## Switching Edexcel GCSE (9-1) Chemistry to OCR GCSE (9-1) Gateway Chemistry A

## Introduction

Are you currently teaching the Edexcel GCSE sciences? Are you thinking of switching? We are here to help.

We will provide you with all the support you could need to switch from the Edexcel GCSE Chemistry qualification to our OCR GCSE Chemistry A, including:

* Mapping of Edexcel’s specification to OCR’s specification
* An overview of the differences in assessment
* Mapping of the Edexcel textbook to OCR’s specification

## Our offer

* Our GCSE (9-1) Gateway Chemistry A qualification has been created by our subject specialist team working with a number of stakeholders including: OCR Science Consultative Forum, teachers, assessors, Higher Education Institutions and learned societies. It has been created to be a qualification which engages students so they achieve their full potential.
* Our GCSE team are passionate about both science and education. With industry, teaching and assessment experience, they are fully committed to supporting centres’ delivery of our GCSE qualifications.
* We have produced a wide range of support materials, such as handbooks (including maths skills), delivery guides, practical activities and end of topic quizzes. We have a selection of practice papers which can be used as mock papers in preparation for the exams and we have a free and user-friendly tool - ExamBuilder - that you can use to create customised papers for students.
* Within this document as well as mapping the specifications, we also provide textbook mapping – illustrating how you can use your existing Edexcel textbooks to teach the OCR specification; making it easier for you to use the resources you already have.
* Join our conversations on the OCR Community and @ocr\_science on Twitter to discuss and share good practice.

## Key differences

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| **OCR GCSE (9-1) Gateway Chemistry A** | **Edexcel GCSE (9-1) Chemistry** |
| **8 flexible practical** activities - select from our suggested activities or use your own preferred practical activities. | 8 core practical activities you have to deliver. |
| In each assessment students have 1 hour and 45 minutes to complete **90** marks worth of questions | In each assessment students have 1 hour and 45 minute to complete **100** marks worth of questions. |
| 15 marks of multiple choice questions at the start of each paper. | Some multiple choice questions scattered throughout papers. |
| **One** 6 mark level of response question per paper. | **Two** 6 mark level of response question on all sample assessment material. |

## Content mapping

The content within the OCR GCSE (9-1) in Chemistry A (Gateway) covers the key concepts of chemistry and will be very familiar. We’ve laid it out in a logical progression to support teaching the GCSE in a linear way.

Below is a table to show where Edexcel Chemistry content is covered in the OCR Gateway Chemistry specification.

| **Pearson Edexcel GCSE (9-1) in Chemistry** | **OCR Chemistry A (Gateway Science)** | **Additional Content In Pearson Edexcel Chemistry** |
| --- | --- | --- |
| Topic 1 – Key concepts in Chemistry: Atomic Structure | C1.2 Atomic Structure |  |
| Topic 1 – Key concepts in Chemistry: The periodic table | C2.2 Bonding |  |
| Topic 1 – Key concepts in Chemistry: Ionic Bonding | C2.2 Bonding |  |
| Topic 1 – Key concepts in Chemistry: Covalent Bonding | C2.2 Bonding |  |
| Topic 1 – Key concepts in Chemistry: Types of substance | C2.2 Bonding  C2.3 Properties of Materials |  |
| Topic 1 – Key concepts in Chemistry: Calculations involving masses | C2.1 Purity and separating mixtures  C2.3 Properties of Materials  C3.1 Introducing chemical reactions  C5.1 Monitoring chemical reactions |  |
| Topic 2 – States of matter and mixtures: States of matter | C1.1 The Particle Model |  |
| Topic 2 – States of matter and mixtures: Methods of separating and purifying substances | C2.1 Purity and separating mixtures  C6.3 Interpreting and interacting with Earth systems |  |
| Topic 3 – Chemical Changes: Acids | C3.3 Types of chemical reactions | Core Practical: Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a fixed volume of dilute hydrochloric acid |
| Topic 3 – Chemical Changes: Electrolytic Processes | C3.3 Types of chemical reactions  C3.4 Electrolysis | Core Practical:  Investigate the electrolysis of copper sulfate solution with inert electrodes and copper electrodes |
| Topic 4 – Extracting metals and equilibria: Obtaining and using metals | C3.3 Types of chemical reactions  C4.1 Predicting chemical reactions  C5.3 Equilibria  C6.1 Improving processes and products |  |
| Topic 4 – Extracting metals and equilibria: reversible reactions and equilibria | C5.3 Equilibria |  |
| Topic 5 – Separate chemistry 1: Transition metals, alloys and corrosion | C4.1 Predicting chemical reactions  C6.1 Improving processes and products |  |
| Topic 5 – Separate chemistry 1: Quantitative analysis | C5.1 Monitoring chemical reactions |  |
| Topic 5 – Separate chemistry 1: Dynamic equilibria | C6.1 Improving processes and products |  |
| Topic 5 – Separate chemistry 1: Chemical cells and fuel cells | C6.2 Organic Chemistry |  |
| Topic 6 – Groups in the periodic table: Group 1 | C2.2 Bonding  C4.1 Predicting chemical reactions |  |
| Topic 6 – Groups in the periodic table: Group 7 | C2.2 Bonding  C3.3 Types of chemical reactions  C4.1 Predicting chemical reactions  C4.2 Identifying the products of chemical reactions |  |
| Topic 6 – Groups in the periodic table: Group 0 | C2.2 Bonding  C4.1 Predicting chemical reactions |  |
| Topic 7: Rates of reaction and energy changes: Rates of reaction | C5.2 Controlling reactions |  |
| Topic 7: Rates of reaction and energy changes: Heat energy changes in chemical reactions | C3.2 Energetics |  |
| Topic 8: Fuels and Earth science: Fuels | C6.2 Organic chemistry |  |
| Topic 8: Fuels and Earth science: Earth and atmospheric science | C6.3 Interpreting and interacting with Earth systems  C4.2 Identifying the products of chemical reactions |  |
| Topic 9 – Separate chemistry 2: Qualitative analysis: tests for ions | C4.2 Identifying the products of chemical reactions | 9.9C  Evaluate data from a flame photometer  (A) to determine the concentration of ions in dilute solution using a calibration curve  (B) to identify metal ions by comparing the data with reference data (no knowledge of the instrument or how it works is required |
| Topic 9 – Separate chemistry 2: Hydrocarbons | C6.2 Organic Chemistry | 9.14C  Recall the addition reaction of ethene with bromine, showing the structures of reactants and products, and extend this to other alkenes  9.15C  Explain how bromine water is used to distinguish between alkanes and alkenes  9.16C  Describe how the complete combustion of alkanes and alkenes involves the oxidation of the hydrocarbons to produce carbon dioxide and water |
| Topic 9 – Separate chemistry 2: Polymers | C2.2 Bonding  C2.3 Properties of materials  C6.1 Improving processes and products  C6.2 Organic Chemistry |  |
| Topic 9 – Separate chemistry 2: Alcohols and carboxylic acids | C6.2 Organic Chemistry | 9.33C  Describe the production of ethanol by fermentation of carbohydrates in aqueous solution, using yeast to provide enzymes  9.34C  Explain how to obtain a concentrated solution of ethanol by fractional distillation of the fermentation mixture |
| Topic 9 – Separate chemistry 2: Bulk and surface properties of matter including nanoparticles | C2.2 Bonding C2.3 Properties of materials  C6.1 Improving processes and products |  |

## Assessment

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| --- | --- |
| **OCR GCSE (9-1) Gateway Chemistry A** | **Edexcel GCSE (9-1) Chemistry** |
| **Paper 1** (Foundation) or **Paper 3** (Higher)  Assessed: Topic 1-3 and 7  Time allowed: 1 hour 45 minutes  Foundation and Higher tier available  Marks 90 marks  Weighting 50% of GCSE  Question types:  Section A: 15 x Multiple choice  Section B: structured, closed short answer and 1 x 6 mark level of response | **Paper 1**  Assessed: Topics 1-5  Time allowed: 1 hour 45 minutes  Foundation and Higher tier available  Marks: 100 marks  Weighting: 50% of GCSE  Question types: Multiple choice, structured, closed short answer and open response |
| **Paper 2** (Foundation) or **Paper 4** (Higher)  Assessed: Topic 4-6 and 7 (may draw on knowledge from topics 1-3)  Foundation and Higher tier available  Marks 90 marks  Weighting 50% of GCSE  Question types:  Section A: 15 x Multiple choice  Section B: structured, closed short answer and 1x 6 mark level of response | **Paper 2**  Assessed: Topics 1, 6-9  Time allowed: 1 hour 45 minutes  Foundation and Higher tier available  Marks: 100 marks  Weighting: 50% of GCSE  Question types: Multiple choice, structured, closed short answer and open response. |

## Using the Edexcel textbook

Below you will find all the information you need to start teaching OCR GCSE (9-1) Gateway Chemistry A while still using the new Edexcel textbooks. We have mapped our specification to the Edexcel Pearson textbook to save you having to buy another set of textbooks. We also have endorsed textbooks for use with our specification and details of these textbooks can be found on the qualification page on the OCR website.

## Edexcel Pearson textbook mapping

indicates content is for separate science chemistry only

| **Specification statement** | **Chapter covering specification statement** | **Page number** | **Comments** |
| --- | --- | --- | --- |
| **Topic C1 Particles** | | | |
| **C1.1 The particle model** | | | |
| C1.1a describe the main features of the particle model in terms of states of matter and change of state | SC1 States of matter | 2 |  |
| C1.1b explain in terms of the particle model the distinction between physical changes and chemical changes | SC1 States of matter | 2 |  |
| **C1.1c explain the limitations of the particle model in relation to changes of state when particles are represented by inelastic spheres (e.g. like bowling balls)** | SC7 Types of Substance | 48 |  |
| CM1.1i represent three-dimensional shapes in two dimensions and vice versa when looking at chemical structures, e.g. allotropes of carbon |  |  | Numerical, 3D and 2D all covered but no translation between them in book except drawing dot-and-cross diagrams from formulae. |
| **C1.2 Atomic structure** | | | |
| C1.2a describe how and why the atomic model has changed over time | SC3 Atomic Structure | 18-21 |  |
| C1.2b describe the atom as a positively charged nucleus surrounded by negatively charged electrons, with the nuclear radius much smaller than that of the atom and with most of the mass in the nucleus | SC3 Atomic Structure | 18 |  |
| C1.2c recall the typical size (order of magnitude) of atoms and small molecules | SC3 Atomic Structure | 18 |  |
| C1.2d recall relative charges and approximate relative masses of protons, neutrons and electrons | SC3 Atomic Structure | 18 |  |
| C1.2e calculate numbers of protons, neutrons and electrons in atoms and ions, given atomic number and mass number of isotopes | SC3 Atomic Structure | 23 |  |
| CM1.2i relate size and scale of atoms to objects in the physical world | SC3 Atomic Structure | 19 |  |
| CM1.2ii  estimate size and scale of atoms and nanoparticles | SC26 Bulk and surface properties of matter including nanoparticles | 206 |  |
| **Topic C2 Elements, compounds and mixtures** | | | |
| **C2.1 Purity and separating mixtures** | | | |
| C2.1a explain what is meant by the purity of a substance, distinguishing between the scientific and everyday use of the term ‘pure’ | SC2 Methods of separating and purifying substances | 4 |  |
| C2.1b use melting point data to distinguish pure from impure substances | SC2 Methods of separating and purifying substances | 5 |  |
| C2.1c calculate relative formula masses of species separately and in a balanced chemical equation | SC9 Calculations involving masses | 73 |  |
| C2.1d deduce the empirical formula of a compound from the relative numbers of atoms present or from a model or diagram and vice versa | SC9 Calculations involving masses | 73 |  |
| C2.1e explain that many useful materials are formulations of mixtures | SC2 Methods of separating and purifying substances | 4 |  |
| C2.1f describe, explain and exemplify the processes of filtration, crystallisation, simple distillation, and fractional distillation | SC2 Methods of separating and purifying substances | 6 | Distillation page 10, Fractional distillation page 11. |
| C2.1g describe the techniques of paper and thin layer chromatography | SC2 Methods of separating and purifying substances | 8 | TLC not explicitly mentioned. |
| C2.1h recall that chromatography involves a stationary and a mobile phase and that separation depends on the distribution between the phases | SC2 Methods of separating and purifying substances | 8 |  |
| C2.1i interpret chromatograms, including measuring Rf values | SC2 Methods of separating and purifying substances | 9 |  |
| C2.1j suggest suitable purification techniques given information about the substances involved | SC2 Methods of separating and purifying substances | 12 |  |
| C2.1k suggest chromatographic methods for distinguishing pure from impure substances | SC2 Methods of separating and purifying substances | 12 |  |
| CM2.1i arithmetic computation, ratio, percentage and multistep calculations permeates quantitative chemistry | SC9 Calculations involving masses |  | Throughout chapter. |
| CM2.1ii provide answers to an appropriate number of significant figures |  |  | Not explicitly covered. |
| CM2.1iii change the subject of a mathematical equation |  |  | **Not explicitly covered.** |
| CM2.1iv arithmetic computation and ratio when determining empirical formulae, balancing equations | SC9 Calculations involving masses |  | Throughout chapter. |
| **C2.2 Bonding** | | | |
| C2.2a describe metals and non-metals and explain the differences between them on the basis of their characteristic physical and chemical properties | SC7 Types of Substance | 48 |  |
| C2.2b explain how the atomic structure of metals and non-metals relates to their position in the periodic table | SC4 The Periodic table | 31 |  |
| C2.2c explain how the position of an element in the periodic table is related to the arrangement of electrons in its atoms and hence to its atomic number | SC4 The Periodic table | 26 |  |
| C2.2d describe and compare the nature and arrangement of chemical bonds in: i. ionic compounds ii. simple molecules iii. giant covalent structures iv. polymers v. metals | SC7 Types of Substance |  | Throughout chapter. |
| C2.2e explain chemical bonding in terms of electrostatic forces and the transfer or sharing of electrons | SC5 Ionic bonding | 35 |  |
| C2.2f construct dot and cross diagrams for simple covalent and binary ionic substances | SC5 Ionic bonding | 34 |  |
| C2.2g describe the limitations of particular representations and models to include dot and cross diagrams, ball and stick models and two- and three-dimensional representations | SC7 Types of Substance | 48 |  |
| C2.2h explain how the reactions of elements are related to the arrangement of electrons in their atoms and hence to their atomic number | SC17 Groups in the periodic table |  | Group 1 pg 129, Group 7 pg 133, group 0 page 135 |
| C2.2i explain in terms of atomic number how Mendeleev’s arrangement was refined into the modern periodic table | SC4 The Periodic table | 26 |  |
| CM2.2i  estimate size and scale of atoms and nanoparticles | SC26 Bulk and surface properties of matter including nanoparticles | 206 |  |
| CM2.2ii represent three-dimensional shapes in two dimensions and vice versa when looking at chemical structures, e.g. allotropes of carbon |  |  | Numerical, 3D and 2D all covered but no translation between them in book except drawing dot-and-cross diagrams from formulae. |
| CM2.2iii translate information between diagrammatic and numerical forms |  |  | Numerical, 3D and 2D all covered but no translation between them in book except drawing dot-and-cross diagrams from formulae. |
| **C2.3 Properties of materials** | | | |
| C2.3a recall that carbon can form four covalent bonds |  |  | Not explicitly stated. |
| C2.3b explain that the vast array of natural and synthetic organic compounds occur due to the ability of carbon to form families of similar compounds, chains and rings | SC7 Types of Substance | 44 |  |
| C2.3c explain the properties of diamond, graphite, fullerenes and graphene in terms of their structures and bonding | SC7 Types of Substance | 44 |  |
| C2.3d use ideas about energy transfers and the relative strength of chemical bonds and intermolecular forces to explain the different temperatures at which changes of state occur | SC7 Types of Substance | 42 |  |
| C2.3e use data to predict states of substances under given conditions | SC1 States of matter | 16 | Touched on in "methods of separating substances" practical. |
| C2.3f explain how the bulk properties of materials (ionic compounds; simple molecules; giant covalent structures; polymers and metals) are related to the different types of bonds they contain, their bond strengths in relation to intermolecular forces and the ways in which their bonds are arranged | SC7 Types of Substance | 42 |  |
| C2.3g  compare ‘nano’ dimensions to typical dimensions of atoms and molecules | SC26 Bulk and surface properties of matter including nanoparticles | 206 |  |
| C2.3h  describe the surface area to volume relationship for different-sized particles and describe how this affects properties | SC26 Bulk and surface properties of matter including nanoparticles | 207 |  |
| C2.3i  describe how the properties of nanoparticulate materials are related to their uses | SC26 Bulk and surface properties of matter including nanoparticles | 206 |  |
| C2.3j  explain the possible risks associated with some nanoparticulate materials | SC26 Bulk and surface properties of matter including nanoparticles | 206 |  |
| CM2.3i represent three-dimensional shapes in two dimensions and vice versa when looking at chemical structures, e.g. allotropes of carbon |  |  | Numerical, 3D and 2D all covered but no translation between them in book except drawing dot-and-cross diagrams from formulae. |
| CM2.3ii  relate size and scale of atoms to objects in the physical world | SC3 Atomic Structure | 19 |  |
| CM2.3iii  estimate size and scale of atoms and nanoparticles | C2 Bonding, Structure and the properties of matter | 51 |  |
| CM2.3iv  interpret, order and calculate with numbers written in standard form when dealing with nanoparticles | SC26 Bulk and surface properties of matter including nanoparticles | 206 |  |
| CM2.3v  use ratios when considering relative sizes and surface area to volume comparisons | SC26 Bulk and surface properties of matter including nanoparticles | 207 |  |
| CM2.3vi  calculate surface areas and volumes of cubes |  |  | Not covered. |
| **Topic C3 Chemical reactions** | | | |
| **C3.1 Introducing chemical reactions** | | | |
| C3.1a use chemical symbols to write the formulae of elements and simple covalent and ionic compounds | SC6 Covalent bonding | 40 |  |
| C3.1b use the names and symbols of common elements and compounds and the principle of conservation of mass to write formulae and balanced chemical equations **and half equations** | SC9 Calculations involving masses SC10 Electrolytic processes | 74, 84 |  |
| C3.1c use the names and symbols of common elements from a supplied periodic table to write formulae and balanced chemical equations where appropriate | SC9 Calculations involving masses | 74 |  |
| C3.1d use the formula of common ions to deduce the formula of a compound |  |  | Not explicit. |
| **C3.1e construct balanced ionic equations** | SC9 Calculations involving masses | 66 |  |
| C3.1f describe the physical states of products and reactants using state symbols (s, l, g and aq) | SC8 Acids and Alkalis | 56 |  |
| **C3.1g recall and use the definitions of the Avogadro constant (in standard form) and of the mole** | SC9 Calculations involving masses | 76 |  |
| **C3.1h explain how the mass of a given substance is related to the amount of that substance in moles and vice versa** | SC9 Calculations involving masses | 76 |  |
| C3.1i recall and use the law of conservation of mass | SC9 Calculations involving masses | 74 |  |
| C3.1j explain any observed changes in mass in non-enclosed systems during a chemical reaction and explain them using the particle model | SC9 Calculations involving masses | 74 |  |
| **C3.1k deduce the stoichiometry of an equation from the masses of reactants and products and explain the effect of a limiting quantity of a reactant** | SC9 Calculations involving masses | 76 |  |
| **C3.1l use a balanced equation to calculate masses of reactants or products** | SC9 Calculations involving masses | 75 |  |
| CM3.1i arithmetic computation and ratio when determining empirical formulae, balancing equations | SC9 Calculations involving masses |  | Throughout chapter. |
| **CM3.1ii calculations with numbers written in standard form when using the Avogadro constant** | SC9 Calculations involving masses | 76 |  |
| CM3.1iii provide answers to an appropriate number of significant figures |  |  | Not explicit. |
| CM3.1iv convert units where appropriate **particularly from mass to moles** | SC9 Calculations involving masses | 76 |  |
| **C3.2 Energetics** | | | |
| C3.2a distinguish between endothermic and exothermic reactions on the basis of the temperature change of the surroundings | SC19 Heat energy changes in chemical reactions | 144 |  |
| C3.2b draw and label a reaction profile for an exothermic and an endothermic reaction | SC19 Heat energy changes in chemical reactions | 146 |  |
| C3.2c explain activation energy as the energy needed for a reaction to occur | SC19 Heat energy changes in chemical reactions | 144 |  |
| **C3.2d calculate energy changes in a chemical reaction by considering bond making and bond breaking energies** | SC19 Heat energy changes in chemical reactions | 147 |  |
| CM3.2i interpretation of charts and graphs when dealing with reaction profiles | SC19 Heat energy changes in chemical reactions | 146 |  |
| CM3.2ii arithmetic computation when calculating energy changes | SC19 Heat energy changes in chemical reactions | 147 |  |
| **C3.3 Types of chemical reactions** | | | |
| C3.3a explain reduction and oxidation in terms of loss or gain of oxygen, identifying which species are oxidised and which are reduced | SC11 Obtaining and using metals | 90 |  |
| **C3.3b explain reduction and oxidation in terms of gain or loss of electrons, identifying which species are oxidised and which are reduced** | SC11 Obtaining and using metals | 90 |  |
| C3.3c recall that acids form hydrogen ions when they dissolve in water and solutions of alkalis contain hydroxide ions | SC8 Acids and Alkalis | 64 |  |
| C3.3d describe neutralisation as acid reacting with alkali or a base to form a salt plus water | SC8 Acids and Alkalis | 56 |  |
| C3.3e recognise that aqueous neutralisation reactions can be generalised to hydrogen ions reacting with hydroxide ions to form water | SC8 Acids and Alkalis | 64 |  |
| C3.3f recall that carbonates and some metals react with acids and write balanced equations predicting products from given reactants | SC8 Acids and Alkalis | 66 |  |
| **C3.3g use and explain the terms dilute and concentrated (amount of substance) and weak and strong (degree of ionisation) in relation to acids** | SC8 Acids and Alkalis | 53 |  |
| C3.3h recall that relative acidity and alkalinity are measured by pH | SC8 Acids and Alkalis | 52 |  |
| **C3.3i describe neutrality and relative acidity and alkalinity in terms of the effect of the concentration of hydrogen ions on the numerical value of pH (whole numbers only)** | SC8 Acids and Alkalis | 54 |  |
| **C3.3j recall that as hydrogen ion concentration increases by a factor of ten the pH value of a solution decreases by a factor of one** | SC8 Acids and Alkalis | 54 |  |
| C3.3k describe techniques and apparatus used to measure pH | SC8 Acids and Alkalis | 52 |  |
| CM3.3i arithmetic computation, ratio, percentage and multistep calculations permeates quantitative chemistry | SC9 Calculations involving masses |  | Throughout chapter. |
| **C3.4 Electrolysis** | | | |
| C3.4a recall that metals (or hydrogen) are formed at the cathode and non-metals are formed at the anode in electrolysis using inert electrodes | SC10 Electrolytic processes | 85 |  |
| C3.4b predict the products of electrolysis of binary ionic compounds in the molten state | SC10 Electrolytic processes | 84 |  |
| C3.4c describe competing reactions in the electrolysis of aqueous solutions of ionic compounds in terms of the different species present | SC10 Electrolytic processes | 85 |  |
| C3.4d describe electrolysis in terms of the ions present and reactions at the electrodes | SC10 Electrolytic processes | 80 |  |
| C3.4e describe the technique of electrolysis using inert and non-inert electrodes | SC10 Electrolytic processes | 82 |  |
| CM3.4i arithmetic computation and ratio when determining empirical formulae, balancing equations | SC9 Calculations involving masses |  | Throughout chapter. |
| **Topic C4 Predicting and identifying reactions and products** | | | |
| **C4.1 Predicting chemical reactions** | | | |
| C4.1a recall the simple properties of Groups 1, 7 and 0 | SC17 Groups in the periodic table |  | Group 1 pg 129, Group 7 pg 133, group 0 page 135 |
| C4.1b explain how observed simple properties of Groups 1, 7 and 0 depend on the outer shell of electrons of the atoms and predict properties from given trends down the groups | SC17 Groups in the periodic table |  | Group 1 pg 129, Group 7 pg 133, group 0 page 135 |
| C4.1c  recall the general properties of transition metals and their compounds and exemplify these by reference to a small number of transition metals | SC13 Transition metals, alloys and corrosion | 96 |  |
| C4.1d predict possible reactions and probable reactivity of elements from their positions in the periodic table | SC4 The Periodic table | 30 |  |
| C4.1e explain how the reactivity of metals with water or dilute acids is related to the tendency of the metal to form its positive ion | SC17 Groups in the periodic table | 129 |  |
| C4.1f deduce an order of reactivity of metals based on experimental results | SC11 Obtaining and using metals | 86 |  |
| CM4.1i arithmetic computation and ratio when determining empirical formulae, balancing equations | SC9 Calculations involving masses |  | Throughout chapter. |
| **C4.2 Identifying the products of chemical reactions** | | | |
| C4.2a describe tests to identify selected gases |  |  | Oxygen pg 165, Carbon Dioxide pg 198, Hydrogen page 66 |
| C4.2b  describe tests to identify aqueous cations and aqueous anions | SC25 Qualitative analysis: Tests for ions | 196 | Also pg 198 for carbonates, sulfides and halides |
| C4.2c  describe how to perform a flame test | SC25 Qualitative analysis: Tests for ions | 194 |  |
| C4.2d  identify species from test results | SC25 Qualitative analysis: Tests for ions | 194 |  |
| C4.2e  interpret flame tests to identify metal ions | SC25 Qualitative analysis: Tests for ions | 194 |  |
| C4.2f  describe the advantages of instrumental methods of analysis | SC25 Qualitative analysis: Tests for ions | 195 |  |
| C4.2g  interpret an instrumental result given appropriate data in chart or tabular form, when accompanied by a reference set of data in the same form | SC25 Qualitative analysis: Tests for ions | 195 |  |
| CM4.2i  interpret charts, particularly in spectroscopy | SC25 Qualitative analysis: Tests for ions | 195 |  |
| **Topic C5 Monitoring and controlling chemical reactions** | | | |
| **C5.1 Monitoring chemical reactions** | | | |
| **C5.1a  explain how the concentration of a solution in mol/dm3 is related to the mass of the solute and the volume of the solution** | SC14 Quantitative analysis | 113 |  |
| C5.1b  describe the technique of titration | SC14 Quantitative analysis | 116 |  |
| **C5.1c  explain the relationship between the volume of a solution of known concentration of a substance and the volume or concentration of another substance that react completely together** | SC14 Quantitative analysis | 116 |  |
| **C5.1d  describe the relationship between molar amounts of gases and their volumes and vice versa** | SC14 Quantitative analysis | 118 |  |
| **C5.1e  calculate the volumes of gases involved in reactions using the molar gas volume at room temperature and pressure (assumed to be 24dm3)** | SC14 Quantitative analysis | 118 |  |
| **C5.1f explain how the mass of a solute and the volume of the solution is related to the concentration of the solution** | SC9 Calculations involving masses | 74 |  |
| C5.1g  calculate the theoretical amount of a product from a given amount of reactant | SC14 Quantitative analysis | 109 |  |
| C5.1h  calculate the percentage yield of a reaction product from the actual yield of a reaction | SC14 Quantitative analysis | 108 |  |
| C5.1i  define the atom economy of a reaction | SC14 Quantitative analysis | 110 |  |
| C5.1j  calculate the atom economy of a reaction to form a desired product from the balanced equation | SC14 Quantitative analysis | 110 |  |
| **C5.1k  explain why a particular reaction pathway is chosen to produce a specified product given appropriate data** | SC14 Quantitative analysis | 111 |  |
| **CM5.1i  calculations with numbers written in standard form when using the Avogadro constant** | SC9 Calculations involving masses | 76 |  |
| CM5.1ii  provide answers to an appropriate number of significant figures |  |  | Not explicitly covered. |
| CM5.1iii  convert units where appropriate **particularly from mass to moles** | SC9 Calculations involving masses | 76 |  |
| CM5.1iv  arithmetic computation, ratio, percentage and multistep calculations permeates quantitative chemistry | SC9 Calculations involving masses |  | Throughout chapter. |
| CM5.1v  arithmetic computation when calculating yields and atom economy | SC14 Quantitative analysis | 108 |  |
| CM5.1vi  change the subject of a mathematical equation |  |  | Not explicitly covered. |
| **C5.2 Controlling reactions** | | | |
| C5.2a suggest practical methods for determining the rate of a given reaction | SC18 Rates of reaction | 140 |  |
| C5.2b interpret rate of reaction graphs | SC18 Rates of reaction | 137 | Quick "sketch a graph" task. |
| C5.2c describe the effect of changes in temperature, concentration, pressure, and surface area on rate of reaction | SC18 Rates of reaction | 138 |  |
| C5.2d explain the effects on rates of reaction of changes in temperature, concentration and pressure in terms of frequency and energy of collision between particles | SC18 Rates of reaction | 138 |  |
| C5.2e explain the effects on rates of reaction of changes in the size of the pieces of a reacting solid in terms of surface area to volume ratio | SC18 Rates of reaction | 139 |  |
| C5.2f describe the characteristics of catalysts and their effect on rates of reaction | SC18 Rates of reaction | 142 |  |
| C5.2g identify catalysts in reactions | SC18 Rates of reaction | 142 |  |
| C5.2h explain catalytic action in terms of activation energy | SC18 Rates of reaction | 143 |  |
| C5.2i recall that enzymes act as catalysts in biological systems | SC18 Rates of reaction | 143 |  |
| CM5.2i arithmetic computation, ratio when measuring rates of reaction |  |  | Not seemingly covered explicitly. |
| CM5.2ii drawing and interpreting appropriate graphs from data to determine rate of reaction |  |  | Not seemingly covered explicitly. |
| CM5.2iii determining gradients of graphs as a measure of rate of change to determine rate |  |  | Not seemingly covered explicitly. |
| CM5.2iv proportionality when comparing factors affecting rate of reaction |  |  | Not seemingly covered explicitly. |
| **C5.3 Equilibria** | | | |
| C5.3a recall that some reactions may be reversed by altering the reaction conditions | SC12 Reversible reactions and equilibria | 94 |  |
| C5.3b recall that dynamic equilibrium occurs in a closed system when the rates of forward and reverse reactions are equal | SC12 Reversible reactions and equilibria | 94 |  |
| **C5.3c predict the effect of changing reaction conditions on equilibrium position and suggest appropriate conditions to produce as much of a particular product as possible** | SC12 Reversible reactions and equilibria | 95 |  |
| CM5.3i arithmetic computation, ratio when measuring rates of reaction |  |  | Not seemingly covered explicitly. |
| CM5.3ii drawing and interpreting appropriate graphs from data to determine rate of reaction |  |  | Not seemingly covered explicitly. |
| CM5.3iii determining gradients of graphs as a measure of rate of change to determine rate |  |  | Not seemingly covered explicitly. |
| CM5.3iv proportionality when comparing factors affecting rate of reaction |  |  | Not seemingly covered explicitly. |
| **Topic C6 Global challenges** | | | |
| **C6.1 Improving processes and products** | | | |
| C6.1a explain, using the position of carbon in the reactivity series, the principles of industrial processes used to extract metals, including extraction of a non-ferrous metal | SC11 Obtaining and using metals | 88 |  |
| C6.1b explain why and how electrolysis is used to extract some metals from their ores | SC11 Obtaining and using metals | 88 |  |
| **C6.1c evaluate alternative biological methods of metal extraction** | SC11 Obtaining and using metals | 89 |  |
| **C6.1d  explain the trade-off between rate of production of a desired product and position of equilibrium in some industrially important processes** | SC15 Dynamic Equilibria, Calculations involving volumes of gases | 121 | Not a lot of detail. |
| **C6.1e  interpret graphs of reaction conditions versus rate** | SC18 Rates of reaction | 136 | Very few graphs interpretation. |
| **C6.1f  explain how the commercially used conditions for an industrial process are related to the availability and cost of raw materials and energy supplies, control of equilibrium position and rate** | SC15 Dynamic Equilibria, Calculations involving volumes of gases | 120 | Not a lot of detail. |
| C6.1g  explain the importance of the Haber process in agricultural production | SC15 Dynamic Equilibria, Calculations involving volumes of gases | 120 | Not a lot of detail. |
| C6.1h  compare the industrial production of fertilisers with laboratory syntheses of the same products | SC15 Dynamic Equilibria, Calculations involving volumes of gases | 121 | Brief. |
| C6.1i  recall the importance of nitrogen, phosphorus and potassium compounds in agricultural production | SC15 Dynamic Equilibria, Calculations involving volumes of gases | 120 | Not a lot of detail. |
| C6.1j  describe the industrial production of fertilisers as several integrated processes using a variety of raw materials | SC15 Dynamic Equilibria, Calculations involving volumes of gases | 121 |  |
| C6.1k describe the basic principles in carrying out a life-cycle assessment of a material or product | SC11 Obtaining and using metals | 93 |  |
| C6.1l interpret data from a life-cycle assessment of a material or product | SC11 Obtaining and using metals |  | No data interpretation |
| C6.1m describe a process where a material or product is recycled for a different use, and explain why this is viable | SC24 Polymers | 191 |  |
| C6.1n evaluate factors that affect decisions on recycling | SC11 Obtaining and using metals |  | Some data given but no evaluation. |
| C6.1o  describe the composition of some important alloys in relation to their properties and uses | SC13 Transition metals, alloys and corrosion | 102 |  |
| C6.1p  describe the process of corrosion and the conditions which cause corrosion | SC13 Transition metals, alloys and corrosion | 99 |  |
| C6.1q  explain how mitigation of corrosion is achieved by creating a physical barrier to oxygen and water and by sacrificial protection | SC13 Transition metals, alloys and corrosion | 99 |  |
| C6.1r  compare quantitatively the physical properties of glass and clay ceramics, polymers, composites and metals | C26 Bulk and surface properties of matter including nanoparticles | 202 |  |
| C6.1s  explain how the properties of materials are related to their uses and select appropriate materials given details of the usage required | C26 Bulk and surface properties of matter including nanoparticles | 202-205 |  |
| CM6.1i arithmetic computation, ratio when measuring rates of reaction |  |  | Not seemingly covered explicitly. |
| CM6.1ii drawing and interpreting appropriate graphs from data to determine rate of reaction |  |  | Not seemingly covered explicitly. |
| CM6.1iii  determining gradients of graphs as a measure of rate of change to determine rate |  |  | Not seemingly covered explicitly. |
| CM6.1iv  proportionality when comparing factors affecting rate of reaction |  |  | Not seemingly covered explicitly. |
| **C6.2 Organic chemistry** | | | |
| C6.2a  recognise functional groups and identify members of the same homologous series | SC22 Hydrocarbons, SC23 Alcohols and Carboxylic Acids |  | Alkanes 172, Alkenes 173, Alcohols 178, Carboxylic Acids 182 |
| C6.2b  name and draw the structural formulae, using fully displayed formulae, of the first four members of the straight chain alkanes, alkenes, alcohols and carboxylic acids | SC22 Hydrocarbons, SC23 Alcohols and Carboxylic Acids |  | Alkanes 172, Alkenes 173, Alcohols 178, Carboxylic Acids 182 |
| C6.2c  predict the formulae and structures of products of reactions of the first four and other given members of the homologous series of alkanes, alkenes and alcohols | SC22 Hydrocarbons, SC23 Alcohols and Carboxylic Acids |  | Alkanes 172, Alkenes 173, Alcohols 178, Carboxylic Acids 182 |
| C6.2d  recall the basic principles of addition polymerisation by reference to the functional group in the monomer and the repeating units in the polymer | SC22 Hydrocarbons, SC23 Alcohols and Carboxylic Acids |  | Alkanes 172, Alkenes 173, Alcohols 178, Carboxylic Acids 182 |
| **C6.2e  explain the basic principles of condensation polymerisation** | SC24 Polymers | 188 |  |
| **C6.2f  describe practical techniques to make a polymer by condensation** |  |  |  |
| C6.2g  deduce the structure of an addition polymer from a simple alkene monomer and vice versa | SC24 Polymers | 184 |  |
| C6.2h  recall that DNA is a polymer made from four different monomers called nucleotides and that other important naturally-occurring polymers are based on sugars and amino-acids | SC24 Polymers | 185 |  |
| C6.2i  recall that it is the generality of reactions of functional groups that determine the reactions of organic compounds | SC22 Hydrocarbons, SC23 Alcohols and Carboxylic Acids |  | Alkanes 172, Alkenes 173, Alcohols 178, Carboxylic Acids 182 |
| C6.2j describe the separation of crude oil by fractional distillation | SC20 Fuels | 152 |  |
| C6.2k explain the separation of crude oil by fractional distillation | SC20 Fuels | 152 |  |
| C6.2l describe the fractions as largely a mixture of compounds of formula CnH2n+2 which are members of the alkane homologous series | SC20 Fuels | 154 |  |
| C6.2m recall that crude oil is a main source of hydrocarbons and is a feedstock for the petrochemical industry | SC20 Fuels | 150 |  |
| C6.2n explain how modern life is crucially dependent upon hydrocarbons and recognise that crude oil is a finite resource | SC20 Fuels | 151 |  |
| C6.2o describe the production of materials that are more useful by cracking | SC20 Fuels | 160 |  |
| C6.2p  recall that a chemical cell produces a potential difference until the reactants are used up | SC16 Chemical cells and fuel cells | 124 |  |
| C6.2q  evaluate the advantages and disadvantages of hydrogen/oxygen and other fuel cells for given uses | SC16 Chemical cells and fuel cells | 125 |  |
| CM6.2i  represent three-dimensional shapes in two dimensions and vice versa when looking at chemical structures, e.g. allotropes of carbon |  |  | Numerical, 3D and 2D all covered but no translation between them in book except drawing dot-and-cross diagrams from formulae. |
| **C6.3 Interpreting and interacting with Earth systems** | | | |
| C6.3a interpret evidence for how it is thought the atmosphere was originally formed | SC21 Earth and atmospheric science | 162 |  |
| C6.3b describe how it is thought an oxygen-rich atmosphere developed over time | SC21 Earth and atmospheric science | 164 |  |
| C6.3c describe the greenhouse effect in terms of the interaction of radiation with matter within the atmosphere | SC21 Earth and atmospheric science | 166 |  |
| C6.3d evaluate the evidence for additional anthropogenic (human activity) causes of climate change and describe the uncertainties in the evidence base | SC21 Earth and atmospheric science | 167 |  |
| C6.3e describe the potential effects of increased levels of carbon dioxide and methane on the Earth’s climate and how these effects may be mitigated | SC21 Earth and atmospheric science | 168 |  |
| C6.3f describe the major sources of carbon monoxide, sulfur dioxide, oxides of nitrogen and particulates in the atmosphere and explain the problems caused by increased amounts of these substances | SC20 Fuels | 158 | Also pg 168 SC21 Earth and atmospheric science |
| C6.3g describe the principal methods for increasing the availability of potable water in terms of the separation techniques used | SC2 Methods of separating and purifying substances | 15 |  |
| CM6.3i extract and interpret information from charts, graphs and tables |  |  | Skills not explicitly covered in book. |
| CM6.3ii use orders of magnitude to evaluate the significance of data |  |  | Skills not explicitly covered in book. |

## Want to switch?

If you’re an OCR-approved centre, all you need to do is download the specification and start teaching. Your exams officer can complete an intention to teach form which enables us to provide appropriate support. When you’re ready to enter your students, you just need to speak to your exams officer to:

1. Make estimated entries by 10 October so we can prepare the question papers and ensure we’ve got enough examiners.
2. Make final entries by 21 February. If you are not already an OCR-approved centre please refer your exams officer to the centre approval section of our admin guide.

## Next steps

1. Familiarise yourself with the specification, sample assessment materials and teaching resources on the OCR Chemistry A qualification page of the OCR website.

<http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-chemistry-a-j248-from-2016/>

1. Get a login for our secure extranet, Interchange – this allows you to access the latest past/practice papers and use our results analysis service, Active Results.

<https://interchange.ocr.org.uk>

1. Sign up to receive subject updates by email.

<http://www.ocr.org.uk/i-want-to/email-updates>

1. Sign up to attend a training event or take part in webinars on specific topics running throughout the year and our Q&A webinar sessions every half term. <https://www.cpdhub.ocr.org.uk>
2. Attend one of our free teacher network events that are run in each region every term. These are hosted at the end of the school day in a school or college near you, with teachers sharing best practice and subject specialists on hand to lead discussion and answer questions. <http://ocr.org.uk/qualifications/professional-development/teacher-networks/>