Pearson

Getting Ready to Teach International GCSE Chemistry

Your Trainer Today is: TRAINERS NAME

Welcome to this Professional Development Training

Designed for teachers teaching or who are looking to teach the Pearson Edexcel International GCSE Chemistry Specifications.

- To understand how the qualification is devised
- To review the content of the qualification
- To understand the assessment of the qualification
- To explore how to plan the course and/or lessons
- To understand the question types for the qualification
- To understand the Assessment Objectives for the qualification
- To practise using the mark schemes using exemplar student work
- To identify the support available from Pearson

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Welcome to Pearson

Welcome to Pearson Edexcel

We are the world's leading learning company and as the **UK's largest awarding organisation**, best placed to provide qualifications aligned to the British Educational System.

Our international **heritage stretches back over 150 years.**

Today, we partner with schools, universities and employers worldwide, offering world-class, globally-recognized qualifivations to over **3.5 million students a year**.

6,500

Trusted and recognized qualifications partner to 6,500 schools, colleges and employers globally.

10 million

We mark over 10 million exam scripts on behalf of the UK Department for Education each year.

70

We operate in 70 countries worldwide.

The Assessment Model

The assessment model

This tells us how we assess candidates.

Key features:

- The choice of Linear or Modular examinations
- No separate practical exam – practical skills are assessed on the papers
- Papers in both linear and modular have similar question styles
- **No tiering** of papers – both papers grade from 9–1

Linear Route Assessment

Assessments for all units are taken together in one exam series

Grades are calculated on raw marks

Students can re-sit assessments for all units together in one exam series

The grade students receive are calculated at the end of the exam series in which they sat their assessments

Specification Content

Principles of Chemistry	Inorganic Chemistry	Physical Chemistry	Organic Chemistry
(a) States of matter (b) Elements, compounds and mixtures (c) Atomic structure (d) The Periodic Table (e) Chemical formulae, equations and calculations (f) Ionic bonding (g) Covalent bonding (h) Metallic bonding (i) Electrolysis	(a) Group 1 (alkali metals) – lithium, sodium and potassium (b) Group 7 (halogens) – chlorine, bromine and iodine (c) Gases in the atmosphere (d) Reactivity series (e) Extraction and uses of metals (f) Acids, alkalis and titrations (g) Acids, bases and salt preparations (h) Chemical tests	(a) Energetics (b) Rates of reaction (c) Reversible reactions and equilibria	a) Introduction (b) Crude oil (c) Alkanes (d) Alkenes (e) Alcohols (f) Carboxylic acids (g) Esters (h) Synthetic polymers

Paper 1

2-hour written examination

The total number of marks is 110
61.1% of the total International GCSE

Content summary

Assesses core content that is NOT in bold and does not have a ‘ C ’ prefix

Questions may come from any topic area across the specification
Topic 1. Principles of chemistry
Topic 2. Inorganic chemistry
Topic 3. Physical chemistry
Topic 4. Organic chemistry

Paper 2

1-hour-15-minute written examination

The total number of marks is 70
38.9% of the total International GCSE

Content summary

Assesses all the content including content that is in bold and has a ‘C’ prefix

Questions may come from any topic area across the specification

Bold statements cover some topics in greater depth

Assessment of the Qualification

Specification Statements

Each topic and sub-topic contains several specification statements

For example:

(a)	**States of matter**
Students should:	
1.1	understand the three states of matter in terms of the arrangement, movement and energy of the particles
1.2	understand the interconversions between the three states of matter in terms of: • the names of the interconversions • how they are achieved • the changes in arrangement, movement and energy of the particles.
1.3	understand how the results of experiments involving the dilution of coloured solutions and diffusion of gases can be explained
1.4	know what is meant by the terms: • solvent • solute • solution • saturated solution.
1.5C	**know what is meant by the term solubility in the units g per 100 g of solvent**
1.6C	**understand how to plot and interpret solubility curves**
1.7C	***practical: investigate the solubility of a solid in water at a specific temperature***

Activity 1

Which specification statement is the following question assessing?

Malachite is an ore of copper containing copper(II) carbonate and several other compounds that are insoluble in water.

You are supplied with several pieces of malachite, these chemicals and items of apparatus.

Chemicals: dilute sulfuric acid magnesium powder

Apparatus: beakers filter funnel and paper pestle and mortar

Describe how you would use the chemicals and the apparatus to obtain a sample of copper from the malachite.

(6)

2.16 understand how metals can be arranged in a reactivity series based on their displacement reactions between:

- metals and aqueous solutions of metal salts.

Activity 2

Which specification statements are the following questions assessing?

7 Dinitrogen tetraoxide, N_2O_4, is a colourless gas.

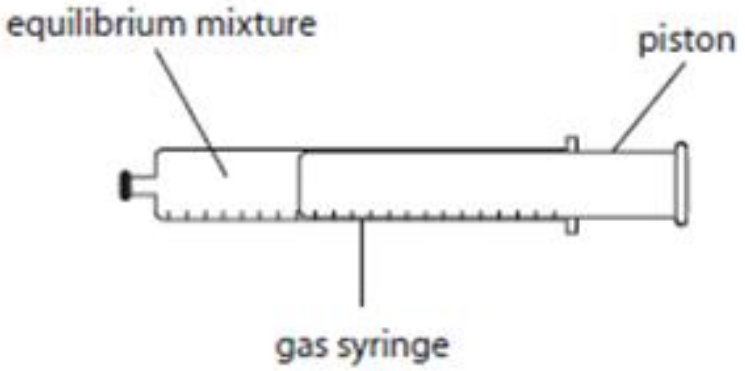
Nitrogen dioxide, NO_2, is a brown gas.

The two gases can exist together in dynamic equilibrium according to the equation

$$N_2O_4(g) \rightleftharpoons 2NO_2(g)$$

(a) Explain what is meant by the term **dynamic equilibrium**.

(b) Some N_2O_4 and some NO_2 are put into a sealed gas syringe and allowed to form an equilibrium mixture.



This equilibrium mixture is brown.

The pressure of the gas in the syringe is increased by pushing in the piston. The mixture is then allowed to reach a new equilibrium at the same temperature as before.

Explain why the new equilibrium mixture contains less NO_2 than the original equilibrium mixture.

Activity 2

(a) 3.20C know that the characteristics of a reaction at dynamic equilibrium are:

- the forward and reverse reactions occur at the same rate
- the concentrations of reactants and products remain constant

(b) 3.22C know the effect of changing either temperature or pressure on the position of equilibrium in a reversible reaction:

- an increase (or decrease) in pressure shifts the position of equilibrium in the direction that produces fewer (or more) moles of gas

Some common errors seen in answers

- Referring to intermolecular forces of attraction when discussing the properties of substances with giant covalent structures, ionic compounds and metals
- Stating that covalent bonds are weak, and therefore require little energy to break, when explaining why simple molecular substances have low melting/boiling points
- Losing marks when writing chemical equations by getting the formulae incorrect (e.g. H instead of H_2, MgCl instead of $MgCl_2$)

Some common errors seen in answers

- Referring to changes in (kinetic) energy of the particles when explaining the effect of surface area of a solid or concentration of a solution of the rate of reaction

- Providing contradicting information when explaining the effects of the change of a variable on the position of equilibrium of a reversible reaction

  E.g. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \quad \Delta H = -92\ kJ/mol$

- A decrease in temperature will increase the yield of ammonia as the equilibrium shifts in the endothermic direction

- Note that Le Chatelier's principle is not on the specification
- Mark schemes do not give credit for the idea that an equilibrium reaction "wants to resist a change" or "moves to oppose a change"

Activity 3

SiF_4 and $SiCl_4$ have simple molecular structures.

SiO_2 has a giant covalent structure.

(i) Explain why the boiling point of $SiCl_4$ is greater than the boiling point of SiF_4

(2)

(ii) Explain why the boiling point of SiO_2 is very much greater than the boiling point of $SiCl_4$

(2)

What are the essential points to include when answering these two questions?

Activity 3

Simple molecular	Giant covalent
Compound exists as simple molecules	The structure is a giant lattice, not molecular
Weak forces between molecules	Strong covalent bonds between atoms
Forces easily overcome – so low boiling point	Lots of energy needed to break the bonds – high boiling point
Stronger intermolecular forces lead to higher boiling point	There are no molecules, so no intermolecular forces

Assessment objectives

Assessment objectives and weightings

		International GCSE
AO1	Knowledge and understanding of chemistry	38–42%
AO2	Application of knowledge and understanding, analysis and evaluation of chemistry	38 42%
AO3	Experimental skills, analysis and evaluation of data and methods in chemistry	19–21%
		100%

Assessment objectives

Relationship of assessment objectives to units

Unit number	Assessment objective		
	AO1	AO2	AO3
Chemistry Paper 1	23.2–25.7%	23.2–25.7%	11.6–12.8%
Chemistry Paper 2	14.8–16.3%	14.8–16.3%	7.4–8.2%
Total for International GCSE	38–42%	38–42%	19–21%

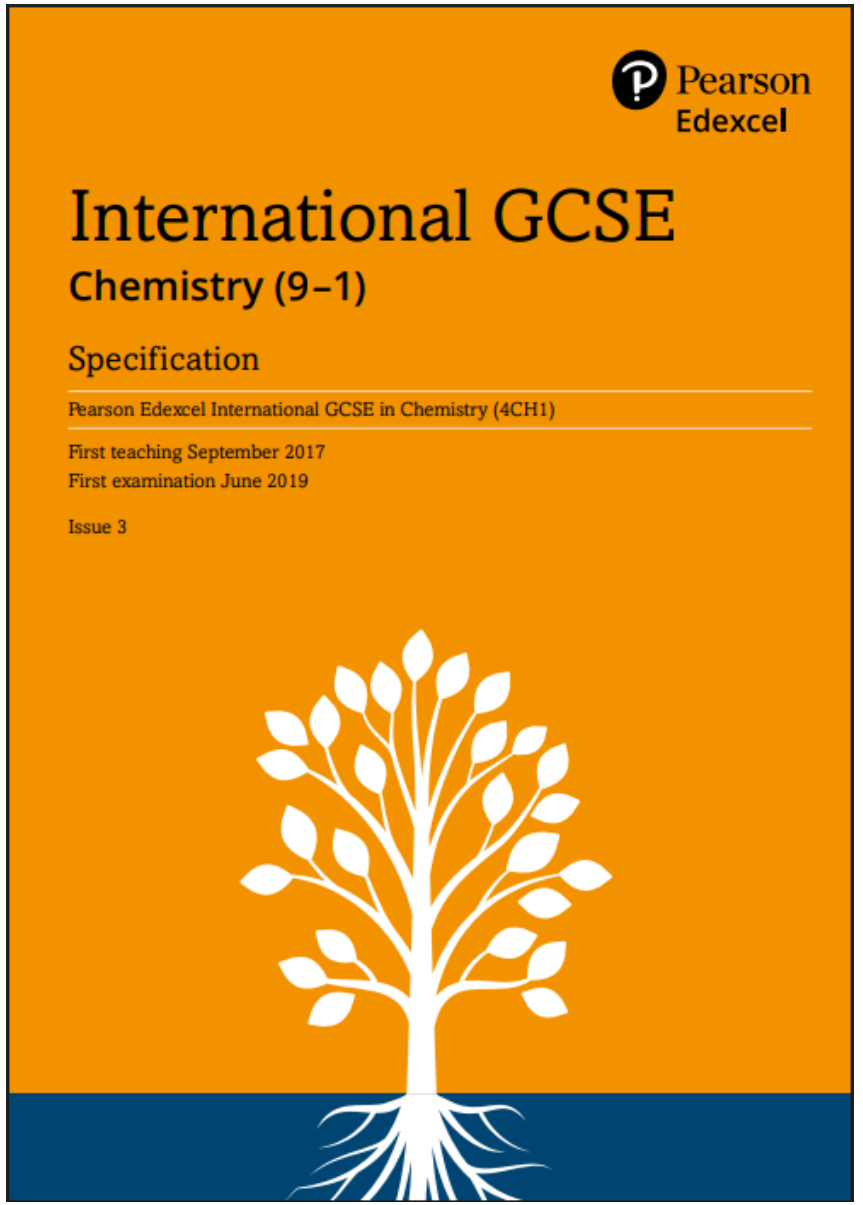
Planning the course

How do I make sure I cover the content?

- Specification
- Schemes of work
- Lesson plans

Key document

The key document needed to deliver the course is:



Example Scheme of Work

Lesson	Topic Sub topic	Specification reference	Suggested activities	Suggested resources	Which skills acquired in this lesson are explicitly assessed through examination?	Which skills could be acquired through teaching and delivery in this lesson?
1	**Section 1: Principles of chemistry** (a) States of matter	**Students will be able to:** 1.1 understand the three states of matter in terms of the arrangement, movement and energy of the particles 1.2 understand the interconversions between the three states of matter in terms of: • the names of the interconversions • how they are achieved • the changes in arrangement, movement and energy of the particles	Activities: • Model particle behaviour in the three states using trays of marbles; draw diagrams of the results. Demonstrations: • Phet Simulation – States of matter • Bromine diffusing into a gas jar of air. Class practicals: • Melting and freezing stearic acid	Pearson Edexcel International GCSE (9–1) Chemistry Student Book: pp.3–6 Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 1: States of matter Phet Simulation – States of matter Melting and freezing stearic acid teacher sheet	Analysis	Analysis Problem solving
2	**Section 1: Principles of chemistry** (a) States of matter	**Students will be able to:** 1.3 understand how the results of experiments involving the dilution of coloured solutions and diffusion of gases can be explained. 1.4 know what is meant by the terms: • solvent • solute • solution • saturated solution	Activities: • Match key terms to definitions. • Discussion about solutions holding different amounts of solute: tears, sea water and brine as three examples. Demonstrations: • Simple test tube comparison of solubility of three substances, e.g. potassium nitrate, sodium	Pearson Edexcel International GCSE (9–1) Chemistry Student Book: pp. 6–9 Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 2: Diffusion and solutions The effect of temperature on solubility teacher sheet	Reasoning Analysis Problem solving	Reasoning Adaptive learning Productivity Analysis Problem solving

Possible components of a lesson plan

While there are many formats for a lesson plan, most lesson plans contain some or all of these elements, typically in this order:

- Title of the lesson
- Time required to complete the lesson
- List of required materials
- List of objectives (what the student is expected to know by the end of the lesson)

Possible components of a lesson plan

- The ‘lead-in’ to the lesson that focuses students on the lesson‘s skills or concepts – this could include showing pictures or models, asking leading questions, or reviewing previous lessons

- An instructional component that describes the sequence of events that make up the lesson, including the teacher’s instructional input and, where appropriate, guided practice by students to consolidate new skills and ideas

- Independent practice that allows students to extend skills or knowledge on their own

Possible components of a lesson plan

- A summary, where the teacher wraps up the discussion and answers questions
- A risk assessment where the lesson's risks and the steps taken to minimise them are documented
- An analysis component the teacher uses to reflect on the lesson itself, such as what worked and what needs improving

Practicals in the specification

- The specification lists 12 Core practicals
- These are listed in italics as specification points

  E.g. 1.7C *practical: investigate the solubility of a solid in water at a specific temperature*

  2.43C *practical: prepare a sample of pure, dry lead(II) sulfate*

- It is strongly recommended that students complete these Core Practicals in order to develop skills

Practicals in the specification

- Other suggested practicals appear in the specification
- The suggested practicals are optional
- You may add – or substitute – your own practicals too!

Experimental skills

- The best way to develop experimental skills is to embed practical investigations in teaching or theory

- The development of knowledge and experimental skills can then happen together, leading to secure acquisition of both knowledge and skills

Experimental skills

In the assessment of experimental skills, students may be tested on their ability to:

- solve problems set in a practical context apply scientific knowledge and understanding in questions with a practical context
- devise and plan investigations, using scientific knowledge and understanding when selecting appropriate techniques
- demonstrate or describe appropriate experimental and investigative methods, including safe and skilful practical techniques

Experimental skills

In the assessment of experimental skills, students may be tested on their ability to:

- make observations and measurements with appropriate precision, record these methodically and present them in appropriate ways
- identify independent, dependent and control variables
- use scientific knowledge and understanding to analyse and interpret data to draw conclusions from experimental activities that are consistent with the evidence

Experimental skills

In the assessment of experimental skills, students may be tested on their ability to:

- communicate the findings from experimental activities, using appropriate technical language, relevant calculations and graphs
- assess the reliability of an experimental activity
- evaluate data and methods taking into account factors that affect accuracy and validity

Question Types

Question Types

The following question types will be set in both Papers 1 and 2

- Multiple choice with 4 alternative answers labelled **A**, **B**, **C** & **D**
- Short response with a mark range from 1 to 4
- Extended writing worth 5 or 6 marks
- Calculations

Questions assessing experimental skills will be set in both papers

Multiple Choice

Here is a typical multiple choice question

In 1937 an airship full of hydrogen gas flew from Germany to America.

(a) Which property of hydrogen makes it a suitable gas to use in an airship?

- ☒ **A** colourless
- ☒ **B** insoluble in water
- ☒ **C** low density
- ☒ **D** no smell

cross in box

line through cross in box

Short response

Here is a typical short response question

The ionic equation for the reaction between magnesium and hydrochloric acid is

$$Mg(s) + 2H^+(aq) \rightarrow Mg^{2+}(aq) + H_2(g)$$

Use the information in this equation, and the particle collision theory, to explain why the rate of reaction decreases during each of the experiments.

(3)

Extended response

Here is a typical extended response question

Malachite is an ore of copper containing copper(II) carbonate and several other compounds that are insoluble in water.

You are supplied with several pieces of malachite, these chemicals and items of apparatus.

Chemicals: dilute sulfuric acid magnesium powder

Apparatus: beakers filter funnel and paper pestle and mortar

Describe how you would use the chemicals and the apparatus to obtain a sample of copper from the malachite.

(6)

Calculations

Here is a typical calculation

The overall equation for the formation of hydrated copper(II) sulfate crystals from copper(II) oxide is

$$CuO(s) + H_2SO_4(aq) + 4H_2O(l) \rightarrow CuSO_4.5H_2O(s)$$

(i) In an experiment, a student completely reacts 9.54 g copper(II) oxide.

Show that the maximum possible mass of $CuSO_4.5H_2O$ crystals that can be obtained is about 30 g.

[M_r of CuO = 79.5 M_r of $CuSO_4.5H_2O$ = 249.5]

Give your answer to an appropriate number of significant figures. (3)

(ii) In this experiment, the actual yield of $CuSO_4.5H_2O$ crystals is 23.92 g.

Calculate the percentage yield of $CuSO_4.5H_2O$ (2)

Activity 4

What are the two essential points to include when answering the following question?

Hydrogen iodide can be manufactured from its elements using this reaction.

$$H_2(g) + I_2(g) \rightleftharpoons 2HI(g) \qquad \Delta H = -9 \text{ kJ/mol}$$

A temperature of 500 °C, a pressure of 4 atm and a platinum catalyst are used in this manufacturing process.

A manufacturer carries out this reaction using the same catalyst, a pressure of 4 atm, but a temperature of 400 °C.

State the effect of this change on the yield of hydrogen iodide.

Justify your answer.

(2)

Activity 4

For this reaction it is sufficient to say:

- A decrease in temperature increases the yield (1 mark)
- because the forward reaction is exothermic (1 mark)

N.B. Le Chatelier's Principle is not needed and should not be used

Activity 5

What are the five essential points to include in the answer to the following question?

Describe how a pure, dry sample of hydrated copper(II) sulfate crystals can

be obtained from a dilute aqueous solution of copper(II) sulfate.

(5)

Activity 5

- Heat/boil the filtrate (1)
- until crystals form in a cooled sample (1)
- Leave the solution to cool so that crystals form (1)
- Filter to remove the crystals (1)
- Dry the crystals on filter paper (1)

Assessment Objectives

Why do we have assessment objectives?

- Help make exams fairer year on year
- Provide structure for question paper writers
- Make sure that exams are about skills, not just about knowledge
- Can provide students with some reassurance about the types of questions they will be asked

Assessment objectives

AO1	AO2	AO3
Knowledge and understanding in chemistry	Application of knowledge and understanding, analysis and evaluation in chemistry	Experimental skills, analysis and evaluation of data and methods in chemistry

Assessment objectives

AO1	AO2	AO3
Questions requiring students to recall and use information that you have taught them	Questions requiring students to apply what you have taught them, or to use skills, or to analyse and make judgements	Questions on practical work and associated practical skills, such as planning, drawing graphs, analysing data, evaluating methods

Assessment objectives

AO1	AO2	AO3
≈40% of total marks	≈ 40% of total marks	≈ 20% of total marks

- Paper 1 and Paper 2 both have the same balance of AO1 : AO2 : AO3
- Compared to our previous specification, the new specification has less AO1 and more AO2

Typical AO1 questions

- Can be simple recall

OR

- can be based on understanding, not just knowledge

Typical AO2 questions

- Can involve simple ideas being applied to unfamiliar scenarios

OR

- can involve more complex scenarios involving data analysis or evaluation

Typical AO3 questions

- Questions based on practical experiences
- Not just Core Practicals, but any practical work!

3 Sodium chloride is a soluble salt.

(a) Name the acid and the alkali that can be used to make sodium chloride.

(2)

acid .....

alkali .....

(b) A teacher drops a bottle containing sodium chloride. The bottle breaks when it hits the floor. The teacher sweeps up the mixture of sodium chloride and glass.

Describe how the teacher can obtain a pure, dry sample of sodium chloride from the mixture.

(4)

ACTIVITY 6

ASSIGNING AOs

Assign an AO to each of the following

questions/part questions on slides 55 to 60

ACTIVITY 6

Assigning AOs

AOs in Multiple choice questions

A student does a flame test to see if a white solid contains lithium ions.

They clean a platinum wire before using it for the flame test.

What is the colour of the flame if the solid contains lithium ions?

- ☒ **A** lilac
- ☒ **B** orange
- ☒ **C** red
- ☒ **D** yellow

ACTIVITY 6

Assigning AOs

AOs in Multiple choice questions

Ammonium carbonate contains nitrogen.

What is the formula of ammonium carbonate?

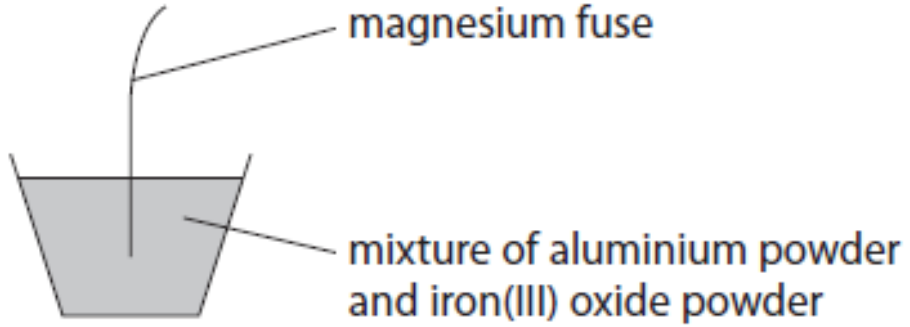
- ☐ **A** NH_3CO_3
- ☐ **B** $(NH_3)_2CO_3$
- ☐ **C** NH_4CO_3
- ☐ **D** $(NH_4)_2CO_3$

ACTIVITY 6

Assigning AOs

AOs in Structured Questions

The diagram shows the apparatus used to demonstrate the reaction between aluminium and iron(III) oxide.



When the magnesium fuse is lit, a very exothermic reaction occurs.

This is the equation for the reaction.

$$Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3$$

(i) State what is meant by the term **exothermic**.

(ii) State why aluminium displaces iron.

(iii) Explain why this reaction is a redox reaction.

ACTIVITY 6

Assigning AOs

AOs in Structured Questions

A student does a flame test to see if a white solid contains lithium ions.

They clean a platinum wire before using it for the flame test.

Explain why the student needs to clean the platinum wire.

Potassium aluminium sulfate is normally found as a hydrated salt, with the formula $KAl(SO_4)_2.xH_2O$

When 23.7 g of the hydrated salt is heated to remove all the water, 12.9 g of the anhydrous salt is formed.

Calculate the value of x.

[for $KAl(SO_4)_2$, $M_r = 258$ for H_2O, $M_r = 18$]

ACTIVITY 6

Assigning AOs

AOs in Structured Questions

A technician finds an unlabelled bottle on a shelf that could be ammonium carbonate solution.

Describe tests that the technician should do to confirm that the solution contains ammonium ions and carbonate ions.

(6)

ACTIVITY 6

Assigning AOs

AOs in Structured Questions

A teacher adds a small piece of sodium to a trough of water.

(i) Give two observations that are made when sodium reacts with water.

(ii) After the reaction has stopped, the teacher adds a few drops of phenolphthalein to the solution in the trough.

Explain the colour of the phenolphthalein after it is added to the solution.

Command words

- Questions in our exam papers are designed to use a specific command word to guide students

- The command words represent a range of skills:
  - simple recall (Give…., Name….)
  - using knowledge (Describe…)
  - giving reasons (Explain…)
  - provide more detailed analysis (Evaluate, Justify)
  - show particular skills (Calculate…., Plot….)

- Is there a link between command words and AOs?

Assigning Command Words to AOs

AO1	AO2	AO3
Add/Label	Calculate	Deduce
Describe	Identify	Design
Explain	Deduce	Draw
Give/State/Name	Determine	Estimate
Give a reason	Predict	Evaluate
	Suggest	Plot
	Write (an equation)	

AO2 Questions and Mark Schemes

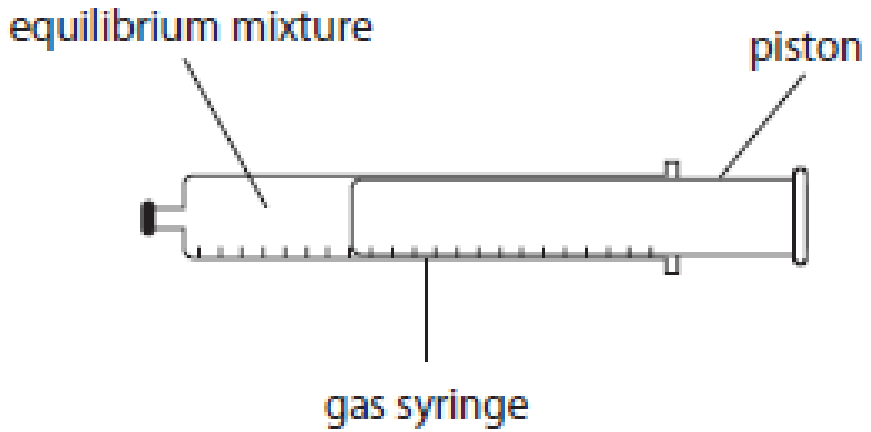
Why not look at AO1?

- AO1 is all about knowledge – and basic understanding
- This is not one that teachers can influence much…
- … students either go away and learn what you teach them or they do not!
- **BUT**… remember that students should still recognise AO1 questions and not spend time going beyond AO1

What is AO2?

Application of knowledge to unfamiliar situations

(b) Some N_2O_4 and some NO_2 are put into a sealed gas syringe and allowed to form an equilibrium mixture.



This equilibrium mixture is brown.

(i) The pressure of the gas in the syringe is increased by pushing in the piston. The mixture is then allowed to reach a new equilibrium at the same temperature as before.

Explain why the new equilibrium mixture contains less NO_2 than the original equilibrium mixture.

(2)

What is AO2?

Calculations

9 Halon 1301 is a compound used in some fire extinguishers.

Halon 1301 has the percentage composition by mass of

C 8.05% Br 53.69% F 38.26%

(a) Show, by calculation, that the empirical formula of this compound is $CBrF_3$

(2)

What is AO2?

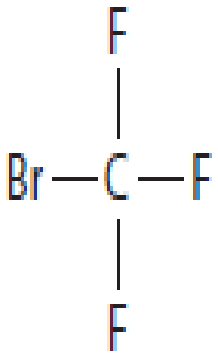
Equations

(ii) Write a chemical equation for the complete combustion of ethanol in air. (2)

What is AO2?

Unfamiliar dot-and-cross diagrams

(b) The diagram shows the displayed formula of a molecule of Halon 1301.



Draw a dot-and-cross diagram to show all the outer electrons in this molecule.

(2)

ACTIVITY 7 AO2 in exams

Use the mark schemes shown on screen to mark the student responses on slides 70 to 84

We will go through each question one at a time

ACTIVITY 7

AO2 in exams

Nitrogen dioxide produced in car engines reacts with water vapour and oxygen in the atmosphere to form nitric acid.

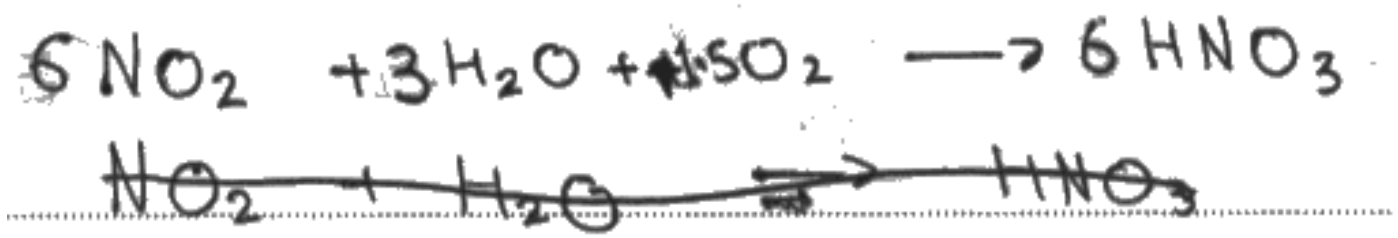
Give a chemical equation for this reaction. (2)

Answer	Notes
$4NO_2 + 2H_2O + O_2 \rightarrow 4HNO_3$ M1 all formulae correct M2 balancing of correct formulae	ALLOW multiples and fractions IGNORE state symbols even if incorrect M2 dep on M1

ACTIVITY 7

AO2 in exams

Student 1



Answer	Notes
$4NO_2 + 2H_2O + O_2 \rightarrow 4HNO_3$ M1 all formulae correct M2 balancing of correct formulae	ALLOW multiples and fractions IGNORE state symbols even if incorrect M2 dep on M1

ACTIVITY 7

AO2 in exams

Student 2

4

$4NO_{2\,(g)} + 2H_2O_{(g)} + O_{2\,(g)} \rightarrow 4HNO_{3\,(aq)}$

Answer	Notes
$4NO_2 + 2H_2O + O_2 \rightarrow 4HNO_3$ M1 all formulae correct M2 balancing of correct formulae	ALLOW multiples and fractions IGNORE state symbols even if incorrect M2 dep on M1

ACTIVITY 7

AO2 in exams

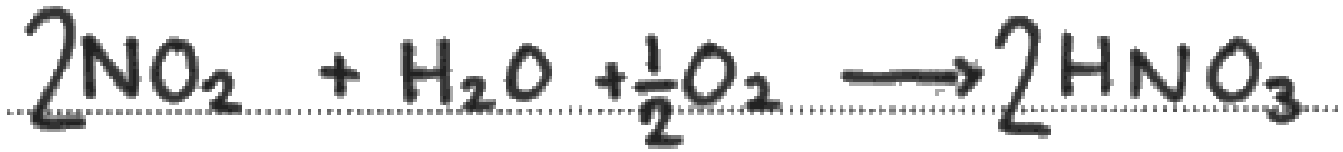
Student 3

Answer	Notes
$4NO_2 + 2H_2O + O_2 \rightarrow 4HNO_3$ M1 all formulae correct M2 balancing of correct formulae	ALLOW multiples and fractions IGNORE state symbols even if incorrect M2 dep on M1

ACTIVITY 7

AO2 in exams

Student 4



Answer	Notes
$4NO_2 + 2H_2O + O_2 \rightarrow 4HNO_3$ M1 all formulae correct M2 balancing of correct formulae	ALLOW multiples and fractions IGNORE state symbols even if incorrect M2 dep on M1

ACTIVITY 7 AO2 in exams

Describe a test for chlorine. (2)

Answer	Notes
A description that refers to the following two points M1 (use damp blue) litmus paper M2 (litmus paper) bleached/turns white Ignore gas/solution	ALLOW universal indicator paper ACCEPT blue litmus paper turns red and then bleached IGNORE gas/solution ALLOW M1 bromide solution M2 turns brown REJECT iodide solution M2 dep on M1 Red litmus paper turns blue then bleaches/turns white scores M1 only

ACTIVITY 7

AO2 in exams

Student 1

Using damp red litmus paper, putting it in presence to chlorine (will bleach) (turn it white).

Answer	Notes
A description that refers to the following two points M1 (use damp blue) litmus paper M2 (litmus paper) bleached/turns white Ignore gas/solution	ALLOW universal indicator paper ACCEPT blue litmus paper turns red and then bleached IGNORE gas/solution ALLOW M1 bromide solution M2 turns brown REJECT iodide solution M2 dep on M1 Red litmus paper turns blue then bleaches/turns white scores M1 only

ACTIVITY 7

AO2 in exams

Student 2

damp red litmus paper → result turn blue then bleaches.

Answer	Notes
A description that refers to the following two points M1 (use damp blue) litmus paper M2 (litmus paper) bleached/turns white Ignore gas/solution	ALLOW universal indicator paper ACCEPT blue litmus paper turns red and then bleached IGNORE gas/solution ALLOW M1 bromide solution M2 turns brown REJECT iodide solution M2 dep on M1 Red litmus paper turns blue then bleaches/turns white scores M1 only

ACTIVITY 7

AO2 in exams

Student 3

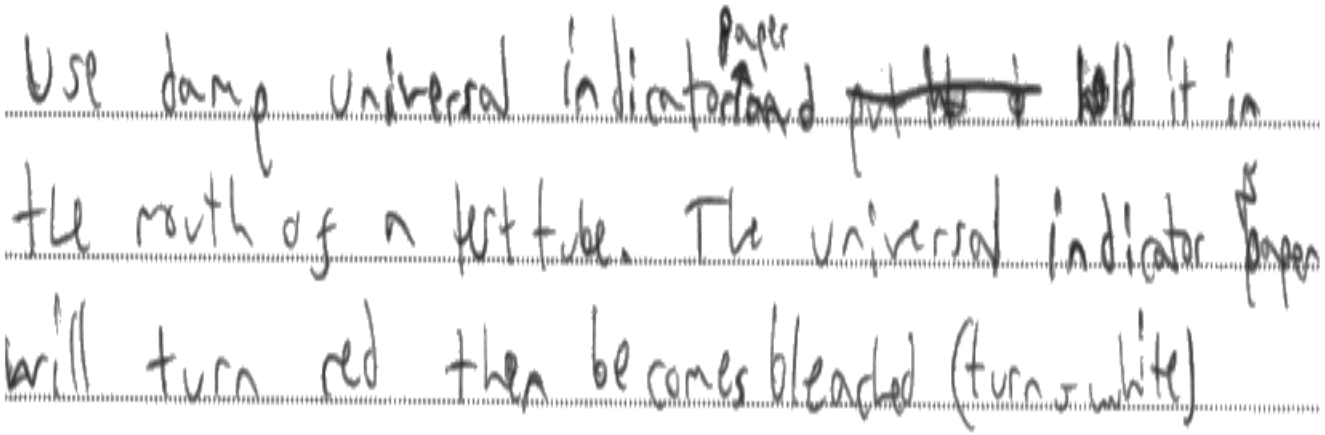
Bleaches damp litmus paper (turns it white)

Answer	Notes
A description that refers to the following two points M1 (use damp blue) litmus paper M2 (litmus paper) bleached/turns white Ignore gas/solution	ALLOW universal indicator paper ACCEPT blue litmus paper turns red and then bleached IGNORE gas/solution ALLOW M1 bromide solution M2 turns brown REJECT iodide solution M2 dep on M1 Red litmus paper turns blue then bleaches/turns white scores M1 only

ACTIVITY 7

AO2 in exams

Student 4



Answer	Notes
A description that refers to the following two points M1 (use damp blue) litmus paper M2 (litmus paper) bleached/turns white Ignore gas/solution	ALLOW universal indicator paper ACCEPT blue litmus paper turns red and then bleached IGNORE gas/solution ALLOW M1 bromide solution M2 turns brown REJECT iodide solution M2 dep on M1 Red litmus paper turns blue then bleaches/turns white scores M1 only

ACTIVITY 7 AO2 in exams

A sample of element Z contains three isotopes. The table shows the numbers of particles in the nucleus of each isotope and the percentage abundance of each isotope.

Isotope	Number of protons	Number of neutrons	Percentage abundance
1	12	12	79.0
2	12	13	10.0
3	12	14	11.0

Use the information in the table to calculate the relative atomic mass (A_r) of element Z.

Give your answer to one decimal place.

(4)

Answer	Notes
M1 (isotopic masses) 24, 25 and 26	
M2 $79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26$ **OR** 2432	**M2** subsumes **M1** **ALLOW** ecf if incorrect mass numbers used 12.3 scores 3 with working
M3 $\frac{79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26}{100}$ **OR** $\frac{2432}{100}$ **OR** 24.32	24.3 without working scores 4
M4 24.3	24.32 without working scores 3 M4 scores only if numbers from the table are used.

ACTIVITY 7

AO2 in exams

Student 1

$12+12=24$

$12+13=25$

$12+14=26$

$(24\times 0.79)+(25\times 0.1)+(26\times 0.11)$

$= 2432$

$A_r = 24.3$

Answer	Notes
M1 (isotopic masses) 24, 25 and 26 **M2** $79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26$ **OR** 2432 **M3** $\frac{79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26}{100}$ **OR** $\frac{2432}{100}$ **OR** 24.32 **M4** 24.3	**M2** subsumes **M1** **ALLOW** ecf if incorrect mass numbers used 12.3 scores 3 with working 24.3 without working scores 4 24.32 without working scores 3 M4 scores only if numbers from the table are used.

ACTIVITY 7

AO2 in exams

Student 2

$$\frac{(12 \times 79) + (13 \times 10) + (14 \times 11)}{100}$$

$A_r = 12.3$

Answer	Notes
M1 (isotopic masses) 24, 25 and 26 **M2** 79.0 × 24 + 10.0 × 25 + 11.0 × 26 OR 2432 **M3** $\frac{79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26}{100}$ OR $\frac{2432}{100}$ OR 24.32 **M4** 24.3	**M2** subsumes **M1** **ALLOW** ecf if incorrect mass numbers used 12.3 scores 3 with working 24.3 without working scores 4 24.32 without working scores 3 M4 scores only if numbers from the table are used.

ACTIVITY 7

AO2 in exams

Student 3

$A_r = 24.32$

Answer	Notes
M1 (isotopic masses) 24, 25 and 26 M2 $79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26$ OR 2432 M3 $\frac{79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26}{100}$ OR $\frac{2432}{100}$ OR 24.32 M4 24.3	M2 subsumes M1 ALLOW ecf if incorrect mass numbers used 12.3 scores 3 with working 24.3 without working scores 4 24.32 without working scores 3 M4 scores only if numbers from the table are used.

ACTIVITY 7

AO2 in exams

Student 4

$A_r =$ 24

Answer	Notes
M1 (isotopic masses) 24, 25 and 26 M2 $79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26$ OR 2432 M3 $\frac{79.0 \times 24 + 10.0 \times 25 + 11.0 \times 26}{100}$ OR $\frac{2432}{100}$ OR 24.32 M4 24.3	M2 subsumes M1 ALLOW ecf if incorrect mass numbers used 12.3 scores 3 with working 24.3 without working scores 4 24.32 without working scores 3 M4 scores only if numbers from the table are used.

Preparing students for AO2

Teaching approaches:

Is it better to present facts or to teach principles? Why?

Questioning styles:

Is it better to ask closed or open questions? Why?

Assessment activities:

Is it better to set formative or summative assessments? Why?

Exam preparation:

What else could you do to prepare your students to answer the AO2 exam questions?

AO2

Question styles

- Think about one of the topics that you teach which often has AO2 questions in exams.
- What sorts of questions do you ask in class when teaching this topic?
- How do these questions help students to prepare for AO2 questions?

AO2

Homework activities

- Why do you set homework?
- What sort of questions/problems do you set?
- What do you expect students to gain from the questions that you set?
- Will what they gain help them to answer AO2 questions?

AO3 Questions and Mark Schemes

What is AO3?

- AO3 assesses the practical skills and understanding gained by students as they undertake practical work
- AO3 questions may require RECALL of practical techniques and understanding or APPLICATION of these to new situations
- AO3 may also involve the use of experimental data, and the evaluation of experimental methods or results

AO3: Recall of a Practical Technique

(e) Describe how the student could obtain a pure, dry sample of hydrated copper(II) sulfate crystals from the filtrate in stage 6.

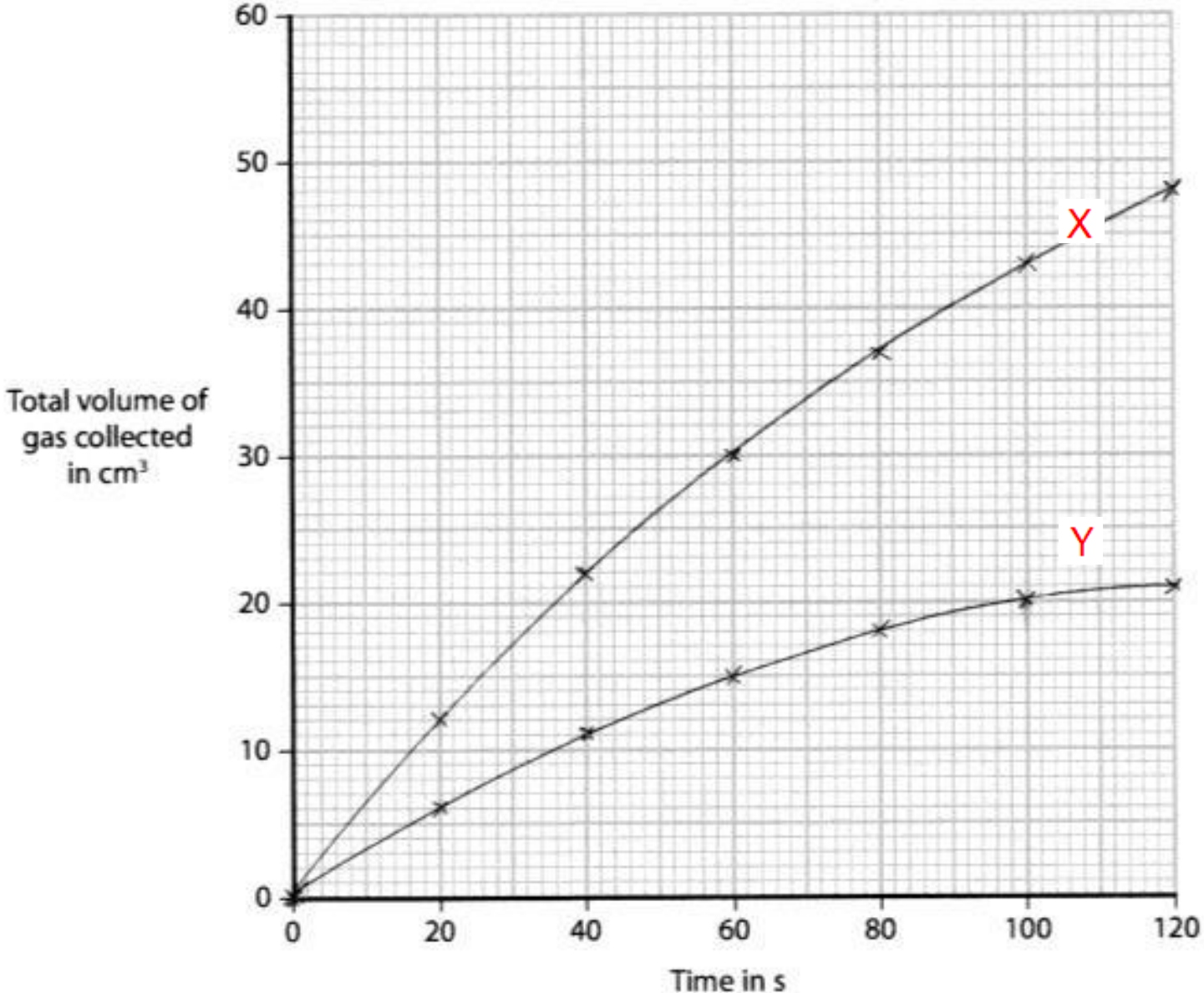
(5)

AO3: Analysis of results – graph

The graph on the next slide shows the results of reacting two different acids, X and Y, with the same mass of magnesium ribbon and at the same temperature

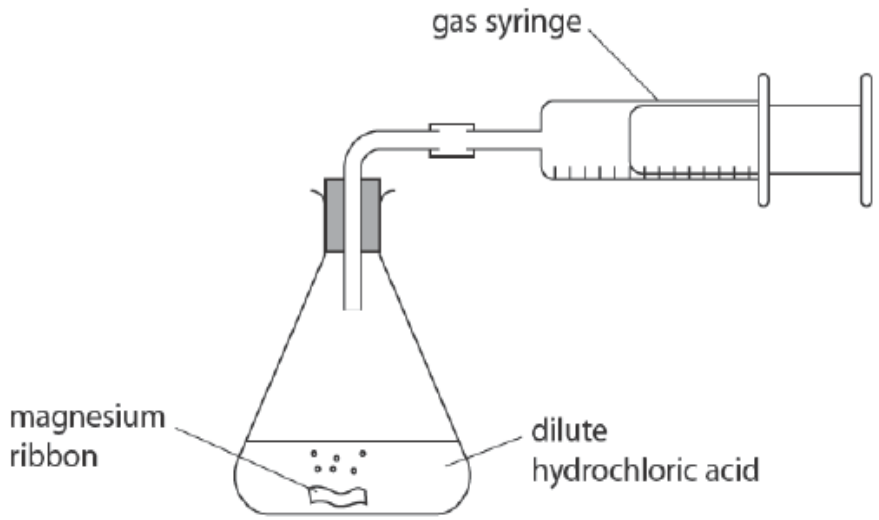
Explain how the curves show which acid has the greater concentration of hydrogen ions

AO3: Analysis of results – graph



AO3: Evaluation of methods

13 A student uses this apparatus to investigate the rate of reaction between magnesium and an **excess** of dilute hydrochloric acid.



She uses this method.

- use a graduated beaker to pour 50 cm^3 of dilute hydrochloric acid of concentration 2.00 mol/dm^3 into the conical flask
- add a piece of magnesium ribbon of mass 0.086 g to the acid and put the bung into the neck of the flask
- measure the total volume of gas collected every ten seconds until the reaction stops

(c) The expected volume of gas produced in the first experiment is 86 cm^3.

Suggest why the volume collected is less than the expected volume.

(1)

(d) The student uses a graduated beaker to measure the volume of dilute hydrochloric acid.

Explain why it is **not** necessary to use a measuring cylinder in this experiment.

(2)

AO3: Evaluation of methods – Examiner's report

Question 13 (c)

This question was poorly answered by the majority of candidates.

Many said that gas escapes or is lost, but very few of these went on to say why it escapes, so this was insufficient to be awarded the mark.

Some said that the magnesium did not fully react, which was not creditworthy because as the acid is in excess there is no reason why the magnesium would stop reacting.

Question 13 (d)

This question was not particularly well answered.

Many talked about an accurate measurement not being required but failed to mention that this was because the acid was in excess.

As the second marking point was dependent on the first, answers such as these could not be awarded any marks.

AO3: Use of data

(c) The table shows the results of experiments done by four students, A, B, C and D.

Alcohol	Formula of alcohol	Time taken for liquid to evaporate in s				
		Student A	Student B	Student C	Student D	Mean time in s
methanol	CH_3OH	20	24	22	26	23
ethanol	C_2H_5OH	32	34	35	30	33
propanol	C_3H_7OH	45	47	50	48	48
butanol	C_4H_9OH	64	63	90	60	

(ii) Explain how the results show which alcohol evaporates most easily.

(2)

AO3: Use of data – Examiner's report

Question 3 (c) (ii)

Most candidates identified that methanol was the alcohol that evaporates most easily and gained the first mark.

The question asked for an explanation for this from the results, and as the results in the table were values of times, the required explanation needed to refer to methanol taking the shortest time.

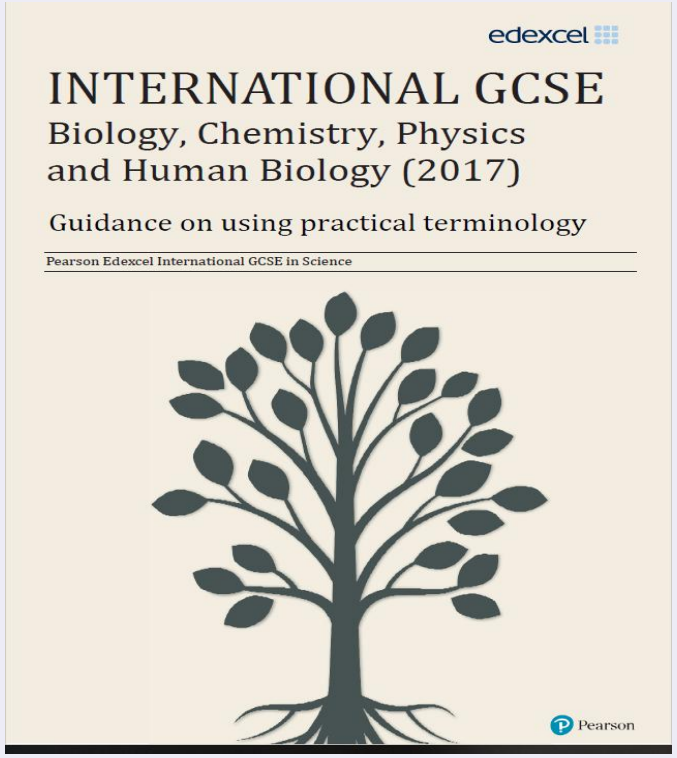
Teaching AO3: Terminology

validity

anomaly

precision

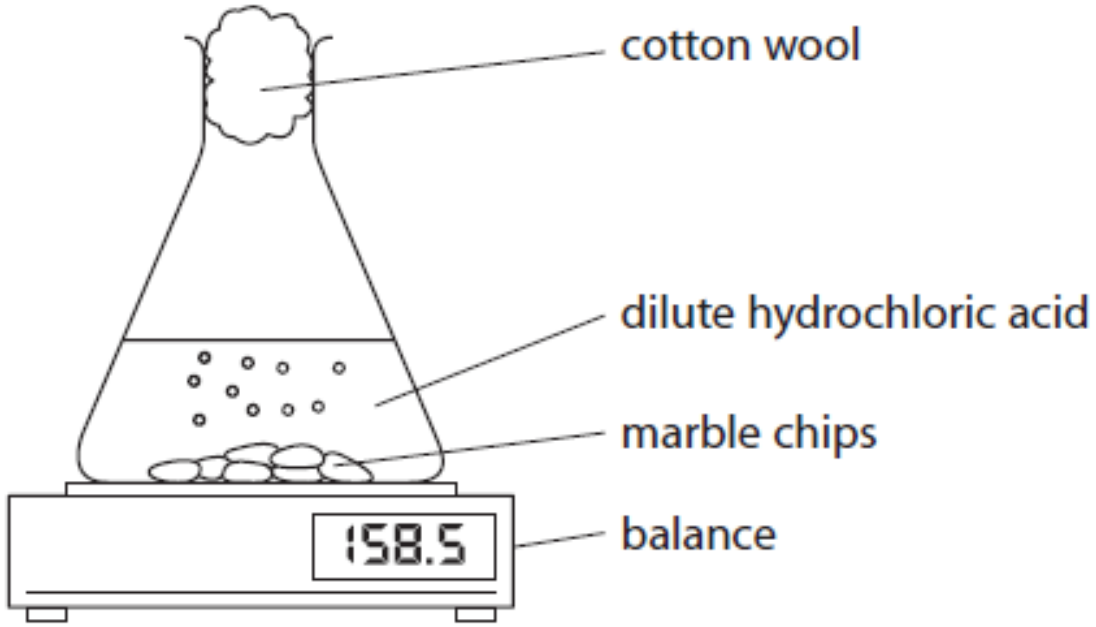
accuracy



reliability

Terminology: Accuracy

5 A student uses this apparatus to investigate the rate of reaction between marble chips and dilute hydrochloric acid.



(a) During the reaction, the reading on the balance decreases because mass is lost from the flask.

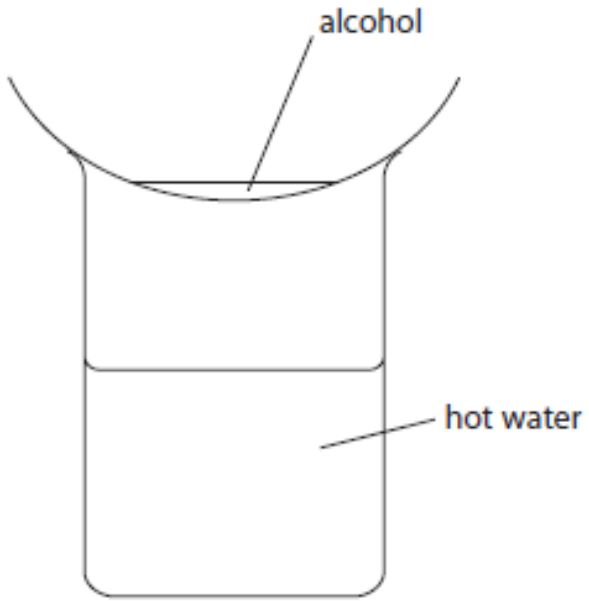
(i) Explain how using the cotton wool increases the accuracy of this investigation.

(2)

Terminology: Validity

3 Methanol, ethanol, propanol and butanol are alcohols. They are all liquids that evaporate easily when warmed.

A student uses this apparatus to compare the time taken for the four liquids to evaporate.



She uses this method.

- pour some methanol into an evaporating basin
- place the evaporating basin on top of a beaker containing hot water
- measure the time taken for the methanol to evaporate completely
- repeat the experiment with each of the other alcohols, using the same apparatus

(a) State two variables the student should control to make sure her results are valid.

(2)

ACTIVITY 8 AO3 in exams

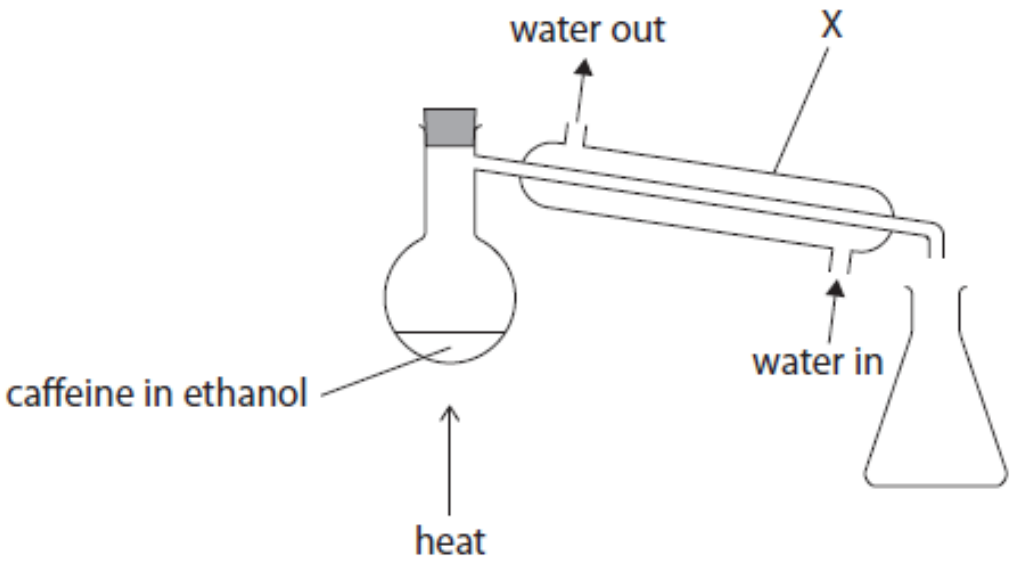
Use the mark schemes shown on screen to mark the student responses on slides 101 to 115

We will go through each question one at a time

ACTIVITY 8

AO3 in exams

Ethanol can be obtained from a solution of caffeine in ethanol using this apparatus.



Describe what happens to the ethanol vapour in apparatus X. (2)

Answer
A description that refers to two of the following points M1 (the condenser/X) cools the (ethanol) vapour M2 so it condenses OR forms liquid (ethanol)

ACTIVITY 8

AO3 in exams

Student 1

it cools down_turns into a liquid
and goes down apparatus X

Answer
A description that refers to two of the following points M1 (the condenser/X) cools the (ethanol) vapour M2 so it condenses OR forms liquid (ethanol)

ACTIVITY 8

AO3 in exams

Student 2

The ethanol vapour in aparatus x condenses bakh into a liquid before being collected in the test tube.

Answer
A description that refers to two of the following points M1 (the condenser/X) cools the (ethanol) vapour M2 so it condenses OR forms liquid (ethanol)

ACTIVITY 8

AO3 in exams

Student 3

As it is heated, the ethanol evaporates and passes through the condensing tube. Here, due to the ~~the~~ water, it condenses and travels down to the conical flask.

Answer
A description that refers to two of the following points M1 (the condenser/X) cools the (ethanol) vapour M2 so it condenses OR forms liquid (ethanol)

ACTIVITY 8

AO3 in exams

Student 4

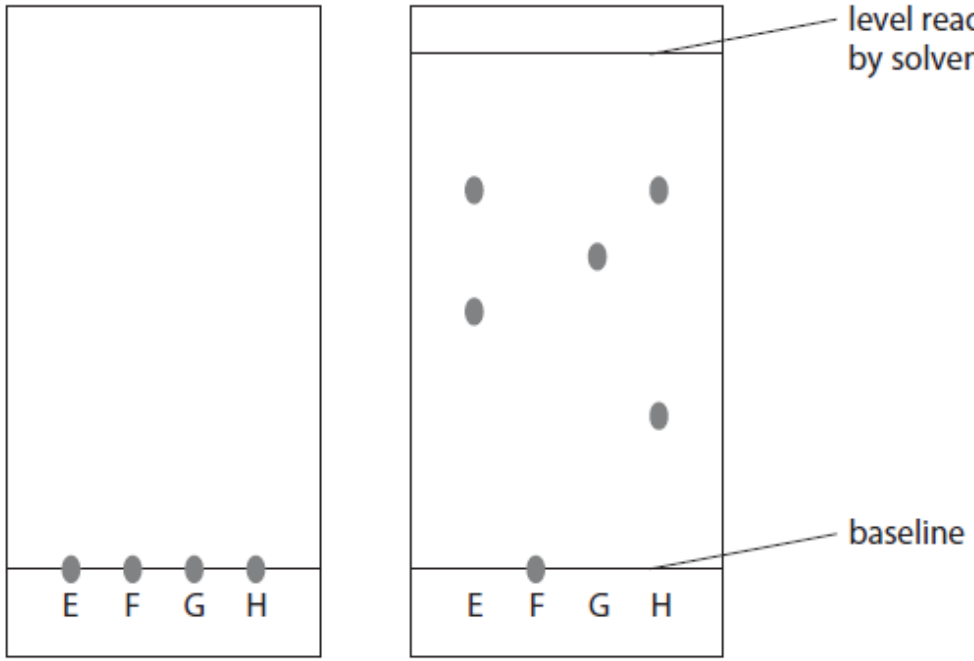
cools down and condenses.

Answer
A description that refers to two of the following points M1 (the condenser/X) cools the (ethanol) vapour M2 so it condenses OR forms liquid (ethanol)

ACTIVITY 8 – AO3 in exams

A student uses paper chromatography in an experiment to separate the dyes in four different felt tip pens, E, F, G and H.

The diagram shows the appearance of the paper before and after the experiment.



(i) The chromatography paper is placed in a solvent. Explain why the spots on the baseline are placed above the level of the solvent. (2)

(ii) Explain which two felt tip pens contain the same dye. (2)

(iii) The student thought that both F and G contained only one dye.

Explain why the student can only be certain about one of these dyes. (2)

Question number	Answer	Notes
(i)	An explanation that links the following two points	**ALLOW** dye in place of spot throughout question 5
	M1 They will not dissolve/diffuse into the solvent (at the bottom of beaker) OWTTE	**ALLOW** water
	M2 so that the dyes can travel up the paper	
(ii)	An explanation that links the following two points	
	M1 E and H	**M2** dep on **M1**
	M2 as the dye is/both have a spot at the same level/travelled the same distance/same Rf value	
(iii)	An explanation that links the following two points	
	M1 The student can only be certain about G containing one dye as only one spot	
	M2 As F is insoluble/not moved (so you cannot tell how many dyes it has) OWTTE	

ACTIVITY 8 – AO3 in exams

(i) So that the spots do not dissolve in the water, and instead they can move up the paper using the solvent.

(ii) E and H as ~~two~~ one of the spots ~~a~~ is shared ~~by~~ by both of them.

(iii) They can be certain about G, as the pen at the baseline disappeared and only 1 spot formed higher on the paper, indicating 1 dye. The dyes in F did not form spots up the paper, but remained on the baseline. They are insoluble in the solvent.

Question number	Answer	Notes
(i)	An explanation that links the following two points	**ALLOW** dye in place of spot throughout question 5
	M1 They will not dissolve/diffuse into the solvent (at the bottom of beaker) OWTTE	**ALLOW** water
	M2 so that the dyes can travel up the paper	
(ii)	An explanation that links the following two points	
	M1 E and H	**M2** dep on **M1**
	M2 as the dye is/both have a spot at the same level/travelled the same distance/same Rf value	
(iii)	An explanation that links the following two points	
	M1 The student can only be certain about G containing one dye as only one spot	
	M2 As F is insoluble/not moved (so you cannot tell how many dyes it has) OWTTE	

ACTIVITY 8 – AO3 in exams

(i) So they do not dissolve in solvent, no results will show.

(ii) E and H show can see they share a dye as it climbs to the same level for both of them

(iii) They can only be certain about G as F did not move, therefore the student doesn't know if it contains 2 dyes.

Question number	Answer	Notes
(i)	An explanation that links the following two points **M1** They will not dissolve/diffuse into the solvent (at the bottom of beaker) OWTTE **M2** so that the dyes can travel up the paper	**ALLOW** dye in place of spot throughout question 5 **ALLOW** water
(ii)	An explanation that links the following two points **M1** E and H **M2** as the dye is/both have a spot at the same level/travelled the same distance/same Rf value	**M2** dep on **M1**
(iii)	An explanation that links the following two points **M1** The student can only be certain about G containing one dye as only one spot **M2** As F is insoluble/not moved (so you cannot tell how many dyes it has) OWTTE	

ACTIVITY 8 – AO3 in exams

(i) So the ~~dyes~~ inks don't dissolve in the solvent before the solvent front moves up the paper, as this will mix the ~~dyes~~ inks, interfering with the test results, and the ~~dyes~~ inks won't move up

(ii) The pen
E and F contain the same dye. This can be seen due to ~~the~~ the dots are of the dyes in both, travelling the same distance

(iii) He can be certain of F, due to it not moving.

Question number	Answer	Notes
(i)	An explanation that links the following two points	**ALLOW** dye in place of spot throughout question 5
	M1 They will not dissolve/diffuse into the solvent (at the bottom of beaker) OWTTE	**ALLOW** water
	M2 so that the dyes can travel up the paper	
(ii)	An explanation that links the following two points	
	M1 E and H	**M2** dep on **M1**
	M2 as the dye is/both have a spot at the same level/travelled the same distance/same Rf value	
(iii)	An explanation that links the following two points	
	M1 The student can only be certain about G containing one dye as only one spot	
	M2 As F is insoluble/not moved (so you cannot tell how many dyes it has) OWTTE	

ACTIVITY 8 – AO3 in exams

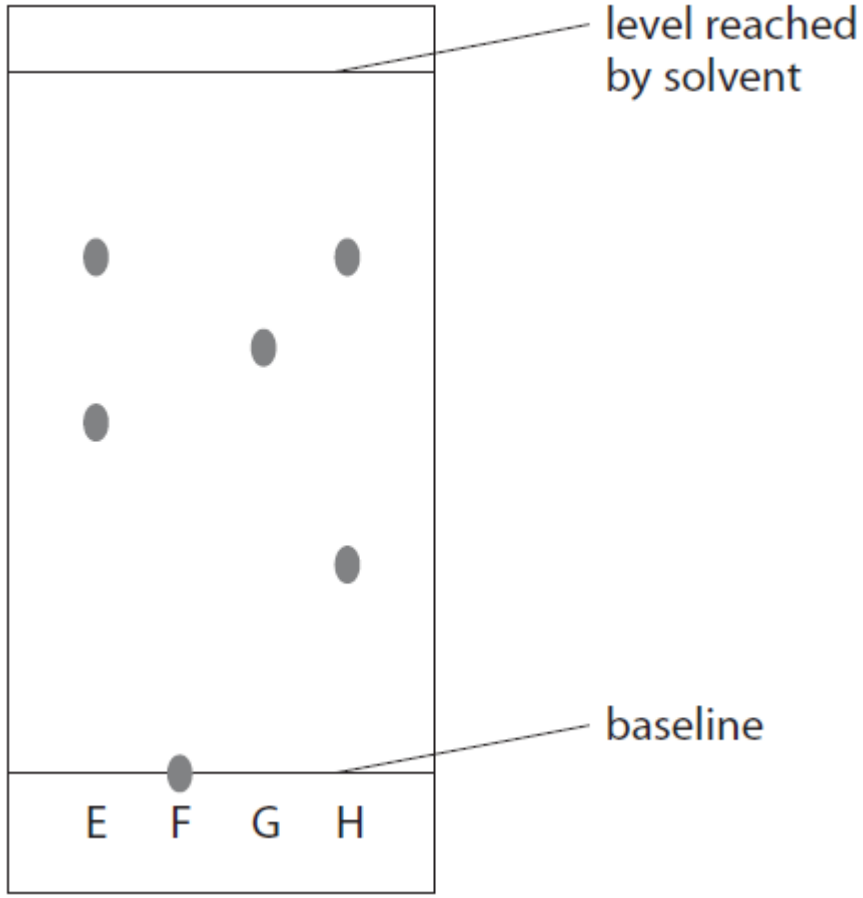
(i) To ensure the dyes don't dissolve into the solvent and rather go up the chromatography paper

(ii) E and H contain the same dye as they both have spots that travelled the same distance up the paper, meaning they have the same solubility.

(iii) Since F has not seperated, due to it not moving due to it's insolubility, the student can't indicate if there are many dyes or not. G on the other hand moved, but displaying only one stain above the baseline; indicating one dye.

Question number	Answer	Notes
(i)	An explanation that links the following two points	**ALLOW** dye in place of spot throughout question 5
	M1 They will not dissolve/diffuse into the solvent (at the bottom of beaker) OWTTE	**ALLOW** water
	M2 so that the dyes can travel up the paper	
(ii)	An explanation that links the following two points	
	M1 E and H	**M2** dep on **M1**
	M2 as the dye is/both have a spot at the same level/travelled the same distance/same Rf value	
(iii)	An explanation that links the following two points	
	M1 The student can only be certain about G containing one dye as only one spot	
	M2 As F is insoluble/not moved (so you cannot tell how many dyes it has) OWTTE	

ACTIVITY 8 – AO3 in exams



Answer	Notes
M1 distance from baseline to solvent level in mm = 65	
M2 distance from baseline to spot/dye in mm = 39	ACCEPT any value between 38 and 41 inclusive
M3 (R_f value = 39 ÷ 65 =) 0.6	ACCEPT any value between 0.57 and 0.64 M3 not awarded if value is incorrectly rounded

Calculate the R_f value for the dye in G.

Show your working. (3)

ACTIVITY 8 – AO3 in exams

Student 1

3.9 - travel by solute

6.5 - travel by solvent

$\frac{3.9}{6.5} = \frac{3}{5} = 0.6$

R_f value = 0.6

Answer	Notes
M1 distance from baseline to solvent level in mm = 65	
M2 distance from baseline to spot/dye in mm = 39	ACCEPT any value between 38 and 41 inclusive
M3 (R_f value = 39 ÷ 65 =) 0.6	ACCEPT any value between 0.57 and 0.64 M3 not awarded if value is incorrectly rounded

ACTIVITY 8 – AO3 in exams

Student 2

$R_f = \frac{\text{Distance of solvent}}{\text{Distance of dye from baseline}} = \frac{6.5\text{cm}}{4\text{cm}} = 1.625 = 1.63$

R_f value = ~~1.625~~ 1.63

Answer	Notes
M1 distance from baseline to solvent level in mm = 65	
M2 distance from baseline to spot/dye in mm = 39	ACCEPT any value between 38 and 41 inclusive
M3 (R_f value = 39 ÷ 65 =) 0.6	ACCEPT any value between 0.57 and 0.64 M3 not awarded if value is incorrectly rounded

ACTIVITY 8 – AO3 in exams

Student 3

4 cm x 2.5 =

R_f value = 10

Answer	Notes
M1 distance from baseline to solvent level in mm = 65	
M2 distance from baseline to spot/dye in mm = 39	ACCEPT any value between 38 and 41 inclusive
M3 (R_f value = 39 ÷ 65 =) 0.6	ACCEPT any value between 0.57 and 0.64 M3 not awarded if value is incorrectly rounded

ACTIVITY 8 – AO3 in exams

Student 4

distance moved by G : $\frac{4\text{ cm}}{6.5\text{ cm}} = 0.67$

distance moved by solvent:

R_f value = 0.67

Answer	Notes
M1 distance from baseline to solvent level in mm = 65	
M2 distance from baseline to spot/dye in mm = 39	ACCEPT any value between 38 and 41 inclusive
M3 (R_f value = 39 ÷ 65 =) 0.6	ACCEPT any value between 0.57 and 0.64 M3 not awarded if value is incorrectly rounded

Teaching AO3

Doing practical work

- The specification for International GCSE Chemistry contain a number of practical activities that form part of the subject content
- Exam questions expect students to be familiar with methods for these practicals
- Questions also expect students to apply their knowledge of practical methodology to unfamiliar scenarios

Teaching AO3

Doing practical work

- Why should students do practical work?
- Are students getting knowledge or skills from practical activities?
- When do you do practical activities: before or after teaching the theory of a topic?

Preparing students for AO3

Teaching approaches: fact .v. investigative

Why does copper turn black when heated in air using a Bunsen burner?

Fact: Copper reacts with oxygen to form copper(II) oxide

Investigative: What may have caused the black substance to appear?

Answer – the Bunsen flame or the air

How can we find out which?

Answer – heat the copper in a vacuum (not practical)

OR

- heat the copper in a test tube so it is not in contact with the Bunsen flame

Preparing students for AO3

Teaching approaches: fact .v. investigative

Investigative: The copper stills turns black so it must be something in the air

How can we find out which gas in the air is responsible?

Answer – heat copper in each gas separately (not practical)

– heat copper in a sample of air and find out the percentage of gas used up

– ≈20% used up, so copper has combined with oxygen

Preparing students for AO3

- **Good, I'm glad it's gone wrong!**
- Add 1 cm depth of 1 mol/dm^3 hydrochloric acid to each of three boiling tubes
- Leave one tube at room temperature
- Place the second in a water bath at ≈ 40°C
- Place the third in a water bath at ≈ 60°C
- You are going to add a 1 cm strip of clean magnesium ribbon to each tube and measure how long it takes for the magnesium ribbon to completely disappear
- Predict the order of disappearance and then do the experiment

Preparing students for AO3

Prediction – magnesium disappears first at 60°C and last at room temperature

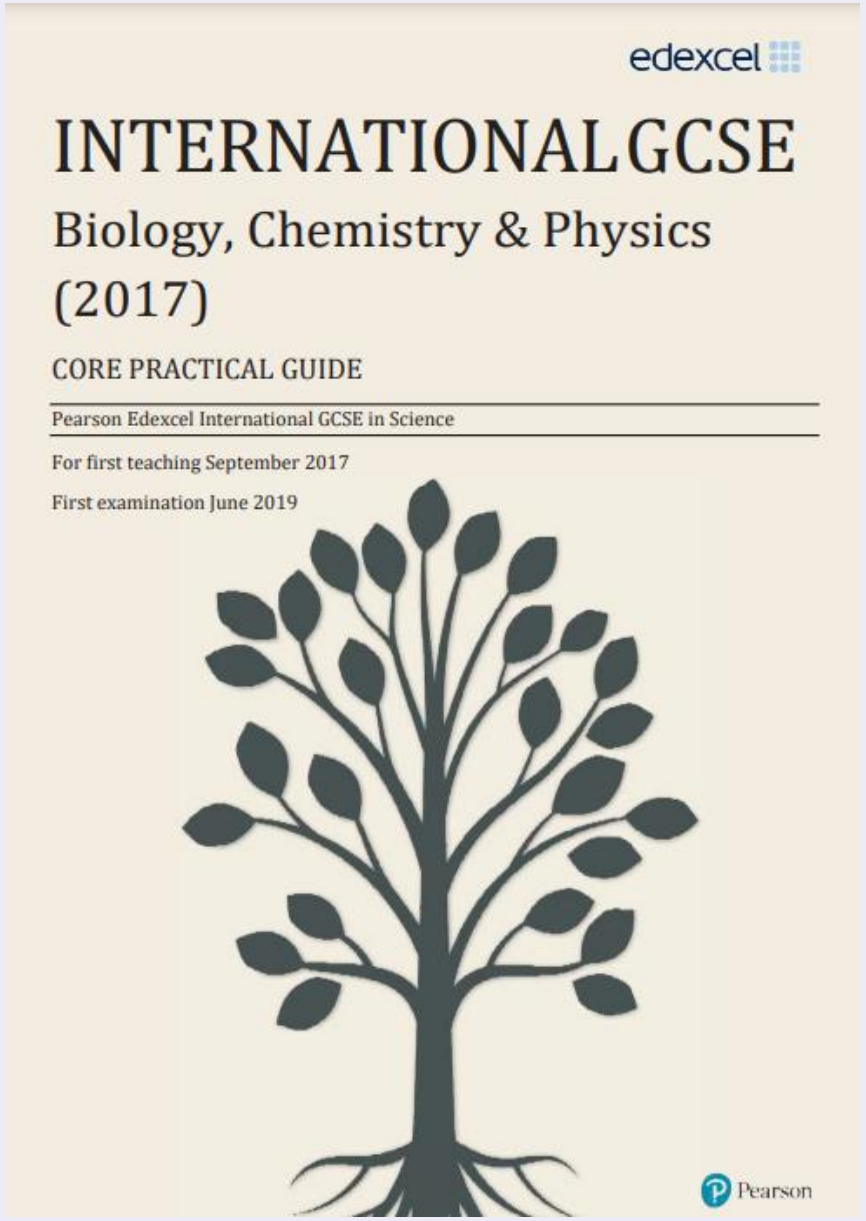
Outcome – magnesium usually disappears first at room temperature and last at 60°C

Explanation – gas given off so violently at 60°C that the magnesium continuously lifts

off the acid and falls back down

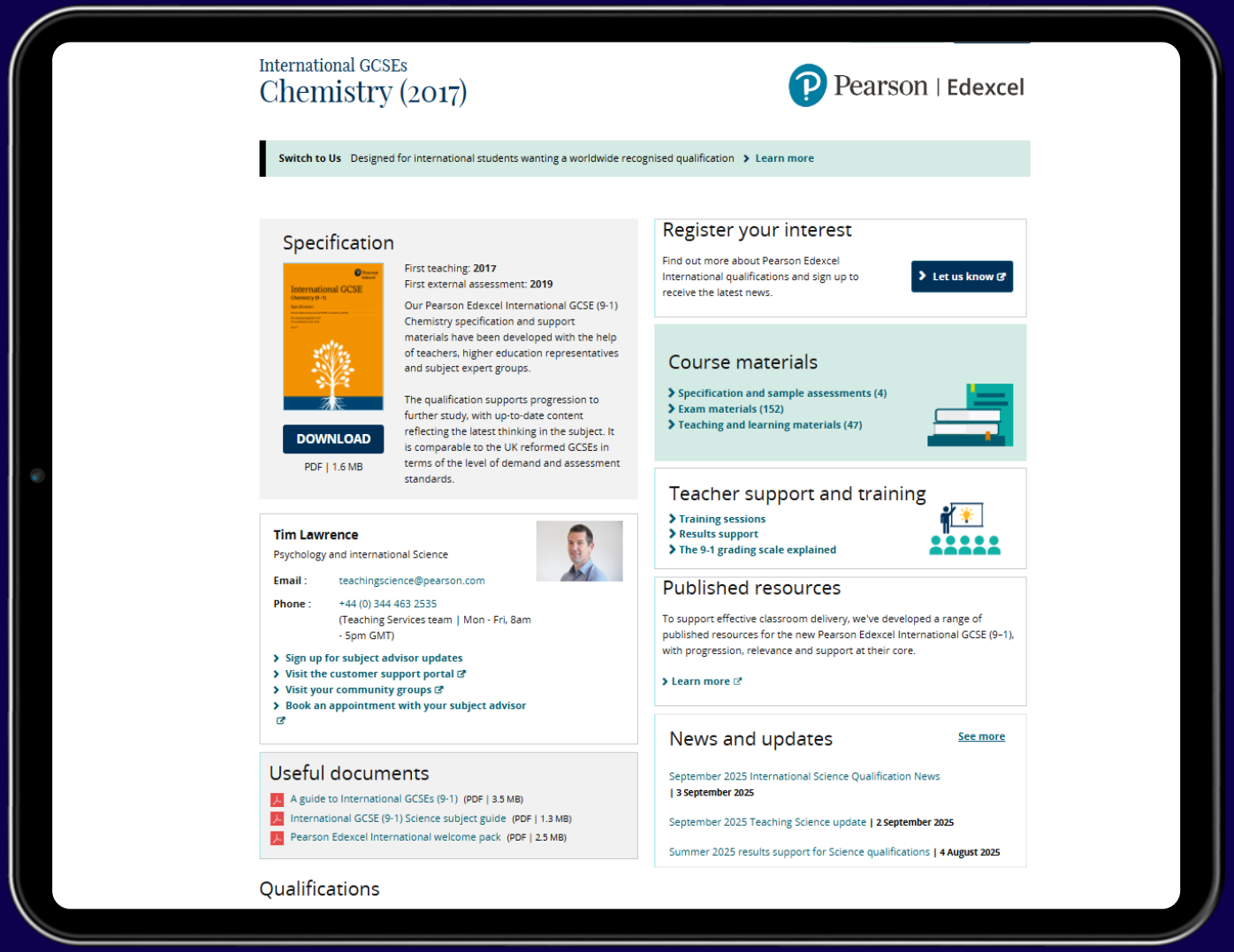
– at room temperature the magnesium sinks

Preparing students for AO3 – The Core Practical Guide



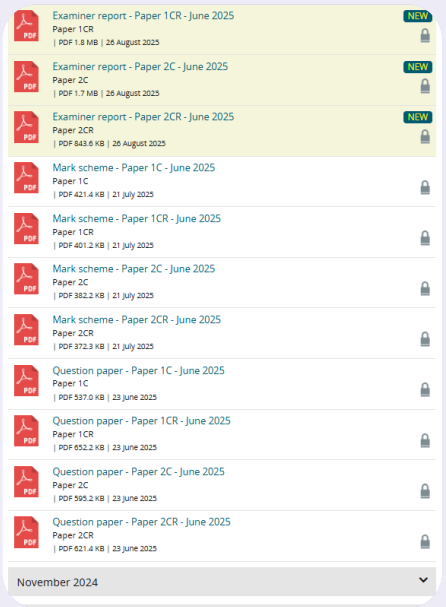
Support

Support for you at every Stage

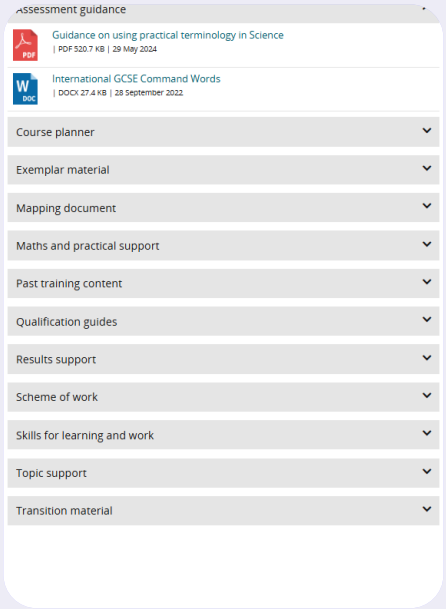


Teaching and Learning Materials

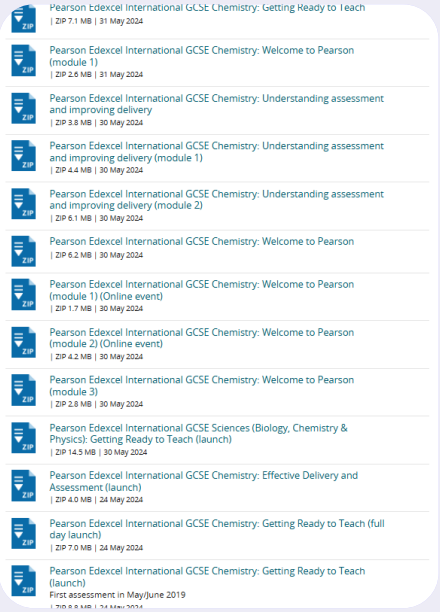
Specification



Past Papers



Teaching and Learning Materials

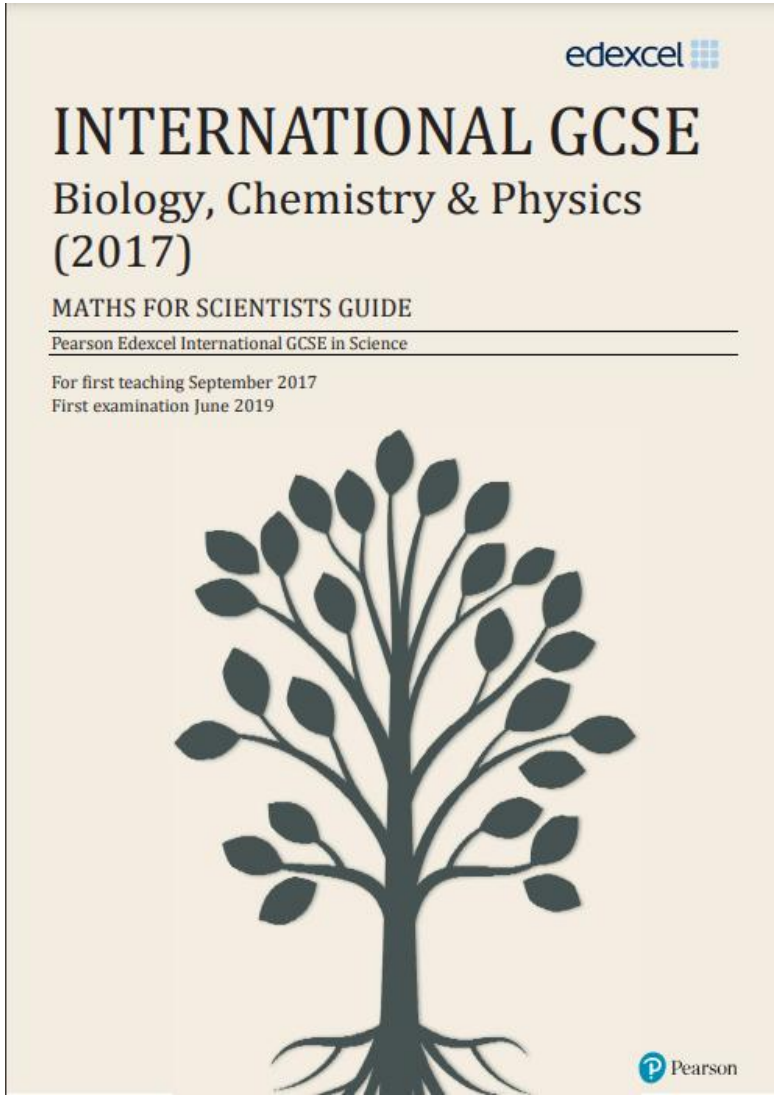


Past Training Content

Guides

Maths for Scientists Guide

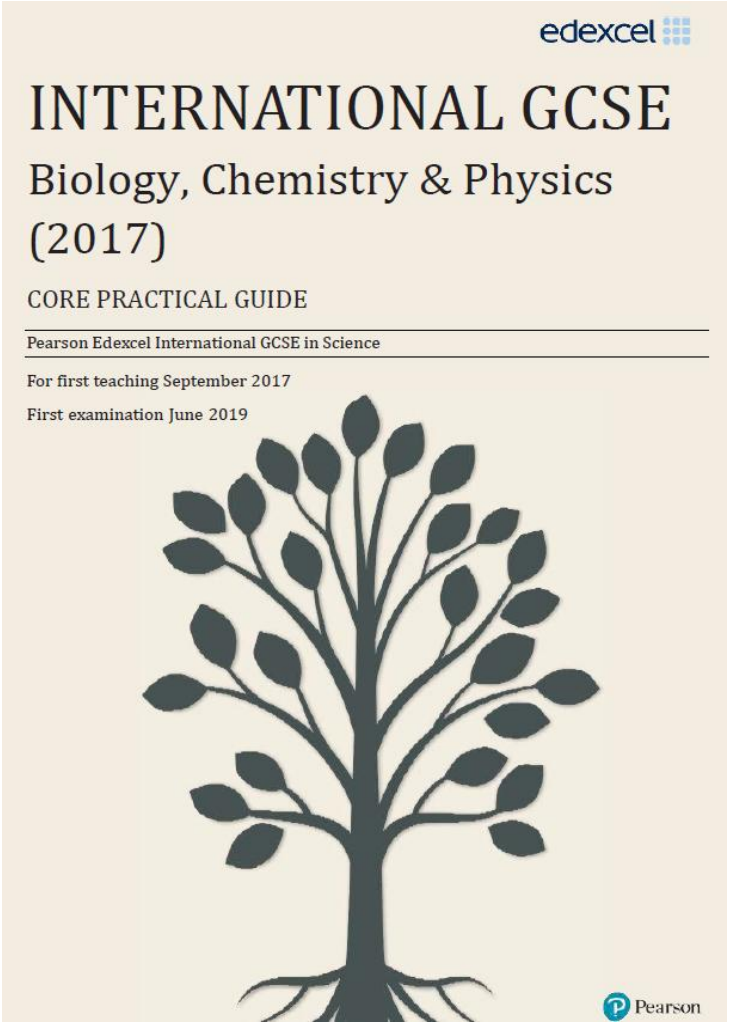
This guide to maths for scientists outlines the content that students will have covered in their maths lessons throughout KS3 and KS4



Guides

Core Practical Guide

- 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

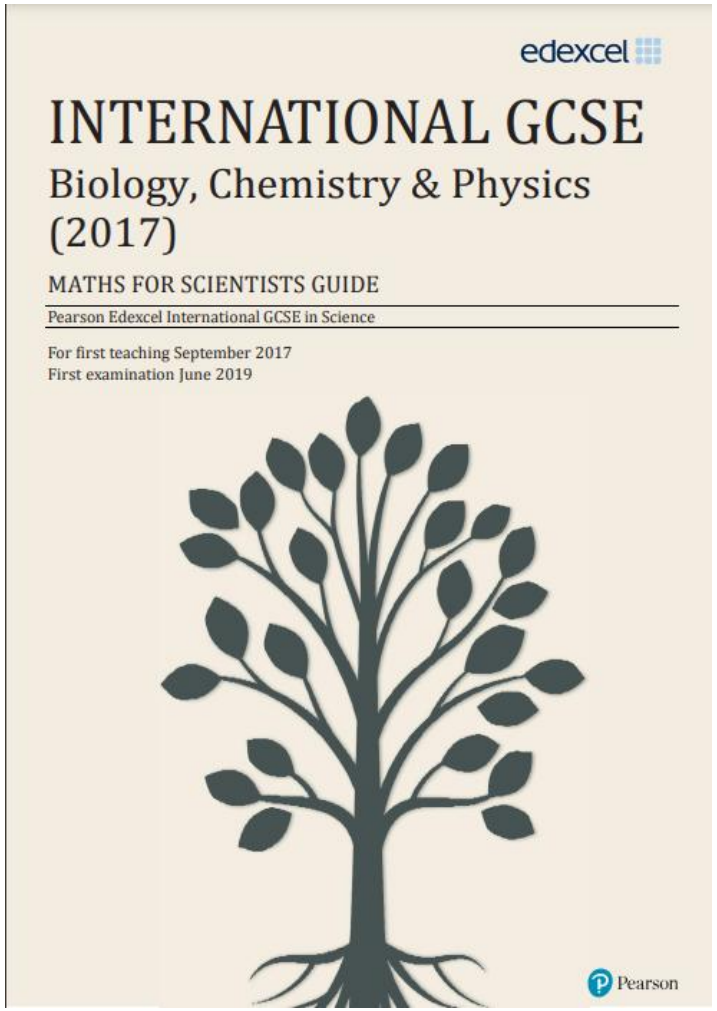


Guides

Topic Guide: Chemical Equilibrium

- In 1984 R.T. Allsop and N.H. George wrote an article, published in Education in Chemistry, entitled ‘Le Châtelier – A Redundant Principle?’ in which they argued that the use of the principle was counterproductive to the understanding of chemical equilibrium

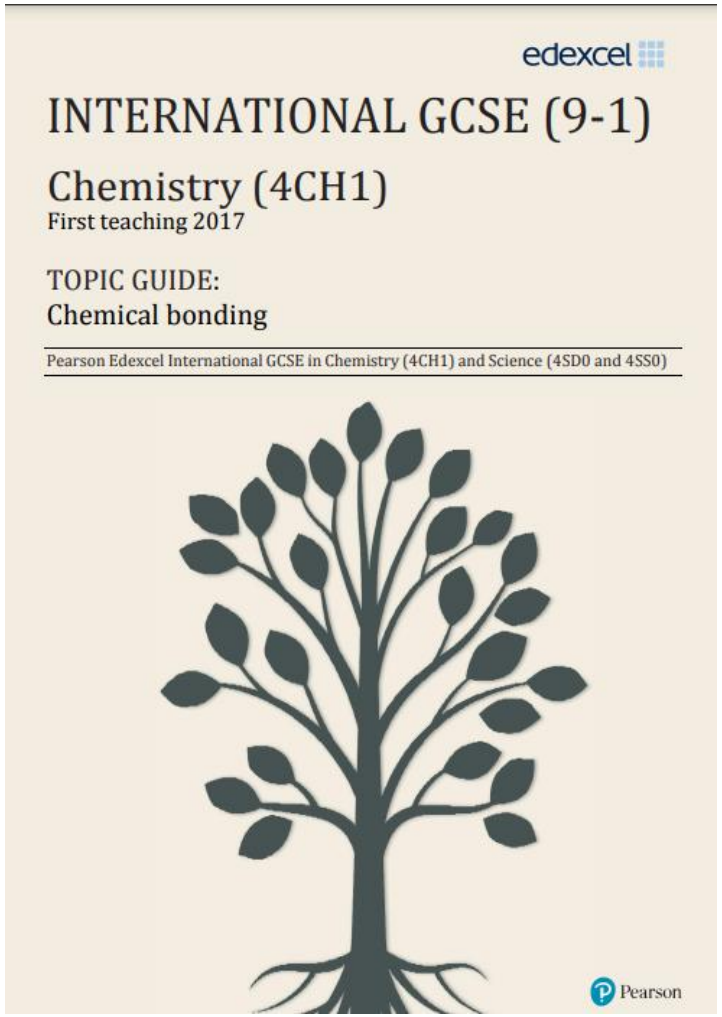
- Although Le Châtelier’s Principle is not required for teaching the International GCSE Chemistry specification, a number of students refer to it in answers



Guides

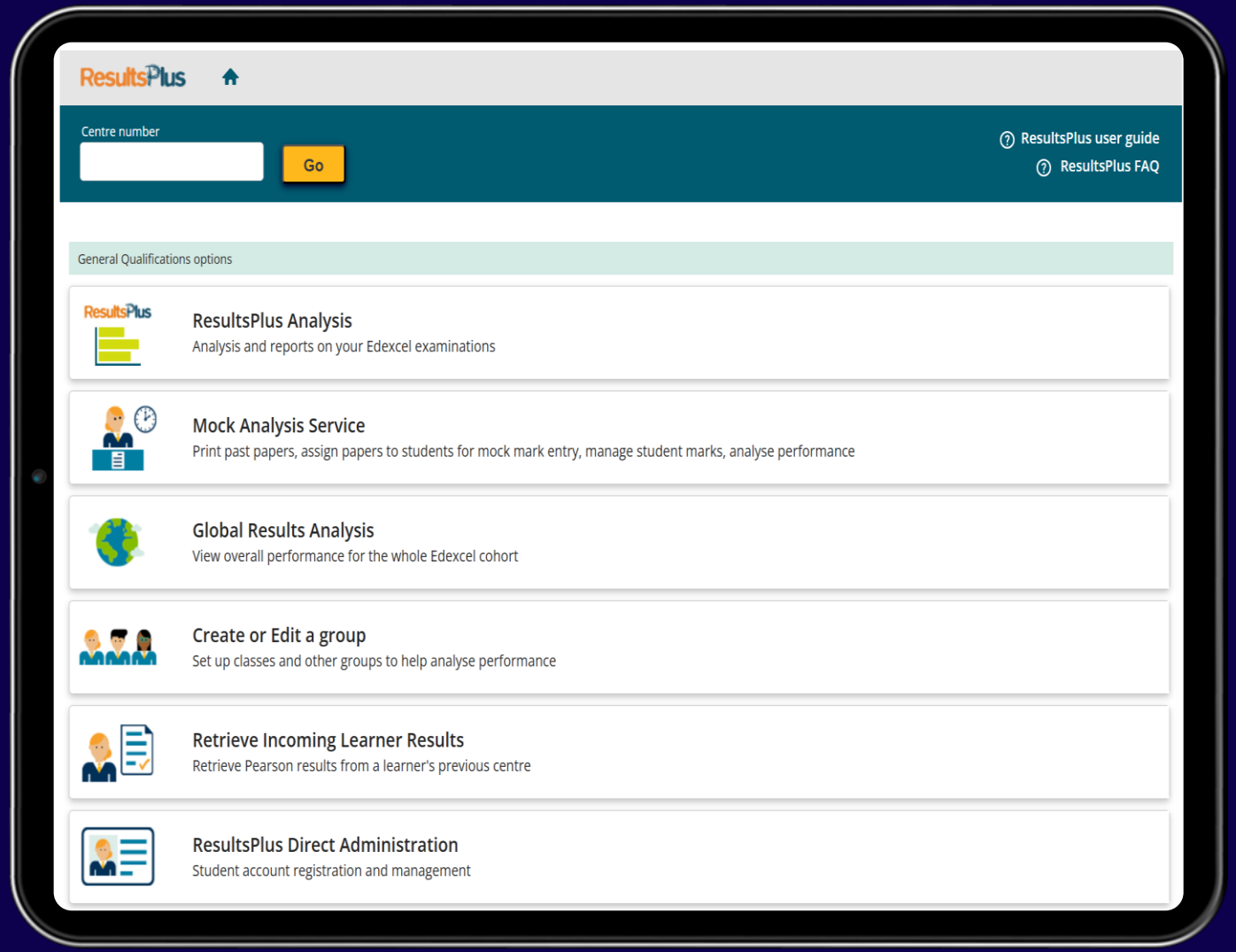
Topic Guide: Chemical Bonding

- Chemical bonding (and related ideas about chemical stability/reactivity) is acknowledged as being a ‘tricky to teach’ topic, and with good reason



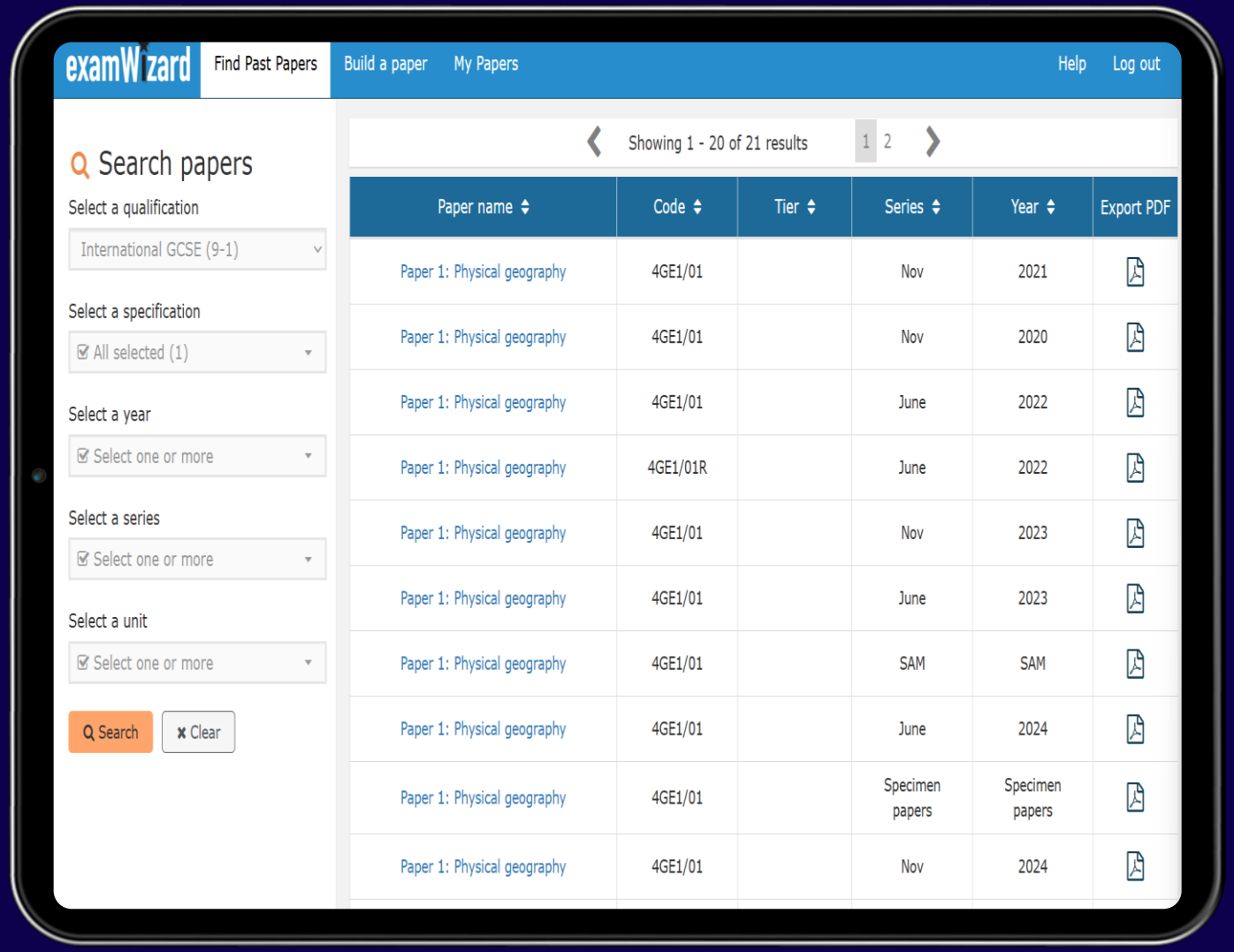
Results Plus

- Provides detailed analysis of your learners performance.
- Identify potential topics, skills and types of question where students may need to develop their learning further.
- See actual scores for each exam question for a student, class or group.
- Understand how your students' performance compares with class and Pearson Edexcel national averages.
- Acquire data that may support effective learning and teaching approaches.



Exam Wizard

- Saves time by creating your own mock paper exams, topic tests, homework or revision activities.
- Uses our Pearson back catalogue of exam questions to practice and develop these skills with your learners'.
- Gain access to past papers and test questions to create tailored learners plans, which target individuals weaknesses.
- Works in conjunction with ResultsPlus to help create exam practice resources for whole cohorts or individual learners.

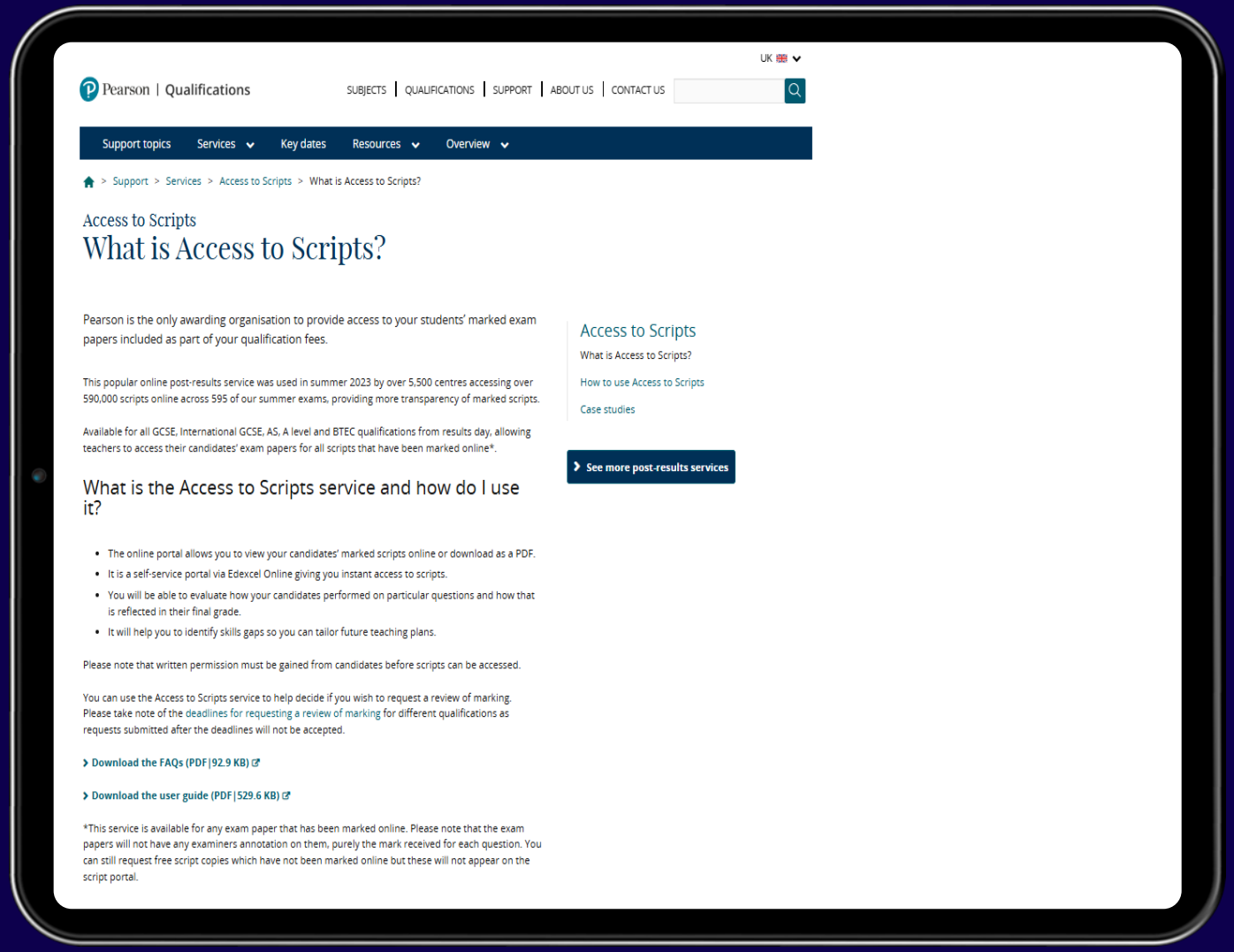


Access to Scripts

Access to Scripts is an online service, included as part of your qualification fees, that allows you to view your candidates' marked scripts online or download as a PDF.

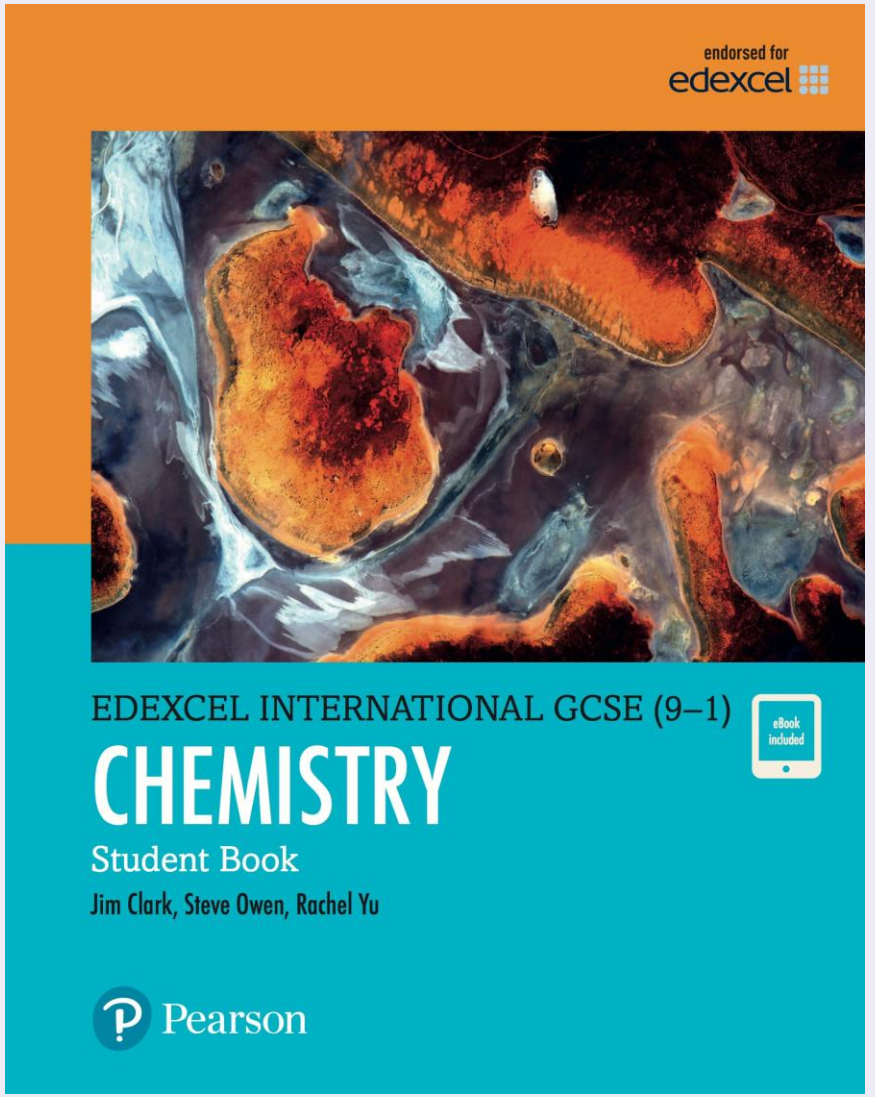
The Access to Scripts service provides a rich source of information, enabling detailed analysis to inform teaching and learning and support students - giving insights and visibility that performance data alone cannot provide.

Pearson is the only awarding organisation to provide access to your students' marked exam papers included as part of your qualification fees.



Paid for Resource

These resources are designed for anyone following the latest Pearson Edexcel International GCSE (9–1), teachers and learners, who want the best preparation for exam success and progression to A Level, International A Level, International Baccalaureate Diploma and BTEC.



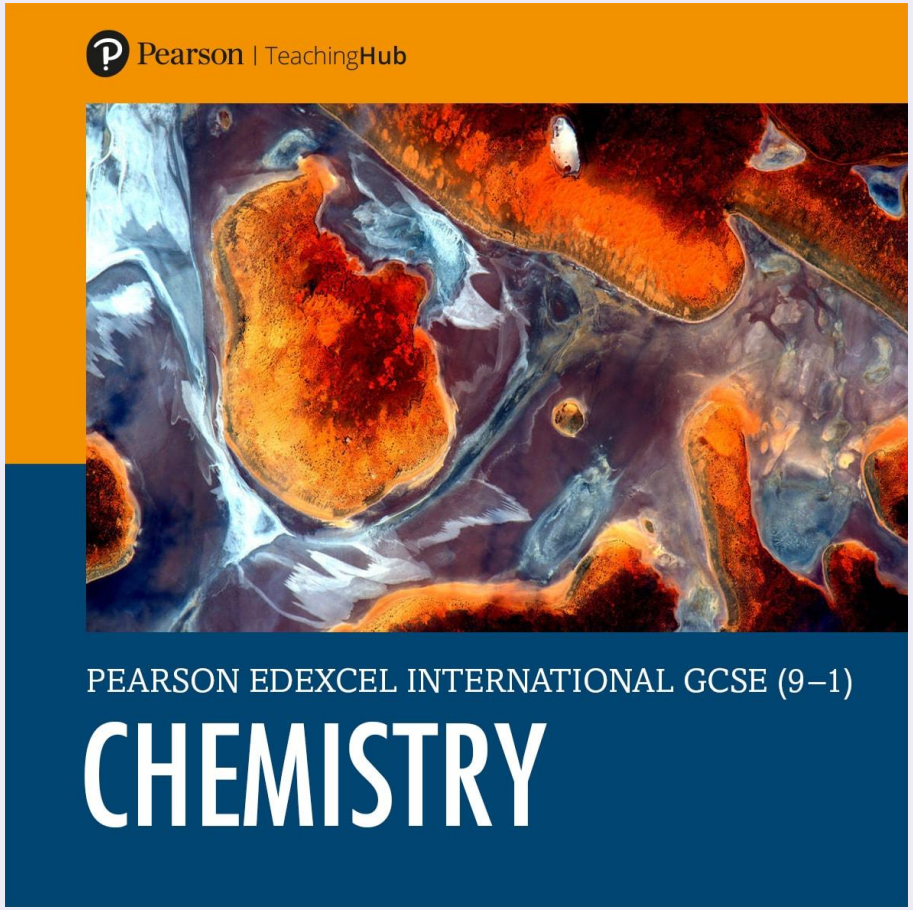
For more information and access to samples visit:

www.pearson.com/international-schools

Paid for Resource

Teaching Hubs

Teaching Hubs is the ultimate, end-to-end programme for teaching and learning excellence at international GCSE. Each course contains meticulous, step-by-step lesson plans, media-rich resources and carefully curated assessment tools, providing teachers with the support and tools to teach International GCSEs consistently, creatively and with complete confidence.



For more information and access to samples visit:

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Subject Partner & Advisor Support

Our subject partners are experts in their fields and are here to support you throughout the year.

Jonathan Wong (top) & Tim Lawrence (bottom)

Email: Teachingscience@pearson.com

Phone: +44 (0) 344 463 2535 (Mon–Fri, 8.00–17.00)

Sign up to receive regular updates from your Subject Partner on qualification news and support for your subject.

Pearson Professional Development Academy

High-quality professional development is key to delivering impactful learning. To help you successfully implement International GCSE and International A level qualifications in your school, we offer a range of training, from introductory sessions to in-depth, customised learning experiences.

Core

Getting Ready to Teach

Understanding Assessment and Improving Delivery

+ webinars to support throughout the year

Advanced

Exam Insights

Enhancing Teaching through Exam Insights

Marking with Accuracy and Insight

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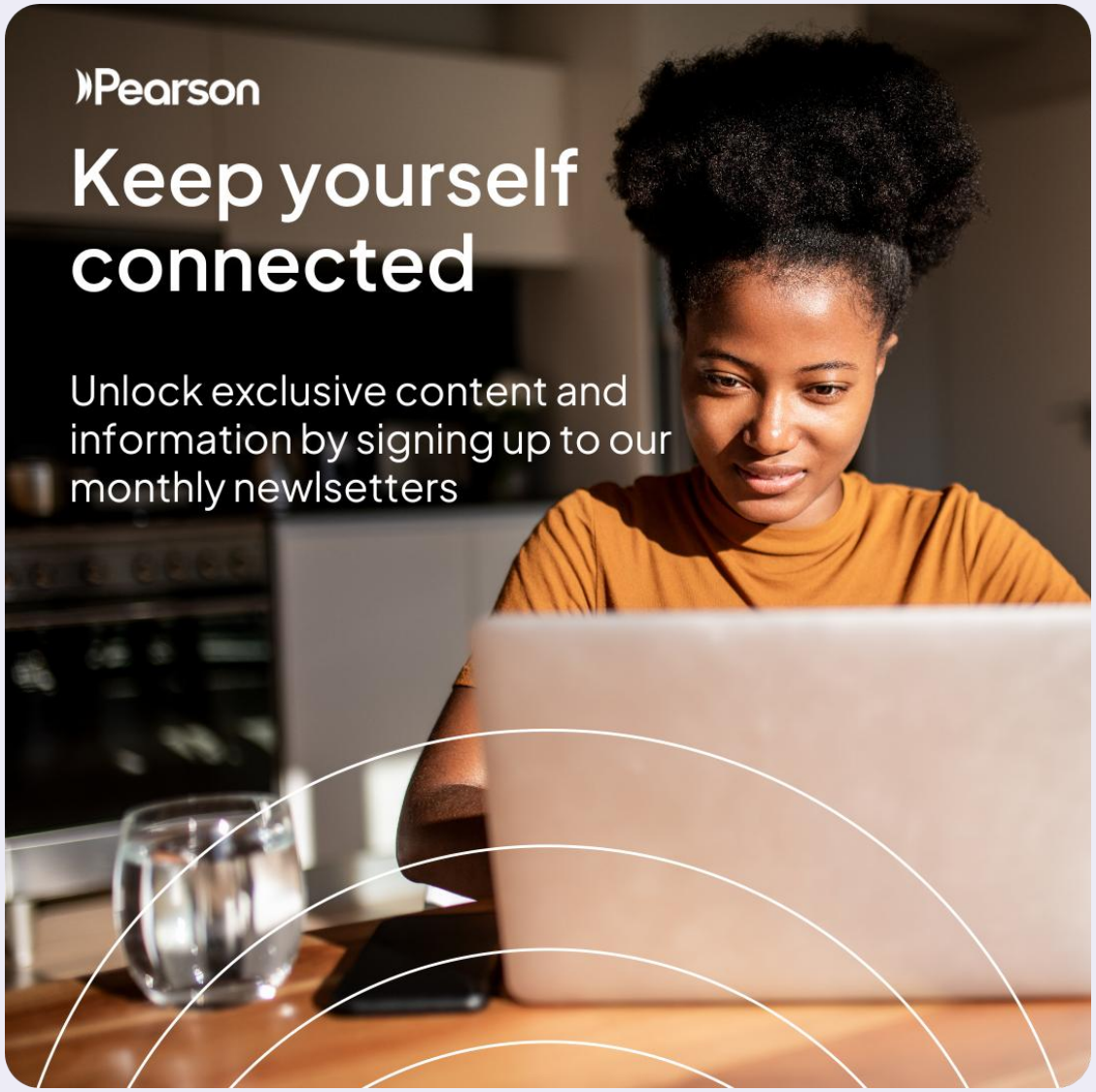
Join our community and stay ahead of the curve! We have a newsletter for your area of interest that will be delivered straight to your inbox. Be the first to hear about upcoming products, services, training, free trial offers, informative webinars, and much more.

Scan the QR code or click here to fill out our form



Questions

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Thank you