Cambridge Assessment International Education

Comparison guide for Cambridge Pre-U Chemistry 9791

Cambridge Pre-U Chemistry 9791
Cambridge International AS & A Level Chemistry 9701
OCR AS/A Level GCE Chemistry H032/H432 and Chemistry (Salters) H033/H433

Introduction

Cambridge International has mapped the assessment objectives, methodology of assessment and topics of Cambridge Pre-U Chemistry 9791 to Cambridge International AS & A Level Chemistry 9701 and OCR AS/A Level GCE Chemistry H032/H432 and Chemistry (Salters) H033/H433 syllabuses for examination in 2022. When comparing the topics, the expressions below have been used to give an indication of overlap between the syllabuses:

- Topic coverage is **identical** to the Cambridge Pre-U syllabus.
- Topic coverage is **almost identical**. Slight differences are stated.
- Topic coverage is **similar**. Differences are stated.
- This topic is **not covered** in this syllabus.

Brief summary

For many topics, the syllabuses being compared with the Cambridge Pre-U syllabus were found to have similar or near identical coverage. The learning objectives (LOs) coverage was spread amongst different numbered topics, rather than being found in one as per the Cambridge Pre-U syllabus. For example: Pre-U A1.4 section comprised of 8 LOs are covered in the Cambridge International AS & A Level syllabus in three different sections (5, 23 and 26).

Cambridge International AS & A Level syllabus has almost identical coverage of assessment objectives to that of the Cambridge Pre-U syllabus. The OCR syllabuses (Chemistry A and B) are not presented in the detail as that found in the Cambridge Pre-U syllabus and relies on the interpretation of the overarching themes rather than specific comparable learning objectives.

Assessment objectives

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE
Assessment objectives (AOs)		
AO1 Knowledge with understanding • scientific phenomena, facts, laws, definitions, quantities, principles, concepts and theories and the relationships and models used to explain them • scientific vocabulary, terminology and conventions (including symbols, quantities and units) • scientific instruments, apparatus and methods, and their uses • scientific developments and the methodology used to develop knowledge.	**AO1 Knowledge with understanding** • scientific phenomena, facts, laws, definitions, concepts and theories • scientific vocabulary, terminology and conventions (including symbols, quantities and units) • scientific instruments and apparatus, including techniques of operation and aspects of safety • scientific quantities and their determination • scientific and technological applications with their social, economic and environmental implications • reasoned explanations for phenomena, patterns and relationships.	**AO1 Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures.**
AO2 Application of knowledge and problem solving • select, organise, interpret and present scientific information • translate information from one form to another (including manipulating numerical and other data) • analyse scientific information by identifying and explaining patterns and trends, drawing inferences and conclusions and constructing arguments • evaluate scientific information in terms of validity, accuracy and precision • apply and synthesise scientific skills, knowledge and understanding to solve problems and explain phenomena.	**AO2 Handling, applying and evaluating information** • locate, select, organise and present information from a variety of sources • translate information from one form to another • manipulate numerical and other data • use information to identify patterns, report trends and draw conclusions. • give reasoned explanations for phenomena, patterns and relationships • make predictions and construct arguments to support hypotheses • make sense of new situations • evaluate hypotheses • demonstrate an awareness of the limitations of chemical theories and models • solve problems.	**AO2 Apply knowledge and understanding of scientific ideas, processes, techniques and procedures:** • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data.

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE
Assessment objectives (AOs)		
AO3 Experimental and investigative skills • plan scientific investigations • use scientific apparatus, methods and techniques skilfully and safely • make, record and communicate observations, measurements and methods methodically with appropriate clarity, precision and accuracy • manipulate, present and analyse raw data from scientific experiments and investigations • report findings and conclusions, supported by evidence • evaluate experimental methods, techniques, raw data and conclusions; identify limitations and suggest improvements.	**AO3 Experimental skills and investigations** • plan experiments and investigations • collect, record and present observations, measurements and estimates • analyse and interpret experimental data to reach conclusions • evaluate methods and quality of experimental data, and suggest improvements to experiments.	**AO3 Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to:** • make judgements and reach conclusions • develop and refine practical design and procedures.

Methodology of assessment

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE
Assessment		
• Paper 1 – 1 hour • Paper 2 – 2 hours 15 minutes • Paper 3 – 2 hours 15 minutes • Paper 4 – 2 hours (practical) All components are externally assessed	**AS Level** • Paper 1 – 1 hour • Paper 2 – 1 hour 15 minutes • Paper 3 – 2 hours (practical) **A Level** • Paper 1 – 1 hour • Paper 2 – 1 hour 15 minutes • Paper 3 – 2 hours (practical) • Paper 4 – 2 hours • Paper 5 – 1 hour 15 minutes All components are externally assessed	**AS Level** • Component 1 – 1 hour 30 minutes • Component 2 – 1 hour 30 minutes **A Level** • Component 1 – 2 hours 15 minutes • Component 2 – 2 hours 15 minutes • Component 3 – 1 hour 30 minutes • Component 4 – non-exam internal assessment All other components externally assessed

Topics

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
1 Physical chemistry			
A1.1 Introductory physical chemistry	Almost identical coverage Cambridge Pre-U syllabus specifies 'kinetic-molecular model' awareness which is not included in this syllabus, nor is collision theory.	Similar coverage Cambridge Pre-U syllabus includes a requirement for awareness of 'kinetic-molecular model' which is not included in this syllabus, nor is awareness of relative proton, electron and neutron relative charges and their behaviour in an electric field.	Similar coverage Cambridge Pre-U syllabus includes a requirement for awareness of 'kinetic-molecular model' which is not included in this syllabus, nor is awareness of relative proton, electron and neutron relative charges and their behaviour in an electric field.
A1.2 Atomic structure atomic shells, subshells, orbitals and electron spin • aufbau principle and electron configurations • periodic trends in atomic properties • ionisation energies	Almost identical coverage Cambridge Pre-U syllabus is more in-depth on a couple of aspects (e.g. shapes of d orbitals required in addition to s and p). Whilst filling of shells is discussed, knowledge and application of aufbau principle is not.	Similar coverage Cambridge Pre-U syllabus is much more comprehensive and in-depth on some aspects of this topic (e.g. Pre-U covers shapes of d orbitals in addition to s and p; concept of shielding; spin and spin-pairing; aufbau principle).	Similar coverage Cambridge Pre-U syllabus is much more comprehensive and in-depth on some aspects of this topic (e.g. Pre-U covers shapes of d orbitals in addition to s and p; concept of shielding; spin and spin-pairing; aufbau principle).
A1.3 Chemical forces molecular bonding and antibonding orbitals • σ and π bonds, bond order • molecular shape and bond angles • intermolecular forces	Similar coverage But Cambridge Pre-U syllabus has greater depth and coverage with respect to: bonding to bonding orbitals; molecular orbitals; deducing changes in geometry and bond angle during a chemical reaction; importance of van der Waals forces and hydrogen bonding in determining protein structure	Syllabus coverage <40% Pre-U addresses σ and π bonds; their relative strengths; bond order and qualitative relationship to bond length and strength; deduction of changes in geometry and bond angle during a chemical reaction and the importance of van der Waals and hydrogen bonding in determining protein structure.	Syllabus coverage <40% Pre-U addresses σ and π bonds; their relative strengths; bond order and qualitative relationship to bond length and strength; deduction of changes in geometry and bond angle during a chemical reaction and the importance of van der Waals and hydrogen bonding in determining protein structure.
A1.4 Energy changes • standard enthalpy changes and the link with temperature • Hess's law and Born-Haber cycles • reaction pathway diagrams, including the effect of catalysis.	Almost identical coverage Pre-U has greater depth and coverage on a couple of topics (e.g. requires statement of first law of thermodynamics; standard enthalpy change of vaporisation).	Similar coverage Pre-U has greater depth and coverage on a number of topics (e.g. requires statement of Hess's Law and first law of thermodynamics; standard enthalpy change of vaporisation). This syllabus refers to	Similar coverage Pre-U has greater depth and coverage on a number of topics (e.g. requires statement of Hess's Law and first law of thermodynamics; standard enthalpy change of vaporisation; interpretation and construction of reaction profiles and

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
		the Maxwell-Boltzmann distribution as just Boltzmann.	the effect of catalysts on reaction energy) This syllabus refers to the Maxwell-Boltzmann distribution as just Boltzmann.
B1.5 Free energy and entropy • entropy and standard entropy change • the second law of thermodynamics • the Gibbs energy equation and the equilibrium constant.	Similar coverage Cambridge Pre-U syllabus has greater depth and coverage requiring knowledge of entropy change of the surroundings; recall and application of the 2nd law of thermodynamics and use of equation that relates Gibbs free energy to the equilibrium constant $\Delta G = -RT \ln K_{eq.}$	Similar coverage Cambridge Pre-U syllabus has greater depth and coverage requiring knowledge of entropy change of the surroundings; recall and application of the 2nd law of thermodynamics and use of equation that relates Gibbs free energy to the equilibrium constant $\Delta G = -RT \ln K_{eq.}$	Syllabus coverage < 50% Cambridge Pre-U syllabus includes coverage of Gibbs Free energy equation; knowledge of entropy change of the surroundings; recall and application of the 2nd law of thermodynamics and use of equation that relates Gibbs free energy to the equilibrium constant $\Delta G = -RT \ln K_{eq.}$
B1.6 Equilibrium • equilibrium constants and Le Chatelier's principle • Brønsted-Lowry and Lewis theories of acids and bases • pH and buffers • oxidation number; quantitative electrolysis • standard electrode and cell potentials • electron flow in cells; Gibbs energy change.	Almost identical coverage This syllabus requires knowledge of the Nernst equation whereas Pre-U does not. The Cambridge Pre-U syllabus covers, in addition to the the Brønsted-Lowry theory, the Lewis theory of acids and basis; the difference between mono, di-, and triprotic (tribasic) acids; calculation of the pH of buffer solutions and knowledge of the hydrogen/oxygen fuel cell.	Similar coverage But Cambridge Pre-U syllabus has greater depth and coverage of some aspects of this topic. The Cambridge Pre-U syllabus includes and uses additional concepts, e.g. Faraday constant, Nernst equation, link between standard cell potential and Gibbs energy change. Examples of where the Cambridge Pre-U syllabus is more demanding include: the Lewis theory of acids and basis; the difference between mono, di-, and triprotic (tribasic) acids; ability to manipulate concepts and complete calculations, e.g. the pH of buffer solutions; quantities during electrolysis. Hydrogen fuel cells are included.	Less than 50% coverage But Cambridge Pre-U syllabus has greater depth and coverage of all aspects of this topic. The Cambridge Pre-U syllabus includes and uses all relevant concepts, e.g. Le Chatelier's principle, Faraday constant, Nernst equation, standard cell potential and Gibbs energy change; these are not included in the OCR syllabus. Examples of where the Cambridge Pre-U syllabus is more demanding include: knowledge of the Lewis theory of acids and basis; difference between mono, di-, and triprotic (tribasic) acids; ability to manipulate concepts and complete calculations, e.g. the pH of buffer solutions; quantities during electrolysis. Hydrogen fuel cells are included.

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
B1.7 Gases and kinetics • kinetic theory and ideal gases • rate of reaction, Arrhenius equation • homogeneous and heterogeneous catalysis • formulating rate equations from data; multi-step reaction mechanisms • rate-concentration and concentration-time dependence.	Almost identical coverage However, Pre-U is more in-depth on a couple of topics and demands greater skills in explanation and deduction. It also requires recall of Boyle's law, Charles law; Arrhenius equation and Boltzmann term, not specified in this syllabus.	Almost identical coverage However, Pre-U is more in-depth on a couple of topics and demands greater skills in explanation and deduction. It also requires recall of Boyle's law, Charles law; and Boltzmann term, not specified in this syllabus. Arrhenius equation is covered.	Similar coverage But Pre-U is more in-depth on several topics demanding greater understanding (e.g. rationalising the rate constant, the steric factor and Boltzmann term; multi-step reactions, predicting overall order of reactions) It also requires recall of Boyle's law, Charles law; Boltzmann term, not specified in this syllabus. Arrhenius equation is covered.
B1.8 Chemical models and evidence • the relationship between evidence, models and theories • the limitations of scientific models.	Similar coverage But not provided in the format of LOs within a discreet section as in Pre-U. Relevant content in syllabus 'Key concepts; Aims and Assessment objective AO2'.	Similar coverage But not provided in the format of LOs within a discreet section as in Pre-U. Relevant content included in Assessment objective AO3 and 'How Science Works (HSW)' sections which is a wider view of science in context, rather than just straightforward scientific enquiry.	Similar coverage But not provided in the format of LOs within a discreet section as in Pre-U. Relevant content included in Assessment objective AO3 and 'How Science Works (HSW)' sections which is a wider view of science in context, rather than just straightforward scientific enquiry.
2 Inorganic chemistry			
A2.1 Periodic Table • division of the Periodic Table by element and structure type • rationalisation and prediction of bonding type using the van Arkel diagram • periodic trends in physical and chemical properties.	Almost identical coverage However, Cambridge Pre-U syllabus specifies terms metalloids and allotropes. It also covers the prediction of bonding type and requires understanding and use of van Arkel diagrams.	Almost identical coverage However, Cambridge Pre-U syllabus specifies terms metalloids and allotropes. It also covers the prediction of bonding type and requires understanding and use of van Arkel diagrams.	Similar coverage Cambridge Pre-U syllabus is more in-depth and comprehensive on a number of topics. Specifically, the terms metalloids and appreciation of allotropes are used and required. The Cambridge Pre-U syllabus also covers oxidation number, prediction of bonding type and requires understanding in relation to and use of electronegativity *and* van Arkel diagrams.
A2.2 Main group chemistry (except Group 14) • thermal stability of carbonates	Similar coverage However, the Cambridge Pre-U syllabus combines in this one topic many different aspects of the	Syllabus coverage <40% The Cambridge Pre-U syllabus combines in this one topic several different aspects of the OCR	Similar coverage However, the Cambridge Pre-U syllabus combines in this one topic many different aspects of the OCR

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
• properties of nitrogen, phosphorus and ammonia • chemistry of oxygen and sulfur • halogen chemistry and the exceptional behaviour of fluorine.	Cambridge syllabus. In general, the Cambridge Pre-U syllabus covers the topic in greater depth and often requires learners to 'explain' rather than just 'describe' concepts. Those topics not covered include redox properties of hydrogen peroxide; detailed characteristics and uses of sulfuric acid and chemistry of fluorine and fluorides.	syllabus. The Cambridge Pre-U syllabus covers the topic in much greater depth, often requiring learners to 'explain' rather than just 'describe' or recall concepts. Those topics not covered include chemistry of nitrogen, fluorine and fluorides, sulfur oxides and sulfuric acid; reactions of halogens with cold NaOH(aq).	syllabus. In general, the Cambridge Pre-U syllabus covers the topic in greater depth and often requires learners to 'explain' rather than just 'describe' concepts. Those topics not covered include chemistry of fluorine and fluorides; sulfuric acid; reactions of halogens with cold NaOH(aq).
B2.3 From non-metals to metals: Group 14 • trends in the properties of the elements • properties of the oxides.	Topic (Group 14 chemistry) not covered.	Topic (Group 14 chemistry) not covered.	Topic (Group 14 chemistry) not covered.
B2.4 Transition elements • physical and atomic properties • geometry and isomerism of complexes • colour and ligand substitution • redox chemistry of complexes.	Almost identical coverage Cambridge Pre-U syllabus extends knowledge to biological role of the iron complexes haemoglobin, myoglobin and ferritin and stability of oxidation states of transition metal complexes.	Similar coverage Cambridge Pre-U syllabus is more comprehensive and in-depth on several topics including geometry and bond angles; tetrahedral complexes; splitting of energy levels; relative stability of oxidation states.	Similar coverage Cambridge Pre-U syllabus is more comprehensive and in-depth on several topics including geometry and bond angles; tetrahedral complexes; splitting of energy levels; relative stability of oxidation states.
B2.5 Crystal structures • close packing in metals • unit cell properties • occupying holes in unit cells.	Syllabus coverage <30% Coverage limited in this syllabus to understanding of a lattice in terms of geometry using coordination number. The Cambridge Pre-U syllabus extends understanding of crystal structures to recognise CCP and HCP structures (using ABC and AB representations of the close-packed structures); unit-cell representations and full symmetry.	Syllabus coverage <30% Coverage limited in this syllabus to understanding of a lattice in terms of geometry using coordination number. The Cambridge Pre-U syllabus extends understanding of crystal structures to recognise CCP and HCP structures (using ABC and AB representations of the close-packed structures); unit-cell representations and full symmetry.	Syllabus coverage <30% Coverage limited in this syllabus to understanding of a lattice in terms of geometry using coordination number. The Cambridge Pre-U syllabus extends understanding of crystal structures to recognise CCP and HCP structures (using ABC and AB representations of the close-packed structures); unit-cell representations and full symmetry.
3 Organic chemistry			
A3.1 Preliminaries • formulae, structures and geometry	Identical coverage (although coverage of these topics in several different syllabus sections).	Identical coverage (although coverage of these topics in several different syllabus sections)	Identical coverage (although coverage of these topics in several different syllabus sections)

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
• structural, geometric and optical isomerism • nomenclature • types of reaction.		The 'radical' rather than 'free-radical' used.	The term 'radical' rather than 'free-radical' used.
A3.2 Functional group level • the inactivity of C–H and C–C bonds • the diversity of heteroatom chemistry • the concept of functional group level • moving between functional group levels • unstable groups.	Syllabus coverage is <25%. Whilst the concept of lone pairs and dipoles are covered, the Cambridge Pre-U syllabus includes 'dipole moments' and demands more explanation and application of principles, (e.g. explain *why* heteroatoms lead to more diverse chemistry). Whilst functional groups are covered, Cambridge Pre-U syllabus uses **functional group level** concept for Organic chemistry and A3.2 refers specifically to changes in functional group levels not replicated in this syllabus.	Syllabus coverage is <25%. Whilst the concept of lone pairs and dipoles are covered, the Cambridge Pre-U syllabus includes 'dipole moments' and demands more explanation and application of principles, (e.g. explain *why* heteroatoms lead to more diverse chemistry). Whilst functional groups are covered, Cambridge Pre-U syllabus uses **functional group level** concept for Organic chemistry and A3.2 refers specifically to changes in functional group levels not replicated in this syllabus.	Syllabus coverage is <25%. Whilst the concept of lone pairs and dipoles are covered, the Cambridge Pre-U syllabus includes 'dipole moments' and demands more explanation and application of principles, (e.g. explain *why* heteroatoms lead to more diverse chemistry). Some aspects of functional groups are covered but Cambridge Pre-U syllabus uses **functional group level** concept for Organic chemistry and A3.2 refers specifically to changes in functional group levels not replicated in this syllabus.
A3.3 Lower functional group level reactions – Alcohol level • moving within the level: – synthesis of alcohols and amines from halogenoalkanes – synthesis of halogenoalkanes from alcohols • moving down a level: – substitution of halogenoalkanes with cyanide • moving up a level: – oxidation to aldehydes and ketones.	Similar coverage Cambridge Pre-U syllabus casts all reactions into the context of the Functional Group Level framework which is not used in this syllabus and several LOs are not therefore directly comparable. However, the required synthesis and substitution reactions are covered.	Similar coverage Cambridge Pre-U syllabus casts all reactions into the context of the Functional Group Level framework which is not used in this syllabus and several LOs are not therefore directly comparable. However, the required synthesis and substitution reactions are covered.	Similar coverage Cambridge Pre-U syllabus casts all reactions into the context of the Functional Group Level framework which is not used in this syllabus and several LOs are not therefore directly comparable. However, the required synthesis and substitution reactions are covered.

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			

A3.4 Lower functional group level reactions – Carbonyl level
• moving within the level:
  - hydrolysis to aldehyde or ketone
  - addition of bisulfite
• moving up a level:
  - oxidation reactions
• moving down a level:
  - addition reactions.
	Syllabus coverage is <40%
	Cambridge Pre-U syllabus casts all reactions into the context of the Functional Group Level framework which is not used in this syllabus and several LOs are not therefore directly comparable. However, some of the required reaction understanding is covered, e.g. oxidation of carboxylic acids to form aldehydes. Girgnard reagents are not included.
		Syllabus coverage is <40%
		Cambridge Pre-U syllabus casts all reactions into the context of the Functional Group Level framework which is not used in this syllabus and several LOs are not therefore directly comparable. However, some of the required reaction understanding is covered, e.g. oxidation of carboxylic acids to form aldehydes. Girgnard reagents are not included.
			Syllabus coverage is <40%
			Cambridge Pre-U syllabus casts all reactions into the context of the Functional Group Level framework which is not used in this syllabus and several LOs are not therefore directly comparable. However, some of the required reaction understanding is covered, e.g. oxidation of carboxylic acids to form aldehydes. Girgnard reagents are not included.

A3.5 Addition and elimination reactions • C=C and C=O in terms of dipole moments • addition reactions to C=C • addition polymerisation • elimination reactions • formation of alkenes by elimination	Almost identical coverage	Almost identical coverage	Almost identical coverage
A3.6 Green chemistry • atom economy • reducing environmental impact	This topic is not covered in this syllabus.	Almost identical coverage	Almost identical coverage

B3.7 Higher functional group level reactions – Carboxylic Acid level
• substitution within the level:
  - hydrolysis to carboxylic acids
  - esters from carboxylic acids
  - reactions of acyl chlorides with alcohols/phenols
  - synthesis of amides from acyl chlorides and amines
  - synthesis of acyl chlorides from carboxylic acids
  - condensation polymerisation
• moving down a level:
	Almost identical coverage
	However, Cambridge Pre-U syllabus does put all reactions into the context of the Functional Group Level framework which is not used in this syllabus.
		Similar coverage
		Cambridge Pre-U syllabus is more comprehensive and in-depth for all aspects.
			Similar coverage
			Cambridge Pre-U syllabus is more comprehensive and in-depth for all aspects.

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
- reduction with metal hydrides.			
B3.8 Higher functional group level reactions – Carbon Dioxide level • moving within the level: - hydrolysis to carbon dioxide • moving down a level: - synthesis of carboxylic acids from Grignard reagents.	This topic is not covered (No use of Grignard reagents within the syllabus)	This topic is not covered (No use of Grignard reagents within the syllabus)	This topic is not covered (No use of Grignard reagents within the syllabus)
B3.9 Mechanisms • S_N1 and S_N2 mechanisms; their determination from kinetics experiments • transition-state geometry and bond angles; inversion of configuration vs racemisation • primary, secondary and tertiary classification of halogenoalkanes; C–Hal bond strength • electrophilic addition mechanism, including Markovnikov's rule • nucleophilic addition mechanism.	Similar coverage Cambridge Pre-U syllabus is more in-depth (e.g. geometry and bond angles in S_N1 and S_N2 reactions of halogenalkanes; Markovnikov products; racemic products).	Coverage of syllabus <40% Cambridge Pre-U syllabus is more in-depth (e.g. geometry and bond angles in S_N1 and S_N2 reactions of halogenalkanes; Markovnikov products; racemic products).	Coverage of syllabus <40% Cambridge Pre-U syllabus is much more in-depth and comprehensive. The OCR syllabus does not require knowledge of the S_N1 mechanism or of the S_N1 or S_N2 nomenclature.
B3.10 Aromatic chemistry • stability of aromatic systems • electrophilic substitution mechanism • activation and deactivation of the benzene ring • directing effects.	Almost identical coverage Cambridge Pre-U syllabus is more demanding for a number of topics, including an appreciation for the utility of aromatic nitro compounds in producing aryl amines.	Similar coverage Cambridge Pre-U syllabus tackles topics in greater depth and precision.	Similar coverage Cambridge Pre-U syllabus tackles topics in greater depth and precision.
B3.11 Acidity and basicity • water, alcohols, phenols and their reactions with sodium	Identical coverage	Similar coverage Cambridge Pre-U syllabus requires knowledge of inductive effects and zwitterions.	Similar coverage Cambridge Pre-U syllabus requires knowledge of aliphatic and aromatic amines; inductive effects.

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
• classification of amines; relative basicities • substituents on carboxylic acids – inductive effects • reactions of amino acids with acids and alkalis; zwitterions.			
B3.12 Stereochemistry • Cahn-Ingold-Prelog rules; R/S assignment • chiral molecules and rotation of polarised light; +/– notation • enantiomers, diastereoisomers, meso compounds.	Syllabus coverage <50% Cambridge Pre-U syllabus is much more comprehensive; knowledge of Cahn-Ingold-Prelog priority rules required; assigning of R/S and +/- assignments and connections between. Knowledge of diastereoisomer and meso compound required in addition to enantiomer which is covered in this syllabus.	Syllabus coverage <30% Cambridge Pre-U syllabus is much more comprehensive; knowledge of Cahn-Ingold-Prelog priority rules required; assigning of R/S and +/- assignments and connections between. Definitions of enantiomer diastereoisomer and meso compound required.	Syllabus coverage <30% Cambridge Pre-U syllabus is much more comprehensive; knowledge of Cahn-Ingold-Prelog priority rules required; assigning of R/S and +/- assignments and connections between. Definitions of enantiomer diastereoisomer and meso compound required.
4 Analysis			
A4.1 Qualitative and quantitative analysis • interpreting experimental observations • performing mole calculations using quantitative data.	Identical coverage But not provided in the format of LOs within a discreet section as in Pre-U Relevant content in data section; practical guidance and other non-topic specific LOs.	Similar coverage But coverage not all provided in the format of LOs. Pre-U requirement for gravimetric analysis has no equivalent in this syllabus. Some relevant content in practical guidance and other parts of the syllabus aims.	Similar coverage But coverage not all provided in the format of LOs. Pre-U requirement for gravimetric analysis has no equivalent in this syllabus. Some relevant content in practical guidance and other parts of the syllabus aims.
A4.2 Mass spectrometry • the physical process of mass spectrometry • interpreting spectra, including isotope effects.	Similar coverage However, Pre-U does expect knowledge of the working of the mass spectrometer but that is not required in this syllabus.	Similar coverage However, Pre-U does expect knowledge of the working of the mass spectrometer but that is not required in this syllabus.	Similar coverage However, Pre-U does expect knowledge of the working of the mass spectrometer but that is not required in this syllabus.
A4.3 Electronic spectroscopy • the physical process • explaining line spectra qualitatively.	Topic not covered	Topic not covered	Identical coverage

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
A4.4 Infra-red • the physical process of infra-red (IR) spectroscopy • interpreting and predicting spectra.	Similar coverage However, Pre-U expects predictions to be made based on bond strength and atomic masses rather than just interpretation of spectra.	Similar coverage However, Pre-U expects predictions to be made based on bond strength and atomic masses rather than just interpretation of spectra.	Similar coverage However, Pre-U expects predictions to be made based on bond strength and atomic masses rather than just interpretation of spectra.
A4.5 Carbon-13 NMR • interpreting and predicting spectra	Identical coverage	Identical coverage	Identical coverage
B4.6 NMR of other spin ½ nuclei • the physical process, including the origin of the chemical-shift scale • interpreting spin ½ spectra, including appreciation of coupling and of the characteristics of labile protons.	Similar coverage Cambridge Pre-U syllabus expects a greater depth of knowledge of the process, origin of chemical shift scale rather than just interpreting spectra.	Similar coverage Cambridge Pre-U syllabus expects a greater depth of knowledge of the process, origin of chemical shift scale rather than just interpreting spectra.	Limited coverage One general statement included in this syllabus. Lack of specifics to correlate with Cambridge Pre-U syllabus.
5 Practical chemistry			
C5.1 Manipulation, measurement and observation • C5.1.1 Successful collection of data and observations • C5.1.2 Quality of measurements or observations • C5.1.3 Decisions relating to measurements or observations.	Identical coverage These LOs are covered in section 'Expectations for each skill (Paper 3)'.	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry' Cambridge Pre-U syllabus is more specific and in-depth on most aspects.	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry' Cambridge Pre-U syllabus is more specific and in-depth on most aspects.
C5.2 Presentation of data and observations • C5.2.1 Recording data or observations • C5.2.2 Display of calculation and reasoning • C5.2.3 Data layout.	Identical coverage These LOs are covered in section 'Expectations for each skill (Paper 3)'.	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry' Cambridge Pre-U syllabus is more specific and in-depth on most aspects.	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry' Cambridge Pre-U syllabus is more specific and in-depth on most aspects.
C5.3 Analysis, conclusions and evaluation • C5.3.1 Interpretation of data or observations • C5.3.2 Drawing conclusions	Identical coverage These LOs are covered in section 'Expectations for each skill (Paper 3)'.	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry

Cambridge Pre-U	Cambridge International AS & A Level	OCR AS/A Level GCE (Chemistry A)	OCR AS/A Level GCE (Chemistry B)
Topics			
• C5.3.3 Evaluation • C5.3.4 Suggesting improvements.		Cambridge Pre-U syllabus is more specific and in-depth on most aspects.	Cambridge Pre-U syllabus is more specific and in-depth on most aspects.
C5.4 Planning • C5.4.1 Methods • C5.4.2 Dealing with data.	Identical coverage These LOs are covered in section 'Expectations for each skill (Paper 5)'.	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry' Cambridge Pre-U syllabus is more specific and in-depth on most aspects.	Similar coverage OCR syllabus covered in 'Module 1 – development of practical skills in chemistry' Cambridge Pre-U syllabus is more specific and in-depth on most aspects.

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