



**Our Getting Ready To Teach training looks at how the new specifications can be delivered in the classroom.**

This is the presentation used in our events and there are embedded notes that will talk you through the specification content and assessment and will tell you what other documents you will need to access along the way. The presentation will go through:

- The structure, content and assessment of the new qualifications
- The support available to guide you through the changes
- Possible teaching and delivery strategies, including co-teaching AS and A level
- New topics and some activities to support teaching and delivery of these themes

There are references to the specification and sample assessments throughout this presentation so make sure you have these to hand.

## Specification at a glance

AS level / A level Year 1	A level Year 2
Atomic Structure and Periodic Table	Kinetics II
Bonding and Structure	Equilibrium II
Formulae and Equations	Acid-base equilibria
Redox I	Energetics II
Inorganic chemistry (Groups 2 & 7)	Organic chemistry II
Organic chemistry I	Modern analytical techniques II
Modern analytical techniques I	Redox II
Energetics I	Transition metals
Kinetics I	Organic chemistry III
Equilibrium I	



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Please note that the ordering of topics within this table does not imply a particular teaching order: the topics may be organised in a variety of different orders. In particular, this table shows the topics that make up AS Chemistry as those covered in Year 1 of the A level course.

Teachers who plan a linear approach to A level over two years may, for example, choose to vary this presentation to allow related topics to be considered together.

Further information on planning a route through the specification appears in the planning section of the '**Getting Started Guide**'. You can find the Guide here:

[http://qualifications.pearson.com/content/dam/pdf/A%20Level/Chemistry/2015/teaching-and-learning-materials/AS\\_and\\_A\\_level\\_Chemistry\\_Getting\\_Started\\_Guide.pdf](http://qualifications.pearson.com/content/dam/pdf/A%20Level/Chemistry/2015/teaching-and-learning-materials/AS_and_A_level_Chemistry_Getting_Started_Guide.pdf)



## 2015 AS and A Level specification

- ❖ Very small changes to the subject criteria produced by the DfE  
eg addition of non-mathematical consideration of  $K_c$  at AS
- ❖ Some content re-arranged  
eg Born-Haber cycles moved from AS to A level

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The final subject criteria, published by the Department for Education, show the core content that must be present in all A level Chemistry specifications. This core content makes up 60% of the course and is largely unchanged from the subject criteria for the GCE 2008 specifications.

In addition, the subject criteria also contain revised appendices for the delivery and assessment of practical and mathematical skills within Chemistry.

The following practical requirements apply to A level Chemistry specifications. A level Chemistry specifications must:

- contain a minimum of 12 core practical activities
- provide opportunities for students to use and develop the techniques listed in Appendix 5c
- assess practical skills within externally-assessed examinations
- provide opportunities for students to develop competency in practical work, which can be assessed by teachers.



## 2015 AS and A Level specification

❖ We have made some additions / deletions to our specification

- eg  $^{13}\text{C}$  NMR and Gibbs energy added
- green chemistry deleted from AS
- some organic reactions have been removed



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The remaining 40% of the AS and A level specifications is at the discretion of each Awarding organisation. Using feedback from teachers, as well as taking into account the needs of students going on to study Chemistry or related subjects, we have taken the opportunity to alter, re-word and re-organise some of the discretionary content in the new Edexcel A level.

Some of the changes that you will notice include:

- the removal of the section called 'Green Chemistry' from AS
- an approach to thermodynamics which includes Gibbs energy changes as well as entropy changes
- the removal of some organic reactions, including the formation of diazonium ions and subsequent coupling reactions
- the inclusion of the use of Grignard reagents as part of organic syntheses
- a greater focus on principles of transition metal chemistry, with less emphasis on learning of colours and reactions.



## AS and A level relationship

- ❖ AS now a 'stand alone' qualification
- ❖ AS is the same standard as current AS
- ❖ AS can be the same content as the first year of A Level  
i.e. AS is co-teachable with A level
- ❖ Students can still take AS then go on to A level
- ❖ Marks in AS level examinations do not count towards an A Level grade



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AS and A levels have been decoupled, which means that the AS qualification will no longer 'count towards' the A level grade. Students can still take AS assessments and progress to A level, but they will need to sit all three A level papers at the end of the course to achieve an A level grade.

The specification has been designed to be co-teachable so you can, if you wish, continue to offer your students an AS qualification and enable them to progress to the full A level.

Activity 1.1 in the GRTT Delegate Booklet offers some suggestions of points to consider within your department.



## Support materials

In addition to the getting started guide, Edexcel provides the following support material for teachers:

- ❖ Transition Guide
- ❖ Practical Guide
- ❖ Topic Guides – Instrumental Analysis
  - Energetics: Energy and Entropy

These materials are provided **free** for each subject through the website [www.edexcel.com/sci2015](http://www.edexcel.com/sci2015)

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### Transition guide

To help you with planning and teaching your first few A-level lessons and to save you time, we have worked with practising teachers and examiners to develop these valuable, focused transition materials. These will help you reinforce key concepts from KS4 and KS5 and guide your students' progression.

These transition guide includes:

- mapping of KS4 Edexcel GCSE(s) to the new Edexcel A Level Chemistry specifications
- baseline assessments, summary sheets, student worksheets and practice questions.

### Practical guide

This guide is designed to:

1. support you and your students through all elements of practical work in the new AS and A level specification. Although it will address assessment arrangements, its focus is to ensure good quality practical work is at the heart of teaching and learning in the subject,
2. explain how the new Ofqual requirements for practical skills can be developed throughout the course using both core practicals and other

specification content.

## **Topic guides**

These guides are intended to help support teachers unfamiliar with this specification and to provide some background information on the parts of the topic that are new – both from a teacher’s perspective to ensure clarity of what is expected, and from a student’s perspective when discussing transition from GCSE and addressing misconceptions.

Each guide can be used as a reference document for teachers, and parts of it (such as the worked examples) could work as revision material for students.

Included in each guide are:

- some ideas on how to address common misconceptions in both new and previously included content
- possible teaching sequences for key specification points where there is new or challenging content
- worked examples that teachers could use to support students in developing their problem solving skills
- links to external websites that can be used to further students’ understanding.

All these Guides can be found on the website:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/chemistry-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuide>



## Support materials - cont

In addition to the guides, Edexcel provides the following support material for teachers:

- ❖ Mapping documents
- ❖ Schemes of work
- ❖ Course planners
- ❖ Sample assessment materials
- ❖ Exemplar materials with commentaries
- ❖ Practical worksheets

These materials are provided **free** for each subject through the website [www.edexcel.com/sci2015](http://www.edexcel.com/sci2015)

### Mapping Documents

Mapping documents are available to support teachers who are both moving to Edexcel from other current Exam Board specifications, and also for existing clients of Edexcel..

These documents indicate what you will be teaching that is new to you and which topics/concepts you will no longer need to teach.

### Schemes of Work

Two schemes of work are available – one based on a two year teaching route and the other for centres who wish to offer the opportunity for learners to take an AS level at the end of year 1 of the course.

### Course planners

The course planners can be used alongside the schemes of work. They give a week by week break down for the teaching of each topic.

### Sample assessment materials

We have produced two sets of papers for AS and three sets of papers for A level. The initial sample assessment materials (SAMS) and will be available to both teachers and students. The extra assessment materials (EAMS) will be available on the secure website for access by teachers only. These papers can then be used as 'mock' examinations.





### **Exemplar materials with commentaries**

Selected questions from the SAMS were given to A level students to answer. Some of these answers, with commentaries from senior examiners, are provided in this document.

### **Practical worksheets**

Each core practical has a student worksheet, a teacher worksheet and a technician worksheet.

All support materials are provided **free** for each subject through the website: <http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/chemistry-2015/teaching-support.html>



## Supporting student progression

You might like to look at Activity 1.3 in the GRTT Delegate Booklet,

which offers some suggestions for you and your department to consider

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Possible challenges include:

- ❖ the amount of content to learn
- ❖ the level of understanding required
- ❖ the increased level of independence and organisational skills required
- ❖ there are likely to be more unstructured questions, unscaffolded calculations, problem solving questions, and unfamiliar contexts for exam questions in both a theoretical and practical context

The Transition Guide offers support in the early stages of the first year of the A level/AS course



## Endorsed resources

- ❖ We are committed to helping teachers deliver our Edexcel qualifications and 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, including ourselves.
- ❖ However, it is not necessary to purchase endorsed resources to deliver our qualifications.

**Pearson:** Year 1 and 2 student books.

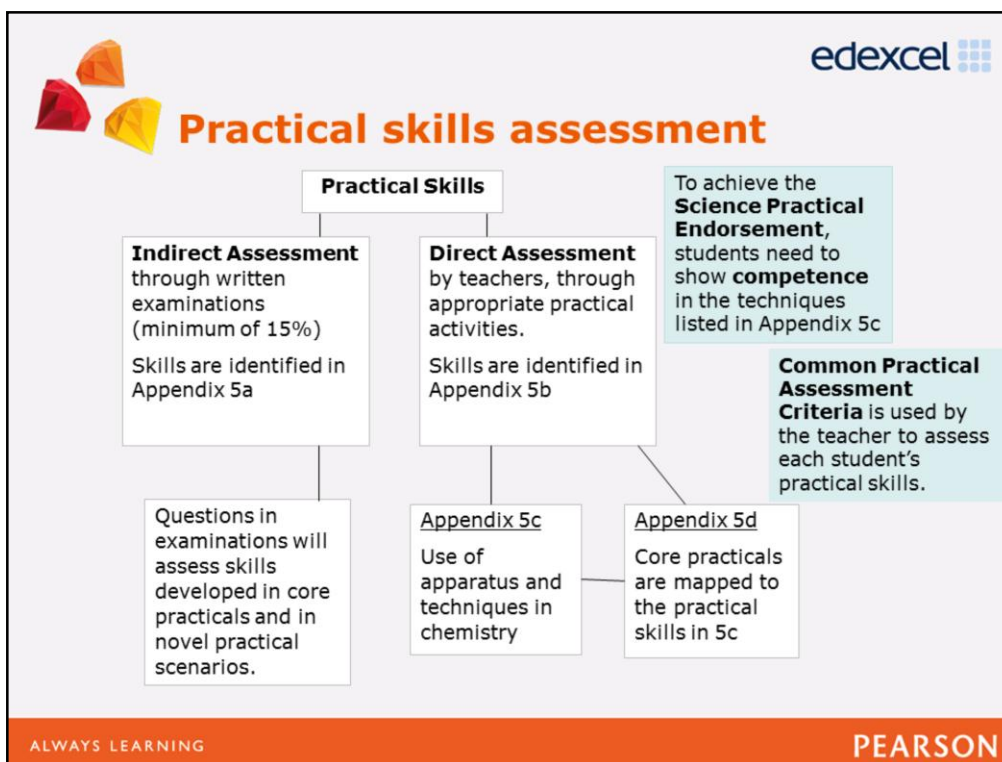
Authors: Cliff Curtis and Jason Murgatroyd.

Year 1 book has been endorsed and published.

**Hodder:** Year 1 and 2 student books.

Authors: Graham Curtis, Andrew Hunt and Graham Hill.

Year 1 book has been endorsed and published.



### Indirect assessment

Questions within written examination papers will assess knowledge and understanding that students gain within the context of the core practicals, as well as novel practical scenarios. Minimum of 15% across each of AS and A Level. The skills are listed in Appendix 5a – indirect assessment

### Direct assessment

Practical work carried out throughout the course will enable students to develop the skills in appendix 5b. Appendix 5c: lists the apparatus and techniques for chemistry. Skills are directly assessed by teachers.

The Common Practical Assessment Criteria (CPAC) will be used to assess students' skills as they demonstrate their competencies.



## **Indirect assessment of practical skills**

You may like to look at Activity 2.1 in the GRTT Delegate Booklet,  
which considers an exemplar question from Paper 3 of the  
A level SAMs

Use Appendix 5a in the A level specification

Consider how you could develop students' practical skills to be sure that they can be assessed indirectly



## **Direct assessment of practical skills**

### **Practical work at the heart of the qualification**

16 Core Practicals embedded into the topics where they enhance the teaching and learning of key concepts :

- ❖ covering all the required techniques (some more than once)
- ❖ build students confidence as scientists and to allow them to demonstrate how they have developed practical competency
- ❖ split between first and second year
- ❖ 'tried and tested' and most can take place in a single lesson

Appendix 5: Working Scientifically gives a detailed table of all the Core Practicals and where the required techniques are covered in each one.

We have chosen tried, tested and familiar practicals that fit naturally into the teaching and learning of topics within the specification.

Students may be asked questions in the practical papers on any of the skills in the core practicals or the questions could be asked within a different setting.

Our core practicals are seen as a minimum expectation so that students gain confidence in the investigative skills they need to be successful at A level and beyond.

You might like to look at Activity 2.2 in the GRTT Delegate Booklet.



## Support materials

**Mapping document** matching the core practicals to the essential skills appendix in our specifications

**Teacher, technician and student worksheets**

**Teacher materials for developing investigative skills**, helping you integrate practical work and the teaching of investigative skills into your lessons

**Student materials for developing investigative skills**, encouraging a deeper understanding of the underlying science behind practicals, guiding students to think independently as scientists and helping their preparations for AS and A level assessment

To make sure our courses can help your students become capable and confident chemists, we have put practical work at the heart of our specification. We have created many resources to help you and your students with each aspect of practical work – from planning and carrying out the experiment, to honing investigative skills.

### Mapping documents

These match the core practicals to the essential skills appendix in our specification.

Not only will they help you ensure that your students cover the required skills and techniques, but also highlight where you could replace or add a practical of your choice that develops the same skills.

### Teacher, technician and student worksheets

These detail the procedure, apparatus and safety instructions for each core practical.



## Common Practical Assessment Criteria



From September onwards, students' skills and competency when completing A level core practicals will be assessed by teachers using the Common Practical Assessment Criteria (CPAC). This assessment leads to the awarding of a Practical Endorsement, which is reported on the A level certificate in addition to the overall grade.

All awarding bodies will follow the same process for administering and awarding the Practical Endorsement, including requiring specific documentary evidence from centres and conducting monitoring visits to ensure consistency in assessment.

For more information read the letter sent to centres. This is available at:

[http://qualifications.pearson.com/content/dam/pdf/News/A%20level%20news/Practical\\_Endorsement\\_Letter\\_June\\_2015.pdf](http://qualifications.pearson.com/content/dam/pdf/News/A%20level%20news/Practical_Endorsement_Letter_June_2015.pdf)



## AS assessment

Paper 1	Paper 2
1h 30 min, 80 marks	1h 30 min, 80 marks
50% of AS	50% of AS
Inorganic and some physical chemistry, with some questions on core practicals	Organic and some physical chemistry, with some questions on core practicals

- ❖ 15 – 20% of marks on practical skills
- ❖ 20% of marks on maths skills

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Paper 1 will examine the following topics:

- Topic 1: Atomic Structure and the Periodic Table
- Topic 2: Bonding and Structure
- Topic 3: Redox I
- Topic 4: Inorganic Chemistry and the Periodic Table
- Topic 5: Formulae, Equations and Amounts of Substance

Paper 2 will examine the following topics:

- Topic 2: Bonding and Structure
- Topic 5: Formulae, Equations and Amounts of Substance
- Topic 6: Organic Chemistry I
- Topic 7: Modern Analytical Techniques I
- Topic 8: Energetics I
- Topic 9: Kinetics I
- Topic 10: Equilibrium I

NOTE: Topics 2 and 5 will be examined on both papers.

Both papers will include questions that target mathematics at Level 2 or above

(see *Appendix 6: Mathematical skills and exemplifications*). Overall, a minimum of 20% of the marks across both papers will be awarded for mathematics at Level 2 or above.

Some questions will assess conceptual and theoretical understanding of experimental methods (see *Appendix 5: Working scientifically*).



## A level assessment

Paper 1	Paper 2	Paper 3
1h 45min 90 marks	1h 45min 90 marks	2h 30min 120 marks
Inorganic and some physical plus AS topics	Organic and some physical plus AS topics	All topics – practical questions make up half the paper
30% of A level	30% of A level	40% of A level

- ❖ 15 - 20% of marks on practical skills
- ❖ 20% of marks on maths skills

Paper 1 will examine the following topics:

- Topic 1: Atomic Structure and the Periodic Table
- Topic 2: Bonding and Structure
- Topic 3: Redox I
- Topic 4: Inorganic Chemistry and the Periodic Table
- Topic 5: Formulae, Equations and Amounts of Substance
- Topic 8: Energetics II
- Topic 10: Equilibrium I
- Topic 11: Equilibrium II
- Topic 12: Acid-base Equilibria
- Topic 13: Energetics II
- Topic 14: Redox II
- Topic 15: Transition Metals



Paper 2 will examine the following topics:

- Topic 2: Bonding and Structure
- Topic 3: Redox I
- Topic 5: Formulae, Equations and Amounts of Substance

- Topic 6: Organic Chemistry I
- Topic 7: Modern Analytical Techniques I
- Topic 9: Kinetics I
- Topic 16: Kinetics II
- Topic 17: Organic Chemistry II
- Topic 18: Organic Chemistry III
- Topic 19: Modern Analytical Techniques II

**NOTE: Topics 2, 3 and 5 will be examined in both papers 1 and 2**

Paper 3 will examine all topics (1 – 19) from the specification.



## Question types in AS

- ❖ Multiple choice
- ❖ Short open
- ❖ Open response
- ❖ Calculation
- ❖ Extended response

❖ Note that multiple choice questions are not grouped together in separate sections – but spread around the papers

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There will be 10 multiple choice questions in each paper.

Short open questions are usually worth 1 or 2 marks. Open response questions are usually worth 3 or 4 marks.

Calculations could be either scaffolded or unscaffolded.

Extended response questions will usually be worth 5 or 6 marks, or possibly even more. More about these types of questions later.



## Question types in A level

- ❖ Multiple choice (Papers 1 and 2 only)
- ❖ Short open
- ❖ Open response
- ❖ Calculation
- ❖ Extended response
- ❖ Comprehension (Paper 3 only)

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There will be 10 multiple choice questions in each of Papers 1 and 2, but none in Paper 3.

Short open questions are usually worth 1 or 2 marks. Open response questions are usually worth 3 or 4 marks.

Calculations are more likely to be unscaffolded A level, although there may be some scaffolded calculations targeted at AS.

Extended response questions will usually be worth 5 or 6 marks, or possibly even more. More about these types of questions later.

Activity 3.1 in the GRTT Delegate Booklet considers the demands of four multiple choice questions.

Activity 3.2 looks at the relative demands of scaffolded and unscaffolded questions.





## Assessment of practical work and mathematical skills

Across all papers:

- ❖ Practical work – minimum 15% at AS and A level
- ❖ Practical work at A level mainly in Paper 3
- ❖ Mathematical skills – minimum 20% at AS and A level
- ❖ Maths skills at Level 2 or higher

Practical assessment has been dealt with earlier.

More about Level 2 maths later in this presentation.

## Revised assessment objectives

		AS	A level
<b>AO1</b>	Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures	35 – 37%	31 – 33%
<b>AO2</b>	Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: <ul style="list-style-type: none"> <li>• in a theoretical context</li> <li>• in a practical context</li> <li>• when handling qualitative data</li> <li>• when handling quantitative data</li> </ul>	41 – 43%	41 – 43%
<b>AO3</b>	Analyse, interpret and evaluate scientific information, ideas & evidence, including in relation to issues, to: <ul style="list-style-type: none"> <li>• make judgements and reach conclusions</li> <li>• develop and refine practical design and procedures</li> </ul>	20 – 23%	25 – 27%

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Comments on the changes:

- Percentages very little changed from current specification
- Percentages slightly different for AS and A level
- AO wording the same for both AS and A level
- AO1 now limited to 10% of total marks for recall
- AO1 and AO2 now also test practical work
- AO3 not limited to practical work (not HSW)

Note the lack of reference to How Science Works compared to current



specifications.



## Ramping

- ❖ Increase in demand through a paper
- ❖ Increase in demand within a question
- ❖ Candidates should attempt all questions – instructed to do so on front cover of each paper
- ❖ Consider A level SAM Paper 1 Question 8

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Purposes of ramping are:

1. to achieve a spread of marks that allows 6 grades (A\* to F) to be awarded
2. to allow weaker candidates to attempt questions with confidence and to score marks

It is a good idea to encourage weaker candidates not to give up when questions later in the paper seem more difficult.



A good question to look at is in the A level SAMs: Paper 1, Question 8.

(a)– simple understanding of acid-base theory in a familiar situation

(b)(i) – understanding strong and weak acids

(b)(ii) – use of  $\text{pH} = -\lg[\text{H}^+]$  rearranged ;not difficult after lots of calculator practice

(c) - more difficult multi-step calculation involving several pieces of numerical data



## Synoptic assessment

- ❖ Ability to work across different topics
- ❖ Ability to combine skills, knowledge and understanding
  
- ❖ Number of marks not specified
- ❖ Assessed within both AS papers
- ❖ At A level, assessed particularly in Paper 3

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A good question to look at is in the A level SAMs: Paper 3, Question 8.

(a)(i) Requires knowledge of suitable apparatus (see appendix 5c, no 7)

(a)(ii & iii) Drying - Topic 18C, spec. Point 22v

(b) Mass/volume/mole calculation of empirical formula – Topic 5, spec. points 5 & 7

(c) Interpreting organic tests – Topic 6, spec. point 25 and Topic 17B, spec. point 8



## The mathematical skill areas

Appendix 6 shows the DfE requirements:

- ❖ Arithmetic and numerical computation
- ❖ Handling data
- ❖ Algebra
- ❖ Graphs
- ❖ Geometry and trigonometry
  
- ❖ Includes examples in chemistry
- ❖ Not all examples are Level 2 or higher

There is more information on the mathematical skills in Appendix 6 (pages 85-89) in the A Level specification.



## Marks for calculations

Do there seem to be a lot of marks for calculations?

- ❖ Paper 1 of the A level SAMs has 90 marks
- ❖ At first sight, 33 of these are for calculations...  
...which is 37%
- ❖ However, Paper 2 has many fewer calculation marks...  
...because of the Organic Chemistry content
- ❖ Also, the 20% rule applies across all papers, not to each individual paper – and is for Level 2 Maths.

The same situation is likely to occur in the AS papers, since there is more scope to ask level 2 maths calculations on Paper 1 than on Paper 2.



## Level 2 Maths in calculations

Not all marks in calculations are justified as Level 2 Maths

Level 2 Maths is characterised by:

- ❖ having to select data from that provided in the question
- ❖ changing units, e.g. from  $\text{cm}^3$  to  $\text{dm}^3$ , kPa to Pa
- ❖ conversion to and from standard form e.g. 0.040 and  $4.0 \times 10^{-2}$
- ❖ rearrangement of a complex expression e.g.  $pV=nRT$
- ❖ multi-step calculations
- ❖ quoting a final answer to an appropriate number of significant figures
- ❖ absence of scaffolding

Some individual marks in calculations may not be Level 2 in isolation, but they might be if either:

- there is repetition of a simple calculation for 1 mark – eg calculating an amount in moles for three substances

or

- the steps are part of a complex overall strategy



## Level 2 Maths in calculations

**Here is an example of a calculation question in the SAMs.**

A 0.161 g sample of sodium peroxide was reacted with water.



The hydrogen peroxide produced was determined by titration with a solution containing cerium(IV) ions. In this reaction the hydrogen peroxide is converted into oxygen.



The solution reacted with exactly 19.85 cm<sup>3</sup> of a 0.208 mol dm<sup>-3</sup> solution of cerium(IV) ions, Ce<sup>4+</sup>.

Deduce the formula of the cerium ion present in the final solution.

Support your answer with a calculation. (4)

**The mark scheme shows how the marks are awarded.**

- calculation of amount of Na<sub>2</sub>O<sub>2</sub>
- calculation of amount of Ce<sup>4+</sup>
- determination of the ratio Na<sub>2</sub>O<sub>2</sub> : Ce<sup>4+</sup>
- formula of cerium ion is Ce<sup>3+</sup>

Look at Activity 3.3 in the GRTT Delegate Booklet.



## Level 2 Maths in calculations

Example of answer:

- $n(\text{Na}_2\text{O}_2) = 0.161 \div 78.0 = 0.0020641 \text{ (mol)}$
- $n(\text{Ce}^{4+}) = 0.208 \times \frac{19.85}{1000} = 0.004129 \text{ (mol)}$
- $n(\text{Na}_2\text{O}_2) : n(\text{Ce}^{4+}) = 0.0020641 : 0.004129 = 1 : 2$
- Formula of cerium ion is  $\text{Ce}^{3+}$

Consider which of the four bulleted steps count as Level 2 maths.

It is not easy to be sure which marks in a given question are Level 2 maths because it depends on the context and the extent to which candidates need to consider a strategy. In this example, considering each mark in isolation:

- 1<sup>st</sup> mark not L2M because it involves only substituting two numbers into a familiar expression and pressing the correct buttons on the calculator
- 2<sup>nd</sup> mark definitely L2M because of conversion of volume unit
- 3<sup>rd</sup> mark probably not L2M because of simple division of one number by another
- 4<sup>th</sup> mark not L2M because the maths needed is straightforward, even though the chemistry is challenging

The final step is chemically challenging but not mathematically demanding:

the equations show that  $\text{Na}_2\text{O}_2 \equiv \text{H}_2\text{O}_2$  and  $\text{H}_2\text{O}_2 \equiv 2\text{e}^-$  therefore as the electrons produced react with  $2\text{Ce}^{4+}$  then each  $\text{Ce}^{4+}$  ion gains  $1\text{e}^-$  so forms  $\text{Ce}^{3+}$  ion

However, given the need for students to develop a multi-step complex strategy, it is likely that Ofqual would accept that more than the 2<sup>nd</sup> mark



as L2M



## Command words

The specification includes three only. These are:

- ❖ know
- ❖ understand
- ❖ be able to

Question papers use a wide range – see Appendix 7

- ❖ Some will be used more than others
- ❖ Worth clarifying common examples for your students – for example, the difference between Explain and Give a reason why

Some command words are likely to appear very frequently, eg calculate, describe, explain, state

Some command words are likely to be used rarely, eg assess, criticise



## "Explain why/how" vs "Explain"

Examples from SAMs:

Explain why stereoisomerism occurs in alkenes. (2)

- ❖ The statement that stereoisomerism occurs in alkenes appears in the question
- ❖ Both marks are for the explanation

Explain the trend in the thermal stability of carbonates in Group 2. (3)

- ❖ Even though the question does not ask for the trend to be stated, this is the 1<sup>st</sup> mark
- ❖ 2<sup>nd</sup> and 3<sup>rd</sup> marks are for the explanation

In the second example, in the current specification, the question might have included two command words (State and explain ...), and these might have appeared as prompts on the answer lines.

**NOTE:** 'State and explain' are unlikely to be used in conjunction with one another in questions.



## Extended response questions

Look at Question 3 from AS Paper 2 in the SAMs.

This is an example of an extended response question that is marked by consideration of both indicative content and the ability to relate together the concepts involved.

Use the mark scheme provided to mark the responses from Student A and Student B on the next slide

Look at Activity 3.4 in the GRTT Delegate Booklet



## Extended response questions

### Student A

The lowering of the temperature to 1000 °K means that the reaction is slower which is a disadvantage. The advantage is that there will be a bigger yield. This is because the reaction is exothermic so the reaction moves to oppose the change.

### Student B

When the temperature is decreased there are fewer collisions per minute between the molecules which means the rate is slower. The reaction is exothermic, so the ~~increased~~ decreased temperature causes a higher yield.

### Sample Answer A

M1, M4 and M5 scored

3 indicative marking points = 2 marks

Structure/lines of reasoning marks:

M4 and M5 linked by 'because', but no linkage for reaction rate points

1 mark for structure/lines of reasoning

Total mark = 2 + 1 = 3

### Sample Answer B

M1, M3, M4 and M5 scored

4 indicative marking points = 3 marks

Structure/lines of reasoning marks:

M1 and M3 are linked

M4 and M5 are linked

2 marks for structure/lines of reasoning

Total mark = 3 + 2 = 5



## Tracking progress

You will probably want your students to do

- ❖ End of topic tests
- ❖ 'Mock' exams

You can use

- ❖ Exam Wizard
- ❖ Results Plus – see next slide

You can find them via this link:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/chemistry-2015/teaching-support/tracking-progress.html>



## Tracking progress

### ResultsPlus

[www.edexcel.com/resultsplus](http://www.edexcel.com/resultsplus)

- ❖ Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance
- ❖ see your students' scores for every exam question
- ❖ understand how your students' performance compares with Edexcel national averages

ResultsPlus is Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance.

Here you can see your students' scores for every exam question and understand how your students' performance compares with Edexcel national averages.



## Support

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For more information, please contact:

- ❖ subject advisors ([TeachingScience@pearson.com](mailto:TeachingScience@pearson.com))
- ❖ subjects pages/communities
- ❖ [Ask the expert](#)

The root of all assistance is the Edexcel Chemistry subject website:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/chemistry-2015.html>

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Ask the Expert is at this URL:

<http://qualifications.pearson.com/en/support/support-for-you/teachers/contact-us.html>





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