

PEARSON EDEXCEL INTERNATIONAL GCSE (9-1) **Biology & Double Award Biology**

GETTING READY TO TEACH

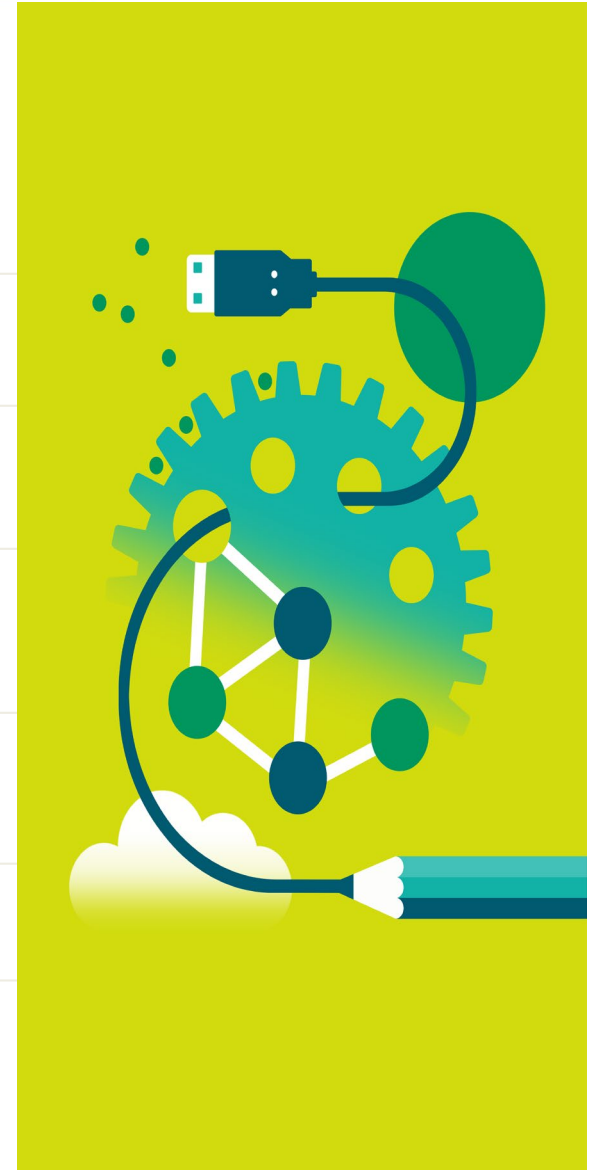
Event code: 4BI1-19IO1

First teaching in 2017, first assessment in 2019.



Your Online Environment

- ❖ Technical Difficulties & Support
- ❖ Recording
- ❖ Communication in an online environment
- ❖ Asking Questions
- ❖ Using Polls
- ❖ Downloading Documents



Aims and Objectives

- ❖ Learn about the changes to the content
- ❖ Structure and assessment of the revised International GCSE in Biology
- ❖ Take an in-depth look at the sample assessment materials
- ❖ Gain a brief overview of the double award and single award science International GCSEs.
- ❖ Discuss the implications of the changes with colleagues and ask questions of our subject expert
- ❖ Learn about the free and published support for the qualification
- ❖ This event can count as 2 hours of CPD



Polls to get to know the delegates.

What are you hoping to get out of the event today?



AGENDA

0800-0840

Session 1 – headline changes; detailed Biology changes

0840-0915

Session 2 – retained questions

0915 -0945

Session 3 – new questions; command words & terms, maths and practical skills

0945-0955

Session 4 – support and resources

0955-1000

Session 5 – questions?

The 9-1 grading scale

“Grade 9 is not the same as A*; it’s a new grade, designed to recognise the very highest performing students.”

Ofqual

New grading structure	Current grading structure
9	A*
8	
7	
6	B
5	
4	C
3	
2	D
1	
U	U

GOOD PASS (DfE)

5 and above = top of C and above

AWARDING

4 and above = bottom of C and above

Comparing 9-1 and A* - G

2018: A* - G

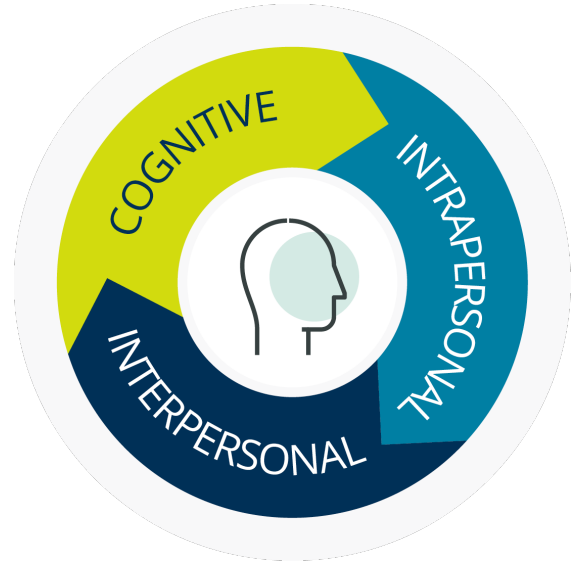
	A*	A* - A	A* - C	A* - F
Biology	35.6%	53.9%	78.6%	90.6%
Chemistry	38.5%	55.8%	81.7%	92.9%
Physics	37.2%	54.7%	78.5%	91.9%

2019: 9 – 1

	Gd 9	Gd 9 – 8	Gd 9 – 7	Gd 9 – 4	Gd 9 - 1
Biology	18.6%	37.7%	53.6%	79.2%	94.0%
Chemistry	23.0%	43.3%	59.0%	80.6%	95.9%
Physics	22.3%	42.4%	59.3%	79.8%	94.2%

Transferable Skills

- ❖ Skills frameworks adapted to support design of new Edexcel International GCSEs
- ❖ Ensure learners acquire skills needed to access Higher Education and fulfilling careers



Cognitive skills

Core skills brain uses to think, learn and reason – used to carry out any task.



Intrapersonal Skills

Emotional intelligence, ability to know, understand and manage own emotions and learning.



Interpersonal Skills

Life skills used every day to communicate and interact with others, individually and in groups.

Headline changes

- ❖ Some revisions to subject content; including a review of content split between Double Award and separate sciences
- ❖ Slight changes to paper lengths and number of marks
- ❖ No change to assessment style; or to assessment of practical skills
- ❖ Introduction of new qualification - Science (Single Award)
- ❖ Grading moves to new 9 – 1 system

Our suite of International GCSEs

Our suite of 9 – 1 qualifications in Science include the following:

Subject	June (from June 2019)	January (from January 2020)
Biology	✓	✓
Chemistry	✓	✓
Physics	✓	✓
Science (Double Award)	✓	✓
Science (Single Award)	✓	x
Human Biology	✓	✓

INTERNATIONAL GCSE BIOLOGY

Specification content



Biology content summary

There are 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
- Biological 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

Changes in Biology content

Activity 1

- ❖ How familiar are you with new versus current specification content?
- ❖ List the changes in content
- ❖ Compare your list with others on your table.

Overview of changes in Biology

Some additions:

- Terms eukaryotic and prokaryotic
 - Mitochondria & ribosome function
 - **Stem cells and cell specialisation**
 - Test for protein and lipid
 - **Core Prac - investigating pH affect on enzyme activity**
 - Risk factors for coronary heart disease
 - Role of auxin in phototropism
 - **Hormones and the menstrual cycle – LH and FSH**
 - **RNA structure and protein synthesis**
 - **Concept of biodiversity**

Some deletions:

- **Turgidity of plant cells**
- **Water cycle (but subsumed in deforestation)**

Overview of changes in Biology

Moving from Double Award into Biology:

- **Gas exchange in plants – stomata and leaf structure**
- **Transpiration and CP role of environmental factors**
- **Kidney function**
- **DNA structure**
- **Genetic mutations**
- **Investigating distribution/biodiversity using quadrats**
- **Deforestation**
- **Fish farming**
- **Micropropagation and cloning**

Overview of changes in Biology

Moving from Biology into Double Award:

- ❖ Core Practical investigate evolution of carbon dioxide and heat from respiring seeds
 - Role of phloem
- ❖ Structure and function of the eye
- ❖ Temperature regulation
- ❖ Seed germination
- ❖ Placenta and developing embryo
- ❖ Sewage pollution
- ❖ Fermenters and production of yoghurt
- ❖ Transgenic organisms

INTERNATIONAL GCSE BIOLOGY

Assessment model



Summary of assessment

FAMILIAR ...

100% external assessment – with no coursework

Linear assessment – all exams take in the same exam session

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

Single tier of entry (un-tiered)

Each paper will have some longer questions (4 – 6 marks)

AND NEW

Maths skills (10% in Bio)

MCQs

More data analysis

How will balance of Assessment Objectives change?

- What are the current AOs?
- What is the current weighting?
- How will it change ?

Assessment objectives

AO1

Knowledge and understanding of biology

40%
of total marks
(was 45-50%)

AO2

Application of knowledge and understanding, analysis and evaluation of biology

40%
of total marks
(was 27.5-32.5%)

AO3

Experimental skills, analysis and evaluation of data and methods in biology

20%
of total marks
(was 20-25%)

Recall to Higher Order Thinking

Pure recall restricted to 15%:

- 16 marks in Paper 1
- 10 marks in Paper 2

Remember AO1 = 44 marks for Paper 1

- 44 minus 16 = 28 marks for recall plus

The consequence is fewer:

- Name the part labelled A....
- What is meant by the term...?
- Complete by writing suitable word on dotted lines...

Assessment summary

Paper 1

Two hours; 110 marks
will **NOT** include the specification statements
printed in **BOLD**

Paper 2

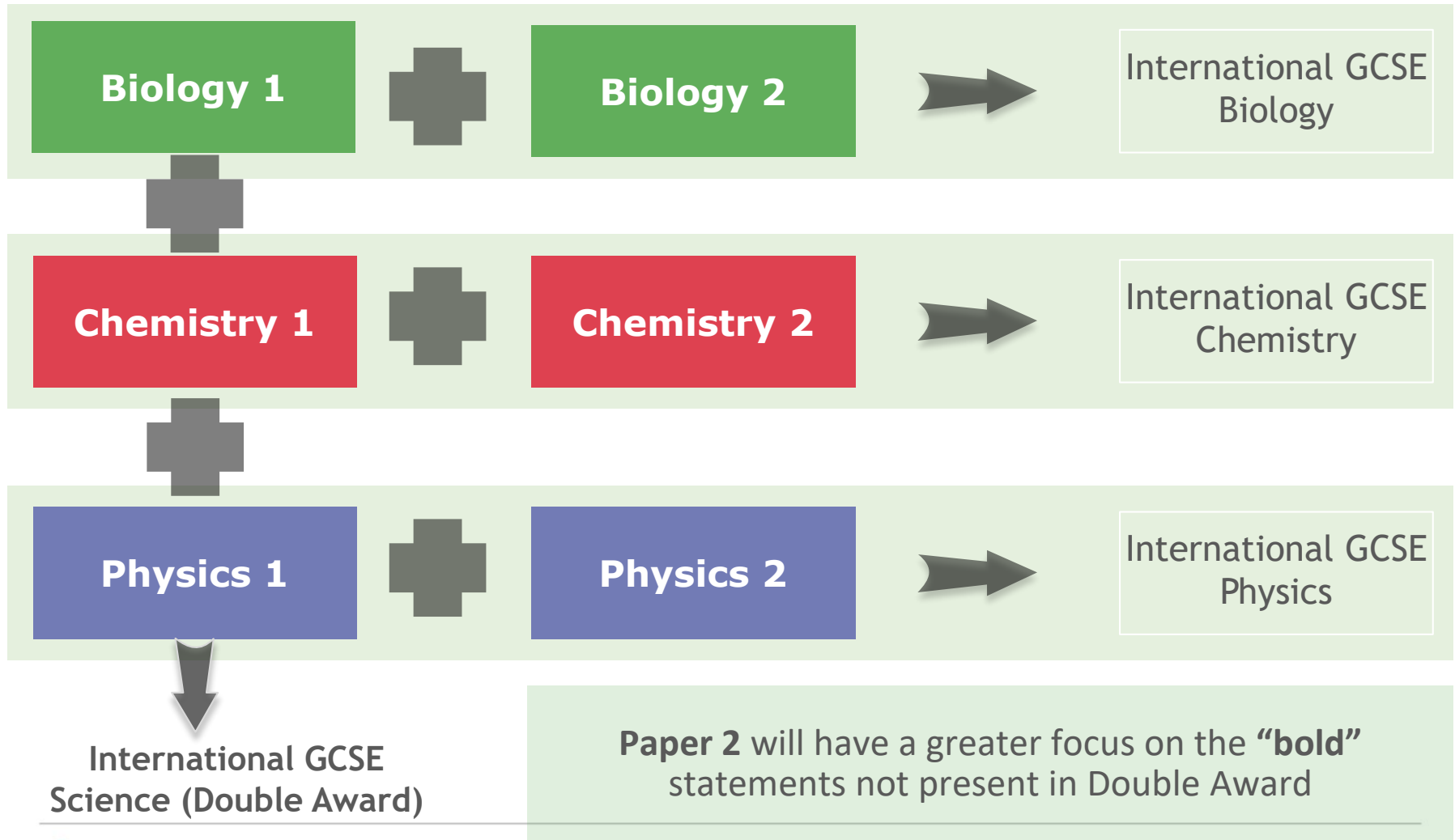
One hour and 15 minutes; 70 marks
includes **ALL** the specification statements,
including those in **BOLD**

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

Structure of papers



INTERNATIONAL GCSE BIOLOGY

Double Award (Science) & Single Award (Science)



Science (Double Award)

- Students take Paper 1 in Biology, Chemistry and Physics
- Students achieve two grades, based on performance across all three papers
- The two grades may not be the same
- Students may still progress to A level

Science (Single Award)

This new qualification has:

- Half the content of the Double Award specification; 1 hour 10 minute paper in each science
- Will NOT share questions with the Double Award exam and will be a similar level of challenge and rigour
- Students would achieve a single grade, based on performance across all three papers
- Not designed for science progression

Question Styles Retained

- CORMS (Question 6 (c) in Paper 1)
- Graph plotting (Question 11 (a) (i) in Paper 1)
- Mini Essays – points based marking – **pheW!**
e.g. Paper 1: 1(a) AO1; 3(a)(i) AO1/AO2; 7(b) AO1; 7(c) AO2 and 12(b) AO1
Paper 2: 1(g) AO1/AO2; 2 AO1; 4(c) AO1/AO2 and 5(a) AO1
- Calculations: see Maths taxonomy - many examples
- **Comprehension (Q1 in Paper 2)**

CORMS and devising investigations

- **Change** = + and - / range of values;
(control) Independent variable
- **Organism** = species / size / age / sex / eq;
(biotic) Controlled variable
- **Repeat** = more than one reading / eq;
(reliable)
- **Measure** = mass / length / units / time / eq;
(precise/accurate) Dependent variable
- **Same** = temp. / LI / water / eq;
(abiotic) Controlled variable

Design an investigation to find out if...

- ❖ ...a new fertiliser improves the growth of a plant.
- ❖ ...adding vitamin D improves the growth of chickens.
- ❖ ...biological washing powder removes stains better than ordinary washing powder.
- ❖ ...training at altitude increases the number of red blood cells in the plasma of athletes.
- ❖ ...adding vitamin C to bread dough helps it to rise faster.

TASK

Design an experiment to find out if

- (1) a lab based investigation
- (2) a non-lab based investigation

Activity 2

Design an experiment you could carry out to find out how temperature affects the rate of decomposition of plant leaves.

Please construct a mark scheme for this question.

Design an experiment you could carry out to find out how temperature affects the rate of decomposition of plant leaves.

- C low & high temperatures / different temperatures / eq;
- O same species of leaves / eq;
- R idea of replication;
- M1 mass of leaves / eq;
- M2 stated time period;
- S1 moisture / oxygen / decomposers / eq;
- S2 moisture / oxygen / decomposers / eq;

ANSWER 1: on activity 2 sheet

I would take some leaves from the same plant and put half in a beaker kept a cold place and half in a beaker kept in a warm place. I would leave them for a while and then look at them to see which ones had decomposed the most. All conditions must be the same. I would repeat the experiment.

ANSWER 2: on activity 2 sheet

I would take 100 g of leaves from the same plant and put 25 g in a beaker kept in a fridge at 5 °C, 25 g in the lab at 18 °C, 25 g in an incubator at 35 °C and 25 g in an oven at 90 °C.

I would do this again so that I had five beakers at each temperature. Wetness, oxygen and number of bacteria would be kept the same. After a week I would measure the weight of the leaves to the nearest 0.1g and get the average.

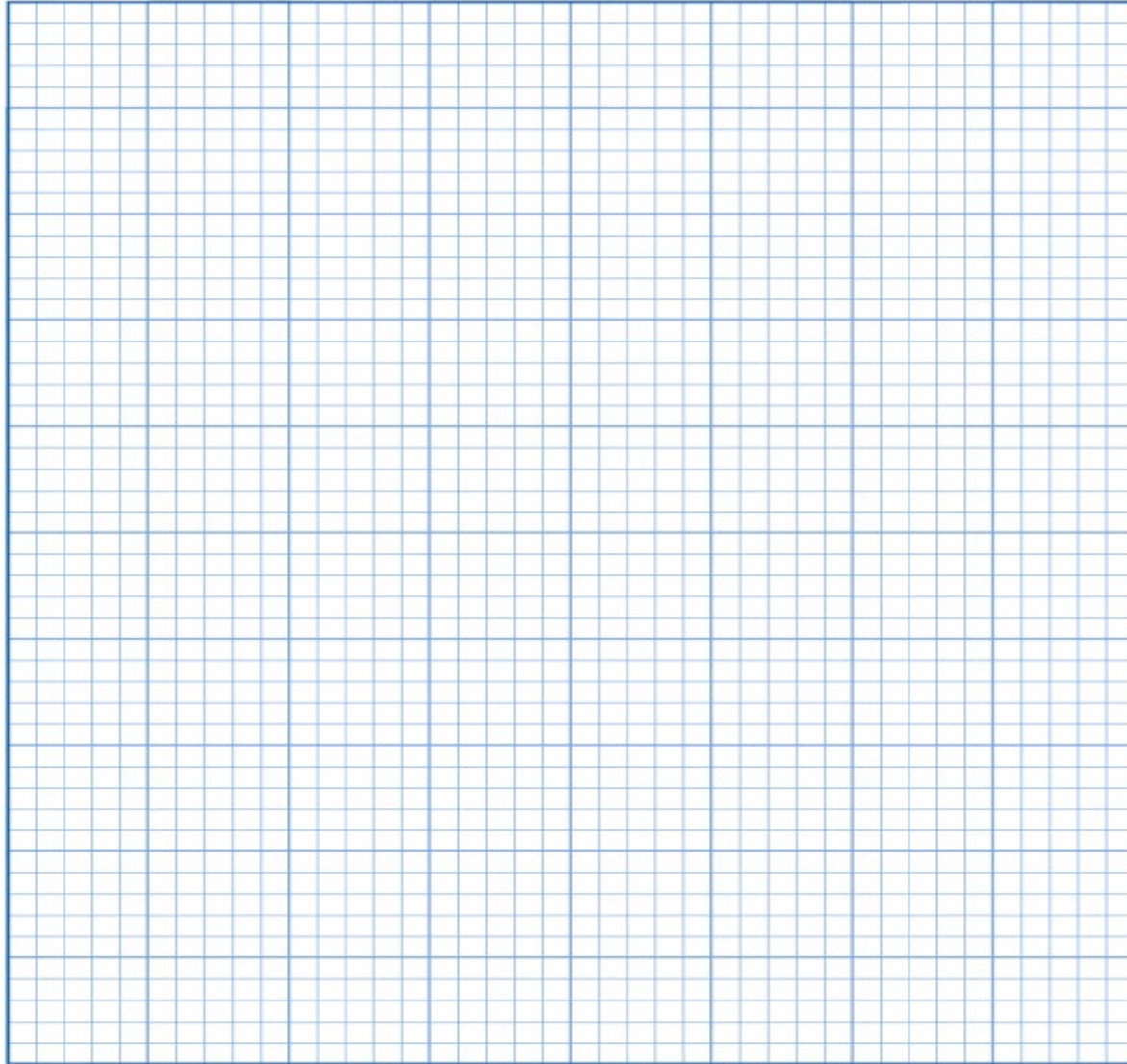
Plotting graphs

Activity 3

Often marked as SLAAP, SLAPU or SLAPUK / eq;

- **S** scale linear and half of each axis
- **L** lines straight, between points and neat
- **A** axis correct way around
- **A** axes labelled
- **P** points plotted correctly
- **U** units correct on each axis
- **K** key if two or more lines

Time in hours	Percentage of plankton remaining in beakers	
	Mussels near high-water mark	Mussels near low-water mark
0	100	100
1	82	88
2	60	76
3	39	62
4	20	50



Mini Essays

Activity 4

Explain the consequences of fertiliser containing nitrate polluting a river.

(5)

Please construct your mark scheme for this question.

Mini Essay 1 – mark scheme

1. (nitrates) soluble / dissolve;
2. rain / water / run off;
3. leaching / leached;
4. algal growth / plant growth / algal bloom / eq;
5. block light / sun / eq;
6. plants die / less photosynthesis / eq;
7. less oxygen / anoxic / eq;
8. bacteria / fungi;
9. decomposers / decomposition / rot / decay / eq;
10. respiration;
11. fish / animals die;
12. eutrophication;

Answer 1

The nitrates help algae to grow and they stop light getting to the bigger plants. The big plants no longer photosynthesise and so die. Bacteria decompose the dead plants and use up oxygen in respiration. Fish then die. This is called utrofication.

Answer 2

The fertiliser poisons plants so they die.

This means there is less photosynthesis and so less oxygen in the water. The fish suffocate.

Mini Essay #2

Activity 5

Fish are an important source of protein to humans.

Describe what happens to protein in the gut of a human. (5)

Please construct your mark scheme for this question.

Mini Essay 2 – mark scheme

1. digested;
2. amino acids / (poly)peptides;
3. stomach;
4. protease / named protease enzyme (ONCE);
5. HCl / acid / low pH / eq;
6. small intestine / duodenum / ileum;
7. bile / neutralise / alkaline / eq;
8. optimum pH (ONCE);

Answer 1

The fish is chewed and swallowed. In the stomach amylase turns the protein into amino acids which are absorbed in the small intestine. Bile is released to make the optimum pH for the amylase to work.

Answer 2

The fish protein is digested by pepsin in the stomach where HCl provides the optimum pH.

New Question Styles

➤ **Multiple Choice**

Paper 1 – up to 10

Paper 2 – up to 5

See questions in both Paper 1 and Paper 2

NB: Pure recall can only be c.15% so some MCQs will be more demanding

➤ **Analysis of Data**

To address the shift in emphasis from AO1 to AO2

Data analysis questions

- See Question 3 (b) (i) in Paper 2 and also the mark scheme
- Also see 3 (c) which shows how a CP is examined in AO3 and AO1, rather than all AO1

Data analysis example

A shrew is a very small mammal.

Different types of shrew have different body masses.

The table gives the oxygen used, in cm^3 per g per hour, by five different types of shrew.

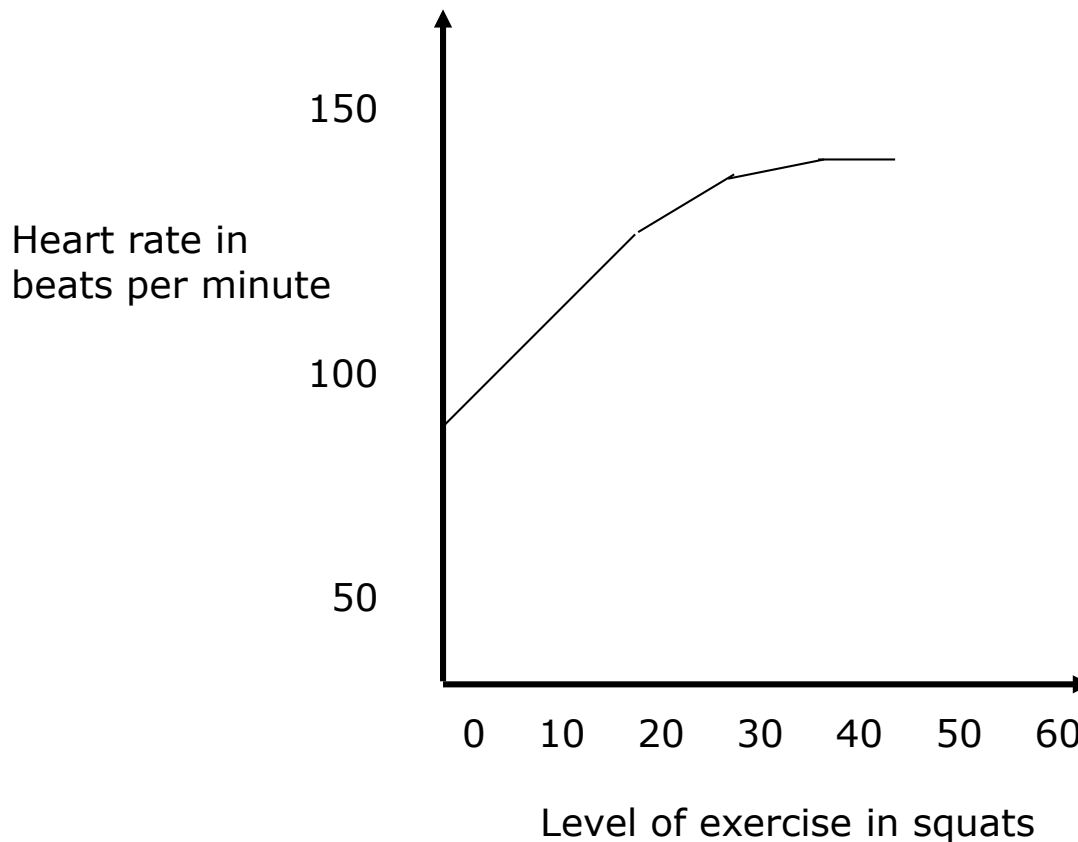
Type of shrew	Body mass of shrew in g	Oxygen used in cm^3 per g per hour
Masked	2.5	10.8
Wandering	4.5	8.6
Monterey	6.5	7.2
Sonoma	11.5	5.2
Short-tailed	20.0	4.0

Command words

- All our qualifications in science now use a common taxonomy for command words
- These can be found in an appendix at the back of the specification
- Students can still expect a range of command words across the demand range of the exam paper
- See Paper 1 Question 8 – 'EVALUATE'

What does EXPLAIN mean?

The graph below shows the effect of exercise on human heart rate.



Question: Explain the pattern shown by the graph.

Answer: As the level of exercise increases so does the heart rate. = ✗

Answer: As the level of exercise increases so does the heart rate BECAUSE exercising muscle; cells need a supply of glucose; and oxygen; to carry out aerobic respiration; which makes ATP; Also, more blood needs to be sent to the skin for heat loss; The graph levels off at 48 squats because there is a maximum rate; at which the heart can beat regardless of the level of exercise. = ✓

Scientific Terms

Example of Scientific Term Questions

Paper 1

Question 3 (a) (ii) 'reliability'

Corms question Question 6 (c)
'independent and dependent variable' controlled variables'

Paper 2

Question 3 (c) ideas of reliability and control

INTERNATIONAL GCSE BIOLOGY

Practical and mathematical skills



Practicals in the specification

- Specifications contain a number of suggested 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 straight lines

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.

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

Practical skills in examinations

Students may be tested on their ability to:

Describe and plan experiments

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

Describe safe and appropriate practical techniques

Communicate findings from experimental activities using appropriate vocabulary, calculations and graphs

Analyse and interpret data from experimental activities

Evaluate data and methods

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, 20% in Chemistry and 30% in Physics
- See SAMs for an example, but note that maths questions have always been asked in previous papers so should not be a surprise

INTERNATIONAL GCSE SCIENCES 2017

Support and published resources



Teaching and learning support overview

Getting Started Guide
& Scheme of Work

Subject interpretation
of transferable skills

Subject Advisor

Results Plus &
ExamWizard

Regional Support
Teams

Curriculum Matched
Publishing

Access to Scripts

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](#)
 - [ResultsPlus - Cohort Analysis](#)
 - [ResultsPlus - Mock Analysis](#)
 - [ResultsPlus - Global Analysis](#)

Contact your Subject Advisor

Your Science Subject Advisor team can be contacted through our website

<https://qualifications.pearson.com/en/contact-us/teachers.html>

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Finally

***Thank you
Any questions?***

***Please complete your evaluation form which
will be emailed to you.***