

# PEARSON EDEXCEL INTERNATIONAL

## GCSE (9-1)

### **Biology, Chemistry & Physics**

## **ONLINE MODULE 2**

### GETTING READY TO TEACH

Event code:

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First teaching in 2017, first assessment in 2019.

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# In this module, you will:

- Build on your understanding of these specifications developed in module 1 of this course.
- Consider how to deliver the practical elements of these specifications
- Consider key aspects of the ways in which ‘working scientifically’ skills are included and developed.
- Look at some of the support available from Pearson
- 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 practical

## Pearson Edexcel International GCSE

### Biology, Chemistry and Physics

# 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 form a basis for practical work, on which schools are encouraged to build
- ❖ Questions on exam papers test practical skills, rather than recall of specific techniques – so they may be in the context of any practical activity

# Core Practicals

- ❖ Each specification contains 12 - 14 practical activities embedded in the specification content
- ❖ 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 all of 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

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

4



# ACTIVITY 1 – Practical terminology

Define each of these terms



validity



anomaly



precision



accuracy



reliability

# 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...

# Looking at the SAMs

ACCURACY, PRECISION, RELIABILITY, VALIDITY

- ❖ Physics: did not appear in any questions
- ❖ Chemistry: one question uses “validity”  
one mark scheme uses “accuracy”
- ❖ Biology: one MCQ uses “reliability”  
one longer question uses “validity”

(b) The data shows the mean maximum lung volume at each age.

(i) Which of the following would improve the reliability of these mean values?

(1)

- ☐ **A** using a larger range of ages
- ☐ **B** measuring more people at each age
- ☐ **C** measuring lung volume in  $\text{cm}^3$
- ☐ **D** measuring lung volumes in other mammals

(c) A student wants to compare the transpiration rate of two weed species.

Describe how the student could measure the rate of water loss in order to make a valid comparison.

(5)

He repeats the method using the same amount, in moles, of different metals.

(a) To make the experiment valid, he starts with the copper(II) sulfate solution and the added metal at the same temperature.

State **two** other variables that must be controlled if the experiment is to be valid.

(2)

(a) A teacher advises the student to use a  $50 \text{ cm}^3$  burette instead of the  $10 \text{ cm}^3$  measuring cylinder.

Suggest **two** reasons why it would be better to use a burette instead of a measuring cylinder to add the acid in this experiment.

(2)

# Practical support guide

- ❖ Free to download from 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 laboratory
- ❖ A past paper question, where relevant, perhaps to use as a homework activity

# ACTIVITY 2 – using the Practical Guide

**Your pack contains an example of the Practical Guide for one of the Core Practicals.**

**What questions would you ask as the students did this practical?**

**How do these questions:**

- **help students understand the practical?**
- **prepare students for exam questions?**

# 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 questions in 2019

## Paper 1

(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)

## Paper 1B

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)

# Does CORMS work for other sciences?

- ❖ Biology questions are set in very general situations
- ❖ In Chemistry and Physics, questions tend to be in a familiar situation
- ❖ Chemistry and Physics questions tend, therefore, to require more specific experimental details e.g. apparatus used, measurements taken
- ❖ It is always worth addressing validity and reliability!

# Graphs

- ❖ Guidance is given in the document “Guidance on using practical terminology”
- ❖ Students are advised to draw graphs in pencil
- ❖ Draw graphs as large 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

## ACTIVITY 3 – example questions

**Your pack contains two example questions testing 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

- ❖ 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 these should not come as a surprise

# 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  
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](#)



**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**

- 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.

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**For more information on ATS, and the post results windows,**

# Further examination feedback

- ❖ Look out for our pre-recorded feedback sessions for International GCSE
- ❖ These provide feedback directly from the Principal Examiner on the summer exams
- ❖ Examiner reports are also provided on each subject website, along with question papers & mark schemes

# Contact your Subject Advisor

Your Science Subject Advisor team can be contacted through our website

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

Phone: **+44 (0)330 058 9493**

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



# Thank you

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