

PEARSON EDEXCEL INTERNATIONAL GCSE (9-1)

Science: Double Award & Single Award

GETTING READY TO TEACH

Event code: 4SD0/19IF0

1

First teaching in 2017, first assessment in 2019.



Location:

Trainer:

Welcome to today's event

- ❖ Introduction to your trainer: Damian Riddle
- ❖ Housekeeping
- ❖ What's in your pack?
- ❖ How today's training is structured

Today's Agenda

1000 – 1010	Welcome and introductions
1010 – 1110	Specifications: structure, content and planning
1110 – 1130	MORNING BREAK
1130 – 1230	Delivery: scientific content; practical & maths skills
1230 – 1330	LUNCH
1330 – 1500	Assessment: question papers & mark scheme
1500 – 1530	Support
1530 – 1600	Plenary and departure

Getting to know you

- ❖ Who are you, and which school do you teach at?
- ❖ Do you teach Biology, Chemistry or Physics?
- ❖ Are you new to Pearson Edexcel International GCSE; or have you been teaching the existing specification?
- ❖ Do you teach Single Award, Double Award, or separate sciences?

Specifications: structure, content and planning

Pearson Edexcel International GCSE

**Science (Double Award) and
Science (Single Award)**

Edexcel International GCSE: The headlines

- Revised for first exams in June 2019
- Small revisions to subject content of separate Sciences, but larger review of content of Double Award
- Slight changes to paper lengths and number of marks
- No change to assessment style; or to assessment of practical skills
- Introduction of Science (Single Award)
- Grading moves to new 9 – 1 system to match changes in UK reformed GCSE

Our suite of International GCSEs

Our International
GCSE Science
specifications

EXAM SERIES
January
May / June

BIOLOGY

CHEMISTRY

PHYSICS

SCIENCE (DOUBLE AWARD)

SCIENCE (SINGLE AWARD) - NEW!!

In addition, there is also an International GCSE in Human Biology

What's available when?

Note that “R” papers are produced in January and June – but not for Science (Single Award) or for Human Biology in January

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

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)

Specification content

Reading our specifications

- Our specifications are clearly divided into topics and sub-topics
- Each specification has an initial word e.g. 'know', 'describe' or 'understand' that shows the level of understanding that will be examined
- Practical statements are clearly marked
- Note that specification numbering follows from that of Biology / Chemistry and Physics – which explains the gaps!

Switching from CIE (Cambridge)

The content of our International GCSEs is similar to the Cambridge course, but the Pearson Edexcel specifications:

- place a greater emphasis on skills for progression, rather than on recall
- emphasise breadth of topics rather than depth
- do not split content into Core / Extension
- assess each science subject in separate question papers
- use open questions rather than multiple choice

Mapping documents

If you have moved from the previous International GCSE (A* - G) specification, there are mapping documents on the website detailing the changes to the specification

There are also schemes of work to help you plan the delivery of the new specifications

Science (Double Award) – 4SDo

- Topics grouped together in a more logical way – whole topics removed from separate Sciences
- Students sit Paper 1 in Biology, Chemistry and Physics
- Students achieve two grades, based on performance across all three papers
- The two grades may be the same or different:
(9-9 is the highest, then 9-8, 8-8, 8-7, etc)
- Students may still progress to A level

Biology qualification content summary

There are five topic areas in the specification:

Nature & variety of living organisms

- Characteristic of living organisms
- Variety of living organisms

Structures & functions in living organisms

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

Reproduction & inheritance

- Reproduction
- Inheritance

Ecology & the environment

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

Use of biological resources

- Food production
- Selective breeding
- Genetic modification

Biology: some key points

- Emphasis give to both plant and animal biology
 - Topic 2 – Structure and functions in living organisms – makes up about half the specification
 - Range of content over topic areas, to prepare for further study
 - Topic 5 introduces more modern biological techniques such as the use of GM
 - Practical activities built into the specification content

Chemistry qualification content summary

There are four sections in the specification, with industrial process covered in each section where relevant

Principles of Chemistry

- States of matter
- Mixtures etc
- Atomic structure
- Periodic Table
- Equations and calculations
- Ionic and covalent bonding

Inorganic Chemistry

- Groups 1 & 7
- Reactivity series
- Gases in the atmosphere
- Reactivity series
- Acids alkalis & titrations
- Salt preparation
- Chemical tests

Physical Chemistry

- Energetics
- Rates of reaction
- Reversible reactions and equilibria

Organic Chemistry

- Introduction
- Crude oil
- Alkanes
- Alkenes
- Polymers

Chemistry: some key points

- Covers inorganic, organic and physical chemistry
 - Less emphasis on calculations – but some calculations remain
 - Principles of industrial reactions, rather than learning of specification reactions
 - Practical activities built into the specification content

Physics qualification content summary

There are now eight topic areas in the specification:

Forces and motion

- Movement & position
- Forces, movement, shape & momentum

Electricity

- Mains electricity
- Energy & voltage in circuits

Waves

- Properties of waves
- The electromagnetic spectrum
- Light & sound

Energy resources and transfers

- Energy transfers
- Work & power

Solids, liquids and gases

- Density & pressure
- Ideal gas molecules

Magnetism and electromagnetism

- Magnetism
- Electromagnetism
- Electromagnetic induction

Radioactivity and particles

- Radioactivity
- Fission & fusion

Astrophysics

- Motion in the Universe
- Stellar evolution

Physics: some key points

- Covers the same 8 topics as Physics (separate science)
 - Key areas removed from Physics are momentum, static electricity, sound, changes of state and electromagnetism
 - Key equations still need to be recalled by students
 - Practical activities built into the specification content

Science (Single Award) – 4SSo

The features of this new qualification:

- Half the content of the Double Award specification
- Involves a 1-hour and 10-minute paper in each science
- Students achieve a single grade, based on performance across all three papers
- Not intended for progression to A level

The idea behind Single Award

- Not designed to be “Foundation Tier” version of Double Award
- Half the content but some challenging topics still included
- Needs to grade across whole range of Grade 9 to Grade 1
- But... suspect there will be two types of student!

ACTIVITY 1 – The challenge of delivering Science

Here are the mean marks for exam papers in June 2019

	4BI1/1B	4BI1/1BR	4CH1/1C	4CH1/1CR	4PH1/1P	4PH1/1PR
Separate science students	62.3	66.4	64.4	76.5	59.9	68.6
Double Award students	55.7	51.1	51.9	59.2	49.3	56.1
<i>Difference</i>	6.6	15.3	12.5	17.3	10.6	12.5

ACTIVITY 1 – The challenge of delivering Science

- **Science (Double Award) students do less well on Paper 1 than the separate science students**
 - **What can be done to reduce the performance gap?**
 - **What strategies are there to help Science students improve their learning?**

Any questions about the content?



BREAK TIME!

**Delivery:
scientific content;
practical & maths skills**

Pearson Edexcel International GCSE

**Science (Double Award) and
Science (Single Award)**

Schemes of work

- An editable scheme of work is provided for the revised qualification.
- It includes many suggested activities to enrich the delivery of the specification in classrooms.

ACTIVITY 2 – “Spiral curriculum”

Students often benefit from coming back to key ideas on more than one occasion.

This helps students to understand key ideas better.

- **Which order do you choose to teach the topics in your subject?**
- **Are there opportunities in your scheme of work to have a spiral curriculum?**

Practical skills

The importance of practical work

- ❖ It is often said that Sciences are “practically based”
- ❖ This is true – but practical work is not just about students gaining skills in manipulation
- ❖ All sciences are also investigative
- ❖ It is the ability to investigate that opens up science to students – and also helps them with application
- ❖ Integration of practical work: exams reflect teaching

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

Core Practicals

- ❖ The specification content for each science in Double Award contains 8 – 9 practical activities (4 – 5 for Single Award)
- ❖ These have been chosen to give students experience of key techniques and apparatus
- ❖ They are also designed to be accessible from the point of view of apparatus
- ❖ Students should be familiar with the core practicals, but will get tested on a wider range of practicals in exams

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

A support document on the website gives guidance on the use of terminology within practical and experimental work.

4

Practical support guide

- ❖ Available on the website
- ❖ An introduction to each practical activity
- ❖ Description of the practical, with some useful hints and tips
- ❖ Questions to use with students to test their understanding as they do the experiment in the lab
- ❖ A past paper question, where relevant, to use as a homework activity

ACTIVITY 3 – widening practical work

Some Topic areas in the specification don't contain practical work

e.g. Transport (Biology), Chemical tests (Chemistry), Energy and voltage in circuits (Physics)

What practical work could you do in these topics?

- Would this be teacher demonstration or student work?**
- What method would you use?**
- What questions would you ask students about this practical to help prepare them for exam questions?**

Practical terminology in exams

- ❖ Exams often phrase questions to avoid using terms because of lack of shared understanding
- ❖ Context: is the question about method / apparatus or data?
- ❖ In general:
 - VALIDITY – about controlling variables
 - RELIABILITY – about repeating to find and remove anomalies
 - PRECISION – about the use of apparatus
 - ACCURACY – the hard one! All the above can affect accuracy...

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

CORMS and devising investigations

- **C**hange with and without OR range of values
(independent variable)
- **O**rganism e.g. species / size / age / sex....
(controlled variable: biotic)
- **R**epeat more than one reading
- **M**easure what is measured, and when?
(dependent variable)
- **S**ame any two factors
(controlled variable: abiotic)

CORMS

from the June 2019 exam papers for Science (Double Award)

(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)

11 The diagram shows an insect called a wasp.

Wasps kill their prey by injecting a poison called venom through a small tube called a stinger.

Some scientists believe that the smell of venom attracts other wasps.

Design an investigation to find out if the smell of venom attracts other wasps.

Include experimental details in your answer and write in full sentences.



(6)

ACTIVITY 4 – practical questions

Your pack contains questions from the June 2019 exam papers for Science (Single Award) that test practical skills.

Discuss possible mark schemes for these questions.

How can you prepare students to answer this type of question in the exam?

Mathematical skills

Mathematical skills

- ❖ 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

Mathematical skills – categories

There are 5 categories of mathematical skills:

- 1 Arithmetical and numerical computation
- 2 Handling data
- 3 Algebra
- 4 Graphs
- 5 Geometry and trigonometry

Graphs

- ❖ Guidance is given in the document “Guidance on using practical terminology”
- ❖ Students are advised to draw graphs in pencil
- ❖ Draw graphs as larger as possible on the grid – but without using a complicated scale!
- ❖ Exam questions give guidance on the type of trend line to draw: a straight line or a curve
- ❖ Biology questions usually ask for points to be joined

Any questions about practical or mathematical skills?



LUNCH

Assessment: question papers & mark schemes

Pearson Edexcel International GCSE

**Science (Double Award) and
Science (Single Award)**

Assessment objectives

AO1

Knowledge and understanding of biology / chemistry / physics

40%
of total marks

AO2

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

40%
of total marks

AO3

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

20%
of total marks

Assessment summary – Double Award

Paper 1

Two hours; 110 marks

Students sit Paper 1 in Biology, in Chemistry and in Physics

If you also teach separate sciences: no bold statements are assessed

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

The AO3 questions
are likely to be in a
practical context

Assessment summary – Single Award

Paper 1

One hour and 10 minutes; 60 marks

Students sit Paper 1 in Biology, in Chemistry and in Physics

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

The AO3 questions
are likely to be in a
practical context

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

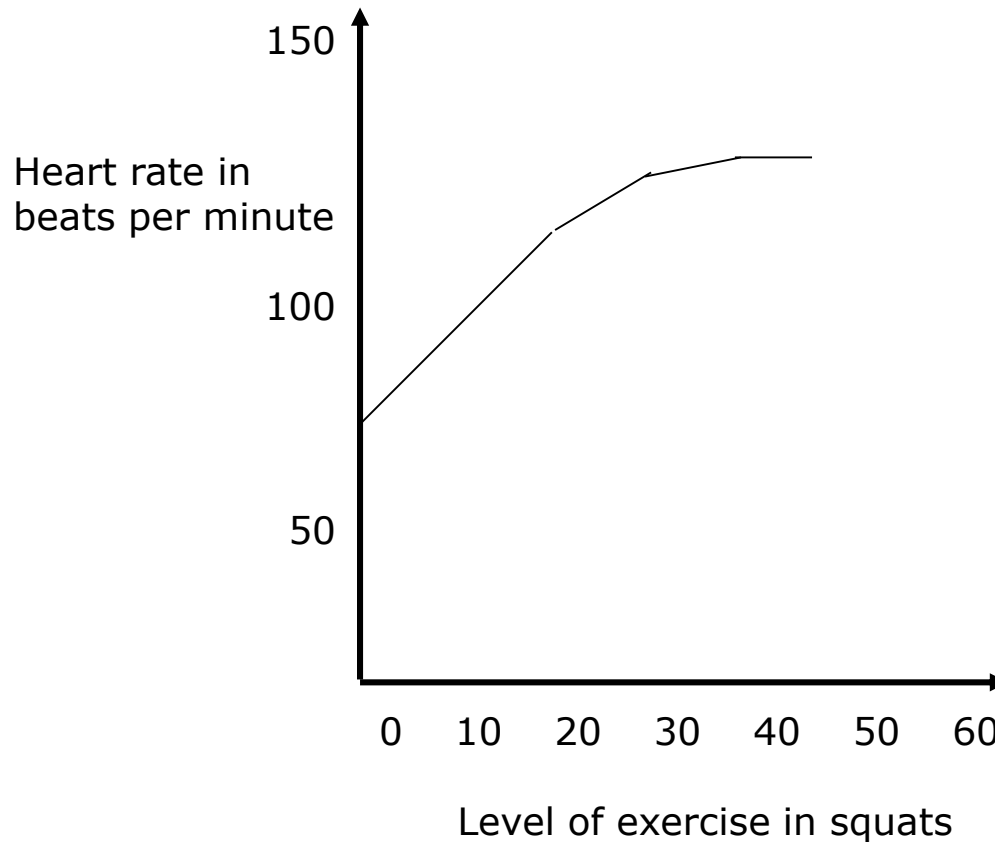
Command words – describe or explain?

These two command words are often used in questions, but sometimes students are not clear about the differences between them.

Describe	To give an account of something. Statements in the response need to be developed, as they are often linked but do not need to include a justification or reason.
Explain	An explanation requires a justification/exemplification of a point. The answer must contain some element of reasoning/justification – this can include mathematical explanations.

What does EXPLAIN mean?

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



Question: Explain the pattern shown by the graph.

Command words – explain a statement that is given

Question

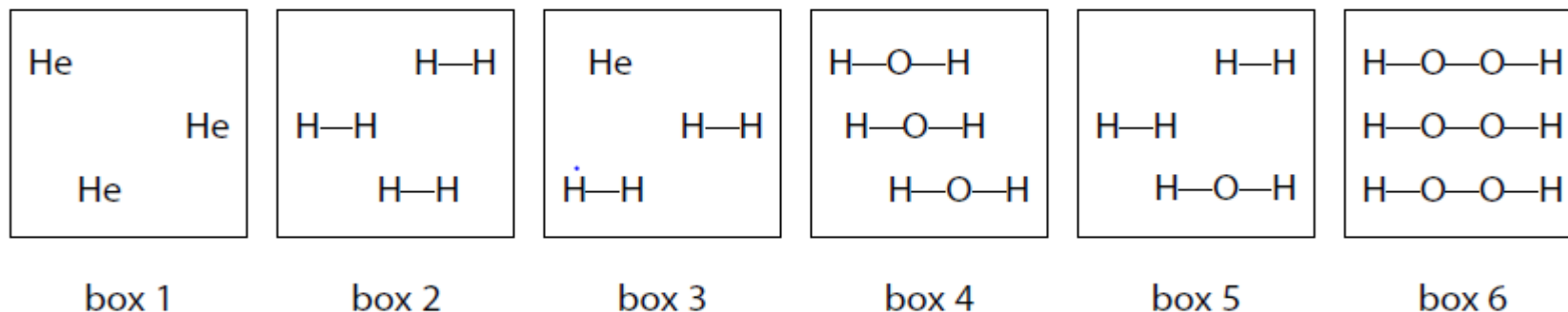
Explain why the use of a catalyst has no effect on the position of equilibrium in a reversible reaction. (2 marks)

Comment

Note that the students are told that the catalyst has no effect, so the 2 marks are for explaining why it has no effect.

Command words – explain something that must be stated

(a) Each of the boxes in the diagram represents either an element, a compound or a mixture.



(i) Explain which **two** boxes represent an element.

(2)

Comment

The first mark is for identifying the two boxes, and the second mark is for giving the reason.

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

ACTIVITY 5 – command words

Questions in June 2019 used the following command words:

- Evaluate (Biology)**
- Show that (Chemistry)**
- Discuss (Physics)**

How would you guide students to answer these questions?

What will the mark scheme say?

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	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

Grade 9

- ❖ Originally intended to 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:

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

Double Award Science, June 2019

- ❖ Notional grade boundaries set on each paper
- ❖ These are set for Grade 7, Grade 4 and Grade 1
- ❖ These are added to give the overall grade boundaries for Double Award

Double Award Science, June 2019

For 4SD0 (R option):

	Grade 7	Grade 4
4SD0/1BR	62	42
4SD0/1CR	67	46
4SD0/1PR	67	43
TOTAL	196	131

Grade 77 = 196 marks

Grade 44 = 131 marks

Double Award Science, June 2019

Grade 77

- Achieved by 31.35% of candidates
- Total of 390 candidates

So a Grade 99 can be achieved by

$$(31.35 / 2) + 7 = 22.675\% \text{ of the Grade 7 candidates}$$

$$22.675\% \text{ of } 390 = 88.4325 \text{ candidates}$$

Double Award Science, June 2019

Mark	Cands	Cum	Cum %
<u>250</u>	4	70	5.63
249	4	74	5.95
248	3	77	6.19
247	3	80	6.43
246	4	84	6.75
245	3	87	6.99
244	4	91	7.32
243	5	96	7.72
242	5	101	8.12
241	4	105	8.44

The Grade 99 was set at 245 marks

Progression and support

Pearson Edexcel International GCSE

Biology, Chemistry and Physics

What's on the website?



International GCSEs and Edexcel Certificates Chemistry (2017)

[Specification](#)[Course materials](#)[Published resources](#)[News](#)

Find course materials

[Specification and sample assessments \(3\)](#)[Exam materials \(8\)](#)[Teaching and learning materials \(18\)](#)

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Find your Document

[Assessment guidance](#)

Teaching and learning materials

In this section of the website you will find:

- Getting started guides
- Mapping document and schemes of work
- Guides for practical and mathematical skills
- Exemplars
- Topic Guides
- Past training materials

Teaching and learning support overview

Getting Started Guide
& Scheme of Work

Subject interpretation
of transferable skills

Subject Advisor

Results Plus &
ExamWizard

Regional Support
Manager

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](#)



examWizard is a free tool for teachers containing a bank of past paper questions to help create their own bespoke mock exams and tests to focus on particular topic areas as needed:

- Use existing mark schemes for accurate marking
- Use existing examiner report for insight
- Use the results to understand where students need more support, informing teaching strategies.

Unlike other similar question banks, ExamWizard is:

- Available free to all Edexcel centres
- Updated with latest questions faster, following the exam series
- One stop shop for assessment material with access to whole past papers and examiner reports as well as the ability to construct bespoke ones easily with content tagged to specific attributes.

New Access to Script (ATS) Online Portal

Access to Scripts (ATS) is a free online portal which allows teachers to immediately access electronically marked exam papers

Provides enhanced transparency and

- Offers transparent approach to marking process
- Provides better understanding of marking before requests for enquiries about results are made
- Provides excellent aid for teaching and preparing other cohorts for examinations by helping you to evaluate a student's performance on particular questions in relation to what they have been taught.

Available instantly from results day for all our examination series, for a defined window, you can view and download scripts which have been marked online free of charge from our Self-Service Portal.

For more information on ATS, and the post results windows, visit our [post-results pages here](#).



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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Twitter: [**@PearsonSciences**](#)

Thank you

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