Edexcel International AS/A Level

IAL Biology

WELCOME TO PEARSON

Event Code: YBI11-20IO3

First teaching in 2018, first assessment 2019

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Agenda

Time	Item
09:45	Register
10:00	Welcome
10:05	Background to the new IAL Biology specification
10:10	Review of the IAL Biology specification
10:40	Ensuring effective delivery of the specification
11:20	Understanding how the specification is assessed
11:50	Overview of support available from Pearson
11:55	Networking
12:00	Finish

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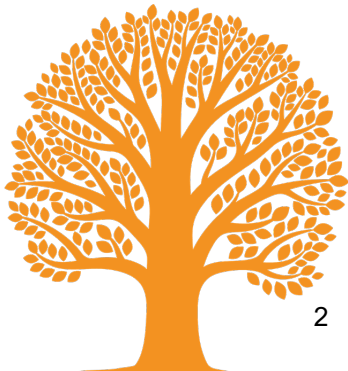
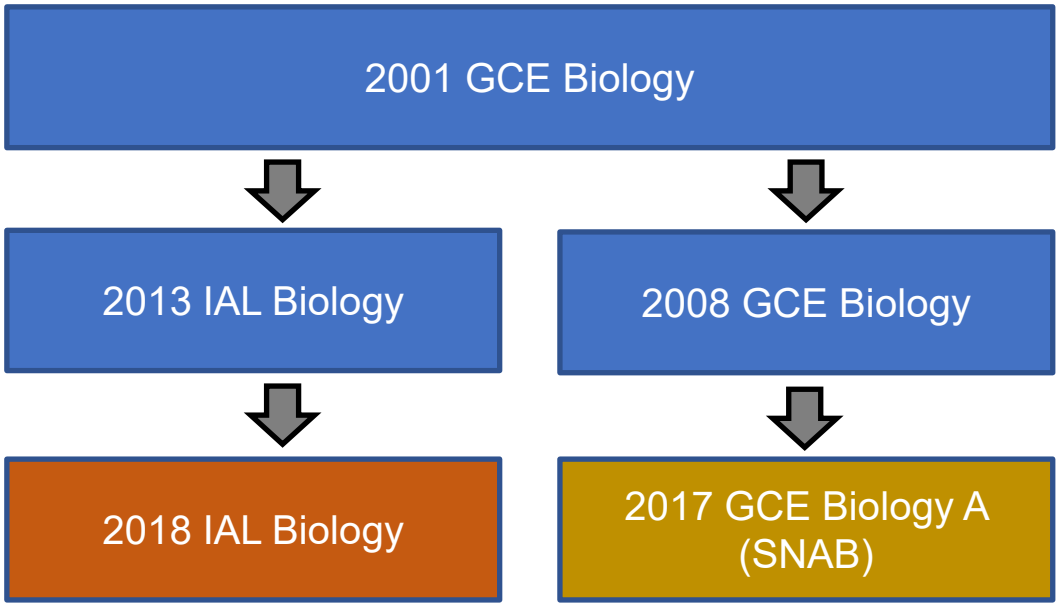


Origin of the new IAL Biology qualification



Same qualification offered to home and international candidates – some restrictions on assessment

Identical specification – similar assessment (with the exception of practical skills)

Similar specification – different assessment model

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Key points about the new IAL Biology qualification

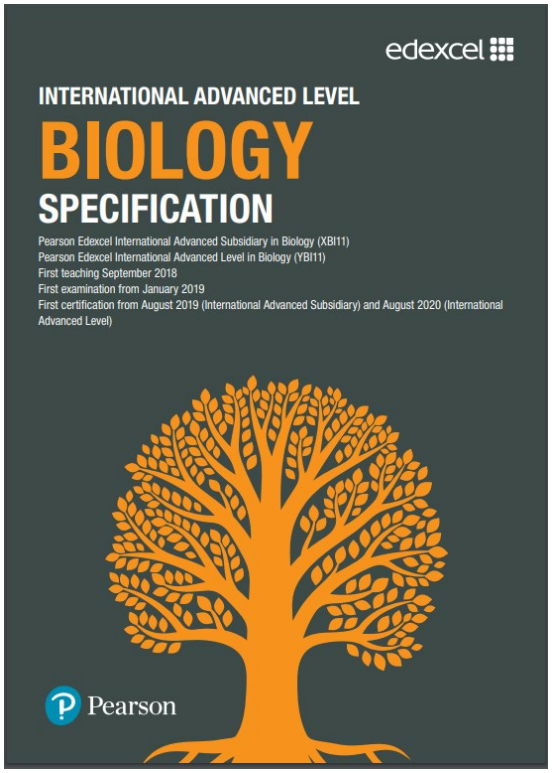
- Specification content – very similar to the legacy IAL and the new UK GCE Biology A specification

- Modular assessment – six units (modules) each assessed by a single external examination offered in January, June and October

- Assessment changes – new command words, mathematical skills requirement, levels-based questions

Specification

- The specification is the main document you need to teach the course.
- It outlines the aims of the course, the content you MUST cover and all the information you need about assessing your students.
- This document is available to download from the Pearson website.



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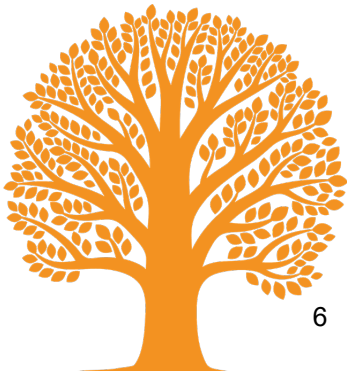
SAMs

- SAMs is short for Sample Assessment Materials.
- The SAMs are examples of the question papers and mark schemes and show the question types and how they will be marked by the examiners.
- We base all of our future papers and assessments on these Sample Assessment Materials.
- The SAMS, for each unit examination, are available to download from the Pearson website.



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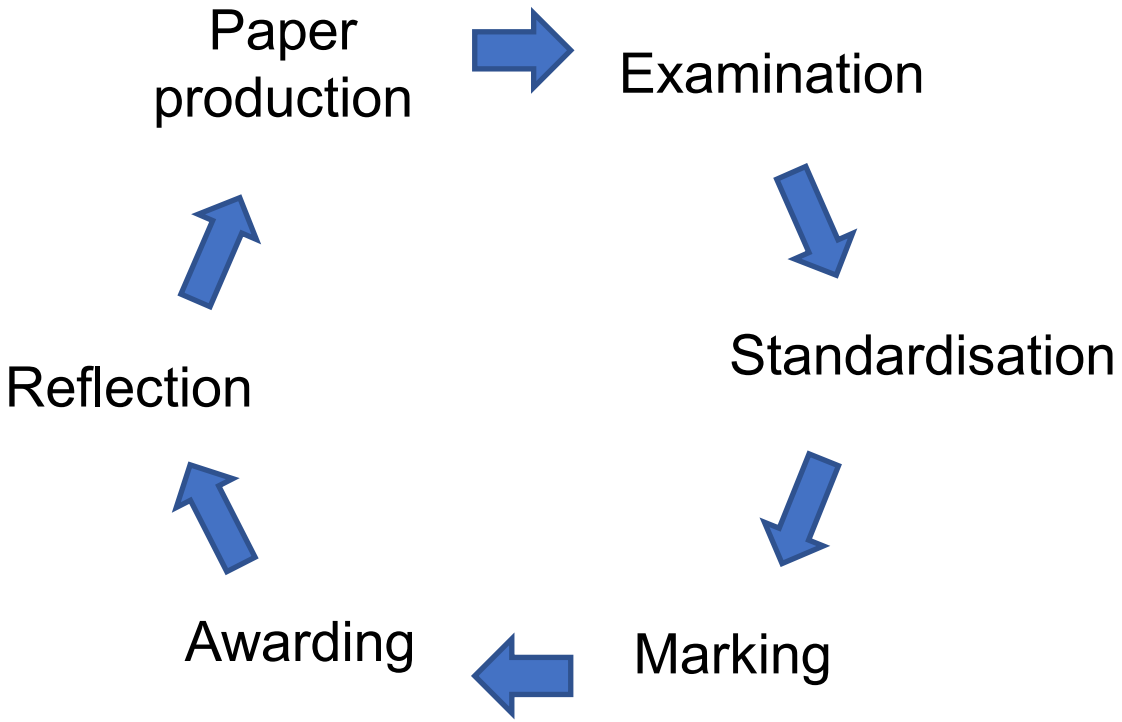
How is the content assessed?



A copy of the Quality of marking document can be downloaded from the Pearson website

https://qualifications.pearson.com/content/dam/pdf/Support/Quality%20Assurance/Quality_of_marking_updated.pdf

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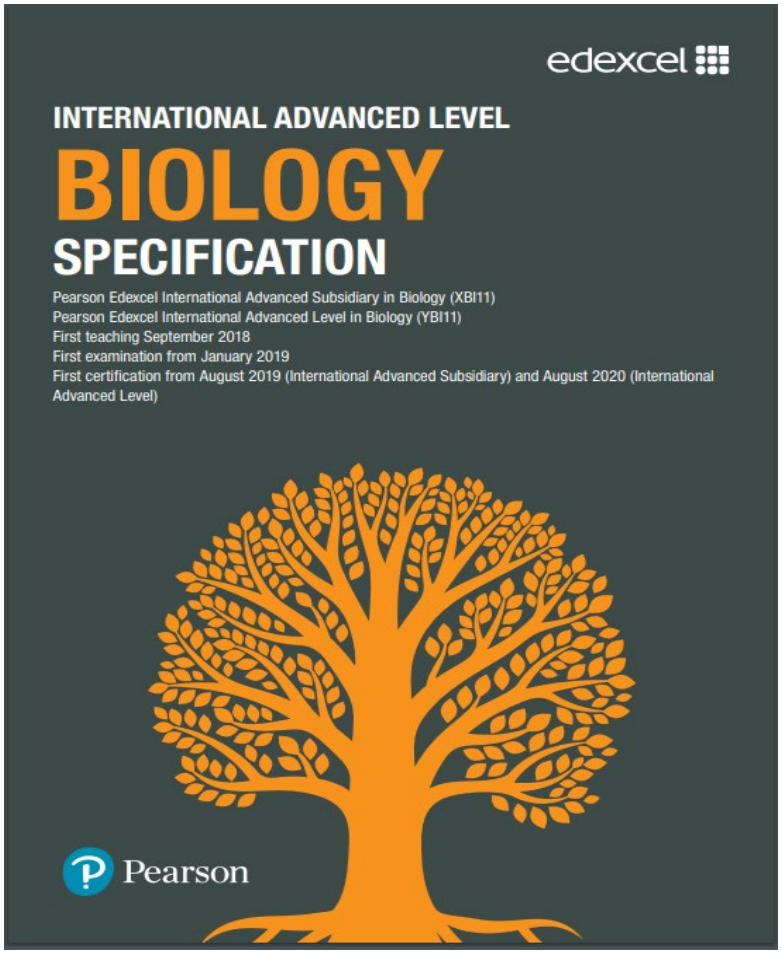
Taking a closer look at the specification



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Overview of the specification: IAS

Unit	Topic
1. Molecules, Diet, Transport and Health	1. Molecules, Transport and Health
	2. Membranes, Proteins, DNA and Gene Expression
2. Cells, Development, Biodiversity and Conservation	3. Cell structure, Reproduction and Development
	4. Plant structure and Function, Biodiversity and Conservation
3. Practical Skills in Biology I	Experimental skills acquired from the study of units 1 and 2

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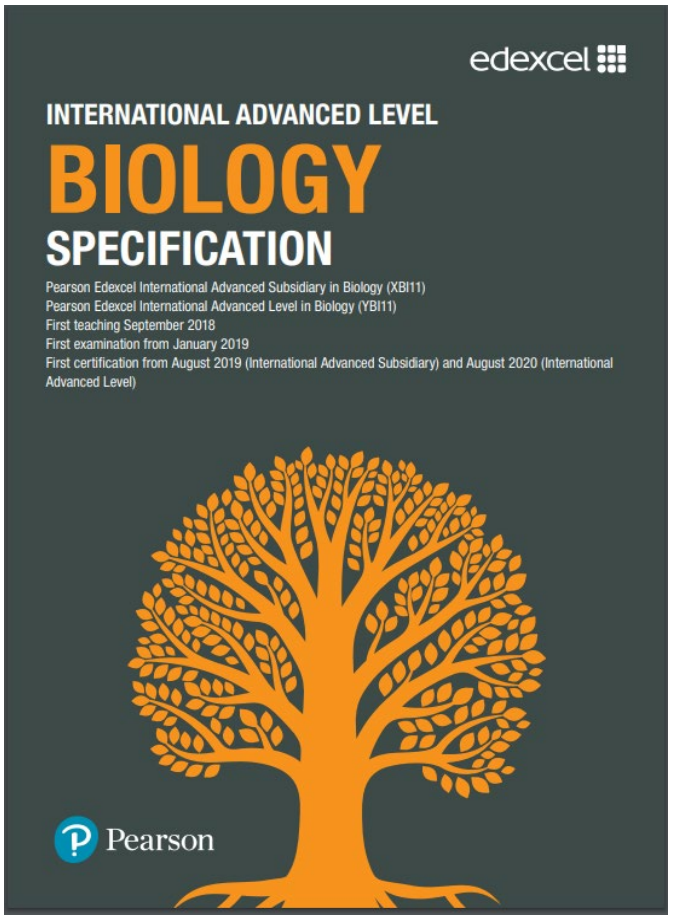
Overview of the specification: IA2

Unit	Topic
4. Energy, Environment, Microbiology and Immunity	5. Energy Flow, Ecosystems and the Environment
	6. Microbiology, Immunity and Forensics
5. Respiration, Internal Environment, Coordination and Gene Expression	7. Respiration, Muscles and the Internal Environment
	8. Coordination, Response and Gene Technology
6. Practical Skills in Biology II	Experimental skills acquired from the study of units 1, 2, 4 and 5

Units 1, 2, 4 and 5 follow the same format



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Interpretation of the specification

1.10	understand the course of events that leads to atherosclerosis (endothelial dysfunction, inflammatory response, plaque formation, raised blood pressure)
1.11	understand the blood clotting process (thromboplastin release, conversion of prothrombin to thrombin and fibrinogen to fibrin) and its role in cardiovascular disease (CVD)

1.20	know the benefits and risks of treatments for cardiovascular disease (CVD) (antihypertensives, statins, anticoagulants and platelet inhibitors)

6.10	understand the differences between the roles of B cells (B memory and B effector cells), and T cells (T helper, T killer and T memory cells) in the host's immune response

So focusing on B effector and T killer cells, it would be reasonable to teach that:

- B effector cells (plasma cells) produce antibodies that recognise a specific antigen
- T killer cells destroy specific target cells.

It would also be reasonable to teach that:

- antibodies from B cells bind to antigens in the blood or on the surface of bacteria or viruses
- T killer cells only recognise antigens on the surface of infected cells or mutated cells.

Look up specification point 7.2.

Now try this activity.

Which of these statements, about glycolysis, do you think your students should be taught?

7.2	understand the roles of glycolysis in aerobic and anaerobic respiration, including the phosphorylation of hexoses, the production of ATP by substrate level phosphorylation, reduced coenzyme, pyruvate and lactate *Details of intermediate stages and compounds are not required.*

For each molecule of glucose undergoing glycolysis two molecules of pyruvate are produced

Glycolysis starts with glucose

~~In glycolysis the enzyme adding the second phosphate is called phosphofructokinase~~

ATP is produced by substrate level phosphorylation

~~Fructose is phosphorylated to fructose-6-phosphate~~

NAD is reduced in the production of pyruvate and oxidised in the conversion of pyruvate to lactate

For every two molecules of ATP used to phosphorylate hexoses four ATP are produced

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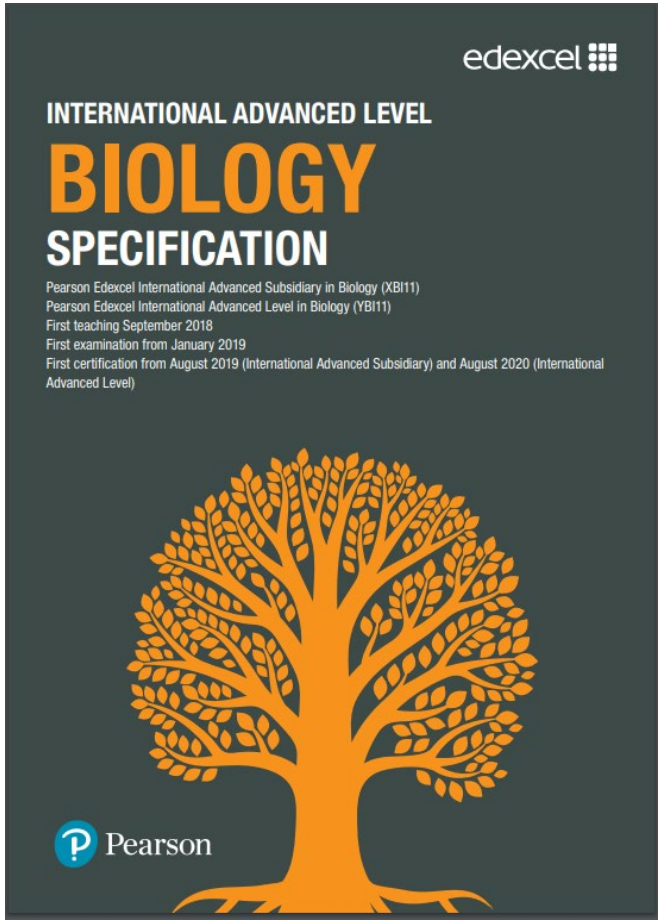
Units 3 and 6 are organised a little differently



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Questions assessing practical skills

RECOMMENDED ADDITIONAL PRACTICAL

Investigate factors affecting the **growth** of pollen tubes

What sort of factors might be investigated?

Taking account of the context

The table shows the results of an investigation into the effect of boric acid concentration, in a sucrose solution, on the growth of pollen tubes.

Boric acid concentration / parts per million (ppm)	Pollen tube length / µm
25	78
50	126
100	166
200	134
300	112
400	90

You are provided with a solution containing 500 g dm^{-3} of sucrose.

Devise a procedure to investigate the effect of different concentrations of sucrose on the rate of growth of pollen tubes, using this sucrose solution. (5)

What information do you think the candidates need to use from the information provided in the question?

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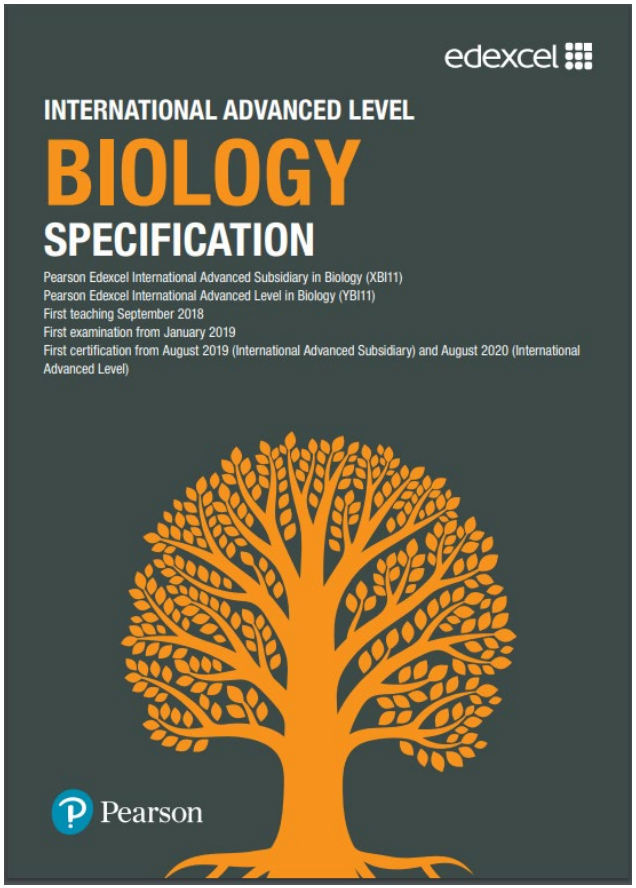
Mark scheme

From the context of the question	From practical skills acquired in the course
Make different concentrations from the 500 g dm^{-3} sucrose solution Use boric acid at a specified concentration Take measurements at specified time intervals (so that a rate can be calculated)	Prepare at least five different concentrations of sucrose Use a microscope and graticule to measure pollen tube length Suggest other factors that need to be controlled e.g. temperature

- use a range of at least 5 concentrations of (sucrose) solution (1)
- detail of dilution method of (500 g dm^{-3} solution) (1)
- at least one control variable named (1)
- use 100 ppm boric acid (solution) (1)
- use a microscope and graticule to measure pollen tube length (1)
- stated times for measurement of pollen tube length (1)

- At least 10% of marks available are for level 2 mathematics
- Skills are listed along with exemplification in appendix 6
- All the mathematical skills can be assessed during life of the qualification



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Which mathematical skill(s) is this question assessing?

(b) The table shows the concentration of these sugars in three pineapples.

Sugar	Concentration of sugar / g cm^{-3}		
	Pineapple 1	Pineapple 2	Pineapple 3
fructose	1.71	1.44	1.41
glucose	1.22	1.02	1.00
sucrose	9.08	7.77	8.81

(i) Calculate the mean concentration of glucose in these three pineapples.

Give your answer in **g dm^{-3}**.

(2)

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$g\ cm^{-3} \rightarrow g\ dm^{-3}$

A.0.1	Recognise and make use of appropriate units in calculations	Candidates may be tested on their ability to: • convert between units, e.g. mm^3 to cm^3 as part of volumetric calculations • work out the unit for a rate, e.g. breathing rate

Calculate the mean …

A.1.2	Find arithmetic means	Candidates may be tested on their ability to: • find the mean of a range of data, e.g. the mean number of stomata in the leaves of a plant

Which mathematical skills?

Urease is an enzyme that converts urea into ammonia.

The reaction between urease and urea was described and then …

(c) In another investigation, the concentration of ammonia was recorded every 5 minutes for 35 minutes, at a pH of 6.0.

The table shows the results of this investigation.

Time / min	Concentration of ammonia / mol dm^{-3}
5	0.0020
10	0.0039
15	0.0053
20	0.0060
25	0.0062
30	0.0062

Which Level 2 mathematical skills might you teach using this data?

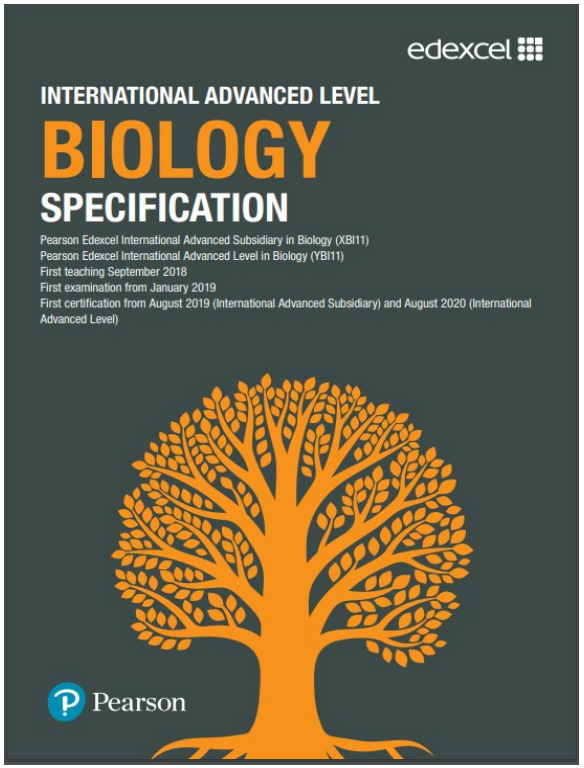
Just a few ideas

Time / min	Concentration of ammonia / mol dm^{-3}
0	0.0000
5	0.0020
10	0.0039
15	0.0053
20	0.0060
25	0.0062
30	0.0062

A.0.1	Appropriate units	Convert between minutes and seconds or mmol dm^{-3} and mol dm^{-3}
A.0.2	Decimal and standard form	Write the concentration in standard form
A.1.3	Construct and interpret tables etc	Describe the data
A.3.2	Plot two variables	Plot the data
A.3.5	Calculate a rate of change from a graph	Plot the data and calculate the initial rate of reaction
A.3.6	Draw and use the slope of a tangent to a curve as a measure of rate of change	Plot the data and find the rate of reaction at 15 minutes

Pre-release scientific article

- Short scientific article (≈ 2000 words)
- The article can relate to any area of the specification.
- Students are expected to study the article in advance of the examination.
- Questions will be on the science covered in the IAL that is relevant to understanding the article and will be in the context of the article.



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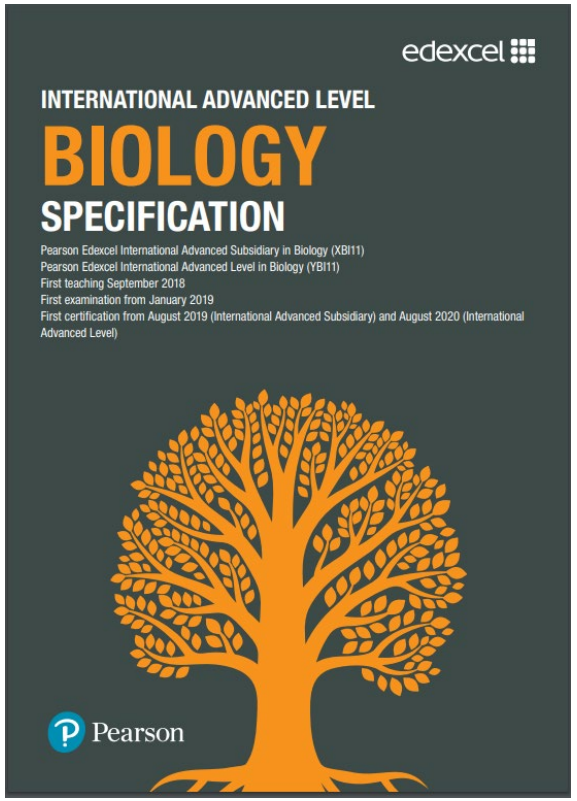
Command words

- Appendix 7 of the specification lists the command words used in the question papers

- Part 2 of this training considers taxonomy in more detail



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Some of the additional guide from Pearson

https://qualifications.pearson.com/en/qualifications/edexcel-international-advanced-levels/biology-2018.html

- Practical skills guides (teacher and student)
- Mathematical skills guide (teacher and student)
- Topic guide: Epigenetics

Planning to cover the course

How do I make sure I cover all the content?

- Specification
- Course planners
- Schemes of work
- Lesson plans

Course planner

- When each topic will be delivered
- Revision dates
- Mock and external exam dates
- Progress review dates
- Practical dates
- Field work dates
- Enrichment activities

Scheme of work

Weeks	Topic Area Aims and Learning Outcomes	Exemplar classroom activities, teaching points and suggested teaching resources	Integrated Transferable Skills
1	the importance of water as a solvent in transport, including its dipole nature the difference between monosaccharides, disaccharides and polysaccharides, including glycogen and starch (amylose and amylopectin) relate the structures of monosaccharides, disaccharides and polysaccharides to their roles in providing and storing energy **CORE PRACTICAL 1** **Use a semi-quantitative method with Benedict's reagent to estimate the concentrations of reducing sugars and with iodine solution to estimate the concentrations of starch, using colour standards.**	Use molecular models to show the structures of water and monosaccharides. Draw a summary table to compare the structures of disaccharides and polysaccharides. All students should carry out practical work. If a colorimeter is available, a calibration curve may be drawn using a range of starch solutions and standard iodine solution.	**Continuous learning** Plan and reflect on own learning, setting goals, meeting and reviewing them regularly. Students could prepare weekly targets for their learning of a particular topic, then using quick self-assessment questions to review their progress. **Teamwork** Work collaboratively with other students in practical work so that the contribution of every

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Lesson plans

1.6	understand why many animals have a heart and circulation (mass transport to overcome the limitations of diffusion in meeting the requirements of organisms)
1.7	understand how the structures of blood vessels (capillaries, arteries and veins) relate to their functions
1.8	know the cardiac cycle (atrial systole, ventricular systole and cardiac diastole) and relate the structure and operation of the mammalian heart, including the major blood vessels, to its function *Details of myogenic stimulation not needed at IAS.*

Lesson plans

- Identify key concepts
- Sequence of events
- Resources required
- How you will demonstrate learning has taken place?

Key questions

Opportunities to develop:

- mathematical skills
- practical skills
- transferable skills

Planning activity – Core Practical

Suggest how you might develop student skills in aspects of:

- Planning
- Implementation and measurement
- Processing results

(pages 25–27 of the specification)

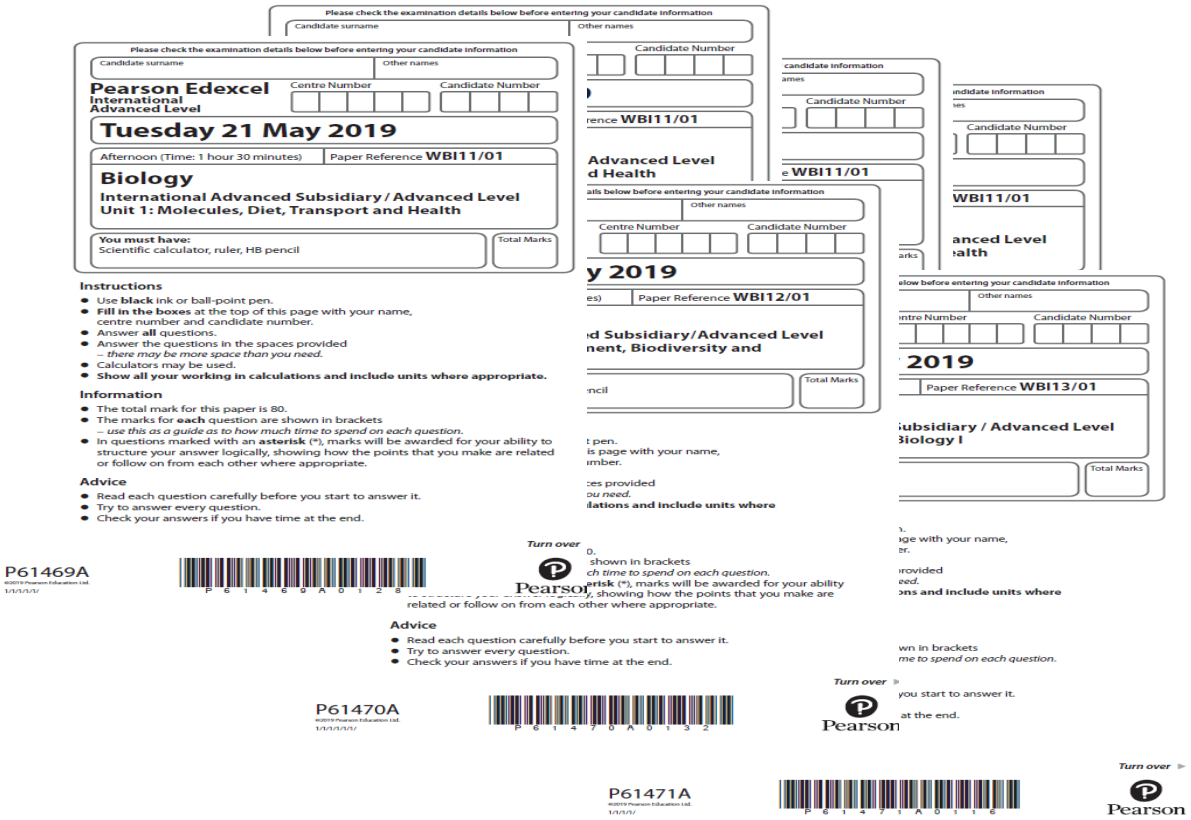
1.14	CORE PRACTICAL 2 Investigate the vitamin C content of food and drink.

Planning activity – Your solutions

You might:

- Provide a method but ask students to devise their own investigation
- Ask students to suggest how more reliable data could be collected e.g. repeating titrations and calculating mean values and the use of error bars
- Provide alternative methods and ask students to evaluate them e.g. count drops/use a burette to titrate DCPIP

Understanding assessment of the course



Six external examinations
Three for the IAS and three for the IA2

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WBI11 and WBI12

Unit		Content overview	Assessment
1	Written examination: • 1 hour and 30 minutes • Available in January, June and October • 80 marks • 40% of IAS • 20% of IAL	Topic 1: Molecules, Transport and Health Topic 2: Membranes, Proteins, DNA and Gene Expression	• Multiple choice, short-open, open-response, calculations and extended-writing questions • Points-based and level-based marks • A minimum of 8 marks targeting mathematics at level 2 • Application of knowledge and understanding to familiar and unfamiliar contexts
2		Topic 3: Cell structure, Reproduction and Development Topic 4: Plant Structure and Function, Biodiversity and Conservation	

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WBI13

Unit 3	Content overview	Assessment
Written examination: • 1 hour and 20 minutes • Available in January, June and October • 50 marks • 20% of IAS • 10% of IAL	Experimental Skills and Knowledge and Understanding of Experimental Techniques Developed in Units 1 and 2 (topics 1 to 4)	• Short-open, open-response and calculations questions • Points-based and level-based marks • A minimum of 5 marks targeting mathematics at level 2 • Application of knowledge and understanding to familiar and unfamiliar contexts

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WBI14 and WBI15

Unit		Content overview	Assessment
4	Written examination: • 1 hour and 45 minutes • Available in January, June and October • 90 marks • 40% of IAS • 20% of IAL	Topic 5: Energy Flow, Ecosystems and the Environment Topic 6: Microbiology, Immunity and Forensics	• Multiple choice, short-open, open-response, calculations and extended-writing questions • Points-based and level-based marks • 10–15 marks draw on IAS topics • A minimum of 9 marks targeting mathematics at level 2 • Application of knowledge and understanding to familiar and unfamiliar contexts • Pre-release reading (scientific article) for Unit 5
5		Topic 7: Respiration, Muscles and the Environment Topic 8: Coordination, Response and Gene Technology	

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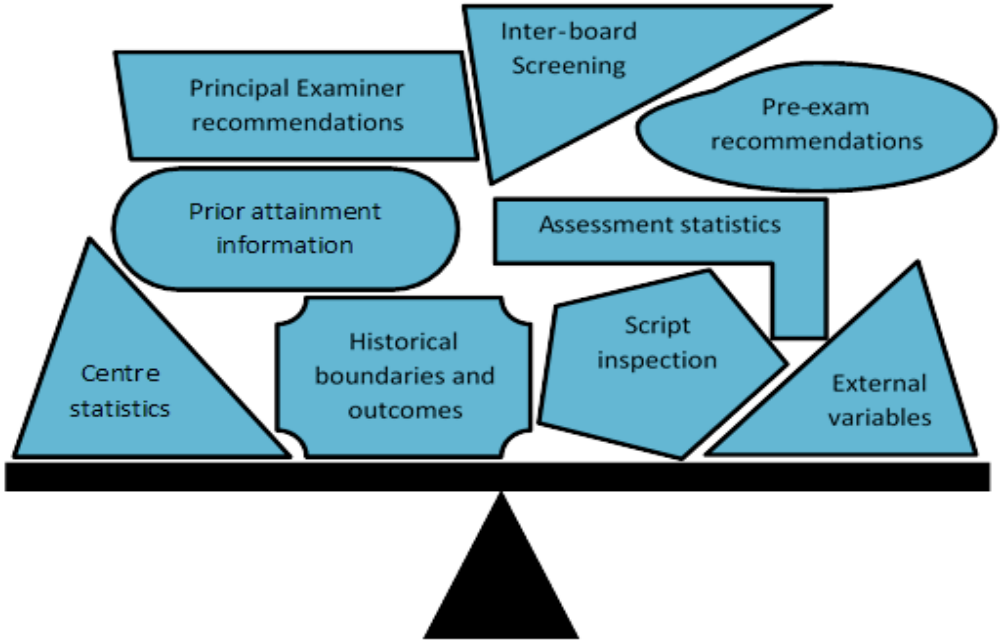
WBI16

Unit 6	Content overview	Assessment
Written examination: 1 hour and 20 minutes Available in January, June and October 50 marks 20% of IAS 10% of IAL	Experimental Skills and Knowledge and Understanding of Experimental Techniques Developed in Units 1, 2, 4 and 5	• Short-open, open-response and calculations questions • Points-based and level-based marks • A minimum of 5 marks targeting mathematics at level 2 • Application of knowledge and understanding to familiar and unfamiliar contexts

Grade boundaries

Setting grade boundaries:

https://qualifications.pearson.com/en/support/support-topics/results-certification/understanding-marks-and-grades.html



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UMS marks

Convert UMS and raw marks:
https://qualifications.pearson.com/en/support/support-topics/results-certification/understanding-marks-and-grades/converting-marks-points-and-grades.html

Grade	Max. UMS	A	B	C	D	E
IAS	300	240	210	180	150	120
IAL	600	480	420	360	300	240

To be awarded an A* candidates need to gain an A for IAL (480 UMS) of which 270 UMS must be from IA2 units.

What are assessment objectives?

Code	Description	% in IAS	% in IA2	% in IAL
AO1	Demonstrate knowledge and understanding of science	36-39	31-34	34-37
AO2	a) Application of knowledge and understanding of science in familiar and unfamiliar contexts	34-36	33-36	33-36
	b) Analysis and evaluation of scientific information to make judgements and reach conclusions	9-11	14-16	11-14
AO3	Experimental skills in science, including analysis and evaluation of data and methods	17-18	17-18	17-18

Mark schemes

The mark scheme for a paper is:

- written at the same time as the paper itself
- revised in the light of student responses to the question
- used by all examiners to mark student responses.

Examiners:

- are qualified teachers
- are trained to mark positively
- are trained to mark as consistently as possible.

Answer this question

(ii) Sperm cells contain mitochondria.

Describe the function of mitochondria in the movement of sperm cells.

(2)

How many marks would you get?

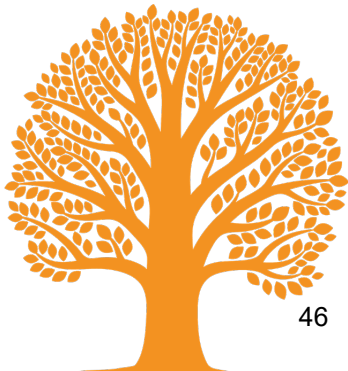
(ii) Sperm cells contain mitochondria.

Describe the function of mitochondria in the movement of sperm cells.

(2)

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	A description that includes two of the following points: • (mitochondria carry out) aerobic respiration (1) • provide {ATP / energy} (1) • to move the flagellum (1)	Accept respiration Do not accept '{produce / make} energy' unqualified Accept tail	**(2)**

Specification pages 21 and 22 and AO on page 44



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Specification point and Assessment objective

3.3	(i) know the ultrastructure of eukaryotic cells, including nucleus, nucleolus, ribosomes, rough and smooth endoplasmic reticulum, mitochondria, centrioles, lysosomes and Golgi apparatus (ii) understand the function of the organelles listed in (i)

3.11	understand how mammalian gametes are specialised for their functions (including the acrosome in sperm and the zona pellucida in the egg cell)

AO2a Application of knowledge and understanding of science in familiar and unfamiliar contexts

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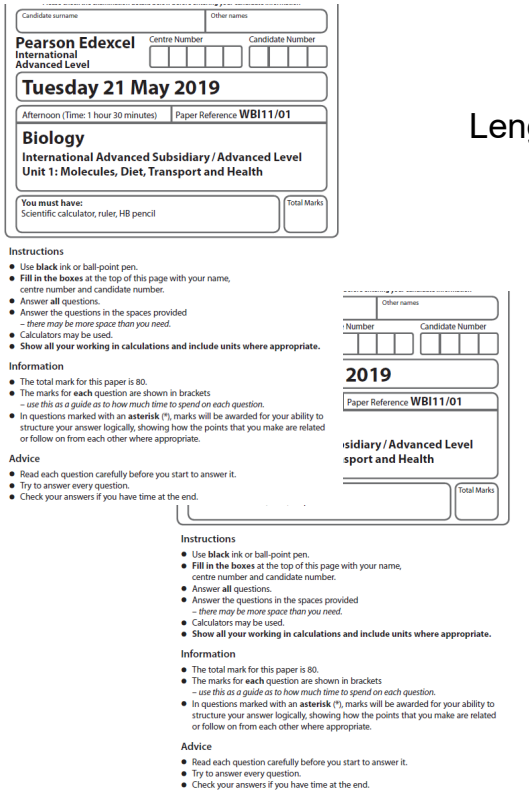
The exam paper



Candidate surname | Other names

Pearson Edexcel
International Advanced Level

Centre Number | Candidate Number

Tuesday 21 May 2019

Afternoon (Time: 1 hour 30 minutes) | Paper Reference **WBI11/01**

Biology

International Advanced Subsidiary / Advanced Level
Unit 1: Molecules, Diet, Transport and Health

You must have:
Scientific calculator, ruler, HB pencil

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Calculators may be used.
- **Show all your working in calculations and include units where appropriate.**

Information

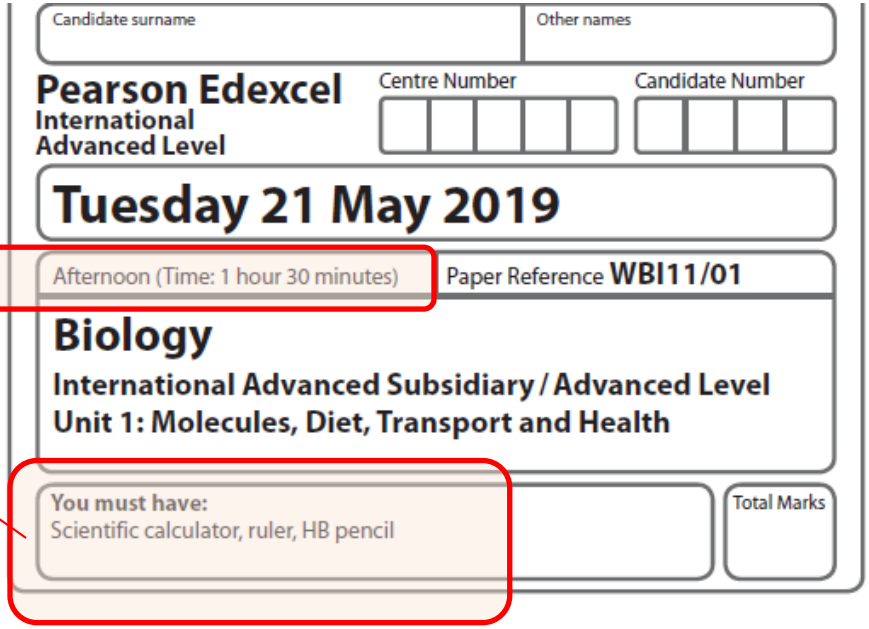
- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- In questions marked with an **asterisk** (*), marks will be awarded for your ability to structure your answer logically, showing how the points that you make are related or follow on from each other where appropriate.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Length of examination

Equipment needed in the examination



Candidate surname | Other names

Pearson Edexcel
International Advanced Level

Centre Number | Candidate Number

Tuesday 21 May 2019

Afternoon (Time: 1 hour 30 minutes) | Paper Reference **WBI11/01**

Biology

International Advanced Subsidiary / Advanced Level
Unit 1: Molecules, Diet, Transport and Health

You must have:
Scientific calculator, ruler, HB pencil

Total Marks

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The exam paper

Information that will help candidates in the examination

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
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Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

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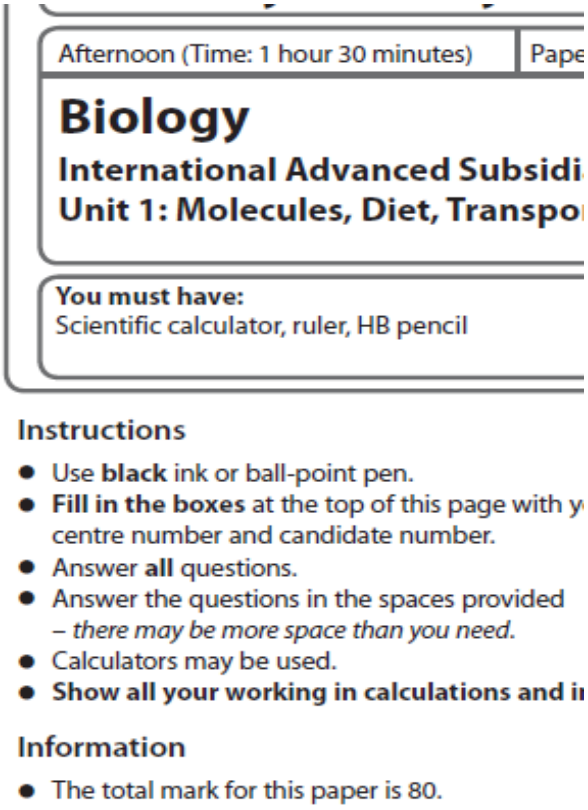
Timing in an examination

Consider the June 2019 WBI11 paper:

- How much time would you advise/expect students to spend on each question?
- What order would you recommend students answer the questions in?



Afternoon (Time: 1 hour 30 minutes) | Pape

Biology

International Advanced Subsidi

Unit 1: Molecules, Diet, Transpo

You must have:
Scientific calculator, ruler, HB pencil

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with y centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Calculators may be used.
- **Show all your working in calculations and i**

Information

- The total mark for this paper is 80.

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How can I teach good exam technique?

- Ensuring that students practise using a whole paper and understand how it is laid out
- Encourage students to read questions carefully paying particular attention to context
- Encourage students to plan their answers especially for higher tariff questions
- Understanding that we always provide more than enough paper – you don't need to fill the whole booklet!
- Walking-talking mocks

Walking-talking mocks

- Use the examination room and seating plan
- Authentic examination booklet
- Talk students through the paper in detail:
  - Colour code questions
  - Highlight context/key word

- Complete the examination under timed conditions

Using a walking-talking mock

- Peer marking
- Ask students to fill out a table at the beginning and the end to say if they feel less/the same/more confident before or after the mock.

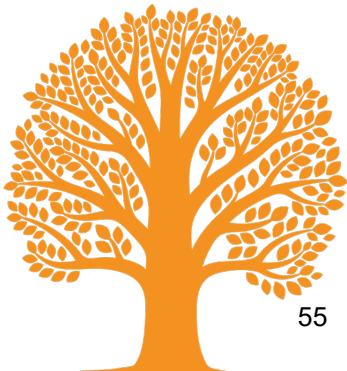
Support from Pearson

https://qualifications.pearson.com/en/qualifications/edexcel-international-advanced-levels/biology-2018.html

Training materials

- This training session and other relevant training can be accessed via the Training from Pearson web page.

https://qualifications.pearson.com/en/support/training-from-pearson-uk/pre-recorded-training.html?QualFamily=International%20Advanced%20Levels&QualSubject=Biology



ResultsPlus

1.
Student takes exam on paper

2.
Exam papers scanned

3.
Examiners mark papers online

4.
Performance reports shared

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examWizard

- Produce your own tests or mock exams
- Use questions linked to mark schemes and Examiner's report
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New Access to Script (ATS) Online Portal

Access to Scripts (ATS) is a free online portal which allows teachers to immediately access electronically marked exam papers

Provides enhanced transparency and

- Offers transparent approach to marking process
- Provides better understanding of marking before requests for enquiries about results are made
- Provides excellent aid for teaching and preparing other cohorts for examinations by helping you to evaluate a student's performance on particular questions in relation to what they have been taught.

Available instantly from results day for all our examination series, for a defined window, you can view and download scripts which have been marked online free of charge from our Self-Service Portal.

For more information on ATS, and the post results windows, visit our post-results pages.

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Contact your dedicated Subject Advisor

Subject Advisor details

Your subject advisor is **Irine Muhiuddin**
Phone: **+44 (0)344 463 2934**
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Edexcel International Advanced Level (IAL) Biology Teacher Resource Pack 1	price: £150.00 isbn10: 1292244887 isbn13: 9781292244884
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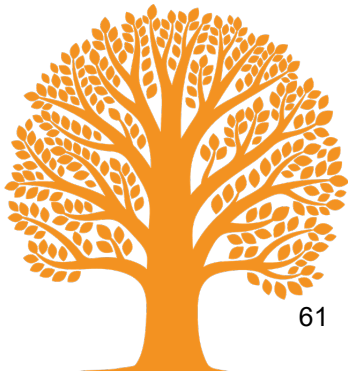
Science Community for IGCSE and IAL

Join the community and keep in touch with others teaching IGCSE and IAL

https://support.pearson.com/uk/s/group/0F90N000000QSOFSA4/science-international



Thank you

Please fill in your evaluation forms

We value your feedback!

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Thank you for your time

Find out more about us at:
http://qualifications.pearson.com

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