Get to know your exams

At the end of your Biology course you will sit three papers: Paper 1 (multiple choice), Paper 2 and Paper 3 (written papers). Papers 1 and 2 test materials from the Core and, for HL candidates, the AHL material. Paper 3 has two parts: Part A assesses applications and skills for the entire syllabus and Part B assesses the Option you have studied. The weighting, duration for each exam, and number of marks available vary according to whether you are sitting Standard Level (SL) or Higher Level (HL):

	Content		Overall weighting/%		Duration/hours	
	SL	**HL**	**SL**	**HL**	**SL**	**HL**
Paper 1	30 multiple-choice questions on core material **30 marks**	40 multiple-choice questions on core and AHL material **40 marks**	20	20	$\frac{3}{4}$	1
Paper 2	• Data-based question • Short-answer and extended-response questions on core material • One out of two extended-response questions to be attempted **50 marks**	• Data-based question • Short-answer and extended-response questions on core and AHL material • Two out of three extended-response questions to be attempted **72 marks**	40	36	$1\frac{1}{4}$	$2\frac{1}{4}$
Paper 3	Questions on core and SL option material • **Section A:** two to three short-answer questions based on experimental skills and techniques, analysis and evaluation, using unseen data linked to the core material. Answer all questions • **Section B:** short-answer and extended-response questions from one option **35 marks**	Questions on core and AHL option material • **Section A:** two to three short-answer questions based on experimental skills and techniques, analysis and evaluation, using unseen data linked to the core material. Answer all questions • **Section B:** short-answer and extended-response questions from one option. **45 marks**	20	24	1	1¼
IA	Practical 24 marks		20	20	10	10

Detailed advice is contained in the next section. Here is some general advice for the exams:

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Advice for the exams

■ Exam tips

Answers need to be concise rather than excessively long and repetitive.

■ Identify the number of marks awarded in each question and use this as a guide to incorporate the appropriate number of points in your answer. If 8 marks is the maximum for a question, for example, then the answer should include at least eight distinct and different points or statements. These don't need to be long paragraphs for the mark; what counts most is a range of accurate, detailed information. It is worth including a couple more points over the number required for the marks available, to be sure that you can gain all the marks.

■ Think carefully about your response and whether or not it answers the question and provides sufficient information for the available marks. Practise using past papers alongside an in-depth analysis of the mark scheme. Analyse the question so that you know what is being asked.

■ Read questions carefully and make sure you answer the question that is being asked. For example, 'How does oxygen enter the blood?' does not mean 'How does oxygen enter the heart or lungs?'. Do not waste time on irrelevant information which will gain no marks.

  □ You are encouraged to underline key words before you attempt an answer.

  □ It is worth taking time to plan answers in rough as this helps to structure answers and include the necessary information.

  □ Pay attention to information given above pictures and diagrams as it may guide your answer.

  □ If a question is not easy to answer at first sight, leave it until the end.

  □ Avoid a 'shot-gun' approach where many ideas are sprinkled into an answer hoping to score marks through positive marking. This strategy may backfire as one part may contradict another and you may lose marks.

■ Do not repeat the question in an answer. There is not enough space to do this in the box provided and it is a waste of time.

■ Use the terms or wording from the question rather than trying to substitute them with words of a different meaning.

■ Use only the space given in the answer booklet.

  □ The box is used to indicate the recommended length of the answer.

  □ If you run out of room, use the extra answer booklets.

  □ Examiners mark on-line and view only the relevant scanned areas of the papers. It is therefore important that your answers are written clearly enough to be fully legible following the scanning process and that they fit within the provided box; you should indicate clearly on your paper when an answer continues in an extra booklet.

■ Write neatly or, if handwriting is not clear, print clearly.

■ The examiner can only mark what you have written and cannot assume anything about knowledge or understanding.

■ Read the questions more than once. Re-read your answers as well.

Use action verbs and command terms that are mentioned in the question. Command terms indicate what is required in an answer (see pages 5–6).

■ Questions asking you to 'distinguish' or 'compare' require contrasting statements, not two separate descriptions where the examiner has to hunt for the answers to the question. For example, if you are asked to distinguish between human milk and artificial milk, you need to say that human milk contains antibodies and provide the contrasting statement that artificial milk

> **Common mistake**
>
> Candidates often read words they recognize in a question and then write everything they know on a topic rather than addressing the question being asked. For example, candidates see words such as 'actin' and 'myosin' in a question and this triggers a response that involves writing all they know about muscles and muscle contraction without actually addressing the question. Read questions carefully and limit your answers to what is being asked.

> **Expert tip**
>
> Write within the allocated space and on the lines provided. If you find the space insufficient, you should complete your answer on the additional pages in an extra booklet, not as a continuation outside the allocated area or in the paper margins. Indicate clearly in your script that you have used extra paper.

does not. If you do not provide a contrasting statement, you will lose marks not for your biology knowledge but because of poor examination technique.

- Comparisons contain similarities, not only differences.

- If the command term is 'distinguish between', rather than 'compare', the answer should only contain differences. Good answers include a table, with each point on the same line.

- The command term 'suggest' means that your answer should contain any reasonable analysis. It requires you to propose ideas rather than reiterate data from the question.

- The term 'evaluate' requires you to assess the implications and limitations of information or data. If you are asked to evaluate a hypothesis, you need to state explicitly whether information supports or refutes it, not just regurgitate data from the question.

- The term 'discuss' requires you to give an account that includes a range of arguments for and against a proposal. Answers need a balance of arguments.

- The term 'explain' indicates that causes, reasons, or mechanisms are required. This means give reasons, not just state. Answers require cause-and-effect connections in each component of the response to be awarded marks.

- 'Outline' requires a brief description rather than a list.

In essay questions:

- Divide your answer into sections and label each section (i.e. 'a', 'b', or 'c'). Avoid writing one continuous essay containing all parts.

- Practise writing extended answers.

- Write a plan or brief notes on what you consider to be the key points in the question; this will help your answer flow, allowing one point to lead to another in a logical order.

- When choosing essay questions, make sure you choose a question in which you can answer all parts reasonably well rather than another question where only one part can be answered well.

- You are not allowed to choose different parts from different questions. All parts you answer must be from the same question.

Throughout the syllabus there are diagrams you need to be able to draw and annotate. You are encouraged to practise drawing.

- Drawings or diagrams should be big enough so that details can be seen clearly. It is difficult to distinguish detail or to identify what a label is pointing to in a very small diagram. The size of the diagram should be proportional to its complexity.

- Use firm lines when doing pencil drawings as faint lines do not show on scanned exam scripts.

- Attention should be given to accurate labelling, juxtaposition of structures, and relative size.

- Close lines in diagrams so that structures are shown as continuous. For example, there should be no gaps in the membrane of the mitochondria.

- In biological drawings, don't sketch or shade. Use crisp, clear lines and label everything carefully.

- Take care that label arrows touch the structure being labelled and are not suspended. The end of the line should be on or inside the structure, not on the edge at the junction with another structure.

Expert tip

You should be familiar with definitions of biological terms; these are highlighted throughout this book. You need to use biology-specific vocabulary clearly and carefully.

Expert tip

- State the obvious rather than leaving things to be inferred by the examiner.
- Separate and unpack distinct ideas rather than bundling them tightly into one sentence.
- Use examples to illustrate ideas and be ready with names of specific organisms.
- Make sure you spell similar words correctly, such as glucagon and glycogen.

Expert tip

If graphs or diagrams are included to help an answer, other than a question asking only for a diagram, annotations should be included around the diagram, not just names of structures.

Expert tip

If a question asks for a plan diagram, no cells should be shown, just the different regions of the structure.

Use past papers to help test your knowledge of the course and familiarize yourself with the format of each exam.

- Do not memorize answers from previous papers because new questions are usually worded slightly differently and require answers to be adapted accordingly.

- You should be familiar with terms or symbols often used in examination papers. For example:

  - □ 'named example' means that you have to write the name of an organism or the common name of the species corresponding to the example you are providing

  - □ '/' announces the units that are being used.

- Be aware that the Biology syllabus changed in 2014 and so exam papers from before that time may have slightly different content.

In multiple choice questions, read all responses carefully before choosing an answer.

- If you cannot be sure of the correct answer to a multiple choice question, you should try to eliminate as many of the incorrect answers as possible.

- If you think that there are two answers that are both partly or both wholly correct, you should always pick the best of the two answers.

- If two or three possibilities remain, rather than one certain answer, it is advisable to choose one of the answers by informed guesswork rather than offering no answer, as no marks are deducted for incorrect answers and a question left unanswered cannot be awarded a mark.

One final and very important piece of advice: attempt every question. Leaving blanks will earn you no marks!

Data response

When answering data interpretation questions:

- Look for the big picture or overall trends.

- Look for variations and deviations in overall trends.

- Use biological knowledge to explain trends and differences.

- Make sure you are able to evaluate scientific methods and understand the basic assumptions that are made and where there are limitations to reliability.

- Look beyond whether values are higher or lower; you should also focus on the degree of change and the relation between sets of data.

- When evaluating a hypothesis, do not just limit your answer to evidence supporting it, but also mention what may not support it or what may limit its scope.

- Use specific language, for example 'increase' rather than 'change', 'gained mass' rather than 'grew bigger'.

- When describing graphical trends, do not just identify the basic pattern, but recognize more subtle points such as changes in rate or a plateau.

- Give units for calculated or mathematical answers. Make sure you show your working; it may be worth a mark!

- In any quantitative answer do not use the term 'amount' as this is too vague. Values are time, rates, percentages, sizes, distances, concentrations, and so on.

When analysing data, think carefully about which trends are significant and which are not.

Expert tip

Why not prepare your own possible exam questions and develop accompanying mark schemes? This style of active learning, coupled with peer review (i.e. asking for feedback from others in your class), can be an effective learning strategy.

Expert tip

Make sure you have the correct equipment for the exam. Take a ruler and use it when reading from graphs. You will need a calculator in Paper 2 and Paper 3.

Expert tip

- You will not gain marks by simply quoting values and leaving the conclusion to the examiner; there must be a statement or comparison showing that the relationship between pieces of data has been understood. For example, in a question concerning goby fish:

  - The statement 'a fed sand goby ate 8.0 mg and a starved sand goby 9.6 mg, whereas a fed black goby ate 4.2 mg and a starved black goby 8.9 mg' would not gain a mark because the answer only quotes data and does not offer analysis.

  - The statements 'both sand and black goby foraged more after starvation' and 'the black goby increased the amount more than the sand goby' would both gain a mark because they offer a comparison and involve analysis of the data.

- If several samples are taken from the same population, the means of the samples are likely to be different. The differences may or may not be significant.

- In biology, where variation is expected, you need to be able to judge whether differences are significant or not. If graphs contain error bars, overlapping error bars indicate that differences in means are *not* significant; if bars do not overlap then differences *are* significant.

- Bear in mind statistical significance. Small differences are unlikely to be significant so are usually not worth mentioning. You should focus on results that are statistically significant at the 5% significance level.

You need to be able to write about correlations and relationships.

- When writing about correlation, causation should not be implied. A verb such as 'increases' or 'decreases' implies cause. However, the adjectives 'decreased' or 'increased' are acceptable because the adjectives describe the conditions of the correlation.

- Are correlations and relationships directly or indirectly proportional? Usually biological data show correlation and not proportionality, because of the many factors that affect results.

Command terms

Command terms are key terms and phrases used in examination questions. They indicate the approach required in an exam answer and the depth of treatment required.

■ Assessment objective 1

Define: Give the precise meaning of a word, phrase, concept, or physical quantity.

Draw: Represent by means of a labelled, accurate diagram or graph, using a pencil. A ruler (straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted (if appropriate) and joined in a straight line or smooth curve.

Label: Add labels to a diagram.

List: Give a sequence of brief answers with no explanation.

Measure: Obtain a value for a quantity.

State: Give a specific name, value, or other brief answer without explanation or calculation.

■ Assessment objective 2

Annotate: Add brief notes to a diagram or graph.

Calculate: Obtain a numerical answer showing the relevant stages in the working (unless instructed not to do so).

Describe: Give a detailed account.

Distinguish: Make clear the differences between two or more concepts or items.

Estimate: Obtain an approximate value.

Identify: Provide an answer from a number of possibilities.

Outline: Give a brief account or summary.

Expert tip

Experiments with independent and dependent variables investigate the effects of the independent on the dependent variable.

Expert tip

Comparisons within data-based questions require 'the big picture' rather than simply a description of quantitative information.

Expert tip

You need to practise as many data-response questions as possible. Examples are provided at the end of many chapters in the Study and Revision Guide. Look at mark schemes carefully to improve your performance and hone your exam technique.

Expert tip

'Assessment objectives', mentioned in your course guide, encourage the development of certain skills, attributes, and attitudes. There are three levels of assessment objectives contained within the command terms: from Level 1 which are simple to use, to Level 3 which are more complex and difficult to apply.

■ Assessment objective 3

Analyse: Break down in order to bring out the essential elements or structure.

Comment: Give a judgment based on a given statement or result of a calculation.

Compare: Give an account of the similarities between two (or more) items or situations, referring to both (all) of them throughout.

Compare and contrast: Give an account of similarities and differences between two (or more) items or situations, referring to both (all) of them throughout.

Construct: Display information in a diagrammatic or logical form.

Deduce: Reach a conclusion from the information given.

Design: Produce a plan, simulation, or model.

Determine: Obtain the only possible answer.

Discuss: Offer a considered and balanced review that includes a range of arguments, factors, or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence.

Evaluate: Make an appraisal by weighing up the strengths and limitations.

Explain: Give a detailed account including reasons or causes.

Predict: Give an expected result.

Sketch: Represent by means of a diagram or graph (labelled as appropriate). The sketch should give a general idea of the required shape or relationship, and should include relevant features.

Suggest: Propose a solution, hypothesis, or other possible answer.

Past paper reference chart

Working on past paper questions is a good way to prepare for an exam.
The tables below allow you to find questions on each topic on specific papers to help you practice.

Topic	Date	SL Paper 1	SL Paper 2	SL Paper 3
	TZ1 = time zone 1 (exams taken in North and South America)			
	TZ2 = time zone 2 (exams taken in Africa, Europe & Middle East, and Asia-Pacific)			
Topic 1	Nov 09	15	4b	
	May 10 TZ1	3, 2, 4	6a, 7c	
	May 10 TZ2	4, 5	7b	
	Nov 10	4	7a, 7b	
	May 11 TZ2	4		
	Nov 12	5, 6		
	May 13 TZ1	3, 4	2abc	D1ab
	May 13 TZ2	2, 3, 4, 5, 7	6a	
	Nov 13	3, 6	7a	
	May 14 TZ1	4, 6	2a-c	
	May 14 TZ2	2, 4		D11cd
	Nov 14		5a	
	May 15 TZ1	2,		
	May 15 TZ2	5, 6, 7		D12ab

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Topic	Date	SL Paper 1	SL Paper 2	SL Paper 3
Topic 2	Nov 09	5, 8, 9	7a	
	May 10 TZ1	7	5b	
	May 10 TZ2	8	5a	
	Nov 10	5, 6, 9, 26, 31		
	May 11 TZ2	6, 9, 12, 16		
	Nov 12	9, 10, 11	5a	
	May 13 TZ1	5, 10, 11, 12, 13	1a-k	
	May 13 TZ2	8, 10, 11, 12	1a-h, 5c, 7a	
	Nov 13	7, 8, 10	4a(i)(ii), 5b, 7b	
	May 14 TZ1	7, 8, 10, 11		
	May 14 TZ2	6	5a	
	Nov 14	10	5a, 6ab	
	May 15 TZ1	8, 9, 11, 12		
	May 15 TZ2	2	5a	
Topic 3	May 09 TZ1		1a-f	
	Nov 09	13		
	May 10 TZ1		7c	
	May 10 TZ2		7c	
	Nov 10	13		
	May 11 TZ2	22, 23		
	Nov 12	13		
	May 13 TZ1	14, 16, 18		
	May 13 TZ2	13, 17	2ab, 5b	
	Nov 13	4, 11, 12, 15, 16		
	May 14 TZ1	17	3a(i)(ii)(iii), 3b(i)(ii)(iii), 6c	
	May 14 TZ2	14		
	Nov 14	13, 14, 16, 17	5c	
	May 15 TZ1	6, 13, 17		
	May 15 TZ2	12, 13	2ab, 6b	
Topic 4	May 09 TZ 2		7c	
	Nov 09	16, 17		
	May 10 TZ1		1a-g	
	May 10 TZ2		8a	
	May 11 TZ2	29		
	Nov 12	19, 20		
	May 13 TZ1	18, 19, 20		
	May 13 TZ2	20	7b	
	Nov 13	18, 19	5a	
	May 14 TZ1		1a-g	
	May 14 TZ2		7b	
	Nov 14	19, 20		
	May 15 TZ1	18		

Topic	Date	SL Paper 1	SL Paper 2	SL Paper 3
Topic 5	May 09 TZ 2		6b	
	Nov 09	18		D1ab
	May 10 TZ1		7a	
	Nov 10	16, 17, 18		
	May 11 TZ2	28, 19	5c	
	Nov 12		2ab	D3
	May 13 TZ1	22, 23	7ac	
	May 13 TZ2	21, 22		D3
	Nov 13	20, 21		
	May 14 TZ1	24		
	May 14 TZ2		3a-c	
	Nov 14	23	5c	3
	May 15 TZ1	23		3
	May 15 TZ2	22		D2a, D3
Topic 6	May 09 TZ1		6c	
	May 09 TZ 2		5b	
	Nov 09	21		
	May 10 TZ1	22	4b, 7b	
	May 10 TZ2	20, 21, 23		
	Nov 10	10, 19, 20, 21		
	May 11 TZ2		1a-h	
	Nov 12	24, 26, 27, 29, 36	1a-g, 5c	
	May 13 TZ1	24, 25, 27	1a-f, 8b	
	Nov 13	24, 28, 29	5c, 7c	
	May 14 TZ1	25, 26, 27, 29		
	May 14 TZ2	22, 24, 25, 26, 30		
	Nov 14	26, 37		
	May 15 TZ1	26, 27, 29	1a-f	
	May 15 TZ2	26, 27, 29	4a-c, 7ab	
Topic 7	May 10 TZ1	26	6c	
	Nov 10	25		
	May 11 TZ2	31		
	Nov 12		7c	
	May 13 TZ2	25, 26		
	Nov 13	26, 27, 29		
	May 14 TZ1	26	2a-c	
	May 14 TZ2	30		
	Nov 14	28, 29		
	May 15 TZ1	25	3ci-v, 5b	

Topic	Date	SL Paper 1	SL Paper 2	SL Paper 3
Topic 8	Nov 09	26, 27, 28		
	May 10 TZ2	30	6a	
	Nov 10	29		
	May 11 TZ2		5b	
	Nov 12	28, 29, 30		
	May 13 TZ1	27, 29, 30		
	May 13 TZ2	28	7c	
	Nov 13	28, 31		
	May 14 TZ1	27, 28, 2		
	May 14 TZ2	31, 32, 33	8c	
	May 15 TZ1	27, 28, 29	7abc	
Topic 9	Nov 09	31	7b	
	May 10 TZ1	32		
	May 10 TZ2		5c	
	Nov 10	32, 33	1a-g	
	May 11 TZ2	32, 34	6c	
	Nov 12	31		
	May 13 TZ2		7b	
	Nov 13	32, 33		
	May 14 TZ1	30, 31, 32		
	May 14 TZ2	34, 35		
	Nov 14	32		
	May 15 TZ1	30, 32		
	May 15 TZ2		8a	
Topic 10	Nov 09	33		
	May 10 TZ2	35	7b	
	Nov 10	34		
	Nov 12		B5c, D2ai,ii	
	May 13 TZ1	33	7b	
	May 13 TZ2	34, 35		
	Nov 13	34		
	May 14 TZ1	33		1a-c
	May 14 TZ2			1a-e
	Nov 14	34,		
	May 15 TZ1	33, 34	5a	
	May 15 TZ2		4abc	
Topic 11	May 09 TZ 2		1a-f	
	Nov 09	39, 40	7c	
	May 10 TZ1	36, 37	4c	
	May 11 TZ2		3abc, 8c	
	Nov 12	37, 40	4a-c	
	May 13 TZ1	36, 37, 38, 39		
	May 13 TZ2	38, 39	8c	
	Nov 13	36, 39, 40	5c	

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Topic	Date	SL Paper 1	SL Paper 2	SL Paper 3
	May 14 TZ1	35, 36, 38, 39	3a-c	
	May 14 TZ2	29, 38, 40		
	Nov 14	38, 39, 40		
	May 15 TZ1	35	4b, 6b	
	May 15 TZ2	29	5c, 6c	
Option A	Nov 09			E3
	May 10 TZ2			E1a-d
	Nov 10			E1a-f
	May 11 TZ2			E2a-c
	May 13 TZ1			E2abc
	Nov 13			E5ab
	May 14 TZ1			E5a, A6, E13a-d
	May 14 TZ2			E4a-e, E5c, E6
	Nov 14			E5a
	May 15 TZ1			E4a-d, E14ab, E15a-c
	May 15 TZ2			E5c
Option B	Nov 09			F2a, F3
	Nov 12			F1a-e
	May 14 TZ1			F16a-d
	Nov 14			F9
	May 15 TZ2			F16a-e
Option C	Nov 12			G1a-e
	May 13 TZ1			F3b, G1a-d, G2c
	May 13 TZ2			G11ab, G2a
	Nov 13			G11ab, G19a-d
	May 14 TZ1			F18ab, G11ab, G12
	May 14 TZ2			G10a-e
	Nov 14			F8a
	May 15 TZ1			G10a-d, G11ab, G12, G18a-c
	May 15 TZ2			F18a, G10a-d, G11ai-ii
Option D	May 09 TZ1			H3b,
	May 09 TZ 2			H1a-e
	Nov 09			H1a-c, H3,
	May 10 TZ2			H2a-b
	Nov 10			H3
	Nov 12			H3
	May 13 TZ1			A1a-c, A2a-c, A3a-b
	May 13 TZ2			H15, H1
	Nov 13			A2ab
	May 14 TZ1			A2a-c, H15
	May 14 TZ2			H15
	Nov 14			H13
	May 15 TZ1			H14bi-ii, H14ci-ii, H15
	May 15 TZ2			A1a-e, H14ab, H15

Countdown to the exams

4–8 weeks to go

- Start by looking at the syllabus and make sure you know exactly what you need to revise.
- Look carefully at the checklists (available on-line as part of the downloadable content for this book) and use them to help organize your class notes and to make sure you have covered everything.
- Work out a realistic revision plan that breaks down the material you need to revise into manageable pieces. Each session should be around 25–40 minutes with breaks in between. The plan should include time for relaxation.
- Read through the relevant sections of this book and refer to the expert tips, common mistakes, key definitions, and case studies.
- Tick off the topics that you feel confident about, and highlight the ones that need further work.
- Look at past papers. They are one of the best ways to check knowledge and practise exam skills. They will help you identify areas that need further work.
- Try different revision methods, e.g. summary notes, mind maps, flash cards.
- Test your understanding of each topic by working through the 'Quick check' and 'Exam practice' questions.
- Make notes of any problem areas as you revise and ask a teacher to go over them in class.

One week to go

- Aim to fit in at least one more timed practice of an entire past paper, comparing your work closely with the mark scheme.
- Examine the checklists carefully to make sure you haven't missed any of the topics. Don't forget your Option topic!
- Tackle any final problems by getting help from your teacher or talking them over with a friend.

The day before the examination

- Look through this book one final time. Look carefully through the information about Paper 1, Paper 2, and Paper 3 to remind yourself what to expect in your exam papers.
- Check the time and place of the exams.
- Make sure you have all the equipment you need (e.g. extra pens, a watch, tissues). Make sure you have a calculator; this is needed in Paper 2 and Paper 3 (it is not allowed in Paper 1).
- Allow some time to relax and have an early night so you are refreshed and ready for the exams.

My exams

Biology Paper 1

Date:………………………….…..

Time:………………………….…..

Location:………………………....

Biology Paper 2

Date:………………………….…..

Time:………………………….…..

Location:………………………....

Biology Paper 3

Date:………………………….…..

Time:………………………….…..

Location:………………………....