

PEARSON EDEXCEL INTERNATIONAL

GCSE (9-1)

Biology, Chemistry & Physics

ONLINE MODULE 1

GETTING READY TO TEACH

Event code:

First teaching in 2017, first assessment in 2019.



In this module, you will:

- Gain an overview of the content and layout of the Pearson Edexcel International GCSE (9-1) specifications in biology, chemistry and physics
- Consider how to deliver the specification and to plan and organise your teaching
- Look at the methods of assessment used and consider how best to prepare students to face these types of assessment
- Share best practice with colleagues

Getting to know you

- ❖ Who are you, which school do you teach at and where is it?
- ❖ Do you teach Biology, Chemistry or Physics?
- ❖ Are you new to Edexcel International GCSE or did you teach our previous specification?
- ❖ What would you like to get out of this training?

Getting Ready for delivery

Pearson Edexcel International GCSE

Biology, Chemistry and Physics

Why Edexcel International GCSE?

- ❖ Developed with input from teachers across the world
- ❖ Suitable for all students: Single Award to separate sciences
- ❖ Engaging content, with progression in mind
- ❖ Clear, accessible question papers available January and June
- ❖ Practical and mathematical skills developed
- ❖ Support from Pearson

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	✓	✓

Key features of the 2017 specifications

- ❖ Subject content revised in line with content of other 14 – 16 curricula, including GCSE in the UK
- ❖ Fairer content split between Double Award and separate sciences
- ❖ Practical skills assessed through questions in exam papers
- ❖ Introduction of new qualification - Science (Single Award)
- ❖ Graded using new 9 – 1 system
- ❖ Support by published resources and free support

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

Chemistry content summary

There are now 4 sections in the specification instead of 5

Principles of Chemistry

- States of matter
- Elements, compounds and mixtures
- Atomic structure
- Periodic Table
- Equations and calculations
- Bonding
- Electrolysis

Inorganic Chemistry

- Groups 1 & 7
- Reactivity series
- Gases in the atmosphere
- Extraction & uses of metals
- Acids, alkalis & titrations
- Salt preparation
- Chemical tests

Physical Chemistry

- Energetics
- Rates of reaction
- Reversible reactions and equilibria

Organic Chemistry

- Introduction
- Crude oil
- Alkanes
- Alkenes
- Alcohols
- Carboxylic acids
- Esters
- Polymers

Physics content summary

There are now 8 topic areas in the specification:

**Forces and
motion**

Electricity

Waves

**Energy
resources and
energy
transfers**

**Solids, liquids
and gases**

**Magnetism and
electro-
magnetism**

**Radioactivity
and particles**

Astrophysics

Comparison with Cambridge IGCSE

- ❖ The content is broadly similar: although some differences occur
e.g. CIE Physics has no Astronomy content
Edexcel International Biology does not include mechanical digestion and the structure of teeth
- ❖ Schools who are switching from CIE can look at our schemes of work for detail on the content required
- ❖ The assessment of the two specifications are different
e.g. Edexcel International has practical questions throughout,
rather than in a separate paper
CIE has a separate multiple choice paper

Reading the specification

(b) Group 7 (halogens) – chlorine, bromine and iodine	
Students should:	
2.5	know the colours, physical states (at room temperature) and trends in physical properties of these elements
2.6	use knowledge of trends in Group 7 to predict the properties of other halogens
2.7	understand how displacement reactions involving halogens and halides provide evidence for the trend in reactivity in Group 7
2.8C	explain the trend in reactivity in Group 7 in terms of electronic configurations

- ❖ “Bold” statements in separate science only (Paper 2)
- ❖ Command words in the specifications give a guide to depth of teaching

Science (Double Award)

Features of Science (Double Award):

- Students take Paper 1 in Biology, Chemistry and Physics
- Students achieve two grades, based on performance across all three papers: these two grades may not be the same
- Students may still progress to A level
- Significant changes to the content of Double Award compared to previous specification

Science (Single Award)

This new qualification has:

- Half the content of the Double Award specification
- Short exam in each science which does not overlap with Double Award or Biology / Chemistry / Physics
- Students achieve a single grade, based on performance across all three papers
- Not designed for science progression

Combinations of subjects

- ❖ Double Award candidates take the same Paper 1 as candidates sitting Biology, Chemistry and Physics as separate sciences
- ❖ Double Award cannot be taken in the same exam series as Biology or Chemistry or Physics
- ❖ Single Award exams contain different questions to those in the Double Award or separate science papers
- ❖ Single Award can therefore be taken in the same exam series as Biology or Chemistry or Physics or Science (Double Award)

Planning your teaching

- ❖ Mapping documents available to show:
 - How content matches the previous specification
 - How content matches the Cambridge specification
 - How the Single and Double Award content fits with the separate science
- ❖ Schemes of work divide the content and provide additional guidance and resources

ACTIVITY 1 – organising your teaching

- ❖ Two years / three years
- ❖ How many hours per week?
- ❖ One teacher for everything / one teacher per science
- ❖ Regular practical / mostly theory
- ❖ Theoretical / application

Progression

- ❖ The Edexcel International GCSE is part of our wider set of specifications for students
- ❖ These start with the Lower Secondary Curriculum
- ❖ International GCSE gives excellent preparation for progression to International A level, or to GCE A level or IB

Skills for progression

- ❖ Learning of facts is of limited use
 - Knowledge marks up to 40% of questions at International GCSE and only around one-third at A level
 - Factual content changes at each stage of learning
- ❖ Progression comes from developing skills
- ❖ Learning styles important: passive learning vs active learning

Teaching skills, not knowledge

Version 1	Version 2
<p>When we eat, enzymes in saliva breakdown starch to simpler carbohydrates , like maltose. We chew our food to break it up into smaller pieces. This makes it easier to swallow but also makes the reaction with enzymes faster because of the higher surface area.</p> <p>Saliva also makes our food wet – this helps as well swallow. The food travels down the oesophagus by peristalsis.</p>	<p>Imagine you're eating a cheese sandwich. What types of food molecules are there in the sandwich?</p> <p>There's an enzyme called amylase in saliva. It breaks down starch to maltose. What would make this process happen faster? How are humans adapted to make this happen?</p> <p>For your homework, I'm going to ask you to plan an experiment you could do to show that surface area</p>

ACTIVITY 2 – Skills for progression

What skills do you think are important in your subject?

Consider:

- **What are the top three skills for progression in your subject?**
- **Does this vary across the three sciences?**

Key skills

- ❖ LANGUAGE: terminology, reading questions
- ❖ CRITICAL THINKING: analysis, evaluation
- ❖ APPLICATION: dealing with new scenarios
- ❖ MATHEMATICS: complex calculations, graphs
- ❖ PRACTICAL: investigations, use of data
- ❖ SYNOPTICITY: linking knowledge areas together

The 9-1 grading scale

- ❖ Designed to show that the new GCSEs are different to the previous ones
- ❖ Matching in outcomes expected between Grade 7 and Grade A; and between Grade 4 and Grade C
- ❖ New Grade 9 above the current A*
- ❖ Number of Grade 9s awarded depends on the number of Grade 7s

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	
3	C
2	
1	
U	D
	E
	F
	G
	U

GOOD PASS (DfE)

5 and above = top of C and above

AWARDING

4 and above = bottom of C and above

Grade 9

- ❖ Originally intended to be fixed: “the top 20% of those scoring Grade 7”
- ❖ Method of awarding Grade 9 has been changed, to be fairer on students
- ❖ New method of working out Grade 9 will be:

$$\begin{array}{l} \text{proportion of Grade 7} \\ \text{students eligible} \\ \text{for Grade 9} \end{array} = \frac{(\% \text{ of students who achieved Grade 7})}{2} + 7\%$$

Comparing 9 - 1 with 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%

Getting Ready for assessment

Pearson Edexcel International GCSE

Biology, Chemistry and Physics

Summary of assessment

100% external assessment – with no coursework

Linear assessment – all exams take in the same exam session

Questions using maths skills
(10% in Bio
20% in Chem
30% in Physics)

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

Single tier of entry (untiered)

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

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

Assessment objectives

AO1

Knowledge and understanding of biology / chemistry / physics

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

AO2

Application of knowledge and understanding, analysis and evaluation of biology / chemistry / physics

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

AO3

Experimental skills, analysis and evaluation of data and methods in biology / chemistry / physics

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

How has assessment changed?

- ❖ Paper 1 has 10 fewer marks; and Paper 2 has 10 more marks
- ❖ Paper 2 carries more “weight” – the bold statements will be tested more than currently
- ❖ There is more emphasis on skills, understanding and application (AO2) and less on recall (AO1)
- ❖ Longer questions in all three sciences; and multiple-choice in all three sciences

AO2 questions

(c) Some people have problems with their breathing system.

They struggle to breathe and can become breathless.

These people may use inhalers to reduce their symptoms.

The inhalers deliver drugs called bronchodilators into their lungs.

The photograph shows a person using an inhaler.



(Source: © Ljupco Smokovski/Shutterstock)

(i) Suggest how bronchodilators help these people to breathe.

(2)

❖ “Sir, you never taught us anything about inhalers!”

❖ Students need to deal with contexts and apply their knowledge

ACTIVITY 3 – AO2 questions

Your pack contains two questions involving AO2 from this summer's exams.

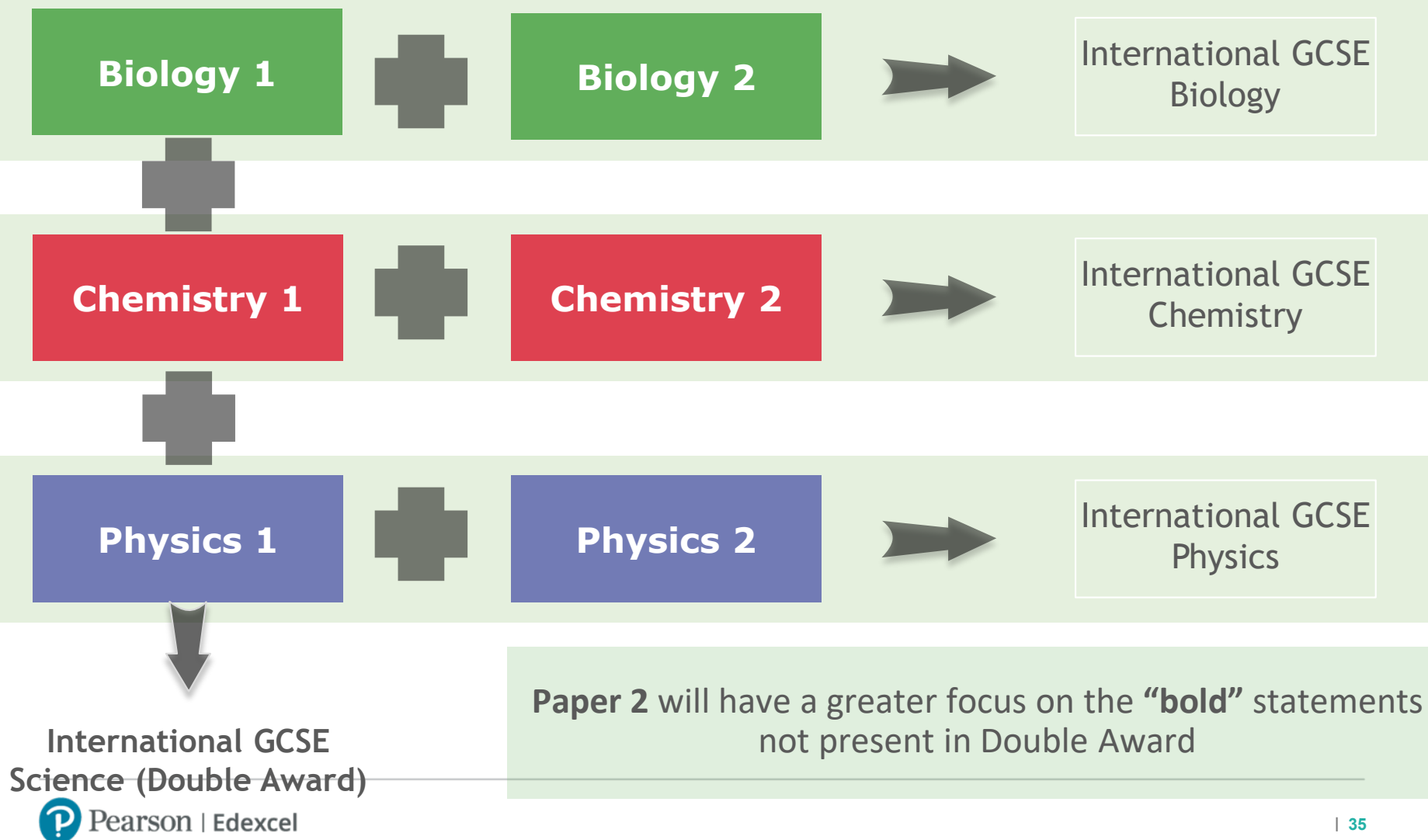
How would your students read these questions?

What can you do to help students access this type of question?

Preparing students for AO2

- ❖ Teaching approaches: facts vs principles
- ❖ Questioning styles: closed vs open
- ❖ Homework activities: formative vs summative
- ❖ Exam preparation

Structure of papers



Exam question guide

The question style is similar to that of the existing International GCSE:

A small number of multiple choice questions

Short answer responses, usually worth 1 – 3 marks

Longer answer questions, up to 6 marks

All questions are **compulsory** and may cover **practical** situations as well as **areas** of theory

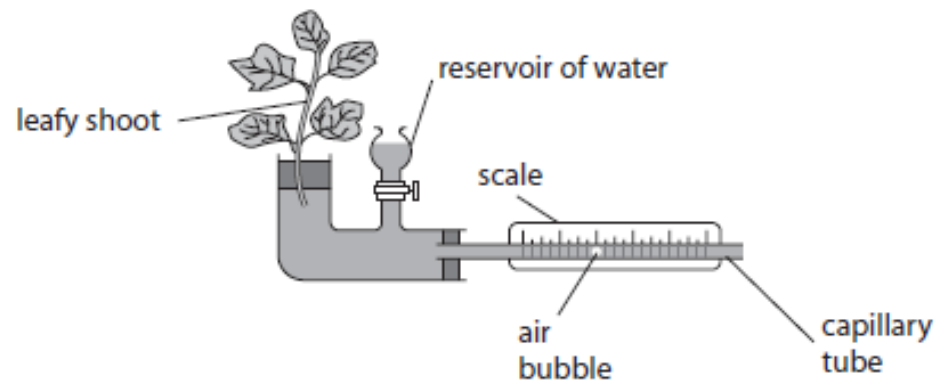
Command words

- ❖ 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

Describe and explain #1

- 4 A student investigates the effect of wind on the rate of transpiration of a leafy shoot using a potometer.

The diagram shows her apparatus.



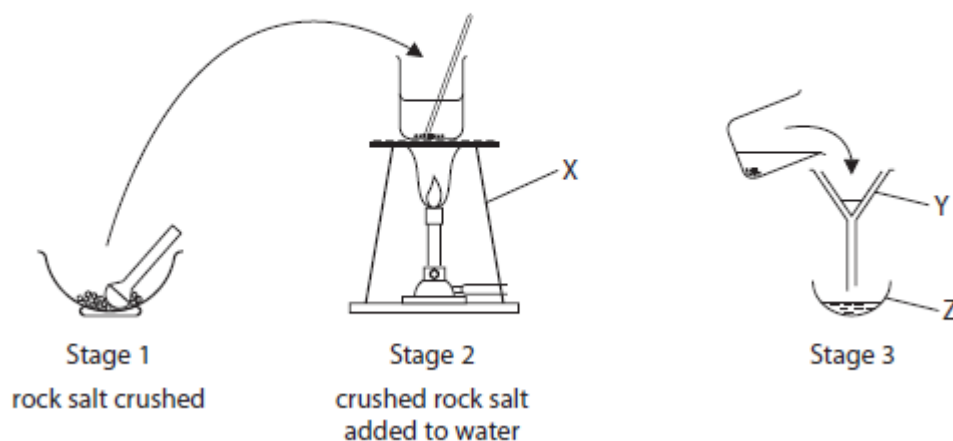
(b) The table shows the student's results.

Experiment	Rate of transpiration in mm per minute	
	still air	wind
1	0	3
2	1	4
3	1	3

Describe and explain #2

- 2 Rock salt is a mixture of the soluble salt, sodium chloride, and some insoluble impurities.

The diagram shows the first three stages of a method used to obtain pure sodium chloride from rock salt.



How do you get
2 marks here?

- (c) (i) Explain what happens to the impurities in stage 3.

(2)

- (iii) Describe a chemical test used to distinguish between unsaturated and saturated hydrocarbons.

(3)

How much detail
is needed here?

test

results

New command words: Compare

“Give similarities and differences between several things, not just one”

(c) The table gives some data on two main sequence stars, X and Y.

	Star X	Star Y	The Sun
mass compared to the Sun	0.7	15	1

Compare the evolutionary paths for Star X and Star Y.

(4)

New command words: Comment on

“Look at data and information and decide what it shows”

(e) The molecular formula of compound **S** is C_4H_8

Student X states that compound **S** is an alkane.

Student Y states that compound **S** is an alkene.

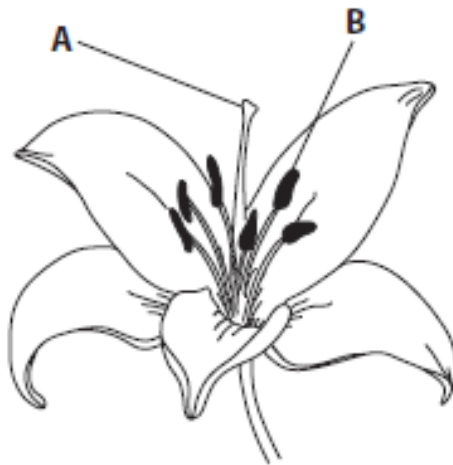
Comment on each of the student's statements.

(4)

New command words: Identify

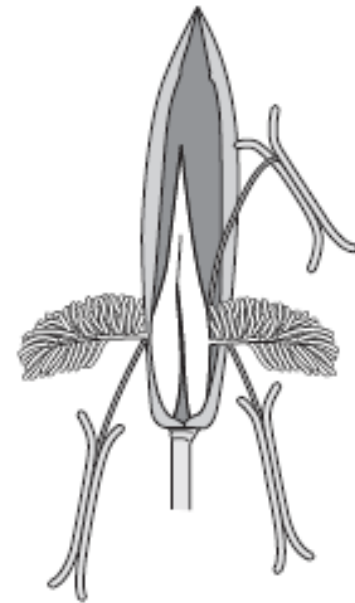
“Choose key details from information in the question”

- 8 The diagrams show two flowers from different species.



magnification $\times 0.5$

Flower 1



magnification $\times 10$

Flower 2

- (b) Identify the method of pollination used by each flower.

Include features shown on the diagram to support your answer.

Some subject specific issues

BIOLOGY

- comprehension exercise in Paper 2

PHYSICS

- formulae which students need to remember are marked in the specification as “know and use...”
- other formulae are just “use...” and will be provided in the question paper
- different formulae are provided for Paper 1 and Paper 2

Thank you

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