

# PEARSON EDEXCEL INTERNATIONAL GCSE (9–1)

Pearson Edexcel  
International GCSE  
Biology: Welcome to  
Pearson



Event code: 4BI1-20IO2

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First teaching in 2017, first assessment in 2019

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# Session agenda

- 08:00 Welcome and International GCSE features
- 08.10 Specification design and Key documentation
- 08:20 The assessment model
- 08:35 Specification content
- 09:00 Assessment objectives
- 09:15 Taxonomy (Command words)
- 09:25 Core practicals
- 09:40 Maths skills
- 09:50 Support from Pearson
- 10:00 Finish



# Aims and objectives

Today, we will:

- identify how the qualification is devised and the fundamental documentation
- review the content of the qualification
- explore how to plan the course and/or lessons
- understand the assessment of the qualification and how to prepare students
- identify support available from Pearson



# Getting to know you!

- How long have you been teaching this specification?
- Were your students entered for the last examination series?
- What is the single most important thing you hope to take away from the session?



The logo features a large white circle centered on a teal background. The background is decorated with a repeating pattern of dark teal slanted bars and dots. Inside the white circle, the text "Pearson Edexcel" is written in a dark blue, bold, sans-serif font.

**Pearson Edexcel**

# About Pearson Edexcel

**Pearson is the world's leading learning company.** Our mission is to help people make progress in their lives through learning – because we believe that learning opens up opportunities, creating fulfilling careers and better lives.

- **Qualifications:** our qualifications and assessments help to educate millions of people worldwide.
- **Support:** we provide innovative textbooks, curriculum materials, multimedia learning tools, IT platforms, professional development.
- **Impact:** At the core of everything we do is the desire to make a measurable impact on improving people's lives through learning.

**Edexcel is part of Pearson Education and is the UK's largest awarding body.**

**Worldwide recognition:** over 150 years of international education experience, more than 3.4 million learners in 70+ countries. Over 9 million scripts marked annually, with exceptionally reliable results.



# **International GCSE features**



# 9–1 Grading scale

	NEW GRADING STRUCTURE	CURRENT GRADING STRUCTURE
<p>The new <b>grade 9</b> represents a new level of attainment and has been introduced to differentiate your top performing students.</p> <p>The bottom of the <b>grade 7</b> broadly aligns with the bottom of the grade A.</p>	9	A*
	8	
	7	A
<p>There's greater differentiation in the middle of the scale, with <b>three new grades 6, 5 and 4</b> rather than two grades (B and C).</p> <p>The bottom of the <b>grade 4</b> broadly aligns with the bottom of the grade C.</p>	6	B
	5	C
	4	
	3	D
<p>The bottom of the <b>grade 1</b> broadly aligns with the bottom of the grade G.</p>	2	E
	1	F
	1	G
	U	U





# 9–1 Grading scale

## Awarding

- The grading system is changing, but our commitment to awarding grades that accurately reflect learner exam performance remains the same.
- We set new grade boundaries (minimum number of marks needed to achieve each grade) for each assessment of each qualification.

## Benefits

- Greater differentiation across levels of attainment, e.g. 2 grades where the current C grade is.
- Rewards truly outstanding achievement with the grade 9.
- Provides more information about student attainment to help progression to A Level.
- Same scale for Pearson Edexcel GCSE and International GCSE allows for clear comparison with English standards, unlike old A\* to G grading.



# World-class qualifications

All Edexcel qualifications are developed to meet Pearson's **World Class Qualification design principles**

Endorsement of educational **thought-leaders and assessment experts** from across the globe

Developed using an understanding and benchmarking of **all educational systems**


Qualifications that support young people to **develop the capabilities** they need to **progress** and prosper in their lives



# Supporting transferable skills

- Our transferable skills framework underpins the design of all Pearson Edexcel international qualifications and their supporting resources across IPLS, International GCSE and International A Level.
- Ensures our assessments target the skills students need for successful progression.
- Increasing our support where these skills naturally occur through the teaching, learning and assessment.
- Pearson materials and mapping will support you in identifying and developing the acquisition of these skills in students across the full curriculum.
- <https://qualifications.pearson.com/content/dam/pdf/International%20GCSE/General/Transferable-Skills-Information-Pack.pdf>





**Specification  
design and key  
documentation**

# Subject features

**Reviewed and updated in light of UK GCSE changes**

**Full preparation for A Level study**

**Mathematical skills embedded**

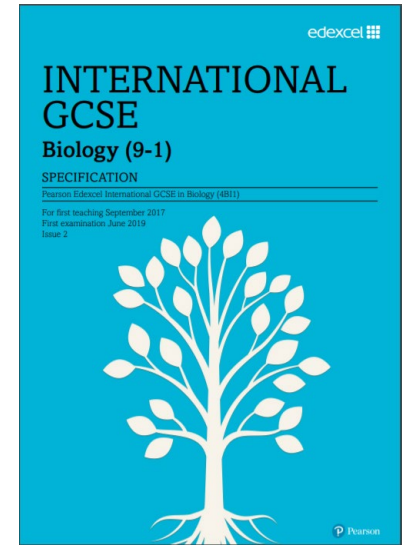
**Clear methods of assessment**

**Transferable Skills embedded**

**Practical Skills embedded**

**Dedicated textbooks are currently in production**

**Teachingscience@  
Pearson.com**

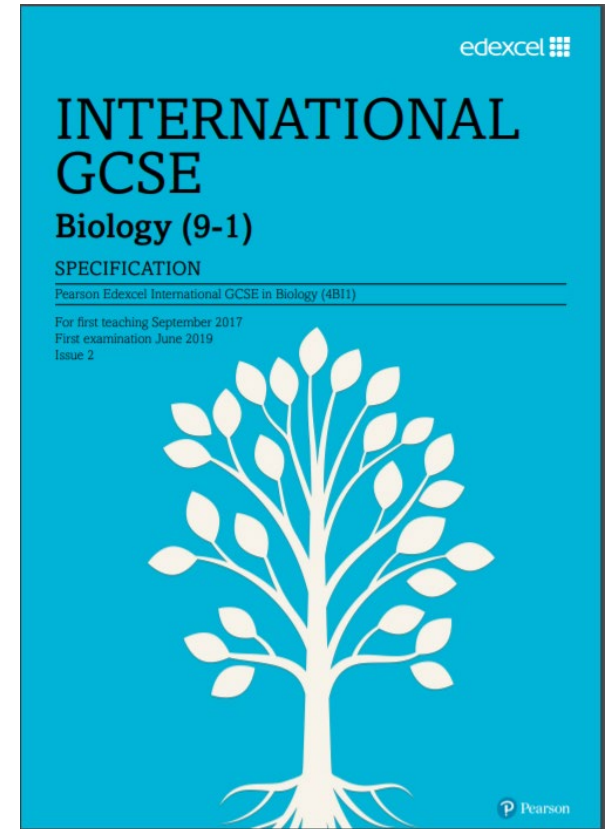


# The Specification

The Specification contains all the key information required for teaching the course.

It can be downloaded directly from the Pearson website.

Many other useful materials can also be downloaded from the website.





[Home](#) > [Our qualifications](#) > [International GCSEs and Edexcel Certificates](#) > [Biology \(2017\)](#)

# International GCSEs and Edexcel Certificates Biology (2017)



Specification

[Course materials](#)

[Published resources](#)

[News](#)

## Specification



**DOWNLOAD**

PDF | 1.2 MB

First teaching: **September 2017**

First external assessment: **2019**

Our Pearson Edexcel International GCSE (9-1) Biology specification and support materials have been developed with the help of teachers, higher education representatives and subject expert groups.

The qualification supports progression to further study, with up-to-date content reflecting the latest thinking in the subject. It is comparable to the UK reformed GCSEs in terms of the level of demand and assessment standards.

## Register your interest

Find out more about Pearson Edexcel International qualifications and sign up to receive the latest news.

[▶ Let us know](#)

## Course materials

- ▶ [Specification and sample assessments \(3\)](#)
- ▶ [Exam materials \(13\)](#)
- ▶ [Teaching and learning materials \(20\)](#)



# What does the specification contain?

- **Assessment model** – mark allocations, topics, styles of questions on both papers
- **Content** – arranged by topics
- **Assessment objectives** – the skills that we test on the papers AND the proportions of marks allocated to each skill
- **Taxonomy** – all the command words used in questions
- **Mathematical skills** – the skills that may be tested in the exams
- **Practical skills** – the core practicals that students should do and the skills expected
- **Transferable skills** – other skills that can be taught through International GCSE Biology







# **The assessment model**

# The assessment model

This tells us how we assess candidates.

Key features:

- Two examination papers – both must be taken in the same session
- Linear examinations – there are no modules
- No separate practical exam – practical skills are assessed on the papers
- Papers have similar question styles but paper 2 has additional content
- **No tiering** of papers – both papers grade from 9–1



# Assessment summary

## Paper 1

Two hours; 110 marks

## Paper 2

One hour and 15 minutes; 70 marks

Both papers will contain  
a mixture of AO1,  
AO2 and AO3

The AO3 questions  
are likely to be in a  
practical context



# Assessment summary

There will be two examination papers:

## Paper 1

will **NOT** include the specification statements printed in **BOLD**

## Paper 2

includes **ALL** the specification statements, including those printed in **BOLD**

Both papers have similar question types



# Paper 1

<b>Biology Paper 1</b>	*Paper code 4BI1/1B and 4SD0/1B
<ul style="list-style-type: none"><li>Externally assessed</li><li>Availability: January and June</li><li>First assessment: June 2019</li></ul>	61.1% of the total International GCSE
<b>Content summary</b> <p>Assesses core content that is <b>not</b> in bold and does not have a 'B' reference. Questions may come from any topic area across the specification.</p> <ol style="list-style-type: none"><li>The nature and variety of living organisms</li><li>Structures and functions in living organisms</li><li>Reproduction and inheritance</li><li>Ecology and the environment</li><li>Use of biological resources</li></ol>	
<b>Assessment</b> <ul style="list-style-type: none"><li>The paper is assessed through a 2-hour written examination paper set and marked by Pearson.</li><li>The total number of marks is 110.</li><li>A mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.</li><li>A calculator may be used in the examinations.</li></ul>	



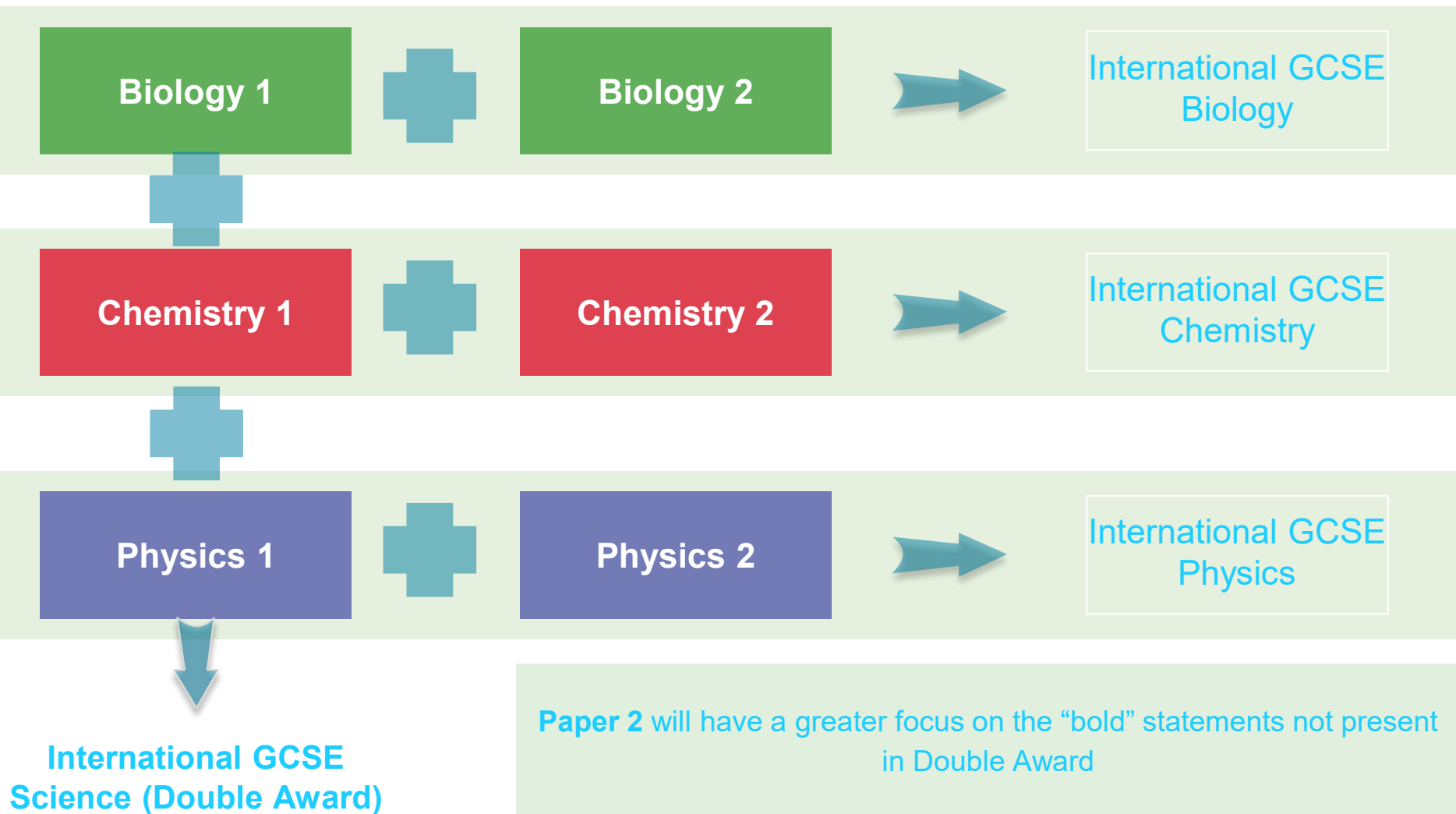
# Paper 2

<b>Biology Paper 2</b>	*Paper code 4BI1/2B
<ul style="list-style-type: none"><li>Externally assessed</li><li>Availability: January and June</li><li>First assessment: June 2019</li></ul>	38.9% of the total International GCSE
<b>Content summary</b> <p>Assesses <b>all the content</b>, including content that is in bold and has a 'B' reference. Questions may come from any topic area across the specification. Bold statements cover some sub-topics in greater depth.</p> <ol style="list-style-type: none"><li>The nature and variety of living organisms</li><li>Structures and functions in living organisms</li><li>Reproduction and inheritance</li><li>Ecology and the environment</li><li>Use of biological resources</li></ol>	
<b>Assessment</b> <ul style="list-style-type: none"><li>The paper is assessed through a 1-hour and 15-minute written examination paper set and marked by Pearson.</li><li>The total number of marks is 70.</li><li>A mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.</li><li>A calculator may be used in the examinations.</li></ul>	



<b>Humans</b>	
2.59	describe the composition of the blood: red blood cells, white blood cells, platelets and plasma
2.60	understand the role of plasma in the transport of carbon dioxide, digested food, urea, hormones and heat energy
2.61	understand how adaptations of red blood cells make them suitable for the transport of oxygen, including shape, the absence of a nucleus and the presence of haemoglobin
2.62	understand how the immune system responds to disease using white blood cells, illustrated by phagocytes ingesting pathogens and lymphocytes releasing antibodies specific to the pathogen
<b>2.63B understand how vaccination results in the manufacture of memory cells, which enable future antibody production to the pathogen to occur sooner, faster and in greater quantity</b>	
<b>2.64B understand how platelets are involved in blood clotting, which prevents blood loss and the entry of micro-organisms</b>	
2.65	describe the structure of the heart and how it functions
2.66	explain how the heart rate changes during exercise and under the influence of adrenaline
2.67	understand how factors may increase the risk of developing coronary heart disease
2.68	understand how the structure of arteries, veins and capillaries relate to their function
2.69	understand the general structure of the circulation system, including the blood vessels to and from the heart and lungs, liver and kidneys









**Content**

# Biology qualification content summary

There continue to be five topic areas in the specification:

## Nature and variety of living organisms

- Characteristics of living organisms
- Variety of living organisms

## Structures and functions in living organisms

- Organisation
- Cell structure
- Bio molecules
- Movement in & out of cells
- Nutrition
- Respiration
- Gas exchange
- Transport
- Excretion
- Coordination & response

## Reproduction and inheritance

- Reproduction
- Inheritance

## Ecology and the environment

- Organisms in environment
- Feeding relationships
- Cycles within ecosystems
- Human influences on environment

## Use of biological resources

- Food production
- Selective breeding
- Genetic modification
- Cloning



# Topic 1: The nature and variety of living organisms

- Subdivided into two areas:
  - (a) Characteristics of living organisms
  - (b) Variety of living organisms
- Focus on classification of organisms
- Key features of living organisms and viruses are given
- Students often find fungi and protoctists difficult – key vocabulary is given. They should be familiar with key terms such as mycelium, hyphae, chitin, eukaryote and prokaryote, pathogen.
- Example organisms and viruses are given, e.g. Pneumococcus, HIV
- Only account for about c. 5% of marks over the papers.



# Topic 2: Structure and functions in living organisms

- (a) Level of organisation
- (b) Cell structure
- (c) Biological molecules
- (d) Movement of substances into and out of cells
- (e) Nutrition
- (f) Respiration
- (g) Gas exchange
- (h) Transport
- (i) Excretion
- (j) Co-ordination and response



# Topic 2: Structure and functions in living organisms

- Large section of specification
- Biological molecules, cell biology and physiology of living organisms
- What many pupils think of as being biology
- Both animals and plants are considered



# Topic 3: Reproduction and inheritance

- Two sub-topics:
  - (a) Reproduction
  - (b) Inheritance
- Plant and animal reproduction are both considered
- Inheritance covers both classical genetics and molecular genetics (DNA structure, transcription, translation, mutations), natural selection and mutation.



# Topic 4: Ecology and the environment

- Four sub-topics:
  - (a) The organism in the environment
  - (b) Feeding relationships
  - (c) Cycles within ecosystems
  - (d) Human influences on the environment
- Many students find nitrogen cycle challenging
- Water vapour, carbon dioxide, nitrous oxide, methane and CFCs are listed as greenhouse gases.



# Topic 5: Use of biological resources

- Four sub-topics:
  - (a) Food production
  - (b) Selective breeding
  - (c) Genetic modification (genetic engineering)
  - (d) Cloning
- This topic has several different themes
- Lots of detail in terms of methods of cloning, use of fermenters and genetic engineering





# Scheme of work

- Pearson publish an editable scheme of work
- Has a suggested order which is the same as the specification
- The topics can be taught in ANY order and this will depend on individual circumstances
- Has suggested activities for all topics.
- The order and timings will depend if the course is taught over one, two or three years.



# How do we use the specification to organise our teaching?

## International GCSE Biology (2017)

### How to use the Scheme of Work

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This Scheme of Work (SoW) has been made available on a word document rather than PDF, allowing you to edit the document in a way that suits your teaching style and learner needs.

International GCSEs have 120 - 140 guided learning hours.

Guidance provided within the course planners, schemes of work and lesson plans are suggested approaches which can be adapted by centres to suit their particular context.

The following SoW is based on 2 hours of teaching time per week over 60 weeks and can be adjusted to how centres will use time for practical activities differently; you should edit this planner to suit your teaching approach.

The course planner, in the *Getting Started Guide*, provides a high level view of how you could approach the topics to cover the specification content across two years.

The columns in this lesson plan indicate:

- An overview of the time allocated to lessons
- Which section of the specification this lesson (or group of lessons) relates to
- The learning outcomes of those lessons.
- The activities and resources that could be used to support the teaching of this lesson
- Transferable skills support, see below for further information



Week	Content coverage	Learning outcomes	Exemplar activities	Exemplar resources	Which transferable skills are explicitly assessed through examination	Which transferable skills could also be acquired through teaching and delivery
4	<b>Section 2: Structures and functions in living organisms</b> a) Levels of organisation b) Cell structure	Students will be assessed on their ability to:  <b>2.5B explain the importance of cell differentiation in the development of specialised cells</b>  <b>2.6B understand the advantages and disadvantages of using stem cells in Medicine.</b>	<b>Activities:</b> <ul style="list-style-type: none"> <li>View abpi poster of stem cells.</li> <li>Carry out interactive web exercise on stem cells (<a href="http://www.abpischools.org.uk/page/resource/age.cfm">http://www.abpischools.org.uk/page/resource/age.cfm</a>).</li> <li>Class debate on the ethics of stem cell use.</li> <li>Make an information leaflet for a doctor's surgery informing patients on the uses of stem cells.</li> </ul>	<b>Websites:</b> <ul style="list-style-type: none"> <li>Association of the British Pharmaceutical Industry (ABPI) website provides posters, information and interactive exercises on stems cells (<a href="http://www.abpischools.org.uk/page/about.cfm">http://www.abpischools.org.uk/page/about.cfm</a>)</li> </ul> <b>Video clips:</b> <ul style="list-style-type: none"> <li>BBC DVD about stem cells and uses in medicine – Fix Me – Horizon</li> </ul>	Personal and social responsibility Adaptability Problem solving Reasoning Interpretation Adaptive learning Adaptability Creativity	Personal and social responsibility Adaptability Intellectual interest and curiosity Perseverance Communication Collaboration Teamwork Ethics Cooperation Interpersonal skills Leadership Responsibility Assertive communication Self- presentation
5	<b>Section 2: Structures and functions in living organisms</b> c) Biological molecules	Students will be assessed on their ability to:  <b>2.7 identify the chemical elements present in carbohydrates, proteins and lipids (fats and oils)</b>  <b>2.8 describe the structure of carbohydrates, proteins and lipids as large molecules made up from smaller basic units: starch and glycogen from simple sugar; protein from amino acids; lipid from fatty</b>	<b>Activities:</b> <ul style="list-style-type: none"> <li>View models of the biological molecules to ascertain common elements.</li> <li>Make paper models of large molecules from simple basic units.</li> <li><b>Build a Carbohydrate</b> interactive game.</li> </ul> <b>Animation:</b> <ul style="list-style-type: none"> <li>Virtual laboratory – starch test</li> </ul>	Edexcel International GCSE Biology Student Book: Pages 37–43  Experiment 6 – Student Book: Page 43 and pdf on ActiveBook Page 42  Edexcel International GCSE Biology Revision Guide: Page 15	Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Creativity Innovation Adaptability	Intellectual interest and curiosity Reasoning Interpretation Decision making Adaptive learning Initiative Self-direction Self regulation (metacognition, forethought, reflection) Communication Collaboration



# Activity 1: What order should we teach the topics in?

- Fill in the text box to list **three topics** that you think should be covered at the **start of the course**.
- Fill in the text box to list **two topics** that you think should be taught at the **end of the course**.
- Fill in the text box to give **one topic** that is '**synoptic**' – this means that it links to many other areas of the specification.



There is no one correct order of teaching topics!

- The published scheme of work runs in specification order.
- You can change the order to suit schools / classes / teaching styles.
- Make sure that everything is covered!
- Use topics to revisit themes – helps pupil understanding and ‘deep learning’
- Use ‘synoptic’ topics such as fish farming to draw together all aspects of the specification



# Considerations when planning a scheme of work

- ‘Underpinning topics’ need covering early – cells, transport across membranes, enzymes
- Some topics are often found to be more difficult – transcription / translation and so may be better placed at the end of the course BUT there can be a risk that they are then rushed
- Some topics require knowledge from other areas of the course – gas exchange requires a knowledge of diffusion
- Some topics draw everything together – fish farming involves pollution, respiration, digestion, nitrogen cycle, energy flow...
- Seasonal availability of plants for practicals



# Activity 2: Gas exchange in humans

Write in the text box any other areas of the specification this topic might link to.

<b><i>Humans</i></b>	
2.46	describe the structure of the thorax, including the ribs, intercostal muscles, diaphragm, trachea, bronchi, bronchioles, alveoli and pleural membranes
2.47	understand the role of the intercostal muscles and the diaphragm in ventilation
2.48	explain how alveoli are adapted for gas exchange by diffusion between air in the lungs and blood in capillaries
2.49	understand the biological consequences of smoking in relation to the lungs and the circulatory system, including coronary heart disease
2.50	<i>practical: investigate breathing in humans, including the release of carbon dioxide and the effect of exercise</i>



# Activity 2

## (d) Movement of substances into and out of cells

### Students should:

- |      |   |
|------|---|
| 2.15 | understand the processes of diffusion, osmosis and active transport by which substances move into and out of cells  |
| 2.16 | understand how factors affect the rate of movement of substances into and out of cells, including the effects of surface area to volume ratio, distance, temperature and concentration gradient |
| 2.17 | <i>practical: investigate diffusion and osmosis using living and non-living systems</i>   |

## (f) Respiration

### Students should:

- |      |  |
|------|--|
| 2.34 | understand how the process of respiration produces ATP in living organisms   |
| 2.35 | know that ATP provides energy for cells  |
| 2.36 | describe the differences between aerobic and anaerobic respiration   |
| 2.37 | know the word equation and the balanced chemical symbol equation for aerobic respiration in living organisms                   |
| 2.38 | know the word equation for anaerobic respiration in plants and in animals  |
| 2.39 | <i>practical: investigate the evolution of carbon dioxide and heat from respiring seeds or other suitable living organisms</i> |





<b>(h) Transport</b>	
<b>Students should:</b>	
2.51	understand why simple, unicellular organisms can rely on diffusion for movement of substances in and out of the cell
2.52	understand the need for a transport system in multicellular organisms
2.67	understand how factors may increase the risk of developing coronary heart disease

<b>(g) Gas exchange</b>	
<b>Students should:</b>	
<b><i>Flowering plants</i></b>	
<b>2.40B</b>	<b>understand the role of diffusion in gas exchange</b>
<b>2.41B</b>	<b>understand gas exchange (of carbon dioxide and oxygen) in relation to respiration and photosynthesis</b>
<b>2.42B</b>	<b>understand how the structure of the leaf is adapted for gas exchange</b>
<b>2.43B</b>	<b>describe the role of stomata in gas exchange</b>
<b>2.44B</b>	<b>understand how respiration continues during the day and night, but that the net exchange of carbon dioxide and oxygen depends on the intensity of light</b>
<b>2.45B</b>	<b><i>practical: investigate the effect of light on net gas exchange from a leaf, using hydrogen-carbonate indicator</i></b>



# How can we help students with content?

- Give clear checklists for them each time we teach a topic.
- Encourage 'metacognition' by getting them to evaluate their own knowledge and learning of a topic.
- After tests and exams, get them to assess their 'weaker' topic areas by giving them a grid to write in their marks.



# Checklist for topics

Code	Topic	😊	😐	😞
7.1	know that the process of respiration releases energy in living organisms			
7.2	practical: investigate the difference between inspired and expired air for carbon dioxide concentration			
7.3	know the word equation and the balanced chemical symbol equation for aerobic respiration in living organisms			
7.4	know the word equation for anaerobic respiration			
7.5	explain the differences between aerobic and anaerobic respiration			
7.6	understand the role of ATP in energy transfer (addition and removal of a phosphate group and associated energy requirement and release)			



# Test grids

- Students fill in a test grid after getting their paper back.
- The grid gives the specification references so they can check any weaker areas.
- Assessment objectives are also shown to help them self-identify where they lose marks

**Test Grid**

Question	Spec Ref	Max Mark	My Score	AO1	AO2	AO3
1ai	2.54	3				
1aii	2.54	2				
1b	2.57B	3				
1ci	2.57B	1				
1cii	2.60	1				
1d	2.60	3				
1e	2.58B	6				
Total		19	/ 19	/ 5	/ 5	/ 9





# **Assessment objectives**

# Assessment objectives

- There are three assessment objectives: AO1, AO2 and AO3
- Questions on the exam papers will focus on all three objectives.
- Very important that pupils are aware of how they will be assessed.
- Many pupils (and teachers!) only focus on content.



# Assessment objectives and weightings

- The balance of the assessment objectives is the same on Paper 1 and Paper 2.

		International GCSE
<b>AO1</b>	Knowledge and understanding of biology	38–42%
<b>AO2</b>	Application of knowledge and understanding, analysis and evaluation of biology	38–42%
<b>AO3</b>	Experimental skills, analysis and evaluation of data and methods in biology	19–21%
		100%



# Assessment objective 1 (AO1)

## AO1 Knowledge and understanding of biology / science

- AO1 is about understanding content.
- Conscientious students like AO1 questions – they feel confident in learning detail and depth.
- Easy to revise – repetitions, mind maps, testing with flash cards and questions.





# Typical AO1 Questions

1 Organs in the human body have different functions.

(a) Name the organ that produces bile.

(1)

(b) Which organ releases progesterone?

(1)

- ☐ A the brain
- ☐ B the ovary
- ☐ C the pituitary
- ☐ D the testis

(c) Which row of the table correctly shows whether the kidneys and skin are involved in excretion?

(1)

	kidneys	skin
<input type="checkbox"/> A	no	no
<input type="checkbox"/> B	no	yes
<input type="checkbox"/> C	yes	no
<input type="checkbox"/> D	yes	yes



# Assessment objective 2 (AO2)

## AO2 Application of knowledge and understanding, analysis and evaluation of biology

- AO2 is about **application** of knowledge to familiar and unfamiliar contexts.
- Can require quantitative (calculations, graphs, analysis of tables with data) or qualitative analysis
- Can require higher cognitive levels – *evaluate, discuss*
- Can be challenging for less confident students: ‘You never taught us about birds in the winter!’
- Are often ‘suggest’ questions as this implies an unfamiliar context



# Typical AO2 Questions

(b) Heart disease is a major risk to health in the United Kingdom.

In a study, the number of people with heart disease was recorded.

The table shows the results of the study.

Age range in years	Number of people with heart disease per 1000 in population	
	males	females
18 to 44	5	3
45 to 64	138	118
65 to 74	305	220
over 75	422	358

(i) Give two conclusions that can be made from this study.

(2)

1 .....

.....

2 .....

.....



# Assessment objective 3 (AO3)

## **AO3 Experimental skills, analysis and evaluation of data and methods in biology / science / human biology**

- AO3 is about experimental skills.
- Can include core practicals (but this could be classed as AO1)
- Can include general practical themes, variables, accuracy, reliability, valid planning, evaluating practical methods and data.
- Often use command words that require higher cognitive skills, such as *evaluate* and *discuss*



# Typical AO3 Questions

(b) The table shows the results the student obtained from her investigation.

Colour of light	Number of gas bubbles released in one minute			
	trial 1	trial 2	trial 3	average
Red	23	26	25	
Blue	19	18	21	19
Green	12	16	6	14

(i) Complete the table by calculating the average rate of photosynthesis for red light.

(1)

.....

(ii) Explain whether the results for each colour are reliable.

(2)

.....

.....

.....

.....

.....

.....



# Typical AO3 Planning questions

(c) Plant growth substances stimulate root growth from a cut stem.

Describe an investigation to find the best concentration of plant growth substance to stimulate root growth.

You should include experimental details in your answer and write in full sentences. (6)



# Activity 3

Fill in the polls to give the Assessment Objectives for the following questions!



(b) What is the dependent variable in this investigation?

(1)

- ☐ **A** germination rate
- ☐ **B** number of cells
- ☐ **C** pollution level
- ☐ **D** time after germination





**9** Pollution can occur in the atmosphere and in rivers.

(a) Carbon monoxide can pollute the atmosphere.

Describe the effects of carbon monoxide pollution on humans.

(3)

.....

.....

.....

.....

.....

.....



- (c) If the mineral ions are not absorbed, they are egested in the faeces.

The faeces of genetically modified (GM) farm animals contain less phosphate than the faeces of normal farm animals.

- (i) Some people catch fish from rivers near farm land.

Discuss why these people might support the genetic modification of farm animals.  
(4)





# **Taxonomy (command words)**

# Command words

- All questions have a command word.
- This tells candidates what is required in their answers.
- The specification lists all the command words.



Add/Label	Requires the addition or labelling of a stimulus material given in the question, for example labelling a diagram or adding units to a table.
Calculate	Obtain a numerical answer, showing relevant working.
Comment on	Requires the synthesis of a number of variables from data/information to form a judgement.
Complete	Requires the completion of a table/diagram.
Deduce	Draw/reach conclusion(s) from the information provided.
Describe	To give an account of something. Statements in the response need to be developed, as they are often linked but <b>do not</b> need to include a justification or reason.
Determine	The answer must have an element that is quantitative from the stimulus provided, or must show how the answer can be reached quantitatively. To gain maximum marks, there must be a quantitative element to the answer.
Design	Plan or invent a procedure from existing principles/ideas.
Discuss	<ul style="list-style-type: none"> <li>Identify the issue/situation/problem/argument that is being assessed within the question.</li> <li>Explore all aspects of an issue/situation/problem/argument.</li> <li>Investigate the issue/situation etc. by reasoning or argument.</li> </ul>
Draw	Produce a diagram either using a ruler or freehand.
Estimate	Find an approximate value, number or quantity from a diagram/given data or through a calculation.
Evaluate	Review information (e.g. data, methods) then bring it together to form a conclusion, drawing on evidence including strengths, weaknesses, alternative actions, relevant data or information. Come to a supported judgement of a subject's quality and relate it to its context.
Explain	An explanation requires a justification/exemplification of a point. The answer must contain some element of reasoning/justification – this can include mathematical explanations.
Give/State/Name	All of these command words are really synonyms. They generally all require recall of one or more pieces of information.
Give a reason/reasons	When a statement has been made and the requirement is only to give the reason(s) why.
Identify	Usually requires some key information to be selected from a given stimulus/resource.

Command word	Definition
Justify	Give evidence to support (either the statement given in the question or an earlier answer).
Plot	Produce a graph by marking points accurately on a grid from data that is provided and then draw a line of best fit through these points. A suitable scale and appropriately labelled axes must be included if these are not provided in the question.
Predict	Give an expected result.
Show that	Verify the statement given in the question.
Sketch	Produce a freehand drawing. For a graph, this would need a line and labelled axes with important features indicated. The axes are not scaled.
State what is meant by	When the meaning of a term is expected but there are different ways for how these can be described.
Suggest	Use your knowledge to propose a solution to a problem in a novel context.
Verb preceding a command word	
Analyse the data/graph to explain	Examine the data/graph in detail to provide an explanation.
Multiple choice questions	
What, Why	Direct command words used for multiple-choice questions.





# **Core practicals**



# Core practicals and general practical skills

## Core practicals

- All courses have a series of core practicals that candidates should complete.
- Candidates may be tested on their knowledge of these practicals.
- Questions about modified versions of the core practicals can be set.
- Core practical methods may be used in other contexts, e.g. indicator solutions, iodine test for starch.

## Practical skills and understanding of the scientific method

- Students should be familiar with typical school laboratory equipment at the appropriate levels.
- Students should understand how to plan experiments that will generate valid data.
- Students should understand how to analyse and evaluate the quality of data at an appropriate level.



# International GCSE Biology core practicals

- 2.9 Investigate food samples for the presence of glucose, starch, protein and fat
- 2.12 Investigate how enzyme activity can be affected by changes in temperature
- 2.14B Investigate how enzyme activity can be affected by changes in pH**
- 2.17 Investigate diffusion and osmosis using living and non-living systems
- 2.23 Investigate photosynthesis, showing the evolution of oxygen from a water plant, the production of starch and the requirements of light, carbon dioxide and chlorophyll
- 2.33B Investigate the energy content in a food sample**
- 2.39 Investigate the evolution of carbon dioxide and heat from respiring seeds or other suitable living organisms
- 2.45B Investigate the effect of light on net gas exchange from a leaf, using hydrogen carbonate indicator**
- 2.50 Practical: investigate breathing in humans, including the release of carbon dioxide and the effect of exercise
- 2.58B Investigate the role of environmental factors in determining the rate of transpiration from a leafy shoot in humans, including the release of carbon dioxide and the effect of exercise**
- 3.5 Investigate the conditions needed for seed germination
- 4.2 Investigate the population size of an organism in two different areas using quadrats
- 4.4B Investigate the distribution of organisms in their habitats and measure biodiversity using quadrat**
- 5.6 Investigate the role of anaerobic respiration by yeast in different conditions





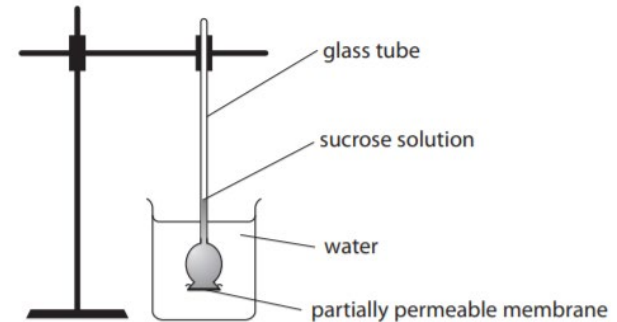
# How are core practicals assessed?

This is an example of a core practical from:

2.17 Investigate diffusion and **osmosis** using living and **non-living systems**

It also tests general practical skills in part (b)

4 This apparatus can be used to show osmosis.



(a) Explain what happens to the level of the sucrose solution in the glass tube.

(3)

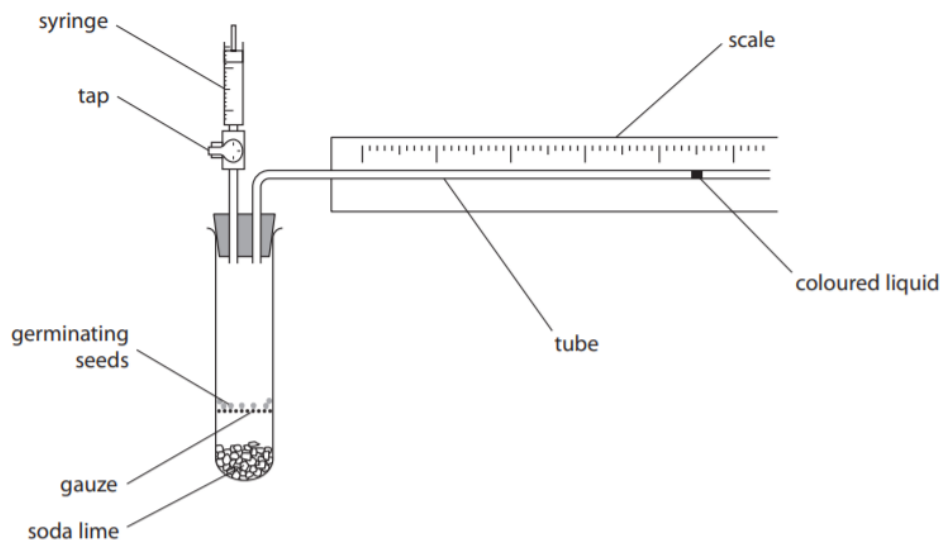
(b) Describe how this apparatus could be modified to measure the rate of osmosis at different temperatures.

(3)



(b) A student investigates the oxygen absorbed by germinating seeds at different temperatures.

The diagram shows some of the student's apparatus.



(i) Suggest why the student opens the tap after obtaining one set of results.

(2)

(ii) What is the function of the soda lime?

(1)

- ☐ A it absorbs carbon dioxide
- ☐ B it absorbs oxygen
- ☐ C it releases carbon dioxide
- ☐ D it releases oxygen

This has aspects of two core practicals in an unfamiliar context.

2.23 Investigate photosynthesis, showing the evolution of oxygen from a water plant, the production of starch and the requirements of light, carbon dioxide and chlorophyll

2.39 Investigate the evolution of carbon dioxide and heat from respiring seeds or other suitable living organisms



# International GCSE experimental skills

## Experimental skills

The best way to develop experimental skills is to embed practical investigations in teaching or theory. The development of knowledge and experimental skills can then happen together, leading to secure acquisition of both knowledge and skills.

Our practical investigations are embedded within 2: *Biology content* as specification points in italics. The skills developed through these and other practicals will be assessed through written examinations.

In the assessment of experimental skills, students may be tested on their ability to:

- solve problems set in a practical context
- apply scientific knowledge and understanding in questions with a practical context
- devise and plan investigations, using scientific knowledge and understanding when selecting appropriate techniques
- demonstrate or describe appropriate experimental and investigative methods, including safe and skilful practical techniques
- make observations and measurements with appropriate precision, record these methodically and present them in appropriate ways
- identify independent, dependent and control variables
- use scientific knowledge and understanding to analyse and interpret data to draw conclusions from experimental activities that are consistent with the evidence
- communicate the findings from experimental activities, using appropriate technical language, relevant calculations and graphs
- assess the reliability of an experimental activity
- evaluate data and methods taking into account factors that affect accuracy and validity.



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# INTERNATIONAL GCSE

Biology, Chemistry & Physics  
(2017)

CORE PRACTICAL GUIDE

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Pearson Edexcel International GCSE in Science

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For first teaching September 2017

First examination June 2019



 Pearson

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# INTERNATIONAL GCSE

Biology, Chemistry, Physics  
and Human Biology (2017)

Guidance on using practical terminology

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Pearson Edexcel International GCSE in Science

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 Pearson





**Maths skills**

# Mathematical skills

- The development and use of relevant mathematical skills is key to progress in science subjects
- A list of mathematical skills which should be developed appears in the Appendix for each specification
- These skills will be tested in exam papers within the context of the science
- Assessment of mathematical skills will account for 10% of marks in Biology





		B	C	P
<b>1</b>	<b>Arithmetic and numerical computation</b>			
A	Recognise and use numbers in decimal form	✓	✓	✓
B	Recognise and use numbers in standard form	✓	✓	✓
C	Use ratios, fractions, percentages, powers and roots	✓	✓	✓
D	Make estimates of the results of simple calculations, without using a calculator	✓		✓
E	Use calculators to handle $\sin x$ and $\sin^{-1} x$ , where $x$ is expressed in degrees			✓
<b>2</b>	<b>Handling data</b>			
A	Use an appropriate number of significant figures	✓	✓	✓
B	Understand and find the arithmetic mean (average)	✓	✓	✓
C	Construct and interpret bar charts	✓	✓	✓
D	Construct and interpret frequency tables, diagrams and histograms	✓		✓
E	Understand the principles of sampling as applied to scientific data	✓		
F	Understand simple probability	✓	✓	✓
G	Understand the terms mode and median	✓		
H	Use a scatter diagram to identify a pattern or trend between two variables	✓	✓	✓
I	Make order of magnitude calculations	✓	✓	✓
<b>3</b>	<b>Algebra</b>			
A	Understand and use the symbols $<$ , $>$ , $\propto$ , $\sim$		✓	✓
B	Change the subject of an equation	✓	✓	✓
C	Substitute numerical values into algebraic equations using appropriate units for physical quantities	✓	✓	✓
D	Solve simple algebraic equations	✓	✓	✓
<b>4</b>	<b>Graphs</b>			
A	Translate information between graphical and numerical form	✓	✓	✓
B	Understand that $y = mx + c$ represents a linear relationship		✓	✓
C	Plot two variables (discrete and continuous) from experimental or other data	✓	✓	✓
D	Determine the slope and intercept of a linear graph	✓	✓	✓
E	Understand, draw and use the slope of a tangent to a curve as a measure of rate of change		✓	✓
F	Understand the physical significance of area between a curve and the $x$ -axis, and measure it by counting squares as appropriate			✓

		B	C	P
<b>5</b>	<b>Geometry and trigonometry</b>			
A	Use angular measures in degrees			✓
B	Visualise and represent 2D and 3D objects, including two dimensional representations of 3D objects			✓
C	Calculate areas of triangles and rectangles, surface areas and volumes of cubes	✓		✓



(ii) The population of the United Kingdom is 65 million, of which half are male.

Calculate the number of males with heart disease in the age range 18 to 44.

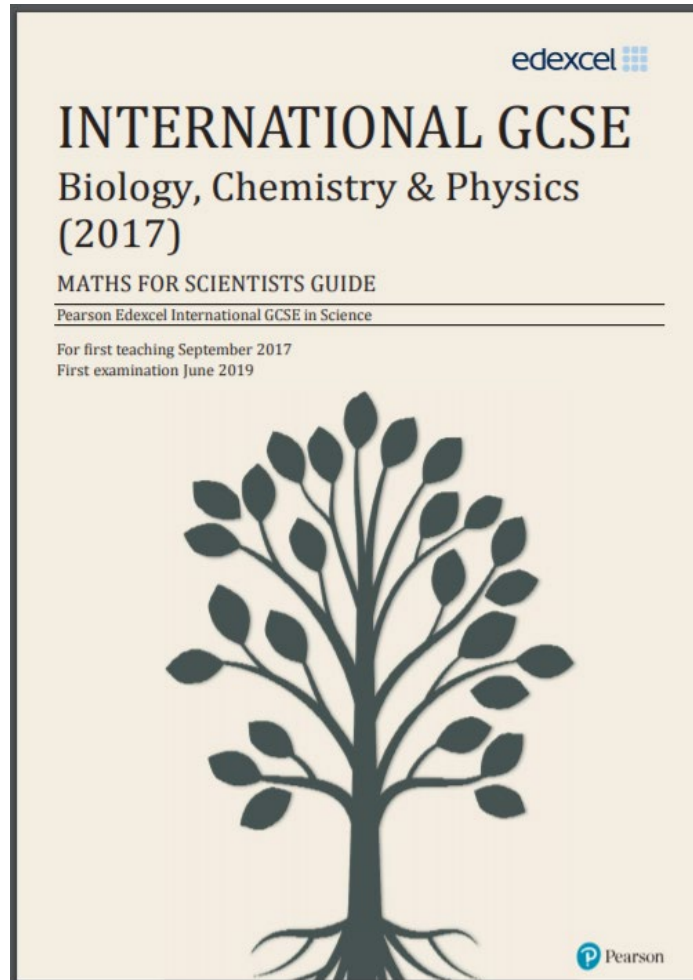
(2)

number of males = .....





# Mathematical skills





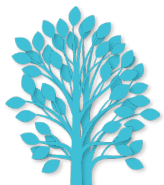
**Support from  
Pearson**

# Support overview for International GCSE in Biology

Getting Started Guide & Scheme of Work	Getting Ready to Teach Events	Subject interpretation of transferable skills
Subject Advisor	ResultsPlus	Regional Support Manager
Curriculum Matched Publishing	Exemplar Marked Responses	Additional SAMs
examWizard	Lesson Plans	Topic booklets



- A free tool for teachers which helps you make quick homework assignments, topic tests and mock exams.
- Questions tagged against unit, topic and assessment objective or simply choose a whole past paper.
- Use existing mark schemes for accurate marking.
- Use Examiner's report for insight.
- Most recent exam content available sooner.
- Use the results to understand where students need more support, informing teaching strategies.



# ExamWizard Home page

**examWizard** Find Past Papers Build a paper My Papers

## examWizard

examWizard is a free exam preparation tool containing a bank of past Edexcel exam questions, mark schemes and examiners' reports for a range of GCSE, GCE, Functional Skills subjects & BTEC sectors.

- Saves you time by enabling you to create your own mock exams, topic tests, homework or revision activities in minutes.
- Links directly to associated examiner reports and mark schemes!

### General Qualification subjects

Sciences

Proceed to login

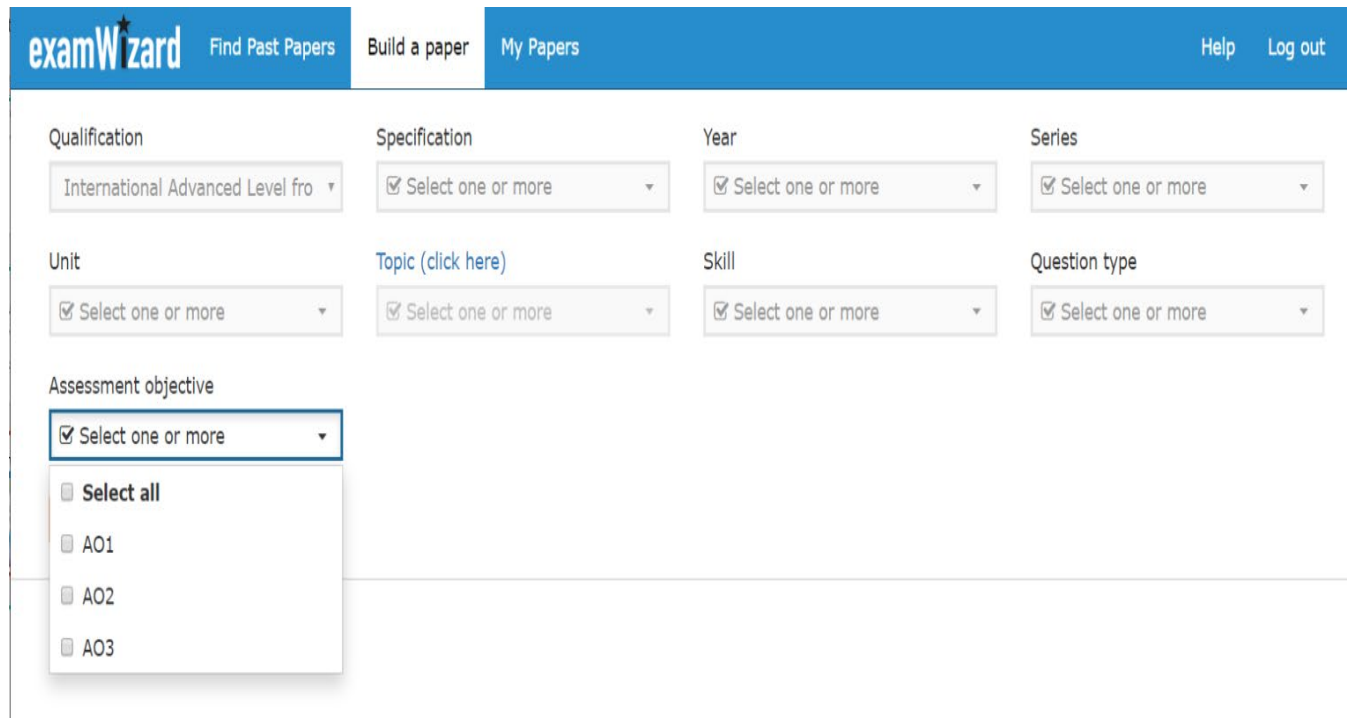
### BTEC & Functional Skills

Choose sector

Proceed to login



- Tests and questions can be made to test a particular topic or AO.
- Mark schemes and Examiner's reports are generated automatically.



The screenshot displays the examWizard interface with a blue header bar containing the logo and navigation links: Find Past Papers, Build a paper, My Papers, Help, and Log out. Below the header, there are several filter sections, each with a dropdown menu. The filters are: Qualification (International Advanced Level fro), Specification (Select one or more), Year (Select one or more), Series (Select one or more), Unit (Select one or more), Topic (click here) (Select one or more), Skill (Select one or more), Question type (Select one or more), and Assessment objective (Select one or more). The Assessment objective dropdown is open, showing options: Select all, AO1, AO2, and AO3.

Qualification	Specification	Year	Series	Unit	Topic (click here)	Skill	Question type	Assessment objective
International Advanced Level fro	<input checked="" type="checkbox"/> Select one or more	<input checked="" type="checkbox"/> Select one or more	<input checked="" type="checkbox"/> Select one or more	<input checked="" type="checkbox"/> Select one or more	<input checked="" type="checkbox"/> Select one or more	<input checked="" type="checkbox"/> Select one or more	<input checked="" type="checkbox"/> Select one or more	<input checked="" type="checkbox"/> Select one or more

☒ Select one or more

- ☐ Select all
- ☐ AO1
- ☐ AO2
- ☐ AO3



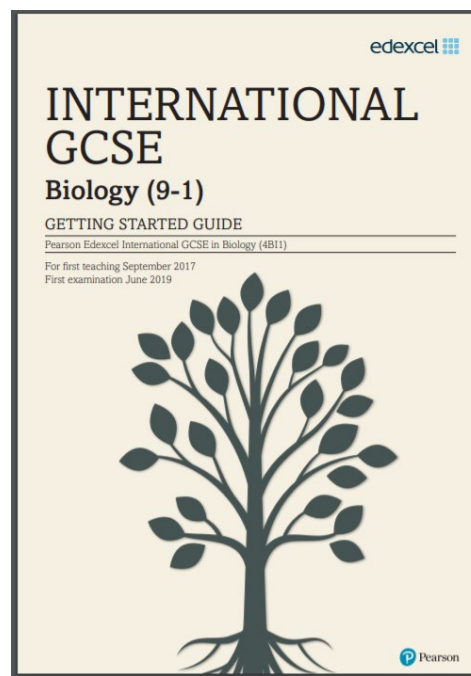
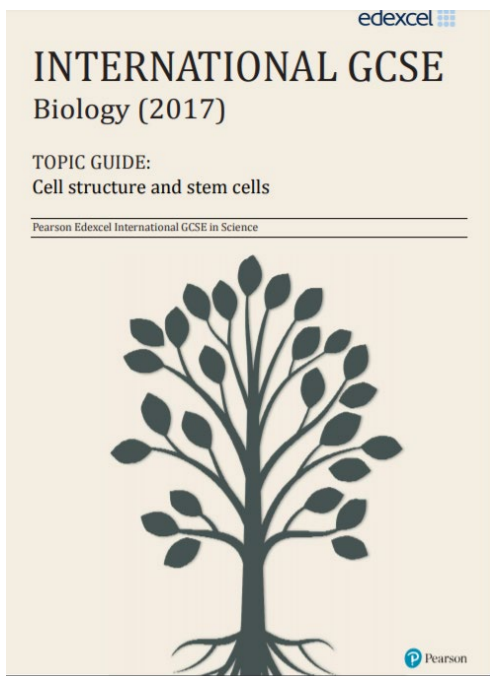
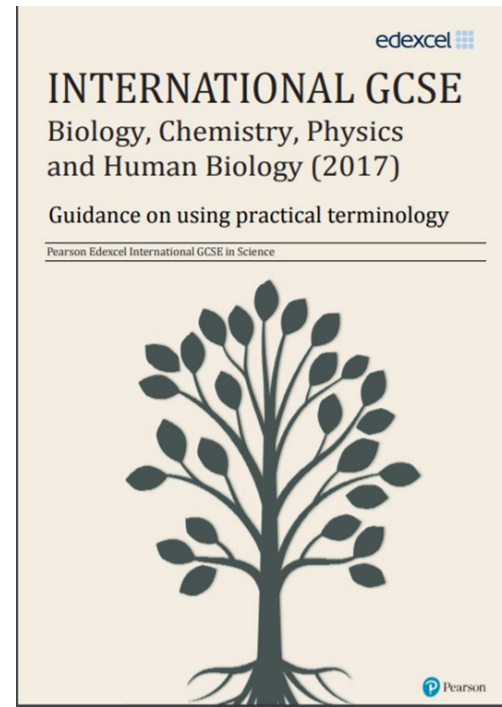
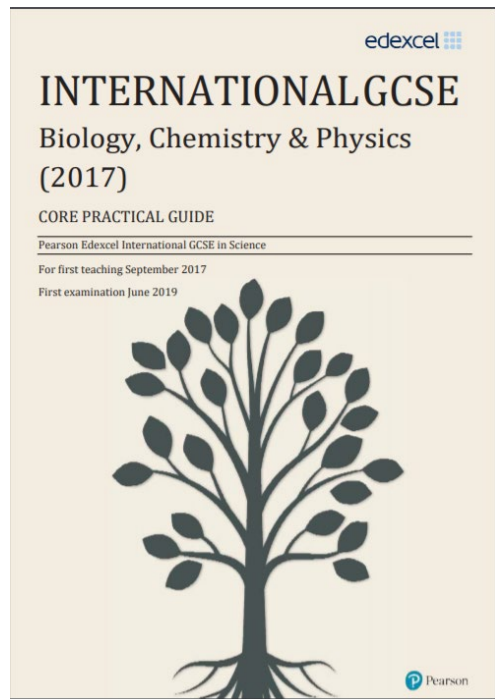
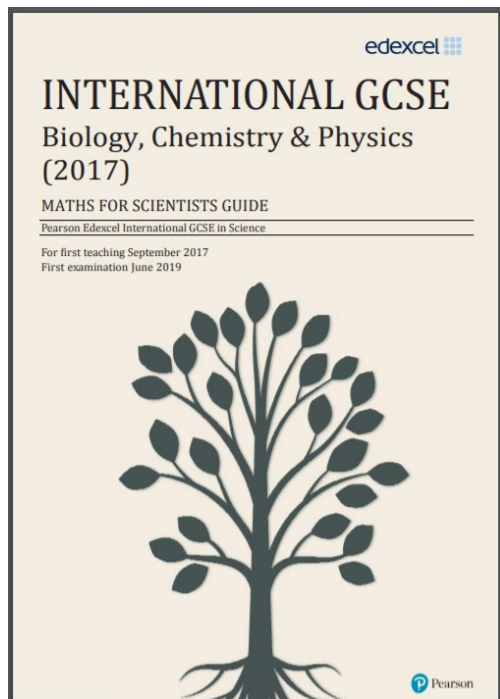


**ResultsPlus is the free online results analysis tool for teachers – it provides analysis features that other similar solutions don't.**

- Provides a detailed breakdown of student performance in Edexcel exams
- Helps identify topics where the student can benefit from further learning and allows this knowledge to inform teaching strategies and approaches.
- Provides a comparison of student performance at regional level
- Allows you to view your school's performance against other Pearson Edexcel schools in your country. You can also find student results analysis from their previous Pearson Edexcel school.
- Mock exams results can also be fed into the system to produce an analysis.
- **ResultsPlus Direct** gives your students access to their final grades and performance breakdown, wherever they are.
- Sign up for free ResultsPlus account in just a few quick and easy steps [here](#).
- Access additional video guides here:
  - **ResultPlus - Individual Student Analysis**
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  - **ResultsPlus - Global Analysis**



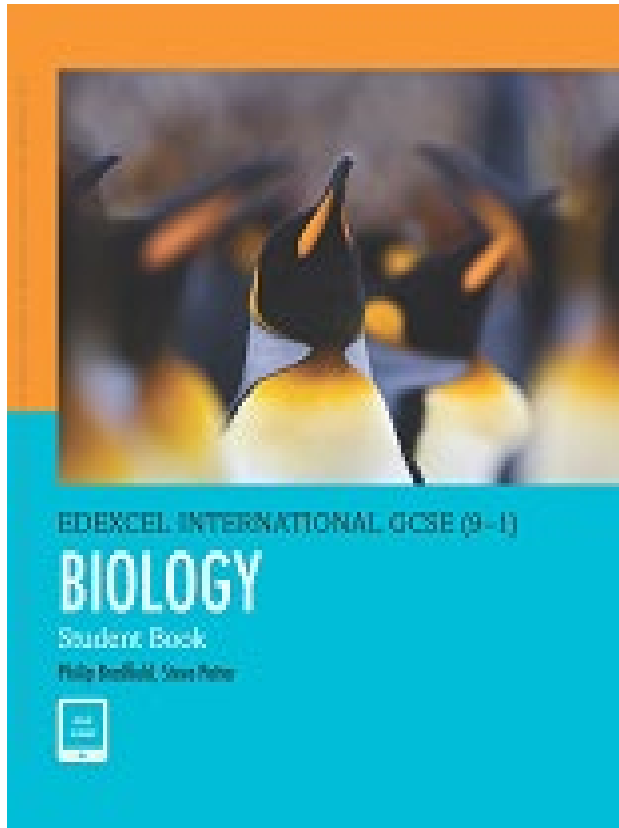






# Published resources – Pearson

[www.pearsonglobalschools.com/](http://www.pearsonglobalschools.com/)



## Student Book – from May 2017

This new resource, which includes access to an eBook, has been developed for the new Edexcel International GCSE specification with progression, international relevance and support at their core, and is designed to supply students with the best preparation possible for the examination.

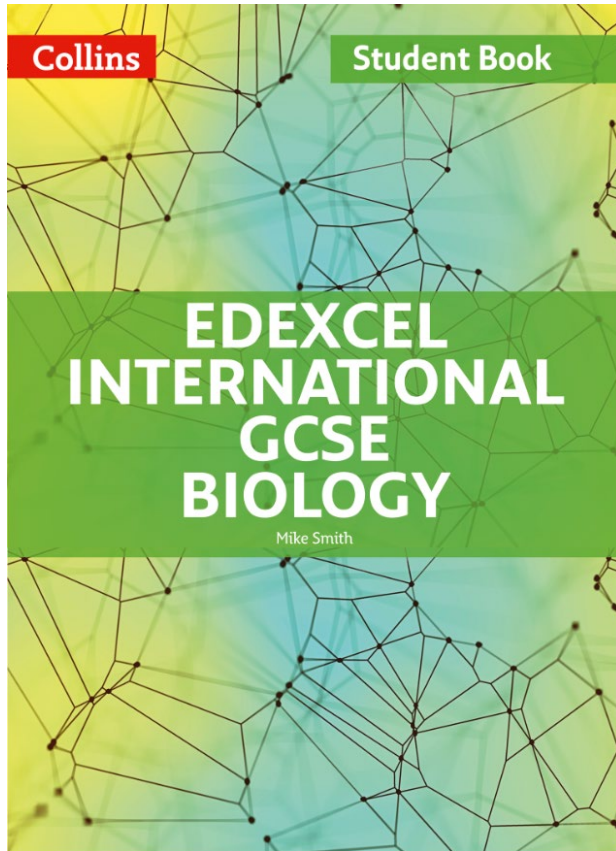
## Teacher Pack – from August 2017

This new resource, available online, will include videos, worksheets, lesson plans and other support to help you deliver the International GCSE in Biology.



# Published resources – Collins

[www.collins.co.uk/category/International/Ages+14-16/Science/](http://www.collins.co.uk/category/International/Ages+14-16/Science/)



**Student Book – from June 2017**

**Teacher Pack – from June 2017**

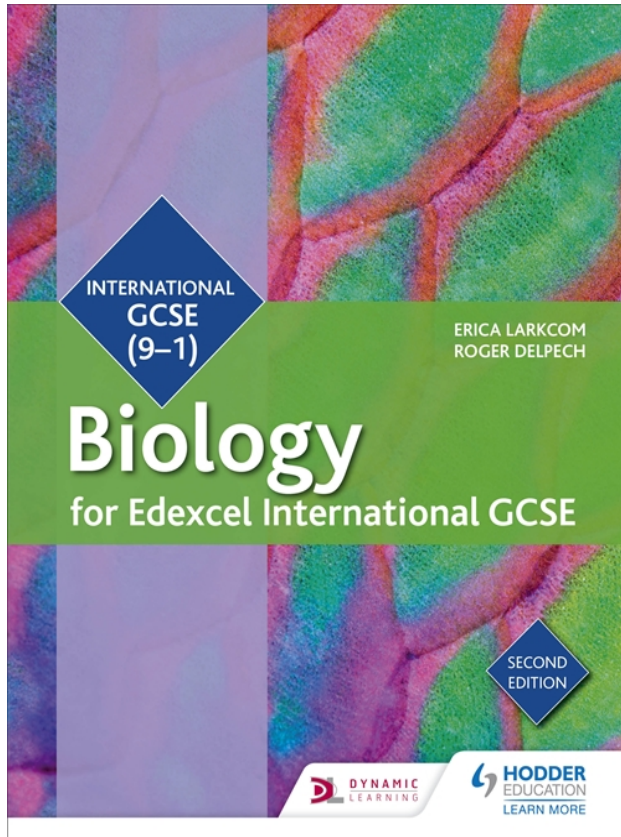
The Collins Student Book allows you to co-teach Edexcel International GCSE Biology and Double Award Science.

It is packed full of engaging content, practical skills features and questions, and is rigorously updated for the new specifications.



# Published resources – Hodder

[www.hoddereducation.co.uk/edexceligcse](http://www.hoddereducation.co.uk/edexceligcse)



**Student Book – from May 2017, and as an eBook from June 2017**

Provide your students with complete coverage of the new Edexcel International GCSE Biology specification with these affordable student books written by expert authors and teachers; testing knowledge and building practical skills throughout.

**Workbook – from July 2017**

Maximise every student's performance with exam-style questions, sample answers and examiner comments, written to support and enhance the content of the Edexcel International GCSE Biology book.



# Other useful links

## 1. [Grade Boundaries](#)

This page shows the minimum marks needed to achieve a certain grade for all UK and international examinations. Also refer to the Examiner's report which is available for download with other documents.

## 2. [Examination Results Statistics](#)

Results statistics summarise the overall grade outcomes of candidates sitting Pearson Edexcel examinations.

## 3. [Progress to University](#)

Here you can find information and guidance about how to progress to universities worldwide with Pearson Edexcel qualifications.

## 4. [Access to scripts](#)

Make an informed enquiry about results (EARs) using our free access to scripts portal.



# Contact your dedicated Subject Advisor



Subject Advisor details

Your subject advisor is Dr Irine Muhiuddin

Phone: + 44 (0)20 7010 2190

Twitter: **@Pearsonxxxxxxx**

Email: [TeachingScience@pearson.com](mailto:TeachingScience@pearson.com)

Sign up for monthly newsletters from Irine to stay on top of qualification updates, training, course materials and industry news.





**Any questions?**

**Please fill in your evaluation forms**

**We value your feedback!**



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