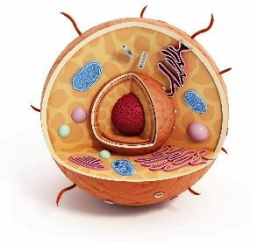
A level Biology

Summer Transition Work



Introduction

The Pearson Edexcel International Advanced Subsidiary in Biology and the Pearson Edexcel International Advanced Level in Biology are part of a suite of International Advanced Level qualifications offered by Pearson.

Structure

The Pearson Edexcel International Advanced Subsidiary in Biology and the Pearson Edexcel International Advanced Level in Biology are modular qualifications. The Advanced Subsidiary can be claimed on completion of the International Advanced Subsidiary (IAS) units. The International Advanced Level can be claimed on completion of all the units (IAS and IA2 units) Content.

The content is relevant for students who have achieved a GCSE in Biology and who want to study this subject at a higher level. The content has been updated from the previous Pearson Edexcel International Advanced Subsidiary in Biology and Pearson Edexcel International Advanced Level in Biology qualifications. It covers the major topics in biology, including biological molecules, diet, transport, health, cells, development, biodiversity, conservation, energy, the environment, microbiology, immunity, respiration, the internal environment, coordination and gene technology.

Assessment

Assessment consists of three written papers at IAS level that are externally assessed. The International A level consists of three further written papers that are externally assessed. Qualification aims and objectives The aims and objectives of these qualifications are to enable students to develop:

- essential knowledge and understanding of different areas of the subject and how they relate to each other
- a deep appreciation of the skills, knowledge and understanding of scientific methods
- competence and confidence in a variety of practical, mathematical and problem-solving skills
- their interest in and enthusiasm for the subject, including developing an interest in further study and careers associated with the subject.

Qualification overview

Pearson Edexcel International Advanced Subsidiary in Biology This qualification consists of three externally examined units. The International Advanced Subsidiary (IAS) is the first half of the International Advanced Level qualification and consists of three IAS units, units 1, 2 and 3.

This qualification may be awarded as a discrete qualification or may contribute 50 percent towards the International Advanced Level qualification.

The qualification will include questions that target mathematics at Level 2 or above (see Appendix 6: Mathematical skills and exemplifications). Overall, at least 10 percent of the marks across the papers will be awarded for mathematics at Level 2 or above. Pearson Edexcel International Advanced Level in Biology This qualification consists of six externally examined units. The International Advanced Level consists of the three IAS units (units 1, 2 and 3) plus three IA2 units (units 4, 5 and 6). Candidates wishing to take the International Advanced Level must, therefore, complete all six units. The qualification will include questions that target mathematics at Level 2 or above (see Appendix 6: Mathematical skills and exemplifications). Overall, at least 10 percent of the marks across the papers will be awarded for mathematics at Level 2 or above.

Content and assessment overview

<table>
<tr><th>IAS
Unit 1: Molecules, Diet, Transport and Health</th><th colspan="2">*Unit code: WBI11/01</th></tr>
<tr><td>Externally assessed
Written examination: 1 hour and 30 minutes
Availability: January, June and October
First assessment: January 2019
80 marks</td><td>40% of the total IAS</td><td>20% of the total IAL</td></tr>
<tr><td colspan="3">Content overview
• Molecules, Transport and Health
• Membranes, Proteins, DNA and Gene Expression</td></tr>
<tr><td colspan="3">Assessment overview
The paper may include multiple-choice, short-open, open-response, calculations and extended-writing questions.
The paper will include a minimum of 8 marks that target mathematics at Level 2 or above (see Appendix 6: Mathematical skills and exemplifications).
Candidates will be expected to apply their knowledge and understanding to familiar and unfamiliar contexts.</td></tr>
</table>

IAS **Unit 2: Cells, Development, Biodiversity and Conservation**	***Unit code: WBI12/01**	
Externally assessed Written examination: 1 hour and 30 minutes Availability: January, June and October First assessment: June 2019 80 marks	40% of the total IAS	20% of the total IAL
Content overview • Cell Structure, Reproduction and Development • Plant Structure and Function, Biodiversity and Conservation		
Assessment overview The paper may include multiple-choice, short open, open-response, calculations and extended-writing questions. The paper will include a minimum of 8 marks that target mathematics at Level 2 or above (see *Appendix 6: Mathematical skills and exemplifications*). Candidates will be expected to apply their knowledge and understanding to familiar and unfamiliar contexts.		

IAS **Unit 3: Practical Skills in Biology I**	***Unit code: WBI13/01**	
Externally assessed Written examination: 1 hour and 20 minutes Availability: January, June and October First assessment: June 2019 50 marks	20% of the total IAS	10% of the total IAL

Content overview

Students are expected to develop experimental skills, and a knowledge and understanding of experimental techniques, by carrying out a range of practical experiments and investigations while they study units 1 and 2.

This unit will assess students' knowledge and understanding of experimental procedures and techniques that were developed in units 1 and 2.

Assessment overview

The paper may include short-open, open-response and calculation questions.

The paper will include a minimum of 5 marks that target mathematics at Level 2 or above (see *Appendix 6: Mathematical skills and exemplifications*).

Candidates will be expected to apply their knowledge and understanding of practical skills to familiar and unfamiliar situations.

IA2 **Unit 4: Energy, Environment, Microbiology and Immunity**	***Unit code: WBI14/01**	
Externally assessed Written examination: 1 hour and 45 minutes Availability: January, June and October First assessment: January 2020 90 marks	40% of the total IA2	20% of the total IAL

Content overview

- Energy Flow, Ecosystems and the Environment
- Microbiology, Immunity and Forensics

Assessment overview

The paper may include multiple-choice, short-open, open-response, calculations and extended-writing questions.

The paper will include a minimum of 9 marks that target mathematics at Level 2 or above (see *Appendix 6: Mathematical skills and exemplifications*).

Candidates will be expected to apply their knowledge and understanding to familiar and unfamiliar contexts.

This paper may contain some synoptic questions which require knowledge and understanding from units 1 and 2.

IA2 **Unit 5: Respiration, Internal Environment, Coordination and Gene Technology**	***Unit code: WBI15/01**	
Externally assessed Written examination: 1 hour and 45 minutes Availability: January, June and October First assessment: June 2020 90 marks	40% of the total IA2	20% of the total IAL

Content overview

- Respiration, Muscles and the Internal Environment
- Coordination, Response and Gene Technology

Assessment overview

The paper may include multiple-choice, short-open, open-response, calculations and extended-writing questions.

Pre-released reading (scientific article) will be provided for this assessment.

The paper will include a minimum of 9 marks that target mathematics at Level 2 or above (see *Appendix 6: Mathematical skills and exemplifications*).

Candidates will be expected to apply their knowledge and understanding to familiar and unfamiliar contexts.

This paper may contain some synoptic questions which require knowledge and understanding from units 1 and 2.

IA2 **Unit 6: Practical Skills in Biology II**	***Unit code: WBI16/01**	
Externally assessed Written examination: 1 hour and 20 minutes Availability: January, June and October First assessment: June 2020 50 marks	20% of the total IA2	10% of the total IAL
Content overview Students are expected to develop further the experimental skills and the knowledge and understanding of experimental techniques they acquired in units 1 and 2, by carrying out a range of practical experiments and investigations while they study units 4 and 5. This unit will assess students' knowledge and understanding of the experimental procedures and techniques that were developed in units 1, 2, 4 and 5.		
Assessment overview The paper may include short-open, open-response and calculation questions. The paper will include a minimum of 5 marks that target mathematics at Level 2 or above (see *Appendix 6: Mathematical skills and exemplifications*). Candidates will be expected to apply their knowledge and understanding of practical skills to familiar and unfamiliar situations.		

Assessment information

Assessment requirements

The Pearson Edexcel International Advanced Subsidiary in Biology consists of three externally examined units.

The Pearson Edexcel International Advanced Level in Biology consists of six externally examined units.

Candidates must complete all assessments.

Please see the *Assessment availability and first award* section for information on from when the assessment for each unit will be available.

Unit	IAS or IA2	Assessment information	Number of raw marks allocated in the unit
Unit 1: Molecules, Diet, Transport and Health	IAS	Externally assessed Written examination: 1 hour and 30 minutes Availability: January, June and October First assessment: January 2019	80 marks
Unit 2: Cells, Development, Biodiversity and Conservation	IAS	Externally assessed Written examination: 1 hour and 30 minutes Availability: January, June and October First assessment: June 2019	80 marks
Unit 3: Practical Skills in Biology I	IAS	Externally assessed Written examination: 1 hour and 20 minutes Availability: January, June and October First assessment: June 2019	50 marks

Unit	IAS or IA2	Assessment information	Number of raw marks allocated in the unit
Unit 4: Energy, Environment, Microbiology and Immunity	IA2	Externally assessed Written examination: 1 hour and 45 minutes Availability: January, June and October First assessment: January 2020	90 marks
Unit 5: Respiration, Internal Environment, Coordination and Gene Technology	IA2	Externally assessed Written examination: 1 hour and 45 minutes Availability: January, June and October First assessment: June 2020	90 marks
Unit 6: Practical Skills in Biology II	IA2	Externally assessed Written examination: 1 hour and 20 minutes Availability: January, June and October First assessment: June 2020	50 marks

Assessment objectives and weightings

		% 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 judgments 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

How are Edexcel International A levels marked and graded?

Edexcel International A levels are modular qualifications made up of four or six separate units. You can complete individual units at different times throughout your course.

Usually, you'll do half of the units in your first year of college or sixth form – this is your International AS level. You'll then complete the remaining units in your second year of college or sixth form – this is your International A2.

You'll be issued a UMS mark and grade for each unit and then when you complete the course you'll 'cash in' to get an overall International AS or International A level grade.

- International AS units and cash-ins are graded A to E.
- International A2 units are graded A to E, but we publish the theoretical A* boundary.
- International A Level cash-ins are graded A* to E.

If you don't get enough marks to pass with an E you'll be awarded a U, which means 'unclassified'.

What are raw and UMS marks?

The 'raw' mark is the actual mark you achieve on an exam or for your coursework.

UMS stands for 'Uniform Mark Scale' and the UMS mark is a conversion of your raw mark used to indicate how well you did in a unit.

In modular qualifications, units can be taken at different times throughout the course. Question papers and coursework tasks may vary slightly in difficulty from year to year. For example, a score of 53 raw marks in one paper for one exam session might represent the same level of achievement as a raw mark of 49 in the following exam session. The Uniform Mark Scale (UMS) ensures that these two raw marks receive the same value when contributing to the final grade.

If you would like to know your raw mark for a particular unit, you will need to speak to the exams officer at your school or college or use our mark converter.

Unit results

Candidates will receive a uniform mark between 0 and the maximum uniform mark for each unit.

The uniform marks at each grade threshold for each unit are:

Units 1, 2, 4 and 5

Unit grade	Maximum uniform mark	A	B	C	D	E
	120	96	84	72	60	48

Units 3 and 6

Unit grade	Maximum uniform mark	A	B	C	D	E
	60	48	42	36	30	24

Qualification results

The minimum uniform marks required for each grade:

International Advanced Subsidiary (cash-in code: XBI11)

Qualification grade	Maximum uniform mark	A	B	C	D	E
	300	240	210	180	150	120

Candidates with a uniform mark in the range 0–119 will be Unclassified (U).

International Advanced Level (cash-in code: YBI11)

Qualification grade	Maximum uniform mark	A	B	C	D	E
	600	480	420	360	300	240

Candidates with a uniform mark in the range 0–239 will be Unclassified (U).

To be awarded an A*, candidates will need to achieve an A for the International Advanced Level qualification (at least 480 uniform marks) **and** at least 90 percent of the total uniform marks available across the IA2 units combined (at least 270 uniform marks).

Resources:

Below are some useful websites, YouTube links and books you can use throughout your A level (IAS/IAL) course to help you with independent study:

- Pearson Edexcel International AS/A Level Biology – Student Book
- Active Learn – Online platform
- CGP Edexcel International A-level Biology Revision guide
- CGP Edexcel International A-level – Workbook – Exam Practice

- Websites: Edexcel International A-level Biology Revision - PMT physicsandmathstutor.com
  https://alevelbiology.co.uk/edexcel-ial/
  https://www.savemyexams.co.uk/a-level
  https://missestruch.co.uk/resources/
  https://www.youtube.com/playlist?list=PL7O6CcKg0HaHd7yzZe3VKgEZ_Cyc0XlF1
  https://www.youtube.com/@snaprevise/playlists?view=50&sort=dd&shelf_id=5

Summer Assignment

Important vocabulary for practical work You will have come across most of the words used in practical work in your GCSE studies. It is important that you use the right definition for each word.

Activity 1

Accurate	A statement suggesting what may happen in the future.
Data	An experiment that give the same results when a different person carries it out, or a different set of equipment is ued.
Precise	A measurement that is close to the true value.
Prediction	An experiment that gives the same results when the same experimenter uses the same method and equipment.
Range	Physical, chemical or biological quantities or characteristics.
Repeatable	A variable that is kept constant during an experiment.
Reproducible	A variable that is measured as the outcome of an experiment.
Resolution	This is the smallest change in the quantity being measured of a measuring instrument that give a perceptible change in the reading.
Uncertainty	The interval within the true value can be expected to lie.
Variable	The spread of data, showing the maximum and minimum values of the data.
Control variable	Measurements where repeated measurements show very little spread.
Dependent variable	Information, in any form, that has been collected.

Cells

All life on Earth exists as cells. These have basic features in common. Activity 2 - Complete the table:

Structure	Function
Cell surface membrane	
Chloroplast	
Cell vacuole	
Mitochondria	
Nucleus	
Cell wall	
Chromosomes	
Ribosomes	

Draw the structure of a plant and animal cell. Use pencil. On each cell, add labels showing each of the structures in the table, if present.

Photosynthesis and respiration

Two of the most important reactions that take place in living things are photosynthesis and respiration. They both involve transfer of energy. Activity 3 - Complete the table

	Photosynthesis	Aerobic respiration
Which organisms carry out this process?		
Where in the organisms does the process take place?		
Energy store at the beginning of the process?		
Energy store at the end of the process		
Reactants needed for the process		
Overall word equation		
Balanced symbol equation		
Products of the process		
Which of the answers for aerobic respiration would be different for anaerobic respiration? Add these answers to the table in a different colour.		

Genetics

Activity 4

Huntington's disease is an example of a disease where the mutation causing the disease is dominant.

- h: normal (recessive)
- H: mutation (dominant)

		Paternal alleles	
		H	H
Maternal alleles	h		
	h		

Cystic fibrosis is an example of a disease where the mutation causing the disease is recessive.

- F: normal (dominant)
- f: mutation (recessive)

		Paternal alleles	
		F	F
Maternal alleles	F		
	f		

For each of Punnett squares:

1. Complete the diagrams to show the alleles for each child.

2. State which parent and child is:

- healthy
- has the disease
- a carrier

Each of the following statements is false. Re-write each one so that it becomes true.

1. The first Punnett square shows that one in every four children from this couple will have Huntington's disease.

2. The second Punnett square shows that there is one in three chance that a child born to this couple will have cystic fibrosis.

3. All children of the second couple will either be carriers or suffer from cystic fibrosis.

4. The percentage of children who are sufferers on the diagram is the same as the percentage of children each couple will have who are sufferers.

5. Having one child who is born with cystic fibrosis means that the next three children will not have the disease.

6. A 50:50 change is the same as a 0.25 probability

Analysing data

Biological investigations often result in large amounts of data being collected. It is important to be able to analyse this data carefully in order to pick out trends.

Activity 5: Mean, median, mode and scatter graphs

A student investigated an area of moorland where succession was occurring. She used quadrats to measure the area covered by different plant species, bare ground and surface water every 10 metres along a transect. She also recorded the depth of soil at each quadrat. Her results are shown in the table

	Area covered in each quadrat A to E in cm2				
	A	B	C	D	E
Bog moss	55	40	10	-	-
Bell heather	-	-	-	15	10
Sundew	10	5	-	-	-
Ling	-	-	-	15	20
Bilberry	-	-	-	15	25
Heath grass	-	-	30	10	5
Soft rush	-	30	20	5	5
Sheep's fescue	-	-	25	35	30
Bare ground	20	15	10	5	5
Surface water	15	10	5	-	-
Soil depth/cm	3.2	4.7	8.2	11.5	14.8

- Indicates zero coverage

Calculate:

1. the mode area of soft rush in the sample
2. the mean soil depth
3. the median amount of bare ground