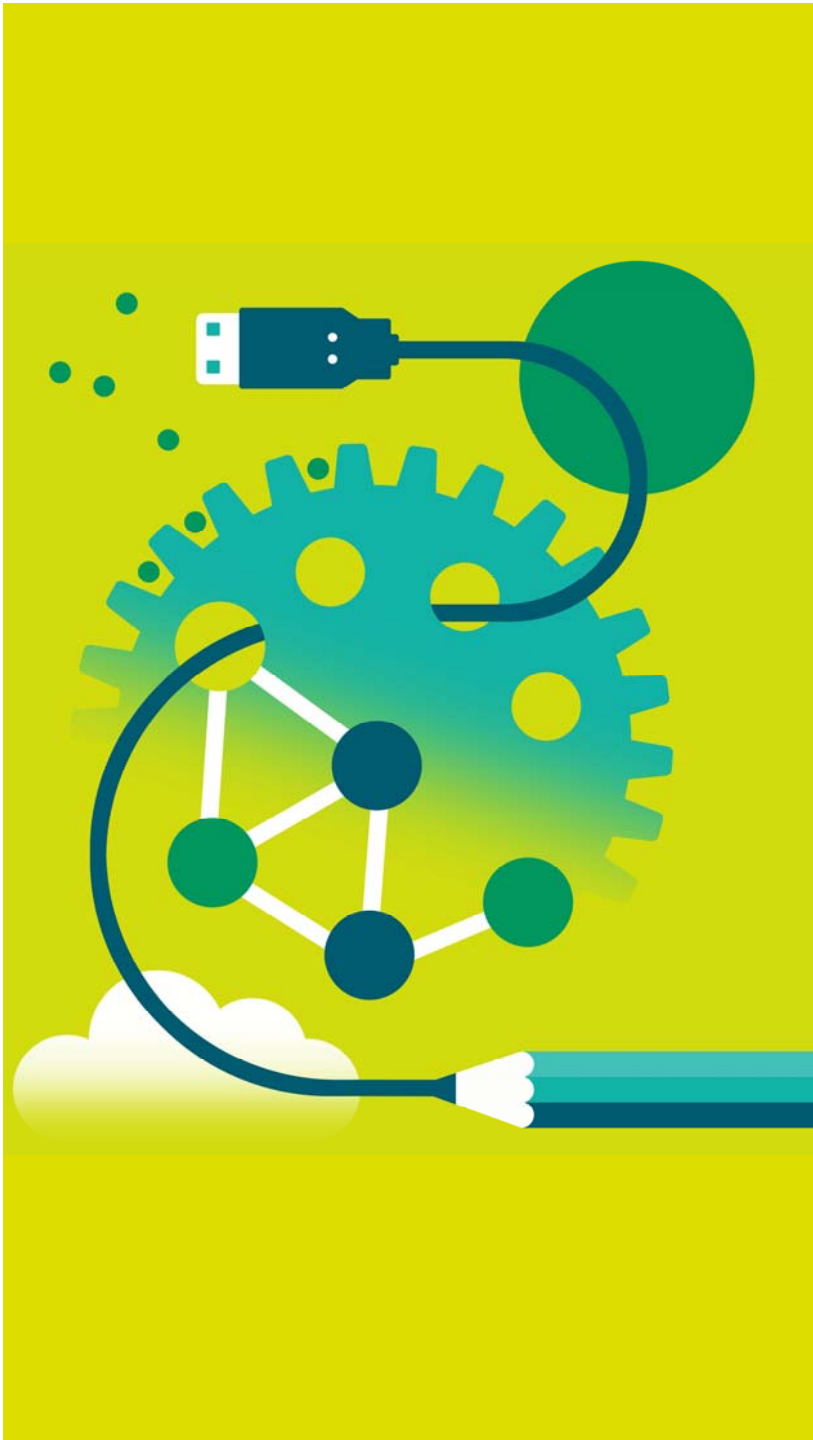


GETTING READY TO TEACH INTERNATIONAL GCSE SCIENCE (SINGLE AWARD)





Your Online Environment

XX Technical Difficulties & Support

XX Recording

XX Communication in an online environment

XX Asking Questions

XX Using Polls

XX Downloading Documents

**Polls to get to know
the delegates.**

Today's Agenda

0800 – 0805 Welcome and introductions

0805 – 0835 Session 1: Specification structure & content

0835 – 0905 Session 2: Practical & maths skills

0905 – 0950 Session 3: Assessment, SAMs & resources

0950 – 1000 Any questions?

Headlines

- New course, based on half the content of the new Science (Double Award) International GCSE
- Same style of question papers as the rest of the International GCSE Science suite
- Written assessment of practical skills
- Worth one International GCSE
- 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

*not for Single
Award

BIOLOGY

CHEMISTRY

PHYSICS

SCIENCE (DOUBLE AWARD)

SCIENCE (SINGLE AWARD) - NEW!!

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

Dates for the new specification

SEPTEMBER 2016	MAY / JUNE 2017	MAY / JUNE 2018	MAY / JUNE 2019
<p>Last year of teaching GCSE Science (Core)</p> <p>New linear GCSE introduced, with no single Science.</p>	<p>Final opportunity to sit GCSE Science (Core)</p>	<p>First year of new linear GCSE exams</p> <p>NO PROVISION FOR SINGLE GCSE IN SCIENCE</p>	
	SEPTEMBER 2017		
	<p>Introduction of new International GCSE Sciences</p>	<p>Only legacy International GCSE available</p>	<p>First exam series for new specifications including Single Award Science</p>

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD)

Specification content



Science (Single Award) – 4SS0

- Specification is about half the size of the Science (Double Award)
- Contains a number of embedded (“core”) practicals
- Students sit Paper 1 in Biology, Chemistry and Physics
- Students achieve one grades, based on performance across all three papers
- Progression to A level not recommended, but students could progress to Double Award or separate sciences

Overview of content

- An overview of most topics
- Not designed to be “the easy parts” of science
- Equal amounts of each of the three sciences
- Can be used as an introductory course before moving on to Double Award or separate sciences
- Some students may take it as their only Science qualification

Biology content of Science (Single Award)

There are 5 topic areas, as in Biology International GCSE:

Nature and variety of living organisms <ul style="list-style-type: none">▪ Characteristics of living organisms▪ Variety of living organisms	Structures and functions in living organisms <ul style="list-style-type: none">▪ Organisation▪ Cell structure▪ Bio molecules▪ Movement in & out of cells▪ Nutrition▪ Respiration▪ Gas exchange▪ Transport	Reproduction and inheritance <ul style="list-style-type: none">▪ Reproduction▪ Inheritance	Ecology and the environment <ul style="list-style-type: none">▪ Organisms in environment▪ Feeding relationships▪ Cycles within ecosystems	Use of biological resources <ul style="list-style-type: none">▪ Food production▪ Genetic modification
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Chemistry content of Science (Single Award)

There are 4 topic areas, as in Chemistry International GCSE:

Principles of Chemistry

- States of matter
- Elements, compounds and mixtures
- Atomic structure
- Periodic Table
- Formulae and equations
- Ionic and covalent bonding

Inorganic Chemistry

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

Physical Chemistry

- Energetics
- Rates of reaction

Organic Chemistry

- Introduction
- Crude oil
- Alkanes
- Alkenes
- Polymers

Physics content of Science (Single Award)

There are 8 topic areas, as in Physics International GCSE:

**Forces and
motion**

Electricity

Waves

**Energy
resources and
energy
transfers**

**Solids, liquids
and gases**

**Magnetism
and electro-
magnetism**

**Radioactivity
and particles**

Astrophysics

Course planner

- The website has a course planner to help you plan the delivery of the new specifications
- There is also a mapping document showing clearly which specification statements are in
 - separate sciences
 - Double Award
 - Single Award

Schemes of work

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

WHEN YOU TEACH THE SPECIFICATION...

- ...will you teach over one year or two years?
- ...which order do you choose to teach the topics?
- The scheme of work can help you make these decisions

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD)

Practical skills



Practicals in the specification

- The specification includes embedded (core) practicals
- It also includes a list of experimental skills that students are expected to acquire
- Further suggestions for practical work appear in **Appendix 6** – in the specification
- Questions on exam papers test practical skills, rather than recall of specific techniques – so they may be in the context of any practical activity

Embedded practicals – Biology

Investigate...

- ...food samples for the presence of glucose, starch, protein and fat
- ...how enzyme activity can be affected by changes in temperature
- ... photosynthesis, showing the evolution of oxygen from a water plant, the production of starch and the requirements of light, carbon dioxide and chlorophyll
- ... the population size of an organism in two different areas using quadrats
- ... the role of anaerobic respiration by yeast in different conditions

Embedded practicals – Chemistry

- Investigate paper chromatography using inks/food colourings
- Determine the approximate percentage by volume of oxygen in air using a metal or a non-metal
- Investigate temperature changes accompanying some types of change (salts dissolving in water, neutralisation, displacement, combustion)
- Investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid

Embedded practicals – Physics

Investigate...

- ... the motion of everyday objects such as toy cars or tennis balls
- ... the refraction of light, using rectangular blocks, semi-circular blocks and triangular prisms
- ... the magnetic field pattern for a permanent bar magnet and between two bar magnets
- ... the penetration powers of different types of radiation using either radioactive sources or simulations

Embedded practicals

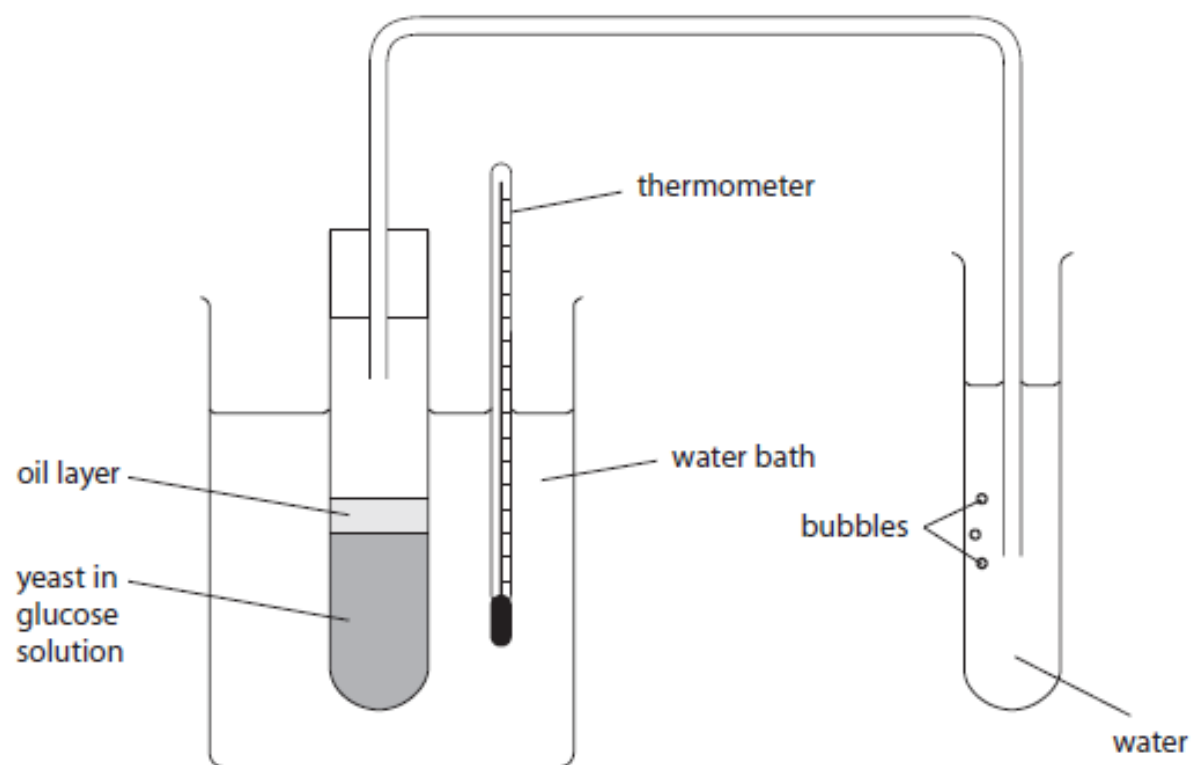
- do students have to do them?

- The simple answer is no - but it needs to be remembered that some examination questions assume that students have detailed knowledge of practical techniques
- There is evidence that students perform better in written examinations when they have had more direct experience of practical work
- Ideally, students would carry out all the embedded practicals, either individually, or in pairs, or in small groups
- If this is not possible, then less good alternatives would be teacher demonstrations, or watching suitable video clips

ACTIVITY - Biology

- 7 A student wants to investigate the effect of temperature on the rate of anaerobic respiration by yeast.

She set up this apparatus.

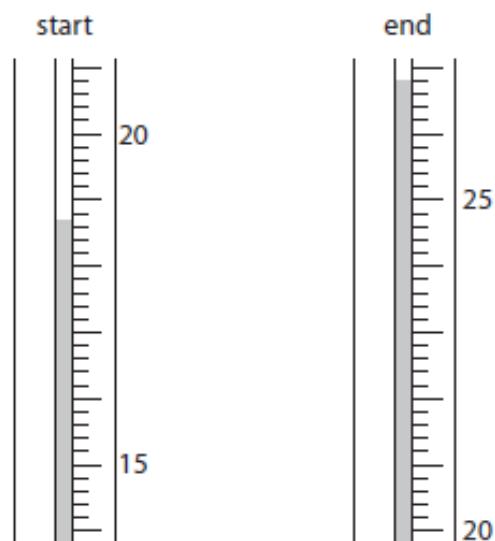


- (a) The oil layer prevents the entry of air into the glucose solution.

Explain why this is necessary.

ACTIVITY - Chemistry

- (a) The diagram shows the thermometer readings at the start and at the end of one experiment.



Complete the table to show:

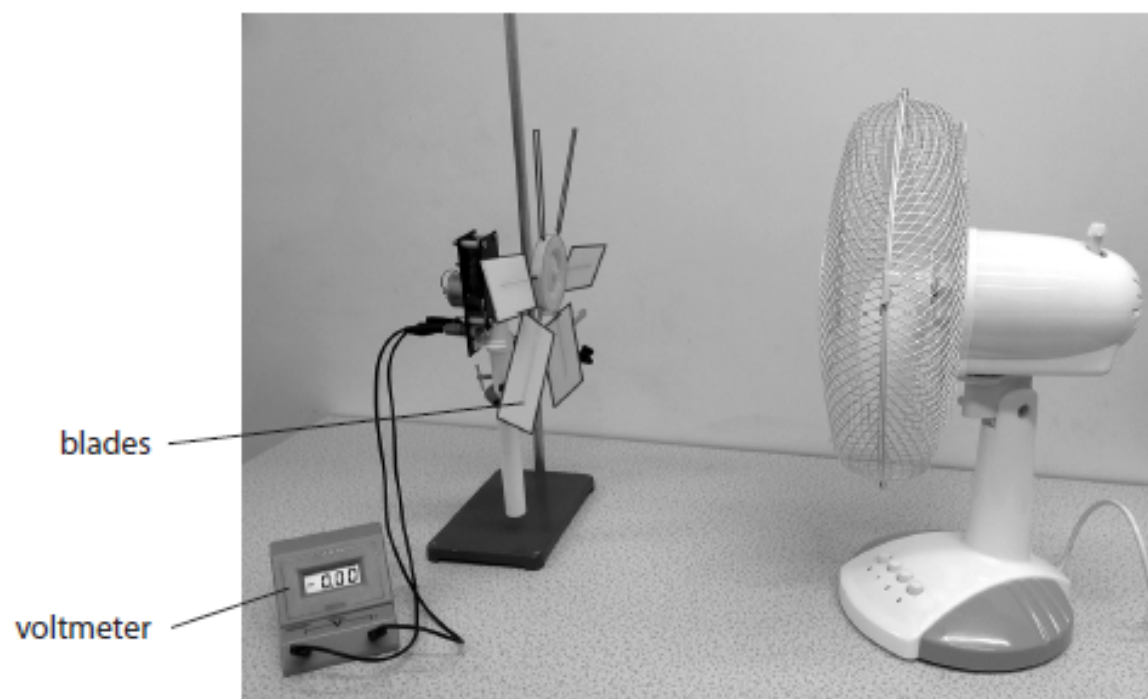
- the thermometer reading at the start of the experiment
- the temperature rise in the experiment.

(2)

thermometer reading at end / °C	26.8
thermometer reading at start / °C	
thermometer rise / °C	

ACTIVITY - Physics

- 8 A student investigates a wind turbine.
The student places an electric fan in front of the wind turbine.
The wind turbine is connected to a voltmeter.
When the wind turbine turns, it generates a voltage.



- (a) The student decides to investigate how the angle of the blades of the wind turbine affects the voltage it generates.

State **two** control variables for this investigation.

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

Definitions of practical terms

- There has been much confusion about the meanings of some scientific terms used in practical work
 - eg accuracy and precision are often confused
 - many do not understand the difference between reliability, repeatability and reproducibility
- At GCSE level it isn't always appropriate to make fine distinctions between all such terms
- The current definitions document will be revised to outline the meanings of the terms that we expect International GCSE science students to be familiar with

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD) 2017

Mathematical skills



Mathematical skills

- The development and use of relevant mathematical skills is important for progression in science subjects
- A list of mathematical skills that should be developed appears in **Appendix 4** of the specification (these are the same skills as for the reformed UK GCSEs)
- These skills will be tested in question papers within the context of the particular science
- Marks awarded for mathematical skills will be approximately 5% in Biology, 10% in Chemistry, 20% 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

Delivering maths skills

- Work with your Maths teachers to help prepare students
- For example, could your Maths teachers use some examples from Science papers to illustrate mathematical techniques?
- Practice different types of maths questions
- Don't forget to use the Guide to Maths Skills on the website!

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD) 2017

Assessment



Summary of assessment

FAMILIAR ...

100% external assessment – with no coursework

Linear assessment – all exams taken in the same exam session

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

Single tier of entry – no foundation or higher

... AND NEW

Questions using maths skills:
5% in Bio
15% in Chem
25% in Phys

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

Assessment objectives

A01

Knowledge and understanding of biology / chemistry / physics

~ 40%
of total marks

A02

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

~ 40%
of total marks

A03

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

~ 20%
of total marks

Assessment summary

Paper 1B

One hour and 10 minutes; 60 marks

Paper 1C

One hour and 10 minutes; 60 marks

Paper 1P

One hour and 10 minutes; 60 marks

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

Candidates sit a paper in
each of the three Sciences to
make up either the Single
Award or the Double Award

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD) 2017

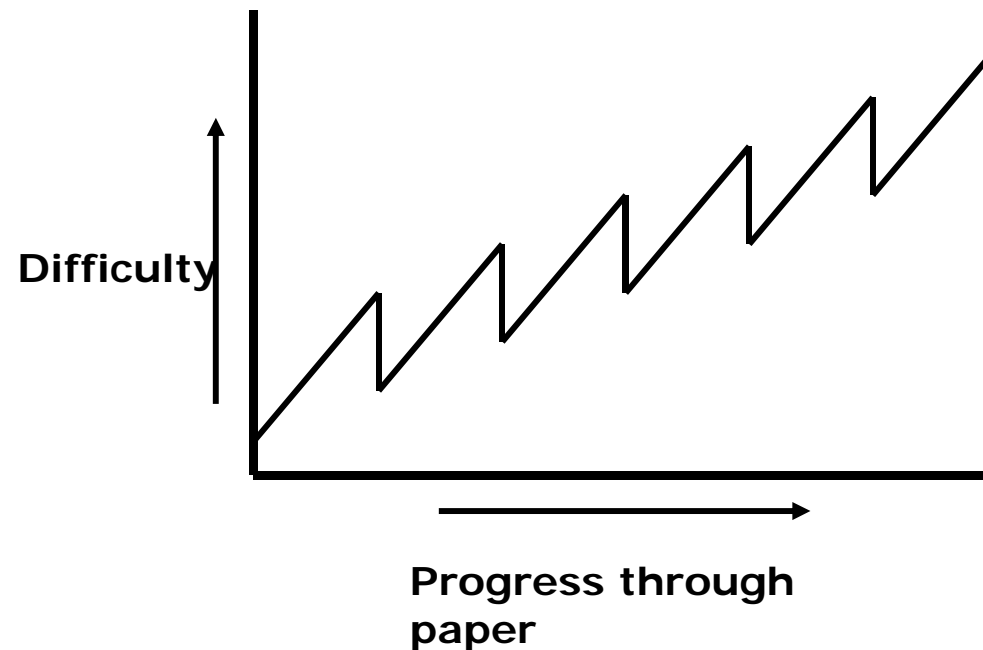
Examination papers and grading



An ideal incline of difficulty

Where possible:

- Increase in difficulty within each question
- Increase in difficulty from first question to last question



Exam question styles

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

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

The new 9-1 grading scale

- Broadly the same proportion of students will achieve a grade 4 and above as currently achieve a grade C and above
- Broadly the same proportion of students will achieve a grade 7 and above as currently achieve a grade A and A*
- The bottom of grade 1 will be aligned with the bottom of grade G

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

Source:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465873/your_qualification_our_regulation.pdf

Grade 9

- Originally intended to be “the top 20% of those scoring Grade 7”
- However, this way of finding Grade 9 has been changed, as this method is not fair on students in subjects with skewed distributions
- New method of working out Grade 9 for GCSE is:

Proportion of Grade 7 students who will be awarded Grade 9

$$= (\% \text{ of students who achieved Grade 7} \div 2) + 7\%$$

- A similar version is expected to be used for International GCSE

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD) 2017

Command words



Command words

- All our qualifications in science now use command words with a common meaning
- The list of command words used in external assessments appears in **Appendix 5** of the specification
- Students should expect to see many different command words in questions – they will reflect the range of demand in the exam paper
- The full list is reproduced in your pack

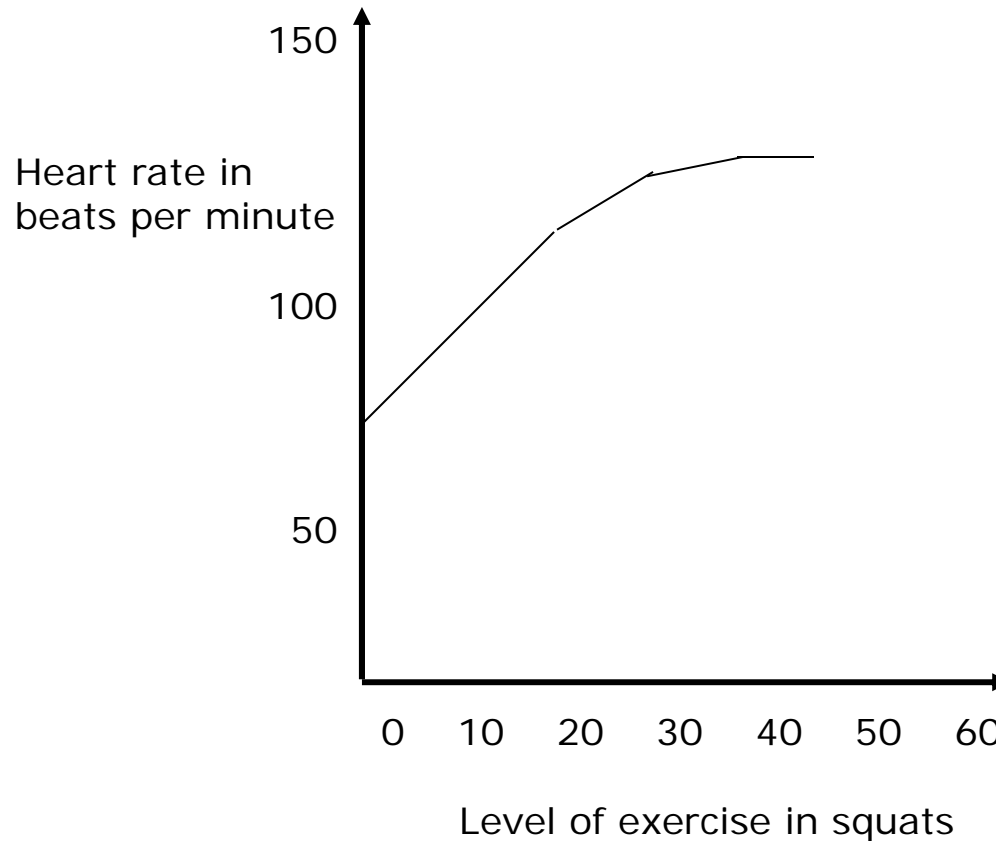
Command words – describe or explain?

These two command words are often used in questions, but sometimes students are not clear about the differences between them – look at what appears in Appendix 5

Note that dual commands are no longer used in questions – so ‘Explain’ may sometimes have the same meaning as ‘State and explain’

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. = ✓

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD) 2017

A closer look at the SAMs
(Sample Assessment Materials)



Question Styles

- Multiple choice
- Short, structured questions
- Graph plotting
- Data analysis
- Longer answers – points based marking
- Calculations

Sample question papers

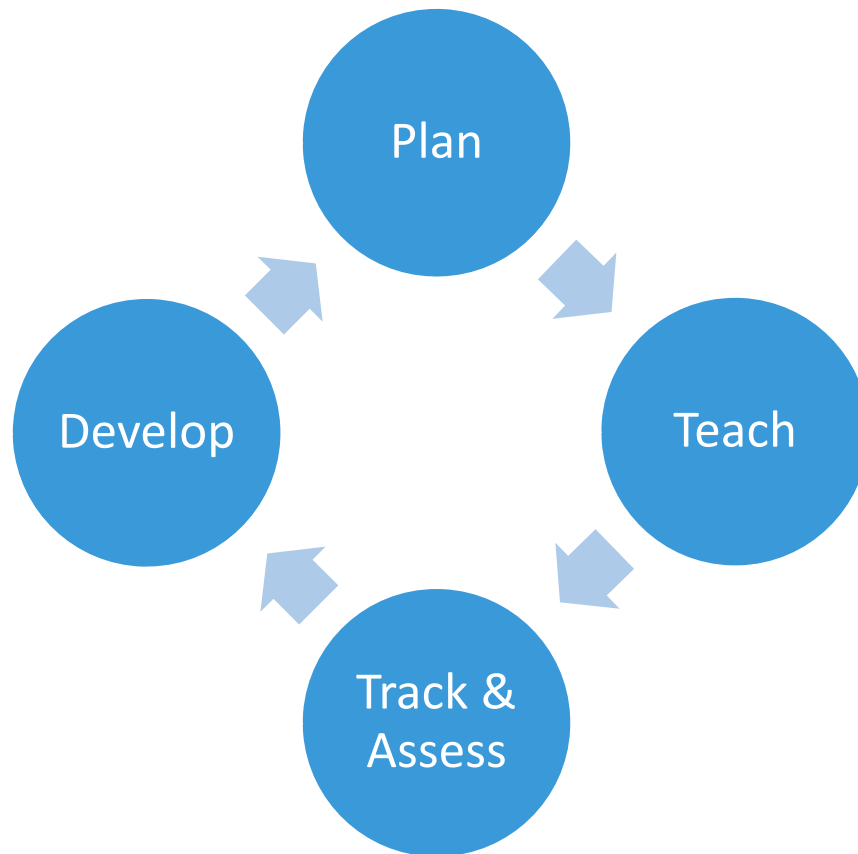
- You can all access the SAMs (including mark schemes) through the Pearson website
- A second set of SAMs papers is currently being written and should be available in April / May 2018

INTERNATIONAL GCSE SCIENCE (SINGLE AWARD) 2017

Support and published resources



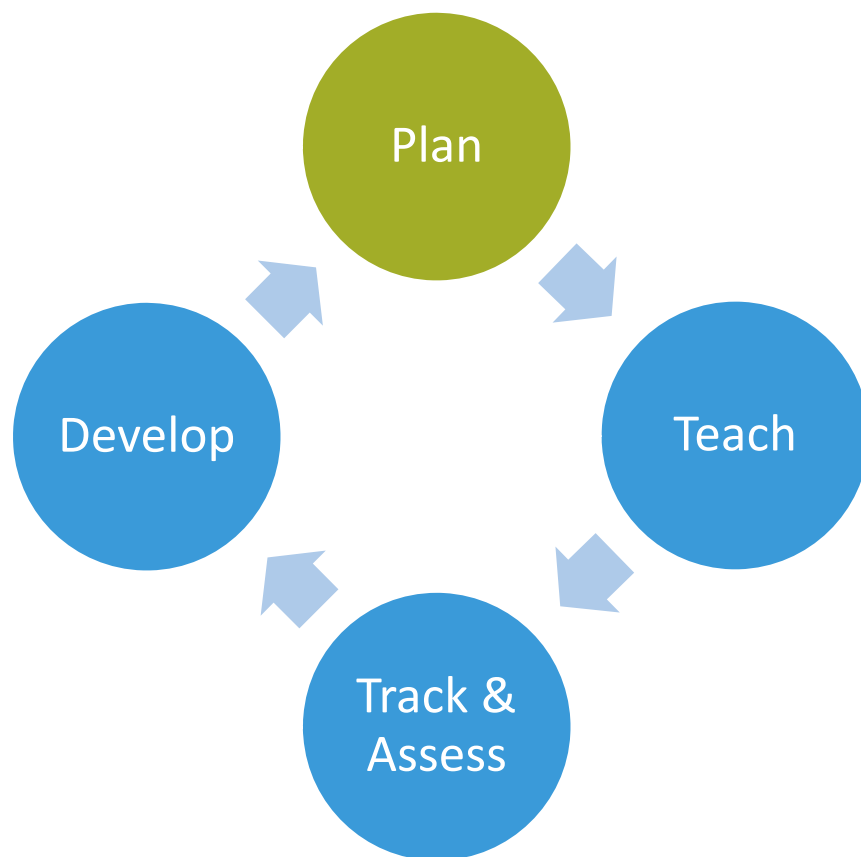
Supporting great science teaching



- We will provide a range of support to help you plan, teach, track and assess, and develop the new course.
- This includes free qualification support to download from our website as well as published resources*

* You do not have to purchase any resources to deliver our qualifications

Supporting great science teaching

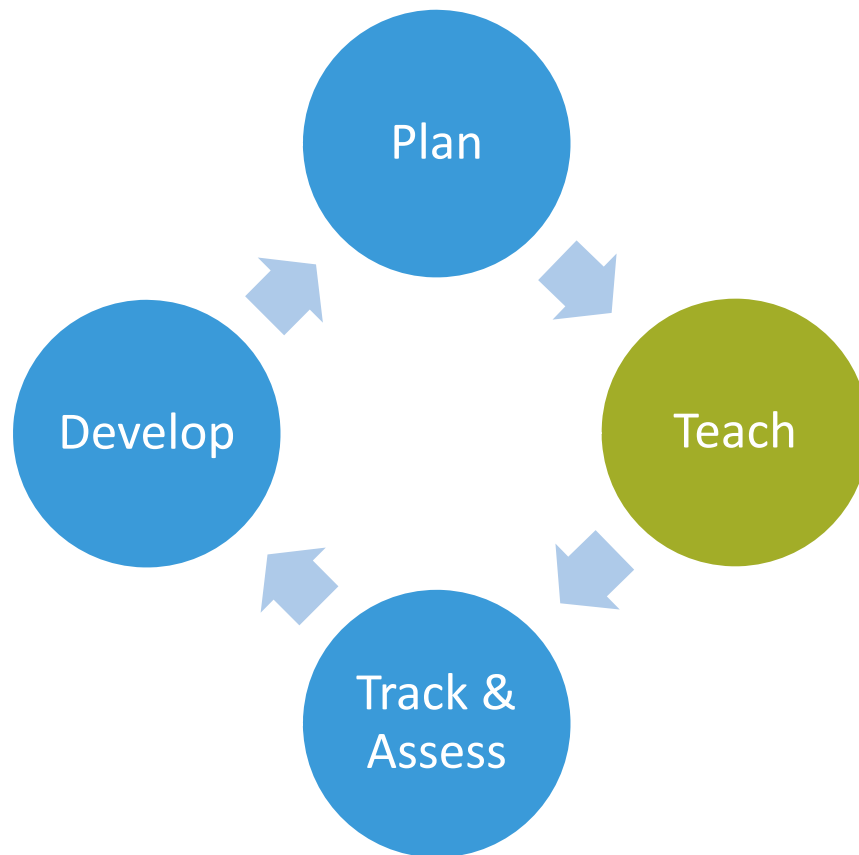


To help you plan the new course we are providing:

Free support for the qualification-

- Getting Started Guide
- Course planners / schemes of work
- Mapping documents

Supporting great science teaching



There will be teaching and learning support to help you deliver the new qualification:

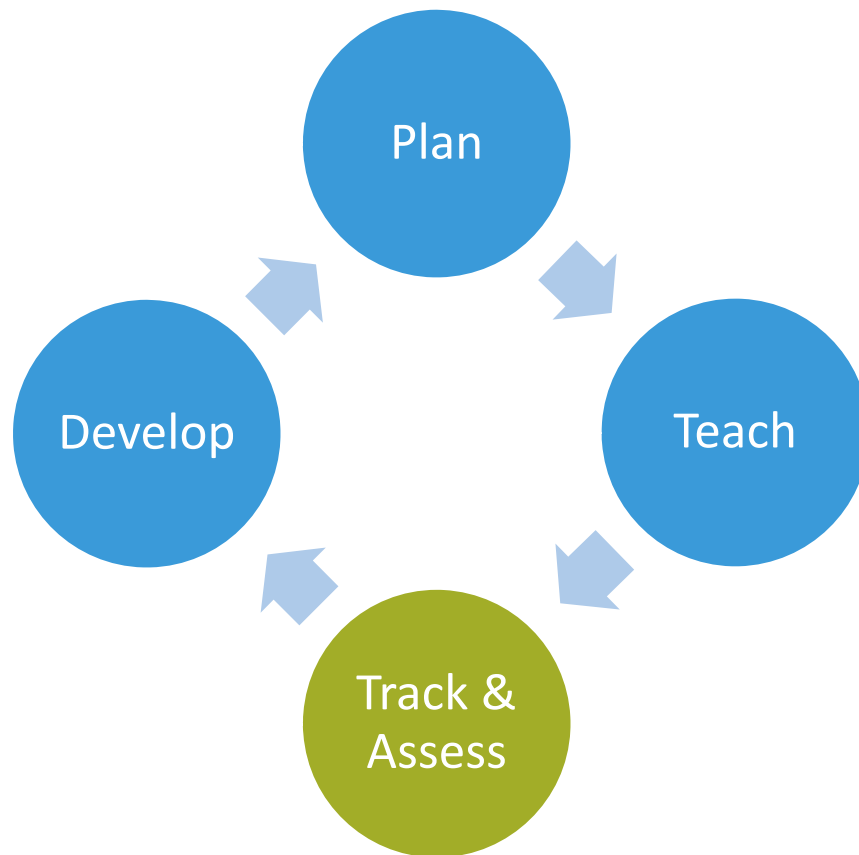
Free support for the qualification:

- Support for practical activities

Published resources from Pearson:

- Student book and ActiveBook (for Double Award)

Supporting great science teaching



To help you prepare your students for the assessments:

Free support for the qualification:

- Specimen papers to support formative assessment and mock exams
- ResultsPlus and ExamWizard

Published resources from Pearson:

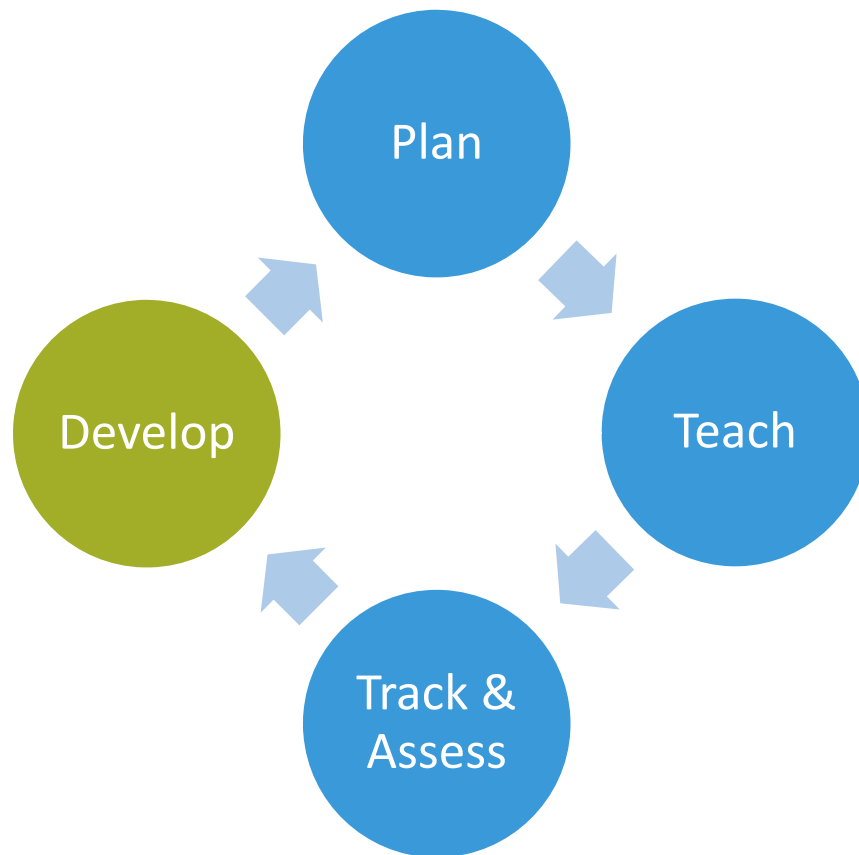
- Consideration is being given to a Revision Guide and Workbook

* You do not have to purchase any resources to deliver our qualification

ResultsPlus and ExamWizard

- **ResultsPlus** provides the most detailed analysis available of your students' exam performance. This free online service helps you identify topics and skills where students could benefit from further learning, helping them gain a deeper understanding.
- **ExamWizard** is a free exam preparation tool containing a bank of past Edexcel exam questions, mark schemes and examiners' reports, so you can create mock papers, homework or practice tests in minutes.

Supporting great science teaching



Our training programme includes:

- Launch events
- Getting Ready to Teach events

Our subject advisor team, led by **Stephen Nugus**, will guide you through all the changes and are on hand to answer any questions you might have.

TeachingScience@pearson.com

Published resources for sale 1

We are committed to helping teachers deliver our Edexcel qualifications and helping students to achieve their full potential.

To do this, we aim for our qualifications to be supported by a wide range of high-quality resources, produced by a range of publishers.

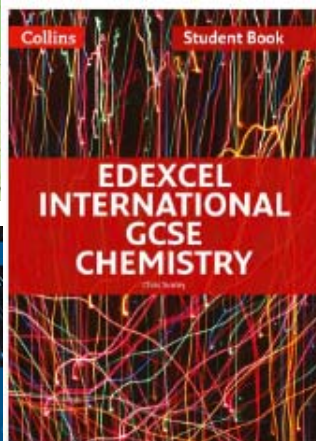
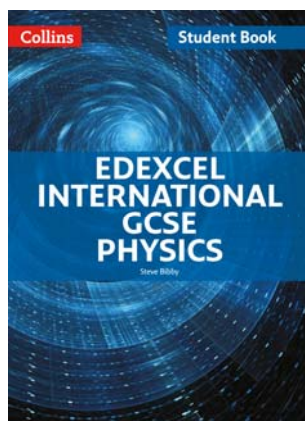
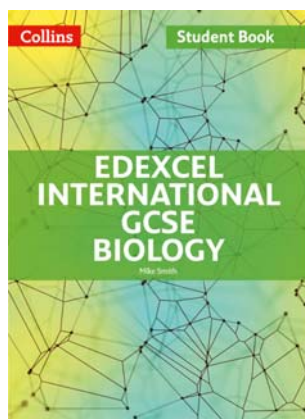
However, it is not necessary to purchase endorsed resources to deliver our qualifications.

Published resources for sale 2

- Four UK publishers are preparing resources, including Student Books, for the new International GCSE qualifications
- These are **Collins, Hodder, International GCSE Physics** and **Pearson**
- Note that published textbooks are for separate Sciences or, from Pearson, for Science (Double Award)
- The Student Books will be endorsed by Pearson/Edexcel – which means that they will have been checked for chemical accuracy and specification coverage

Published resources – Collins

www.collins.co.uk/category/International/Ages+14-16/Science/



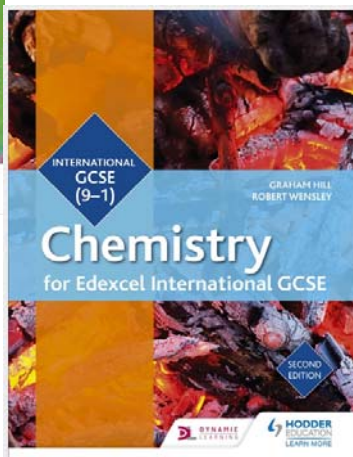
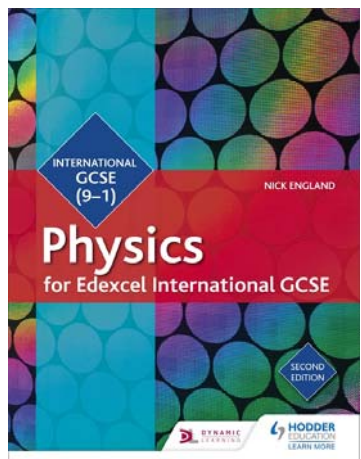
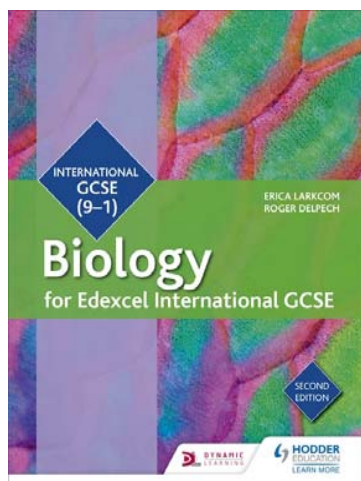
- **Student Book**
- **Teacher Pack**

The Collins Student Books allows you to co-teach Edexcel International GCSE separate sciences and Double Award Science

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

Published resources – Hodder

www.hoddereducation.co.uk/edexceligcse



- **Student Book – and as an eBook**

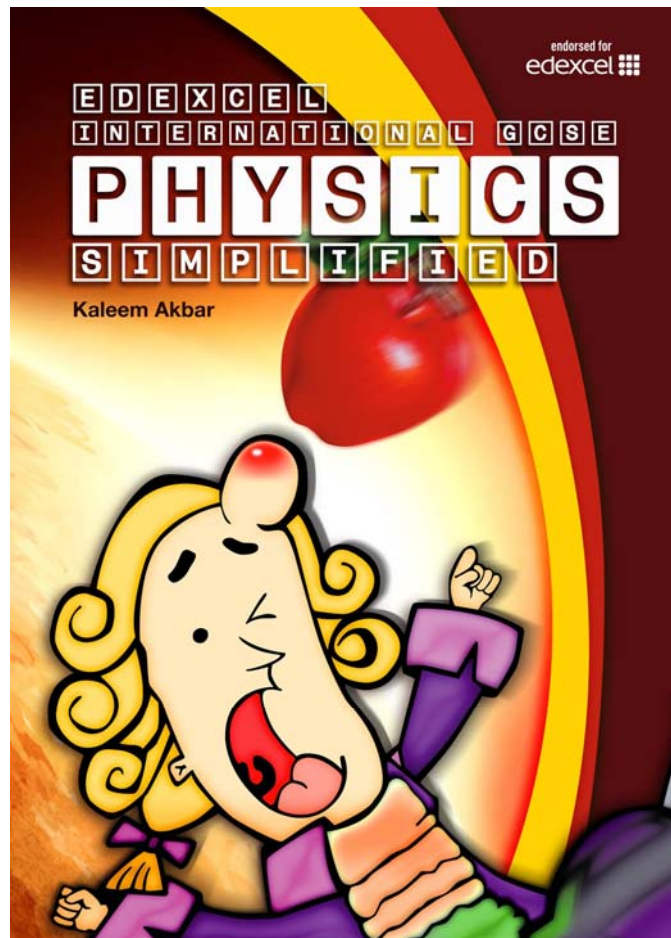
Provide your students with complete coverage of the new Edexcel International GCSE Science specifications with these affordable student books written by expert authors and teachers; testing knowledge and building practical skills throughout.

- **Workbook**

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 student books.

Published resources – International GCSE Physics

www.igcsephysics.com/edexcel/

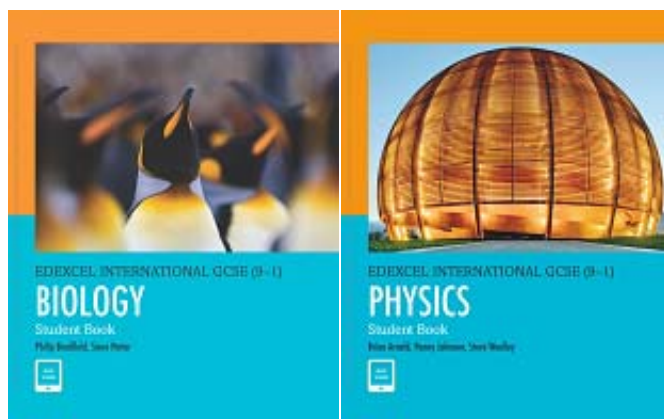


Edexcel International GCSE Physics Simplified provides everything students need as they prepare for their International GCSE examinations. It is written to take the mystery out of physics but to keep the magic in!

Straightforward language and a helpful glossary ensure that the book is accessible to all. Clear images aid understanding; worked example questions are provided throughout. National and international teaching experience of over a decade ideally places the author to understand the requirements of students both in the UK and abroad.

Published resources – Pearson

www.pearsonglobalschools.com/



- **Student Book**

These new resources, which include access to an eBook, have been developed for the new Edexcel International GCSE specifications with progression, international relevance and support at their core, and are designed to supply students with the best preparation possible for the examination.



- **Teacher Pack**

These new resources, available online, will include videos, worksheets, lesson plans and other support to help you deliver the International GCSE.

Free resources from the website:

- Specification
- Sample Assessment Materials (SAMs)
- Getting Started Guides
- Mapping documents
- Course planner and schemes of work
- Guides for maths and practical skills

The presentation is over –
any final questions?

