Pearson Edexcel

International GCSE

Chemistry (9–1)

Getting Started Guide

Pearson Edexcel International GCSE in Chemistry (4CH1)

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Issue 2

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Through initiatives such as onscreen marking and administration, Pearson is leading the way in using technology to modernise educational assessment, and to support teachers and learners.
This guide is Issue 2. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson Edexcel website:
https://qualifications.pearson.com/

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Chemistry (2017) (4CH1)
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Introduction

This Getting Started Guide provides an overview of our International GCSE Chemistry (2017) qualification, to help you get to grips with the changes to content and assessment, and to help you understand what these mean for you and your learners.

Our package of support to help you plan and implement the specification includes:

Planning

We will provide a course planner and an editable scheme of work that you can adapt to suit your department. We also provide training for international and UK-based schools.

Teaching and learning

To support you in delivering this new specification, we will provide suggested resource lists and suggested activities.

Understanding the standard

Sample Assessment Materials and Extra Assessment Materials will be provided.

Tracking learner progress

ResultsPlus provides the most detailed analysis available of your students' examination performance. It can help you identify topics and skills where students could benefit from further learning. We will also offer examWizard, which is a free exam preparation tool containing a bank of past Edexcel exam questions, mark schemes and examiners' reports for a range of GCSE and GCE subjects.

Support

Our subject advisor ensures that you receive help and guidance from us. You can sign up to receive updates at https://qualifications.pearson.com/en/forms/subject-advisor-updates-for-teachers-andtutors.html or contact us using the support portal https://support.pearson.com/uk/s/qualificationcontactus.

Key features of the qualification

Why choose Pearson Edexcel International GCSE in Chemistry (2017)?

We have listened to feedback from all parts of the international school, UK independent school and language teaching community including a large number of teachers. We have made changes that will engage students and give them skills that will support progression to further study in chemistry and a range of other subjects, in chemical sciences and elsewhere. Our content and assessment approach has been designed to meet students' needs and be consistent with our approach across the sciences.

Key qualification features

At Pearson, we offer separate science linear (2017) and modular qualifications in Biology, Chemistry and Physics, as well as Double Award Science qualification – these have been designed to meet different learners' needs. The content and assessment approach for this qualification has been designed to maintain the rigorous standards of all Pearson Edexcel qualifications and meet learner needs in the following ways:

- Content that is interesting and engaging for learners but is also designed to ensure good preparation, both for those continuing to further study and for those wishing to work in a chemistry-related field.
- There are opportunities to 'localise' the content to make it more relevant for learners in their own country.

Assessment structure

- The Pearson Edexcel International GCSE in Physics (2017) is a linear qualification. Two untiered written examinations must be taken in the same series at the end of the course of study. The assessment model has two papers. Paper 1 is 2 hours long and assesses core (non-bold) content from across the specification. Paper 2 is 1 hour and 15 minutes long and assesses a range of sub-topics (bold content) in greater detail in addition to the core content. Both papers will have a range of question styles and calculators can be used in both papers. Practical skills will be assessed through the written papers; there is no coursework or practical exam.

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Clear and straightforward question papers

- Our question papers are clear and accessible for all learners of all ability ranges and learning styles. Our mark schemes are straightforward, so that the assessment requirements are clear.

Broad and deep development of learners' skills

- The design of the international GCSEs aims to extend learners' knowledge and understanding by broadening and deepening skills, for example learners develop the ability to:
  - focus on practical skills through a number of practicals listed in the specification content. These can be supplemented with other suggested practicals. The skills developed will be assessed through questions in written examinations.
  - improve learners' analytical and logic skills by applying understanding of scientific concepts and principles to a range of situations. This will include some examination questions that are more problem solving in style
  - address the need for mathematical skills to complement learners' biology skills by covering a range of mathematical areas.

Progression

International GCSE qualifications enable successful progression to A Level and beyond. Through our development process we have consulted with International Advanced Level and GCE A-Level teachers as well as higher education professors to validate the appropriateness of the qualification, including its content, skills development and assessment structure.

Courses to suit your learners' needs and interests

Teachers of chemistry have a choice of International GCSE courses to deliver, each giving different levels of depth to meet learners' needs. As well as the Pearson Edexcel International GCSE in Chemistry (2017), learners can also be taught our International GCSE in Chemistry (Modular), International GCSE in Science (Double Award) (2017) and International GCSE in Science (Double Award) (Modular). The Science (Double Award) course offers a reduced amount of content but is assessed to the same standard. Progression routes for this course may vary slightly from those for the Pearson Edexcel International GCSE in Chemistry.

More information about all our qualifications can be found on our Edexcel International GCSE pages at qualifications.pearson.com

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Qualification overview

Chemistry Paper 1	*Paper code 4CH1/1C and 4SD0/1C
• Externally assessed • Availability: November and June • First assessment: June 2019	61.1% of the total International GCSE

Content summary

Assesses core content that is **not** in bold and does not have a 'C' reference. Questions may come from any topic area across the specification.

1 Principles of chemistry

2 Inorganic chemistry

3 Physical chemistry

4 Organic chemistry

Assessment

- The paper is assessed through a 2-hour written examination paper set and marked by Pearson.
- The total number of marks is 110.
- A mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.
- A calculator may be used in the examinations.

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Chemistry Paper 2	*Paper code 4CH1/2C
• Externally assessed • Availability: November and June • First assessment: June 2019	38.9% of the total International GCSE

Content summary

Assesses **all the content**, including content that is in bold and has a 'C' reference.
Questions may come from any topic area across the specification.
Bold statements cover some sub-topics in greater depth.

1 Principles of chemistry

2 Inorganic chemistry

3 Physical chemistry

4 Organic chemistry

Assessment

- The paper is assessed through a 1-hour and 15-minute written examination paper set and marked by Pearson.
- The total number of marks is 70.
- A mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.
- A calculator may be used in the examinations.

Content overview

The specification content is divided into the topics, to provide centres with a clear view of what is required. Each topic is then divided into a number of key ideas (sub-topics) that give a focus to the content. Each key idea is broken down into detailed content that specifies what must be studied. The word 'including' in the content specifies the detail of what must be covered. Examination questions will be based on this content.

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Qualification aims

The aims and objectives of this qualification are to enable learners to:

- learn about unifying patterns and themes in chemistry and use them in new and changing situations
- acquire knowledge and understanding of chemical facts, terminology, concepts, principles and practical techniques
- apply the principles and concepts of chemistry, including those related to the applications of chemistry, to different contexts
- evaluate chemical information, making judgements on the basis of this information
- appreciate the practical nature of chemistry, developing experimental and investigative skills based on correct and safe laboratory techniques
- analyse, interpret and evaluate data and experimental methods, drawing conclusions that are consistent with evidence from experimental activities and suggesting possible improvements and further investigations
- recognise the importance of accurate experimental work and reporting scientific methods in chemistry
- select, organise and present relevant information clearly and logically using appropriate vocabulary, definitions and conventions
- develop a logical approach to problem solving in a wider context.
- select and apply appropriate areas of mathematics relevant to chemistry as set out under each topic
- prepare for more advanced courses in chemistry and for other courses that require knowledge of chemistry.

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.

The skills developed through these and other practicals will be assessed through written examinations. In the assessment of experimental skills, learners 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
- 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
- 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.

Our practical investigations are embedded within the Chemistry content as specification points in italics, and are summarized below:

Core	Separate
1.13 practical: investigate paper chromatography using inks/food colourings *1.36 practical: know how to determine the formula of a metal oxide by combustion (e.g. magnesium oxide) or by reduction (e.g. copper(II) oxide)* *2.14 practical: determine the approximate percentage by volume of oxygen in air using a metal or a non-metal* *2.21 practical: investigate reactions between dilute hydrochloric and sulfuric acids and metals (e.g. magnesium, zinc and iron)* *2.42 practical: prepare a sample of pure, dry hydrated copper(II) sulfate crystals starting from copper(II) oxide* *3.8 practical: investigate temperature changes accompanying some of the following types of change:* • *salts dissolving in water* • *neutralisation reactions* • *displacement reactions*	*1.7C practical: investigate the solubility of a solid in water at a specific temperature* *1.60C practical: investigate the electrolysis of aqueous solutions* *2.43C practical: prepare a sample of pure, dry lead(II) sulfate* *4.43C practical: prepare a sample of an ester such as ethyl ethanoate*

• *combustion reactions.* *3.15 practical: investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid* *3.16 practical: investigate the effect of different solids on the catalytic decomposition of hydrogen peroxide solution*	

Suggested practical investigations

The following suggestions are additional practical investigations that exemplify the scientific process. They can be used to supplement learners' understanding of chemistry in addition to the practical investigations found within the main body of the content.

- Investigate the ease of thermal decomposition of carbonates, including calcium carbonate, zinc carbonate and copper carbonate.
- Compare the temperature rise produced when the same volume of water is heated by different fuels.
- Investigate the volume of air used up and products formed when candles are burned.
- Investigate the reactions of calcium compounds: the decomposition of calcium carbonate and the reaction of calcium oxide with water; the reaction of calcium carbonate with acid.
- Carry out simple neutralisation reactions of acids, using metal oxides, hydroxides and/or carbonates.
- Carry out electrolysis of sea water/acidified water.
- Investigate the rusting of iron.
- Investigate simple oxidation and reduction reactions, such as burning elements in oxygen or competition reactions between metals and metal oxides.
- Investigate the fractional distillation of synthetic crude oil and the ease of ignition and viscosity of the fractions.
- Investigate the products produced from the complete combustion of a hydrocarbon.
- Investigate the cracking of paraffin oil.
- Investigate the properties of a group of elements, e.g. Group 2.
- Investigate the properties of typical ionic compounds.
- Test predictions of whether a precipitate forms when soluble salts are mixed.
- Carry out a series of ion tests to identify unknown compounds.
- Build models of simple covalent molecules.
- Investigate the typical properties of simple and giant covalent compounds.

- Investigate the rate of reactions, such as magnesium and hydrochloric acid; or sodium thiosulfate and hydrochloric acid.
- Determine the formula of a hydrated salt such as barium chloride or copper sulfate by heating to drive off water of crystallisation.
- Prepare a substance and calculate the % yield, given the theoretical yield.
- Evaporate a solution to dryness to determine the mass of solute in a given mass of solution.
- Investigate the mass changes at the electrodes during the electrolysis of copper sulfate solution using copper electrodes.
- Investigate the migration of ions in, e.g. potassium manganate (VII) solution.
- Electroplate a metal object.
- Determine the volume of one mole of hydrogen gas by using the reaction of magnesium with hydrochloric acid.
- Determine the molar volume by measuring the volume and mass of a gas (e.g. carbon dioxide).
- Investigate simple reversible reactions, such as the decomposition of ammonium chloride.

Safety is an overriding requirement for all practical work. Centres are responsible for ensuring that whenever their learners complete practical work appropriate safety procedures are followed.

Mathematical skills

The table below identifies the mathematical skills that will be developed and assessed throughout this qualification. These are not explicitly referenced in the content. Details of the mathematical skills in other science subjects are given for reference:

		B	C	P
1	**Arithmetic and numerical computation**			
A	Recognise and use numbers in decimal form	✓	✓	✓
B	Recognise and use numbers in standard form	✓	✓	✓
C	Use ratios, fractions, percentages, powers and roots	✓	✓	✓
D	Make estimates of the results of simple calculations, without using a calculator	✓		✓
E	Use calculators to handle sin x and sin-1 x, where x is expressed in degrees			✓
2	**Handling data**			
A	Use an appropriate number of significant figures	✓	✓	✓
B	Understand and find the arithmetic mean (average)	✓	✓	✓
C	Construct and interpret bar charts	✓	✓	✓
D	Construct and interpret frequency tables, diagrams and histograms	✓		✓
E	Understand the principles of sampling as applied to scientific data	✓		
F	Understand simple probability	✓	✓	✓
G	Understand the terms mode and median	✓		
H	Use a scatter diagram to identify a pattern or trend between two variables	✓	✓	✓
I	Make order of magnitude calculations	✓	✓	✓
3	**Algebra**			
A	Understand and use the symbols <, >, ∝, ~		✓	✓
B	Change the subject of an equation	✓	✓	✓
C	Substitute numerical values into algebraic equations using appropriate units for physical quantities	✓	✓	✓
D	Solve simple algebraic equations	✓	✓	✓
4	**Graphs**			
A	Translate information between graphical and numerical form	✓	✓	✓
B	Understand that $y = mx + c$ represents a linear relationship		✓	✓
C	Plot two variables (discrete and continuous) from experimental or other data	✓	✓	✓
D	Determine the slope and intercept of a linear graph	✓	✓	✓
E	Understand, draw and use the slope of a tangent to a curve as a measure of rate of change		✓	✓
F	Understand the physical significance of area between a curve and the *x*-axis, and measure it by counting squares as appropriate			✓

		B	C	P
5	**Geometry and trigonometry**			
A	Use angular measures in degrees			✓
B	Visualise and represent 2D and 3D objects, including two dimensional representations of 3D objects			✓
C	Calculate areas of triangles and rectangles, surface areas and volumes of cubes	✓		✓

The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

Key

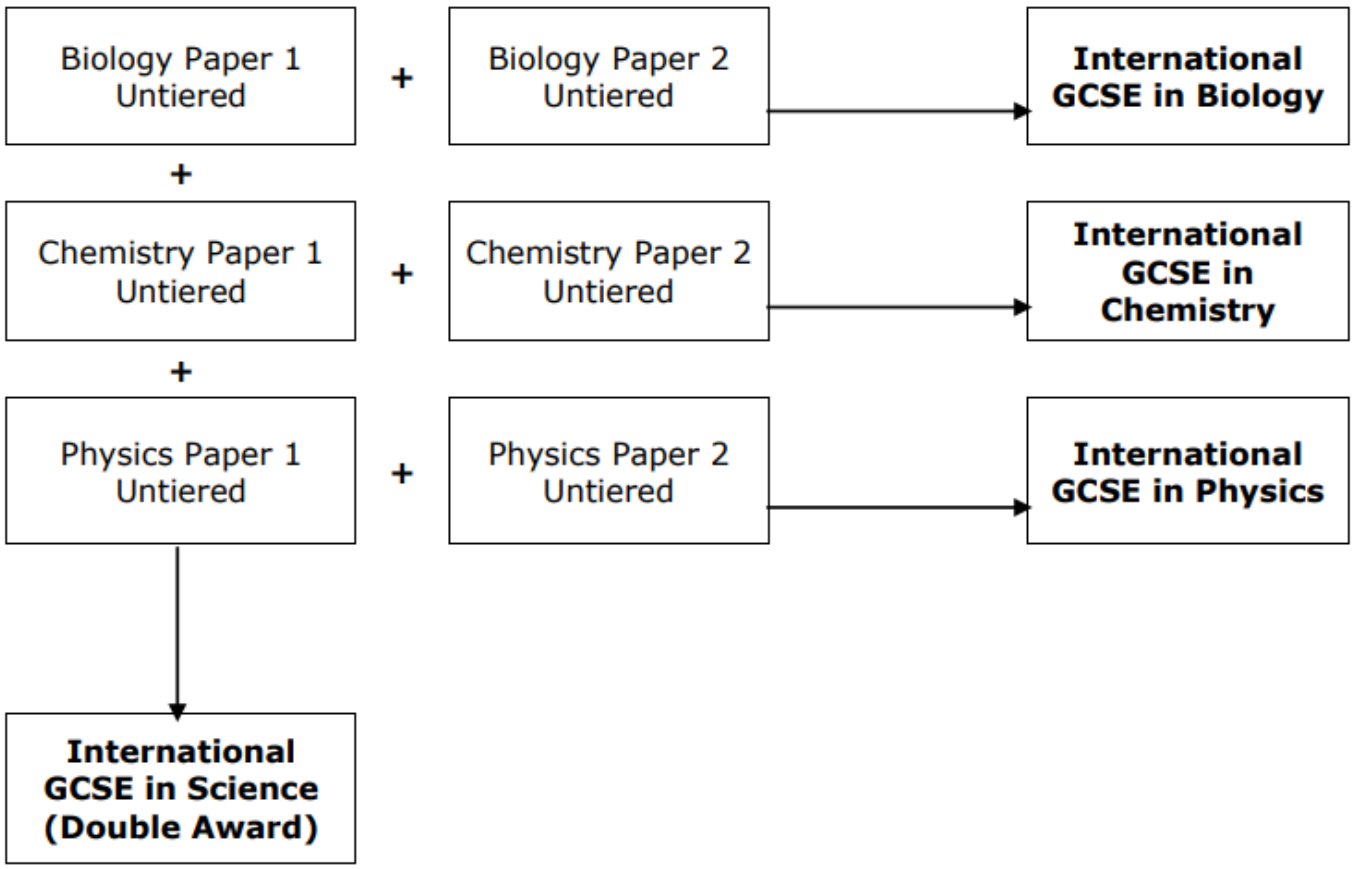
relative atomic mass
atomic symbol
name
atomic (proton) number

**** The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.***

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.

Assessment guidance

How assessment relates to the qualification is demonstrated below



A Pearson Edexcel International GCSE in Science (Single Award) qualification is also available. This will cover approximately 50 per cent of the Pearson Edexcel International GCSE in Science (Double Award) specification, while still having a comparable level of rigour and demand.

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Assessment requirements

Paper number	Level	Assessment information	Number of marks allocated in the paper
Paper 1C	1/2	Assessed through a 2-hour written examination set and marked by Pearson. The paper is weighted at 61.1% of the qualification. A mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions. Assesses the content that is **not** in bold and does not have a 'C' reference. Questions may come from any topic area across the specification.	110
Paper 2C	1/2	Assessed through a 1-hour and 15-minute written examination set and marked by Pearson. The paper is weighted at 38.9% of the qualification. A mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions. Assesses **all the content**, including content that is in bold and has a 'C' reference. Questions may come from any topic area across the specification. Bold statements cover some sub-topics in greater depth.	70

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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%

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%

Sample assessment materials

Sample unit assessments and mark schemes can be found in the Pearson Edexcel International GCSE Chemistry Sample Assessment Materials (SAMs) document.

Calculators

Learners will be expected to have access to a suitable electronic calculator for all unit assessments. Calculators that allow for the retrieval of text or formulae or QWERTY keyboards will not be allowed for use in examinations.

Command word taxonomy

This table lists the command words that could be used in the examinations for this qualification and their definitions

Command word	Definition
Add/Label	Requires the addition or labelling of a stimulus material given in the question, for example labelling a diagram or adding units to a table.
Calculate	Obtain a numerical answer, showing relevant working.
Comment on	Requires the synthesis of a number of variables from data/information to form a judgement.
Complete	Requires the completion of a table/diagram.
Deduce	Draw/reach conclusion(s) from the information provided.
Describe	To give an account of something. Statements in the response need to be developed, as they are often linked but **do not** need to include a justification or reason.
Determine	The answer must have an element that is quantitative from the stimulus provided, or must show how the answer can be reached quantitatively. To gain maximum marks, there must be a quantitative element to the answer.
Design	Plan or invent a procedure from existing principles/ideas.
Discuss	• Identify the issue/situation/problem/ argument that is being assessed within the question. • Explore all aspects of an issue/situation/problem/ argument. • Investigate the issue/situation etc. by reasoning or argument.
Draw	Produce a diagram either using a ruler or freehand.
Estimate	Find an approximate value, number or quantity from a diagram/given data or through a calculation.
Evaluate	Review information (e.g. data, methods) then bring it together to form a conclusion, drawing on evidence including strengths, weaknesses, alternative actions, relevant data or information. Come to a supported judgement of a subject's quality and relate it to its context.
Explain	An explanation requires a justification/exemplification of a point. The answer must contain some element of reasoning/justification – this can include mathematical explanations.
Give/State/Name	All of these command words are really synonyms. They generally all require recall of one or more pieces of information.
Give a reason/reasons	When a statement has been made and the requirement is only to give the reason(s) why.
Identify	Usually requires some key information to be selected from a given stimulus/resource.
Justify	Give evidence to support (either the statement given in the question or an earlier answer).

Command word	Definition
Plot	Produce a graph by marking points accurately on a grid from data that is provided and then draw a line of best fit through these points. A suitable scale and appropriately labelled axes must be included if these are not provided in the question.
Predict	Give an expected result.
Show that	Verify the statement given in the question.
Sketch	Produce a freehand drawing. For a graph, this would need a line and labelled axes with important features indicated. The axes are not scaled.
State what is meant by	When the meaning of a term is expected but there are different ways for how these can be described.
Suggest	Use your knowledge to propose a solution to a problem in a novel context.
Verb proceeding a command word	
Analyse the data/graph to explain	Examine the data/graph in detail to provide an explanation.
Multiple choice questions	
What, Why, Which	Direct command words used for multiple-choice questions.

Planning

We have provided a course planner and an editable scheme of work to support you in delivering this qualification.

This section contains a 2-year course planner for the International GCSE Chemistry (2017) qualification. It follows the specification and scheme of work to cover each of the units.

The course planner summarises what can be covered in each term to enable completion of the content and preparation for assessment at the end of each year. It assumes that each year is split into 3 terms and that each week accounts for roughly 2 Guided Learning Hours over 60 weeks of teaching to give a total of 120 hours for the Chemistry (2017).

This is only a suggested course planner with suggested timings, and it does not need to be followed. You may decide to start teaching content earlier if you would like more time.

Year	Term	Week	Topic/Sub-topic	Spec points/practicals
1	1	1	Section 1: Principles of chemistry a) States of matter	1.1, 1.2, 1.3, 1.4
1	1	2	a) States of matter b) Elements, compounds and mixtures	1.5C, 1.6C, 1.7C, 1.8, 1.9 *Practical: investigate the solubility of a solid in water at a specific temperature*
1	1	3	b) Elements, compounds and mixtures	1.10
1	1	4	b) Elements, compounds and mixtures	1.10, 1.11, 1.12, 1.13 *Practical: investigate paper chromatography using inks/food colourings*
1	1	5	c) Atomic structure	1.14, 1.15, 1.16, 1.17
1	1	6	Consolidation Assessment	

1	1	7	Feedback d) The Periodic Table	1.18, 1.19, 1.20, 1.21
1	1	8	d) The Periodic Table f) Ionic bonding	1.22, 1.23, 1.24, 1.37, 1.38
1	1	9	f) Ionic bonding	1.39, 1.40, 1.41, 1.42, 1.43
1	1	10	g) Covalent bonding	1.44, 1.45, 1.46, 1.47, 1.48
1	1	11	g) Covalent bonding e) Chemical formulae, equations and calculations	1.25, 1.26, 1.49, 1.50, 1.51
1	2	1	Consolidation Assessment	
1	2	2	Feedback Section 2: Inorganic chemistry a) Group 1 (alkali metals)	2.1, 2.2
1	2	3	a) Group 1 (alkali metals) b) Group 7 (halogens)	2.3, **2.4C**, 2.5, 2.6
1	2	4	b) Group 7 (halogens) c) Gases in the atmosphere	2.7, **2.8C**, 2.9, 2.10
1	2	5	c) Gases in the atmosphere	2.13, 2.14 *Practical: determine the approximate percentage by volume of oxygen in air using a metal or non-metal*
1	2	6	c) Gases in the atmosphere Consolidation	2.11, 2.12
1	2	7	Assessment Feedback	
1	2	8	d) Reactivity series	2.15, 2.17, 2.21 *Practical: investigate reactions between dilute hydrochloric and sulfuric acids and metals (e.g. magnesium, zinc and iron)*

1	2	9	d) Reactivity series	2.16, 2.18, 2.19, 2.20
1	2	10	e) Extraction and uses of metals Section 1: Principles of chemistry h) Metallic bonding	**1.52C, 1.53C, 1.54C, 2.22C, 2.23C, 2.24C**
1	3	1	Section 2: Inorganic chemistry e) Extraction and uses of metals f) Acids, alkalis and titrations	**2.25C, 2.26C, 2.27C**, 2.28, 2.29, 2.30, 2.31
1	3	2	f) Acids, alkalis and titrations Consolidation	2.32, **2.33C**
1	3	3	Assessment Feedback	
1	3	4	g) Acids, bases and salt preparations	2.34, 2.35, 2.36, 2.37, 2.38
1	3	5	g) Acids, bases and salt preparations	2.39, **2.40C**, 2.42 *Practical: prepare a sample of pure, dry hydrated copper(II) sulfate crystals starting from copper(II) oxide*
1	3	6	g) Acids, bases and salt preparations h) Chemical tests	2.41C, **2.43C**, 2.44 ***Practical: prepare a sample of pure, dry lead(II) sulfate***
1	3	7	h) Chemical tests	2.45, 2.46, 2.47, 2.48, 2.49, 2.50
1	3	8	Consolidation Assessment	
1	3	9	Feedback Section 1: Principles of chemistry e) Chemical formulae, equations and calculations	1.27, 1.28

1	3	10	e) Chemical formulae, equations and calculations	1.29, 1.30, 1.31, 1.32, 1.33
2	1	1	e) Chemical formulae, equations and calculations	1.34C, 1.36 *Practical: know how to determine the formula of a metal oxide by combustion (e.g. magnesium oxide) or by reduction (e.g. copper(II) oxide)*
2	1	2	e) Chemical formulae, equations and calculations Consolidation	1.35C
2	1	3	Assessment Feedback	
2	1	4	Section 3: Physical chemistry a) Energetics	3.1, 3.2, 3.3, 3.4, 3.8 *Practical: investigate temperature changes accompanying some of the following types of change:* • *Salts dissolving in water* • *Neutralisation reactions*
2	1	5	a) Energetics	3.2, 3.3, 3.4, 3.5C, 3.8 *Practical: investigate temperature changes accompanying some of the following types of change:* • *Displacement reactions* • *Combustion reactions*
2	1	6	a) Energetics Consolidation	3.6C, 3.7C
2	1	7	Assessment Feedback	
2	1	8	Section 4: Organic chemistry a) Introduction	4.1, 4.2, 4.3, 4.4, 4.5
2	1	9	b) Crude oil	4.6, 4.7, 4.8, 4.9, 4.10
2	1	10	b) Crude oil	4.11, 4.12, 4.13, 4.14, 4.15, 4.16

2	1	11	b) Crude oil Section 3: Physical chemistry b) Rates of reaction	3.9, 3.10, 3.11, 4.17, 4.18
2	2	1	b) Rates of reaction	3.12, 3.13, **3.14C**, 3.15, 3.16 *Practical: investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid* *Practical: investigate the effect of different solids on the catalytic decomposition of hydrogen peroxide solution.*
2	2	2	Consolidation Assessment	
2	2	3	Feedback c) Reversible reactions and equilibria	3.17, 3.18, **3.19C, 3.20C**
2	2	4	c) Reversible reactions and equilibria	**3.22C, 3.21C**
2	2	5	Section 4: Organic chemistry c) Alkanes	4.19, 4.20, 4.21, 4.22
2	2	6	d) Alkenes	4.23, 4.24, 4.25, 4.26, 4.27, 4.28
2	2	7	e) Alcohols	**4.29C, 4.30C, 4.31C**
2	2	8	e) Alcohols	**4.32C, 4.33C**
2	2	9	Consolidation Assessment	
2	2	10	Feedback f) Carboxylic acids	**4.34C, 4.35C, 4.37C**

2	3	1	f) Carboxylic acids g) Esters	4.36C, 4.38C, 4.39C, 4.40C, 4.41C, 4.42C
2	3	2	g) Esters h) Synthetic polymers	4.43C, 4.44, 4.45, 4.46 *Practical: prepare a sample of an ester such as ethyl ethanoate*
2	3	3	h) Synthetic polymers	4.47, 4.48C, 4.49C, 4.50C
2	3	4	Section 1: Principles of chemistry i) Electrolysis	1.55C, 1.56C, 1.57C, 1.58C, 1.59C, 1.60C *Practical: investigate the electrolysis of aqueous solution*
2	3	5	Consolidation Assessment	
2	3		Feedback and revision	

We also have a dedicated scheme of work for this qualification here.

Delivery of the qualification – transferable skills

The need for transferable skills

In recent years, higher education institutions and employers have consistently flagged the need for learners to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work.

The Organisation for Economic Co-operation and Development (OECD) defines skills, or competencies, as 'the bundle of knowledge, attributes and capacities that can be learned and that enable individuals to successfully and consistently perform an activity or task and can be built upon and extended through learning.'[1]

To support the design of our qualifications, the Pearson Research Team selected and evaluated seven global 21st-century skills frameworks. Following on from this process, we identified the National Research Council's (NRC) framework [2] as the most evidence-based and robust skills framework, and have used this as a basis for our adapted skills framework.

The framework includes cognitive, intrapersonal skills and interpersonal skills.

The NRC framework is included alongside literacy and numeracy skills.

The skills have been interpreted for this specification to ensure they are appropriate for the subject. All of the skills listed are evident or accessible in the teaching, learning and / or assessment of the qualification. Some skills are directly assessed. Pearson materials will support you in identifying these skills and developing these skills in learners.

A full subject interpretation of each skill, with mapping to show opportunities for learner development is given on the subject pages of our website: qualifications.pearson.com

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