

PEARSON EDEXCEL INTERNATIONAL GCSE (9-1)

Human Biology

GETTING READY TO TEACH

Event code: 18IBAS01

First teaching in 2017, first assessment in 2019.



Aims and Objectives

- Consider the structure, content and assessment of this qualification, and the support available to guide you through these changes
- Consider the key changes from 4HB0
- Explore possible teaching and delivery strategies
- Have the opportunity to network, discuss best practice, take away resources to help with your planning and delivery, and share ideas with other teachers
- Learn about the introduction of the new 9–1 grading scale
- Respond to requests for additional support on maths and practical skills from previous training sessions



Session Agenda

- 10:00 Welcome & Introductions
- 10.00 International GCSE Features
- 10:10 Introduction to the new Edexcel International GCSE in Human Biology
- 11:00 How papers are developed
- 11.20 Coffee break
- 11.40 Mathematics for Human Biology
- 1.00 Lunch
- 2.00 Practical requirements and skills
- 3.00 Presenting and analysing data
- 3.30 Support, resources and final questions
- 4.00 Finish



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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

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.



Awarding of new IGCSE

Support information on awarding the new 9-1 International
GCSE



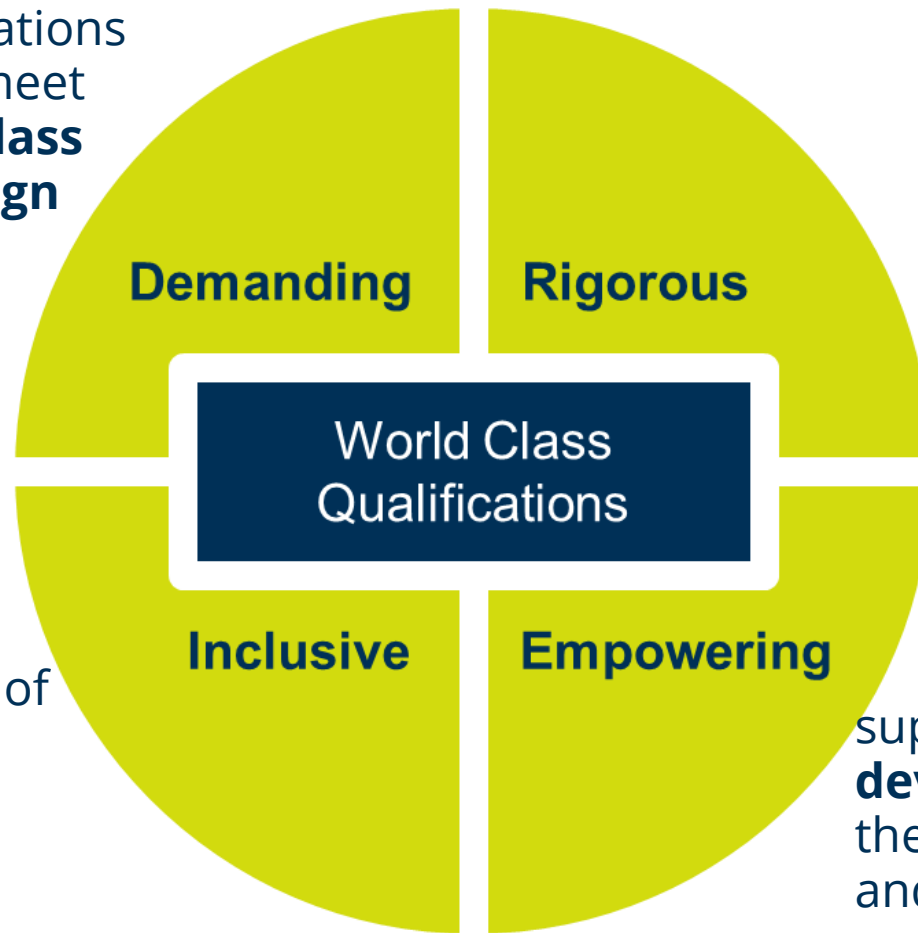
9-1 grading scale

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



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 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.
- [Access information pack here.](#)





Human Biology

INTERNATIONAL GCSE HUMAN BIOLOGY 2017

Assessment Overview



Why are changes happening?

- Internationally benchmarked standards and curriculum
- Encourages deep learning by prioritising depth and cognitive demand
- Assessment tasks which seek to measure higher-order knowledge and skills

- Conceptualises learning as continuous
- Recognises that students progress at different rates and have different learning needs
- Provides detailed information on student achievement and a clear indication of progression possibilities



- Sets and maintains high standards over time
- Reliable and valid assessment tasks and processes that can withstand close scrutiny
- End-users (e.g. employers/universities) can be confident of the knowledge, skills and competencies of certified students
- Assures progression, provides access to a culture and promotes active citizenship
- Develops learner adaptability, initiative, resilience and metacognition
- Builds the capacity to work collaboratively and to lead



Additional student performance recognition at Grade 9

Introduction to the specification

CONTENT

- 12 units
- covering all aspects of human biology, including modern developments in medicine, genetics & molecular biology

SKILLS COVERAGE

- Knowledge and understanding of human biology processes will form an important skill base.
- Skills in critical thinking and evaluation will be tested as will mathematical skills and comprehension skills

Experimental skills are an important part of this course and the application of such skills.



Comparison: 4HB0 with 4HB1

What has changed	Old specification 4HB0	New specification 4HB1
Marks on each paper	<ul style="list-style-type: none"> Paper 1: 120 marks Paper 2: 60 marks 	<ul style="list-style-type: none"> Paper 1: 90 marks Paper 2: 90 marks
Duration of papers	<ul style="list-style-type: none"> Paper 1: 2 hrs Paper 2: 1 hr 	<ul style="list-style-type: none"> Paper 1: 1 hr 45 mins Paper 2: 1 hr 45 mins
Balance of Assessment Objectives	<ul style="list-style-type: none"> AO1: 45–55% AO2: 25–35% AO3: 20% 	<ul style="list-style-type: none"> AO1: 38–42 % AO2: 38–42 % AO3: 19–21%



Assessment objectives

A01

Knowledge and understanding of Human Biology

40%
(36)

of total marks

A02

Application of knowledge and understanding, analysis and evaluation of Human Biology

40%
(36)

of total marks

A03

Experimental skills, analysis and evaluation of data and methods in Human Biology

20%
(18)

of total marks

Assessment summary

Paper 1

One hour and 45 minutes; 90 marks
includes **ALL** the specification statements

Paper 2

One hour and 45 minutes; 90 marks
includes **ALL** the specification statements

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

The AO3 questions
are likely to be in a
practical context

Both papers have similar question types but paper 2 will
have a passage to read on which questions will be based



Summary of assessment

FAMILIAR ...

100% external assessment – with no coursework

Linear assessment – all exams taken in the same exam session

Mixture of question types – all marked with 'points-based' mark schemes

Single tier of entry (untiered)

Each paper will have some longer questions . These have appeared in the current (legacy) paper 2 (4 – 6 marks)

AND NEW

Maths skills
(10% in H Bio)

Comprehension type questions

More data analysis





Activity 1

Reminder of Assessment Objectives

When papers are written we use a grid called the AOG.

This ensures that the papers contain the correct balance of items in terms of

- Assessment Objective
- Specification content
- Type of question
- Target grade



Look at SAM paper 1

Look at AOG grid provided.

Question 1 is classified as all AO 1

What does that mean?

It is also classified as all recall

What does that mean?

It also includes the appropriate specification references



Look at question 2 from new SAM paper 1

Complete the AOG grid to show

- The marks for each section
 - The new specification reference
 - The AO for each item
 - The target grade for each item
 - Maths marks
 - Maths skill reference from specification
-
- Compare your suggestions with others on your table.



Suggested Grid

1	Assessment Objectives							Quant Skills							
2	Q	Total marks	New Content spec ref	AO1 36 +/-2	AO2 36+/- 2	AO3 18+/-1	AO Strand	Grade 1-3 24	Grade 4-6 33	Grade 7-9 33	Maths Skill ref	No. of maths marks	Recall marks	Multiple Choice Question marks	Question Type
3															
4	1														
5		7	5.9.9.4.9.7.11.8	7				3	4				7		Short Objective
6															



Look at question 3 from new SAM paper 1

Complete the AOG grid to show

- The marks for each section
- The new specification reference
- The AO for each item
- The target grade for each item
- Compare your suggestions with others on your table.



Suggested Grid

Q	Assessment Objectives						Quant Skills							
	Total marks	New Content spec ref	AO1 36 +/-2	AO2 36 +/-2	AO3 18 +/-1	AO Strand	Grade 1-3 24	Grade 4-6 33	Grade 7-9 33	Maths Skill ref	No. of maths marks	Recall marks	Multiple Choice Question marks	Question Type
1	7	5.9 9.4 9.7 11.8	7				3	4				7		Short Objective
2 a	6	10.4		6			4	2		4a 4c	3			Open response > 4 m
b	2	10.4		2			1	1		2c	1			Short answer < 4 ma
c	4	10.4		4			4							Short answer < 4 ma
3 a	2	2.2	2				2					2		Short Objective
b	4	2.3			4		4							Open response > 4 m
c i	1	6.7	1				1					1	1	MCQ
ii	3	6.7	3					3						Short answer < 4 ma
iii	5	6.8			5			2	3					Open response > 4 m
4 a i	1	1.3/1.6	1				1						1	MCQ
...	1	1.3/1.6	1				1						1	MCQ

AO checklist

Mapping



4





Mathematics skills

Mathematics skills have always been examined in previous question papers

The new specification just ensures that

- the number of mathematics marks are consistent across Human Biology papers from series to series
- Students and teachers are aware of what kind of skills they will expected to carry out
- The skills are listed in the specification and examples are present in the two sets of SAMS
- A guide for mathematics in International GCSE sciences is also available



		HB	C	P
1	Arithmetic and numerical computation			
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			✓
2	Handling data			
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	✓	✓	✓
3	Algebra			
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	✓	✓	✓



		HB	C	P
4	Graphs			
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			✓

		HB	C	P
5	Geometry and trigonometry			
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	✓		✓





Activity 2

Activity 2 Mathematics skills

- What are the minimum number of Maths marks on Paper 1 ?
- Look at the Mathematics skills listed in the Specification
- For each skill :
- Think of an appropriate example of a content area or specification reference where it might be taught and therefore examined,
- Compare your list to other delegates on your table.



Examples of Mathematics in Biology

Examples from Biology that may not feature in Chemistry and Physics are

- Magnification calculations
- Probability calculations
- Surface area calculations



Magnification calculations

Approach

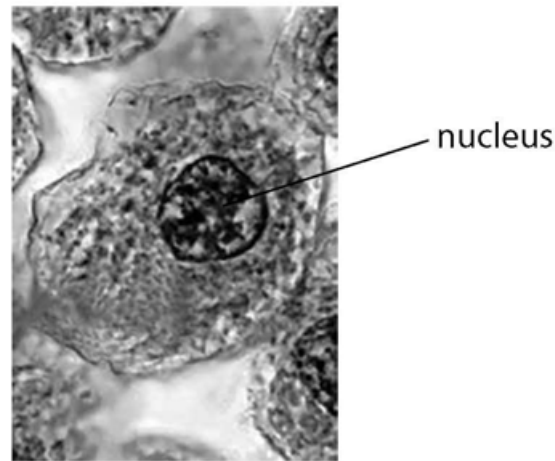
- Making order of magnitude calculations is not taught in GCSE Maths. Please see notes on dividing with decimals above.
- In maths students use and manipulate formulae, but do not meet the magnification formula:

$$\text{magnification} = \text{size of image} \div \text{size of real object}$$

For notes on substituting into formulae and changing the subject, see Section 6 Equations and Formulae.



Figure 7 shows an image of an animal cell taken using a microscope with a $10\times$ eyepiece lens and a $40\times$ objective lens.



(Source: © Ed Reschke/Getty Images)

Figure 7

(b) (i) The total magnification of the animal cell is

(1)

- ☐ **A** $\times 50$
- ☐ **B** $\times 140$
- ☐ **C** $\times 400$
- ☐ **D** $\times 4000$



(ii) The diameter of the cell is $15\text{ }\mu\text{m}$.

Use Figure 7 to estimate the diameter of the cell nucleus.

(1)

diameter of nucleus = μm

(iii) Give the measurement of $15\text{ }\mu\text{m}$ in mm.

(1)

..... mm



Magnification calculations

Maths skills

Mark scheme

Question number	Answer	Mark
4(b)(i)	C	(1)

Question number	Answer	Additional guidance	Mark
4(b)(ii)	$5\text{ }\mu\text{m} \pm 1.5$	approximately a third of the diameter of the cell	(1)

Question number	Answer	Mark
4(b)(iii)	0.015 (mm)	(1)



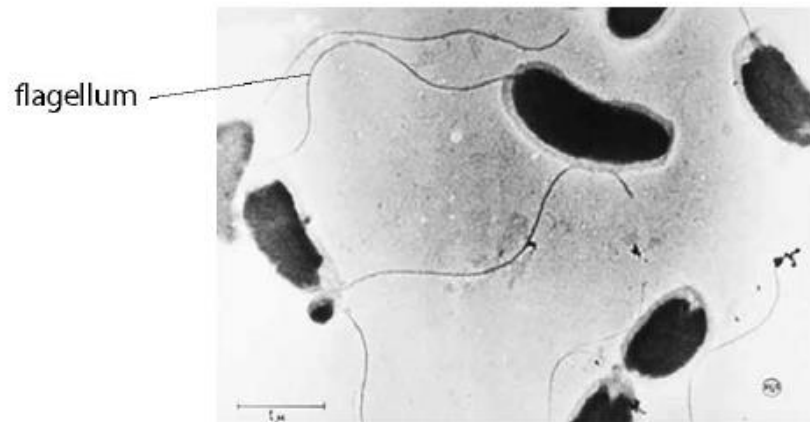
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Activity 3

Magnification calculations

Example 1 - Question 5c

(c) Figure 7 shows some *Vibrio cholerae*, the bacteria that cause cholera.



Magnification $\times 8000$

(Source: Corbis)

Figure 7

The length of one flagellum on Figure 7 is 68mm.

Calculate the length of the flagellum in μm .



Activity 3

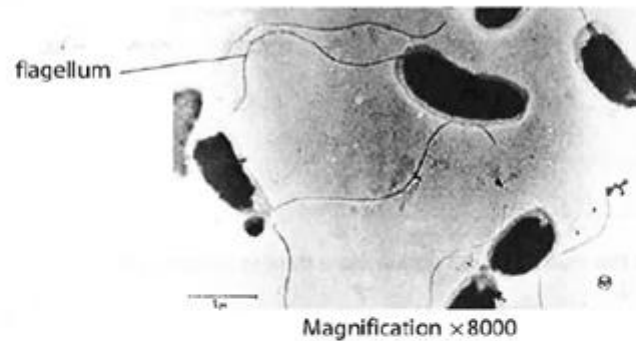
- Write a mark scheme for this question
- Decide how many marks it is worth
- Use your Mark scheme to mark the student example
- Compare your Mark scheme and score with other delegates on your table.



Magnification calculations

Student answers

(c) Figure 7 shows some *Vibrio cholerae*, the bacteria that cause cholera.



(Source: Corbis)

Figure 7

The length of one flagellum on Figure 7 is 68 mm.

Calculate the length of the flagellum in μm.

$$\frac{68}{8000}$$

$$8.5 \times 10^{-3} \mu\text{m}$$



Magnification calculations

Maths skills

Mark scheme

Question number	Answer	Additional guidance	Mark
5(c)	<ul style="list-style-type: none">• $68 \div 8000$ (1)• 0.0085 (1)• $8.5 \text{ (}\mu\text{m)}$ (1)	award full marks for correct numerical answer without working	(3)



Magnification calculations

Examiner's comments

This candidate has correctly calculated the length and has put the answer in standard form, which is acceptable for 2 marks.

However, they did not convert their answer into micrometres for the final mark.

Marks awarded = 2



Probability and genetics

11.19 understand patterns of monohybrid inheritance using a genetic diagram and the probabilities of outcomes

- Probability of outcomes of a cross can be expressed as a decimal, a fraction or a percentage.
- So the chances of a couple having a female child would be 0.5, $\frac{1}{2}$ or 50%
- Probabilities should not be expressed as a ratio.



Surface Area and volume

3.3 understand the factors that affect the rate of movement of substances into and out of cells to include the effects of surface area to volume ratio, temperature and concentration gradient

Maths skill 5C



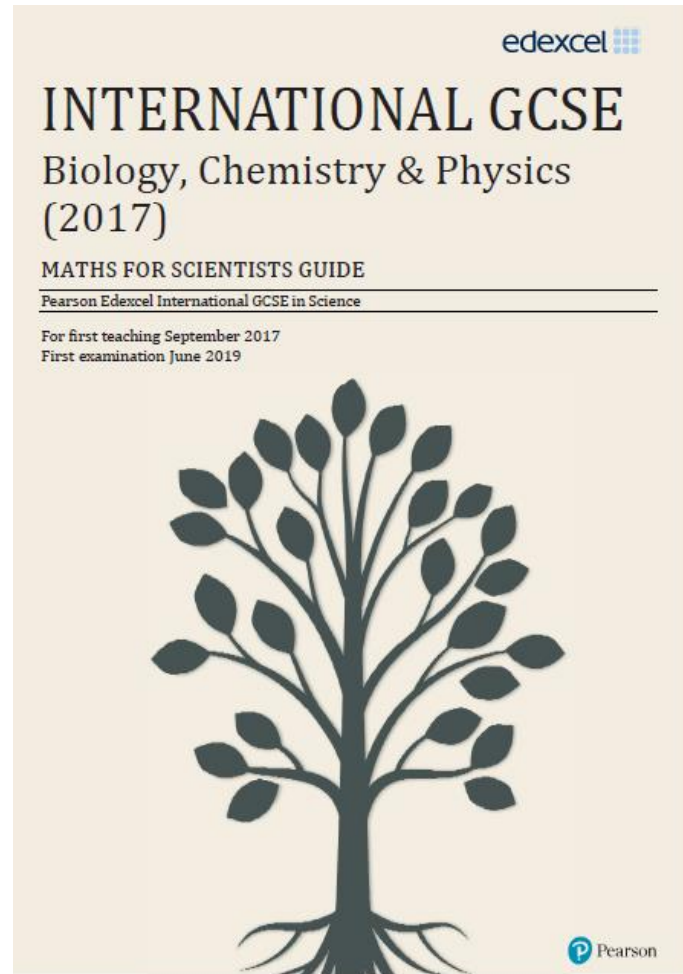
Standard form, significant figures and Units

- The candidates need to be able to use standard form, significant figures and appropriate units.
- These are all covered in the Maths for Scientists guide.



Mathematics Skills

Pearson have produced a MATHS FOR SCIENTISTS GUIDE this is included in the downloads for this training.





Practical Skills

Practical Skills

- Specifications contain a 10 core practicals
- Further suggestions for practicals appear in an Appendix
- The suggested practicals would form a basis for practical work, on which schools would be encouraged to build
- Questions on exam papers test practical skills, rather than recall of specific techniques – so may be in the context of any practical activity



Developing practical skills

Students should be familiar with a range of laboratory apparatus and its use, including the reading of scales.

1

Students should be able to plan an experiment and control variables, to collect and record data in a table, and to plot appropriate graphs with lines of best fit.

2

Students should be able to process and analyse data, to identify and account for anomalies, to evaluate data and methods, and to justify a conclusion.

3

The specification includes guidance on the use of terminology within practical and experimental work.

4



Practical skills in examinations

Students may be tested on their ability to:

Describe and plan experiments

Draw conclusions consistent with the evidence, using scientific knowledge and understanding

Describe safe and appropriate practical techniques

Communicate findings from experimental activities using appropriate language, calculations & graphs

Analyse and interpret data from experimental activities

Evaluate data and methods



Core Practicals

- CP1: Investigate the qualitative and quantitative content of vitamin C in food
- CP2: Investigate the energy content of food
- CP3: Investigate the effect of temperature and pH on enzyme activity
- CP4: Investigate the action of immobilised enzymes including the preparation of alginate beads
- CP5: Investigate the number and position of sensory receptors, such as touch and temperature receptors in the skin
- CP6: Investigate the range of frequency audible to the human ear
- CP7: Investigate the difference between inspired and expired air for carbon dioxide concentration
- CP8: Investigate the effect of exercise on the rate of breathing and measure lung capacity
- CP9: Investigate the effect of exercise on the pulse rate
- CP10: Investigate diffusion using a partially-permeable membrane such as Visking tubing





Activity 4

Activity 4

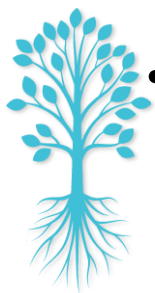
- Look through the list of core practicals
- Identify those that you are least familiar with
- Compare your answer with other delegates
- Which practicals do you have the most difficulty teaching?
- Compare your answer with other delegates



Experimental design and data analysis

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



Experimental design and data analysis

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

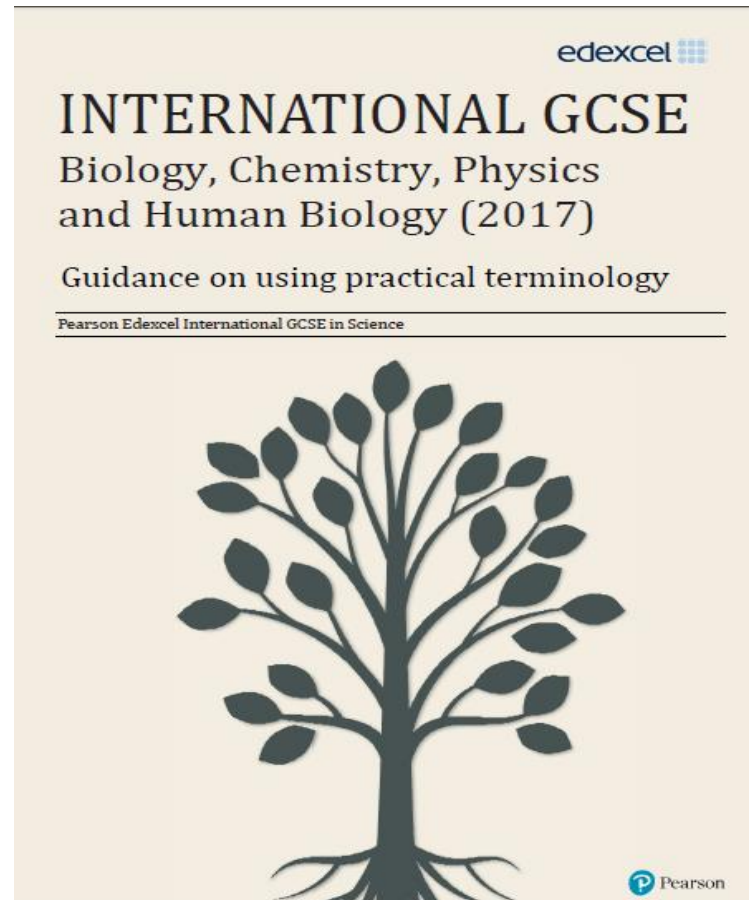
- use scientific knowledge and understanding to analyse and interpret data to draw conclusions from experimental activities that are consistent with the evidence
- communicate the findings from experimental activities, using
- appropriate technical language, relevant calculations and graphs
- assess the reliability of an experimental activity
- evaluate data and methods taking into account factors that affect
- accuracy and validity.



Experimental design and data analysis

Many teachers have asked for guidance on practical terminology

In response to this Pearson have produced a booklet to help teachers understand what we expect candidates to know and understand about experiment design and analysis.





Activity 5

Activity 5

Are you confident that your students understand the following terms:

Variable

Independent

Dependent

Controlled

Validity

Readings

Data

Precise

Accurate

Reliability

Anomalous



Presenting and analysing data

- A data table should have headings showing the variables being measured, along with the **units** for these measurements.
- Data should be presented in numerical order within the table and should also be given to a consistent number of **decimal places**.



Presenting and analysing data

- When data is processed in a table, the result of any calculation should be given to the same number of **significant figures** as the lowest number of significant figures in the data processed.

For example:

- a student takes measurements in a circuit of 8.0 V and 2.15 A, and records these in a table. The table also shows a value for resistance, calculated from these data – this should be given to 2 sf i.e 3.7 Ω .



Presenting and analysing data

- Within examination papers, **units** in tables and graphs will be presented in the written-out format:
temperature in °C.
- The exception to this will be when percentages are used: these will be shown in brackets i.e. *percentage (%)*.
- Note that compound units will usually be given in the format “N / m” or “Newtons per metre” rather than “N m⁻¹”.





Resources

We offer a range of free and paid for resources **for International GCSE in Human Biology**. They have been designed to support teachers to improve learner outcomes.

Support overview for International GCSE in Human Biology

Getting Started Guide

Scheme of Work

Subject interpretation
of transferable skills

Subject Advisor

Results Plus

Regional Support
Manager

Curriculum Matched
Publishing

Getting Ready to
Teach Events

Additional SAMs

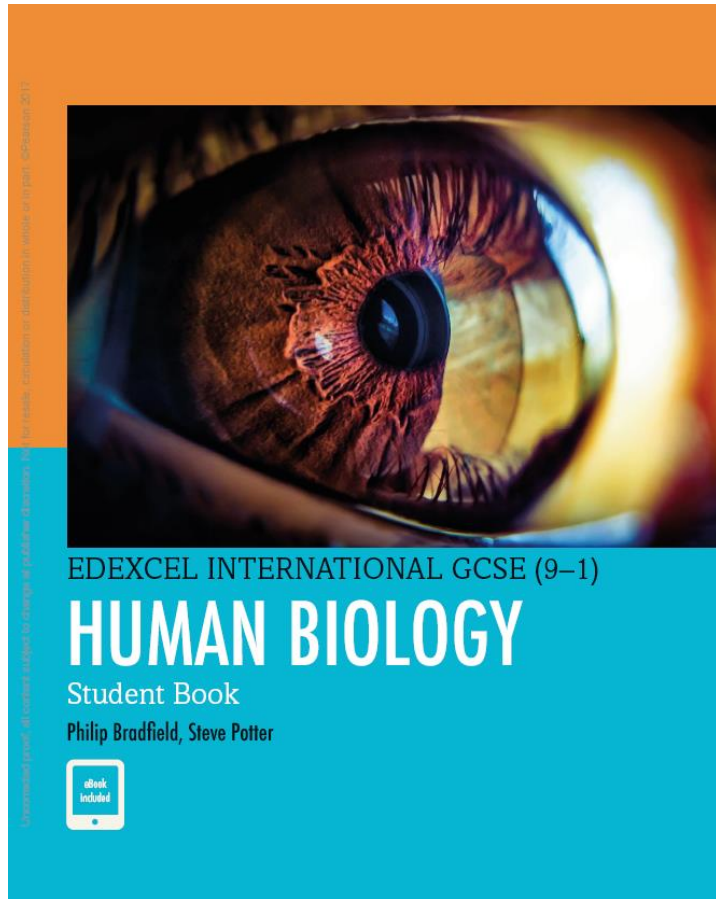
Exam Wizard

Lesson Plans



Published resources – Pearson

<http://www.pearsonglobalschools.com>



Student Book –

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



- Free online results analysis tool for teachers.
- Provides a detailed breakdown of student performance in Pearson Edexcel exams.
- Identify topics and questions where the student could benefit from further learning and inform teaching strategies and approaches.
- Benchmark your school's performance against other Pearson Edexcel schools in your country.
- Not just a post-results tool: Mock exam results can also be fed into the system to produce analysis.
- Find student results analysis from their previous Pearson Edexcel school.
- ResultsPlus Direct gives your students access to their final grades and performance breakdown, wherever they are.
- Schools can [sign up for free ResultsPlus account](#) in just a few quick and easy steps.



- 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 report for insight.
- Most recent exam content available sooner.
- Use the results to understand where students need more support, informing teaching strategies.



Your dedicated Science Subject Advisors

Subject Advisor details

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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 examiners 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.





Any questions?

**Please fill in your
evaluation forms**

**We value your
feedback!**



ALWAYS LEARNING