives that students might use in their answers.

Answer	Marks	Guidance
	3	**List Rule** If **both** prompt lines used and more than one suggestion is on the line mark the first one on each line. If only one line used but there is more than one suggestion listed mark first two written.
low , carbohydrate / sugar , diet ✓		**ALLOW** regulate / control / reduce , for "low" **ALLOW** named sugar / starch **IGNORE** low fat / healthy / balanced / low "carb" , diet
exercise ✓		**ALLOW** example of exercise e.g. walking
manage weight (gain) ✓ drugs to control glucose levels ✓		**ALLOW** named drug e.g. metformin **ALLOW** ref to injecting insulin

The left-hand column shows expected answers (these are the marking points).

The right-hand column provides additional guidance in interpreting candidate responses.

Longer answer / extended response questions

We usually classify longer answer / extended response questions in science as anything over 3 marks. We use these questions to assess across all three Assessment Objectives (AO1, AO2 and AO3).

These question types often include:

- open-ended questions
- synoptic questions linking concepts from across the specification
- data interpretation questions
- questions on experimental design
- questions assessing the application of knowledge in novel contexts
- multi-step calculations.

Example 5

21 (a) The greater blue-ringed octopus, *Hapalochlaena lunulata*, is one of the most venomous of all animals.

Its bite contains tetrodotoxin (TTX), a neurotoxin that can cause paralysis and death within minutes.

(i) The following information has been discovered about the effects of TTX on nerve cells:

- TTX binds to the external surface of the voltage-gated sodium ion channels in the axon membrane.
- Binding of TTX changes the tertiary structure of the channel.
- This means the channel cannot open.

Using the information provided, explain how TTX affects the activity of neurones.

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..... **[4]**

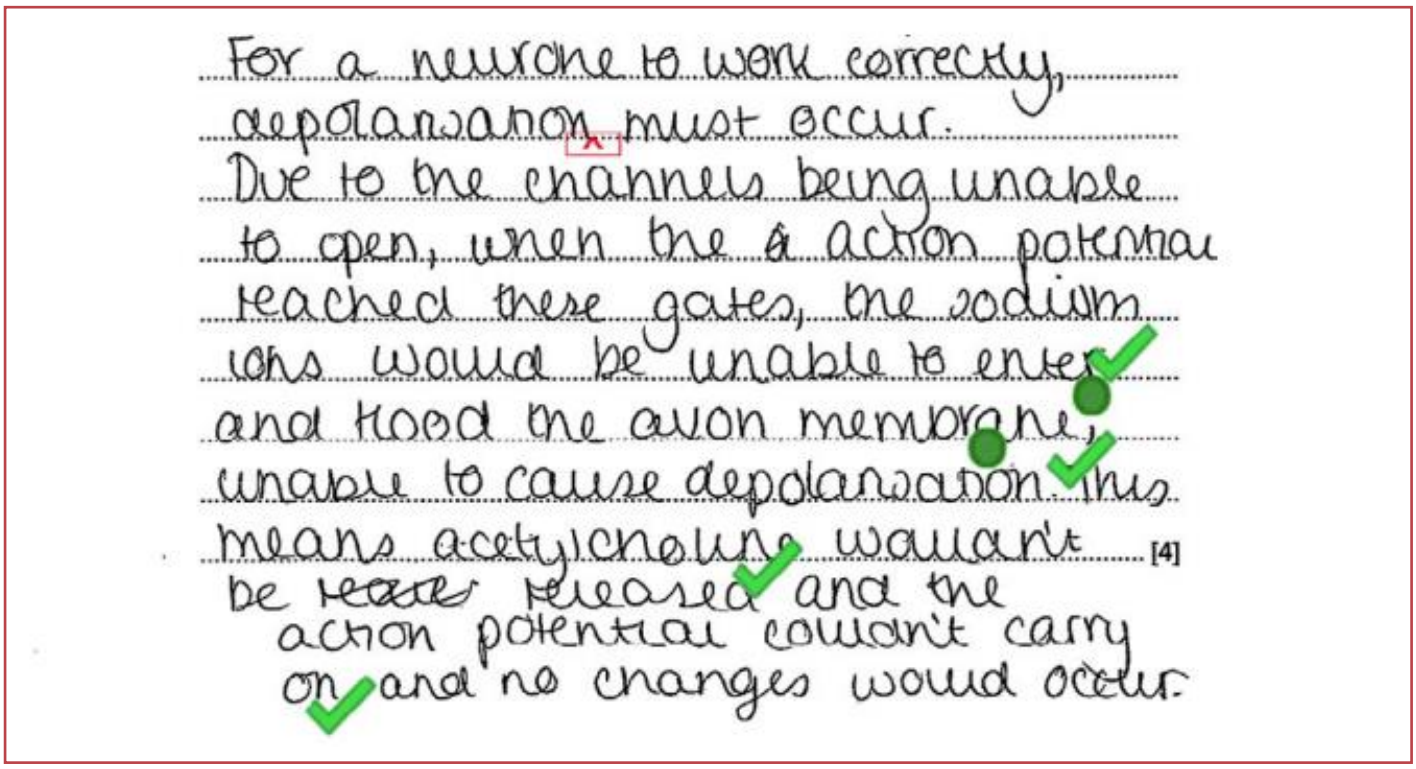
A long answer response question requiring application of knowledge and understanding of scientific processes, techniques and procedures in a **theoretical** context (AO2).

Marking points for this question have a range of demand, making it accessible to all candidates.

There is no asterisk as this question is not using the level of response approach.

A bulleted answer could score maximum marks for this example.

Candidate Exemplar


For a neurone to work correctly, depolarisation must occur. Due to the channels being unable to open, when the a action potential reached these gates, the sodium ions would be unable to enter and flood the axon membrane, unable to cause depolarisation. This means acetylcholine wouldn't be released and the action potential couldn't carry on and no changes would occur. [4]

Calculation questions

Where there is a calculation, we will always leave space for candidates to show their working.

The question may indicate the units required or whether the response is required in a particular format e.g. standard form or to a specific number of significant figures.

For calculation questions, in general, if the answer on the answer line is correct, full marks will be awarded (unless the question specifically requires working to be shown).

It is good practice to show working. Candidates who show their working may be less likely to make a mistake, and may easily spot and correct a mistake themselves. Marks can be given for correct working, even when the final value is incorrect. Significant figures must be shown when asked for in the question.

Fig. 20.1 shows the mean body length of a population of cheetahs from southern Africa.

The error bars on Fig. 20.1 show the standard deviation of mean body length.

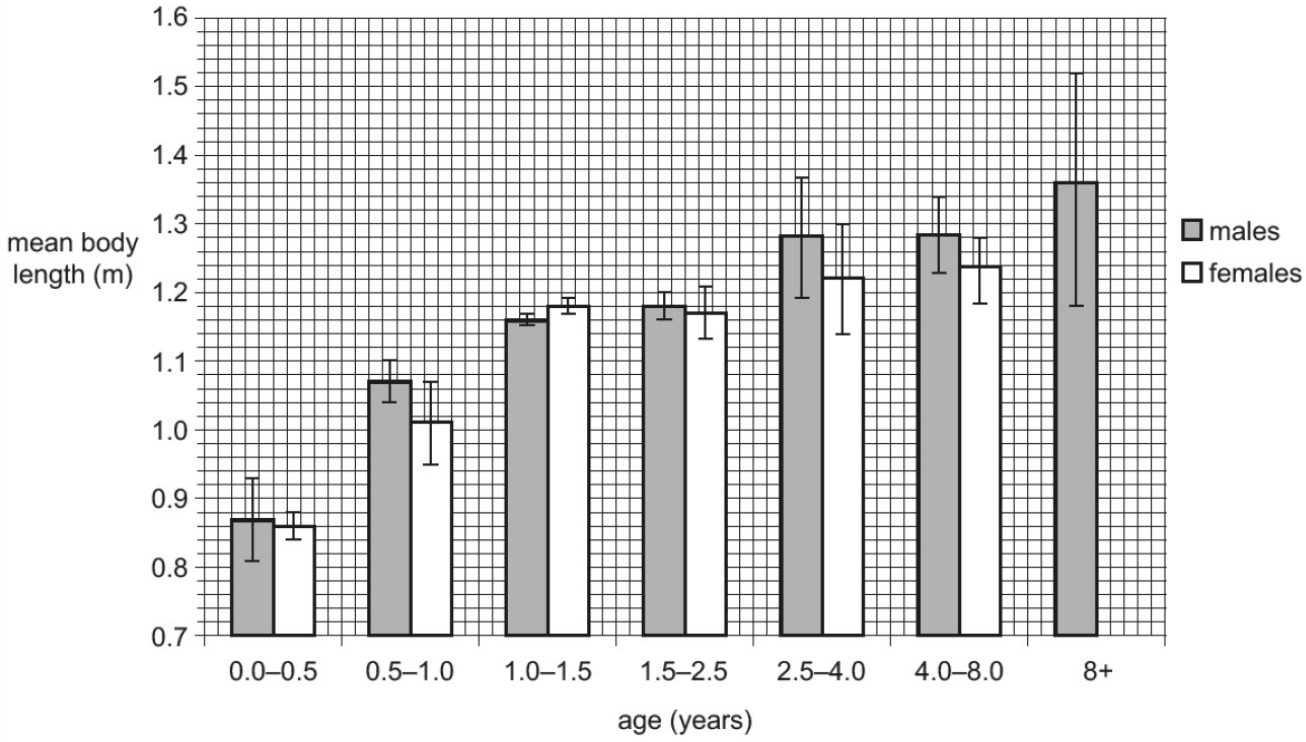


Fig. 20.1

(a) (i) At between 2.5 and 4 years old, the mean length of female cheetahs is less than that of males.

Calculate how much shorter than males female cheetahs are.

Show your working. Express your answer as a percentage to **two significant figures**.

There is a clear indication that the answer must be given to **two significant figures**.

The units might be given on the answer line for calculation questions but not always.

Answer ..... % **[2]**

Level of Response (LoR) questions

We use the term *Level of Response* (often abbreviated to LoR by teachers and examiners) to cover a specific extended response question that tests a candidate's ability to form and develop a sustained line of reasoning which is coherent, relevant, substantiated and logically presented. A LoR question tests both the substance and organisation of the response and is marked using a level of response mark scheme.

In a question paper, LoR questions are flagged with an asterisk* so the candidate is made clear about how the question is being assessed. There are 6 or 9 marks for each LoR question. A LoR question can assess any of the assessment objectives (AO1, AO2 and AO3) and can be on:

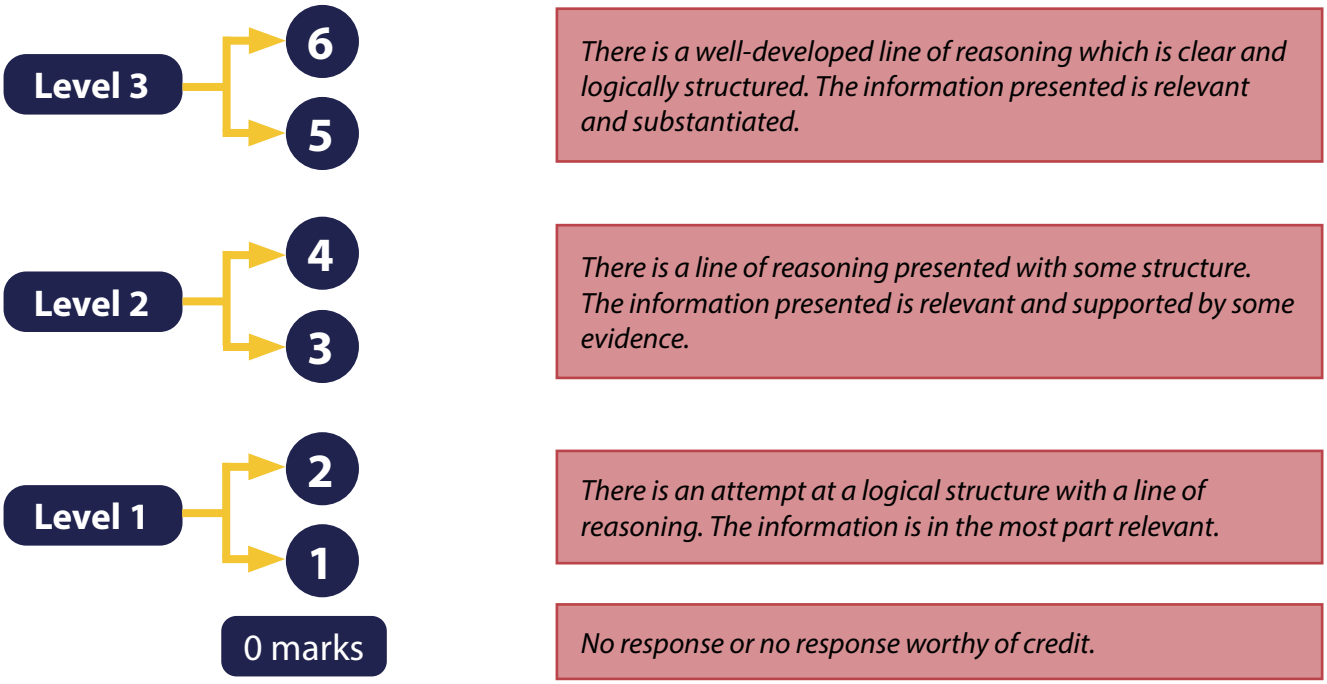
- synopticity
- practical skills
- analysis and evaluation skills
- mathematical skills.

Marking approach for Level of Response questions

Level of response questions are always marked in the same basic way, see below, with the six marks split into three bands and the generic communication descriptors in italics.

Indicative scientific content decides which level an answer is in, based on the level descriptors in the mark scheme.

The higher mark in the level is awarded when all aspects of the communication statement (in italics) are met.



In summary:

- The skills and science content determine the level.
- The communication statement determines the mark within a level.

Example 6

The asterisk* indicates this question is assessed through level of response (LoR).

(ii)* The student has access to standard laboratory equipment and planting materials.

Outline a method that the student could use to investigate the effect of gibberellin concentration on stem elongation in *P. sativum*.

In your answer, you should include details of an appropriate statistical test for this investigation.

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For LoR questions candidates are given 15 answer lines with additional answer lines added below the statement 'Additional answer lines if required'.

A concise clear response should fit within the lines provided in the question paper.

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.... **[6]**

Additional answer space if required.

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This level of response question requires developing and refining **practical design** and processes. Most of the marks available here are testing AO3. There is normally a range in the demand targeted for the marks in LoR questions, so that all candidates have an opportunity to make a good attempt at the question.

Candidate Exemplar

Outline a method that the student could use to investigate the effect of gibberellin concentration on stem elongation in *P. sativum*.

In your answer, you should include details of an appropriate statistical test for this investigation.

Take 60 plants of P. Sativum. This is a control variable, the plants must be of the same species. Make up gibberellin concentrations with a serial dilution. Each concentration should differ by a factor of 10. Take 1cm3 of the standard solution and dilute with 9cm3 of water, this creates 0.9M solution. Repeat process by taking 1cm3 of 0.9M solution and diluting with 9cm3 water to produce 0.8M solution. Make concentrations of 0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1M. Record the initial lengths of the all the stems of the plant. Water the plants with of the same volume (10cm3) solutions of gibberellin, 5 plants for each concentration. The other 5 remaining plants should be watered normally to act as controls to ensure that stem elongation is due to gibberellin concentration making the experiment valid. Water for 28 days and record the new height. Control variables include light intensity and temperature. After collecting data for the stem elongation by substracting final from initial height do a Spearman's rank correlation coefficient to see if correlation is significant. [6]

Additional answer space if required.

This answer would have scored 6 marks

Marking descriptors for each level of response.

These are 'indicative points' for the examiners.

These points do not all have to be present to achieve full marks. They are simply an indication of the type of information and detail that could be expected.

Mark Scheme:

Answer	Guidance
Level 3 (5-6 marks) Comprehensive outline of a valid experimental method, including details of all three types of variable, **and** statistical analysis for the investigation. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3-4 marks)** The answer contains detailed reference to variables **and** statistical analysis for the investigation. *There is a line of reasoning with some structure. The information presented is relevant and supported by some evidence.* **Level 1 (1-2 marks)** The answer contains brief reference to a variable or statistical analysis for the investigation. *There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.* **0 marks** No response or no response worthy of credit.	**Indicative scientific points may include (but are not limited to):** *AO3: To develop and refine practical design and procedures.* *Experimental method* **Validity** • Details of sample sizes and repeats • Details of group design (e.g. two groups: one without additional gibberellin, or several groups receiving different gibberellin concentrations, plus a control group) • Details of gibberellin application **Variables** • Details of control variables (e.g. plant/seedling size, water availability, light, temperature) • Details of the independent variable (varying gibberellin concentrations) • Details of the measurement of the dependent variable (measurement of stem length) **Statistical analysis** • Idea of identifying anomalies • Mean calculations • Standard deviation • Statistical testing (e.g. t-test if two groups are used, or Spearman's rank/Pearson correlation test if a range of concentrations are used)

We can see from the mark scheme above, that Level 3 descriptor for 5-6 marks requires candidates to provide a clear description and clear analysis. All the indicative points do not have to be met to gain Level 3. The higher mark in the level is awarded if the communication statement in italics is met.

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