

OXFORD

INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE CHEMISTRY

(9202)

Switching from Pearson Edexcel International or Cambridge International Examinations to Oxford International AQA Examinations

For this new International GCSE Chemistry specification, Oxford International AQA Examinations have blended the best of the AQA specification, which is the most popular specification in England, with some new ideas, new concepts and new approaches to learning to make it more appropriate for international schools.

Teachers will find the specification an ideal vehicle to make International GCSE Chemistry enjoyable and provide the right level of challenge. It allows a freedom to teach chemistry in a variety of ways and incorporates key themes and concepts throughout the specification.

It has been put together following consultation with teachers who will see this as the ideal choice for students who want to study and excel in chemistry at GCSE level and progress to further study. Some of the key features are the clear signposting of required practical exercises within the content. It is the perfect platform to study at A-level as it develops the key skills required to study at post-16 level and beyond.

TOPIC BY TOPIC COMPARISON

List of Oxford AQA Exam topics and where they are found in the Pearson Edexcel International GCSE Chemistry specification and the Cambridge International Examinations (CIE) GCSE Chemistry specification.

| OxfordAQA (9202) specification v5.2 | Pearson Edexcel International specification (4CH1) | Cambridge International Examinations (CIE) specification (0971) |
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| Overall structure | | |
| 10 topics: <ol style="list-style-type: none"> 1. Atomic structure and the periodic table 2. Structure, bonding and the properties of matter 3. Chemical changes 4. Chemical analysis 5. Acids, bases and salts 6. Quantitative chemistry 7. Periodicity 8. The rate and extent of chemical change 9. Energy changes 10. Organic chemistry. | 4 topics <ol style="list-style-type: none"> 1. Principles of chemistry 2. Inorganic chemistry 3. Physical chemistry 4. Organic chemistry | 14 topics: <ol style="list-style-type: none"> 1. The particulate nature of matter 2. Experimental techniques 3. Atoms, elements and compounds 4. Stoichiometry 5. Electricity and chemistry 6. Chemical energetics 7. Chemical reactions 8. Acids, bases and salts 9. The Periodic Table 10. Metals 11. Air and water 12. Sulfur 13. Carbonates 14. Organic chemistry |

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| <p>All candidates sit two examinations, each 90 minutes in length, which are equally weighted. Both papers assess content from the whole of the specification.</p> <p>Paper 1 has more of a focus on recall, with Paper 2 being more focused on application and evaluation.</p> <p>The examinations are not tiered and cover grades 9–1, with 9 being the highest.</p> <p>There is no ‘extension’ material in the specification; all students are expected to have covered all content.</p> <p>There is a mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.</p> | <p>All candidates sit two examinations.</p> <p>Paper 1 is 120 minutes/110 marks which assesses core content common to the Pearson Edexcel GCSE in Double Science (worth 61.1% of the marks for this qualification)</p> <p>Paper 2 is 75 minutes/70 marks, assesses all the content including content which is unique to the GCSE in Chemistry (worth 38.9% of the marks for this qualification).</p> <p>The examinations are not tiered and cover grades 9–1, with 9 being the highest.</p> <p>There is a mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.</p> | <p>All candidates take three papers</p> <p>Candidates who have studied Core subject content are eligible for grades 1 to 5 and should be entered for Paper 1, Paper 3 and either Paper 5 or Paper 6.</p> <p>Candidates who have studied Extended subject content (Core and Supplement) are eligible for grades 1 to 9 and should be entered for Paper 2, Paper 4 and either Paper 5 or Paper 6.</p> <p>Paper 1 and Paper 2 are multiple choice papers, 40 marks/45 minutes and count for 30% of total marks.</p> <p>Paper 3 and Paper 4 have short answer and structured questions, 80 marks/75 minutes and count for 50% of total marks.</p> <p>Paper 5 is a practical test, 40 marks/75 minutes and counts for 20% of total marks.</p> <p>Paper 6 is an alternative to practical paper, 40 marks/60 minutes, and 20% of total marks.</p> <p>All candidates should be taught the core subject content. Candidates aiming for higher grades should also be taught the extended subject content.</p> |

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| <p>Practical is assessed in the written papers. There is no separate practical examination.</p> <p>Experimental work is described in the main body of the specification and the appendix gives details of the experimental and investigative skills that students should be encouraged to develop during the course.</p> <p>There are five required practical activities. These are described in detail in a separate practical handbook.</p> <p>Required practicals:</p> <ol style="list-style-type: none"> 1. Investigate the products at the anode and cathode in the electrolysis of copper sulfate solution. 2. Identify the metal ion in an unknown compound using flame testing techniques. 3. Establish the concentration of an unknown strong acid through titration with a strong base. 4. Investigate factors affecting the rate of a reaction. 5. Test for the presence of a double bond in an unknown hydrocarbon. | <p>Experimental skills are assessed through the written examinations.</p> <p>Students develop knowledge and understanding of experimental skills through the context of the chemistry they are learning.</p> <p>Experimental work is described in the specification.</p> <p>The appendix contains a list of 26 additional practical investigations that can be used to supplement students' understanding of chemistry in addition to the practical investigations found within the main body of the content.</p> | <p>Students should carry out practical work and investigations within the topics listed in the specification.</p> <p>Experimental skills tested in paper 5 and paper 6 are:</p> <ul style="list-style-type: none"> Simple quantitative experiments involving the measurement of volumes and/or masses Rates (speeds) of reaction Measurement of temperature based on a thermometer with 1°C graduations Problems of an investigatory nature, possibly including suitable organic compounds Filtration Electrolysis Identification of ions and gases |

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| Content | Coverage | Coverage |
| 3.1 Atomic structure and the periodic table | | |
| 3.1.1 Solids, liquids and gases | <p>1(a) States of matter The content is covered in Edexcel is broadly similar but there is more emphasis on solubility and the use of solubility curves plus an experiment to investigate the solubility of a solid.</p> | <p>1.1 The particulate nature of matter The coverage is similar, although OxfordAQA have an explicit requirement for students to be familiar with particular diffusion experiments. The CIE specification includes Brownian motion, which is not included in OxfordAQA. Oxford AQA does not require candidates to describe the pressure and temperature of a gas in terms of the motion of its particles.</p> <p>7.1 Physical and chemical changes This topic is not included in the Oxford AQA specification.</p> |
| 3.1.2 A simple model of the atom | <p>1(c) Atomic structure The coverage is similar but Edexcel includes the calculation of relative atomic mass from relative abundances, which is not included in Oxford AQA specification.</p> | <p>3.1 Atomic structure and the Periodic Table The content is similar. The Oxford AQA specification refers to mass number as the sum of protons and neutrons and the term nucleon is only used in the CIE specification. Only CIE refers to radioactive and non-radioactive isotopes and includes the uses of isotopes.</p> |
| 3.1.3 The Periodic Table | <p>1(d) The Periodic Table Although the content is similar, Exexcel includes the use of electrical conductivity and the acid-base character of oxides to classify elements as metals or non-metals.</p> | <p>9.1 The periodic table 9.2 Periodic trends 9.5 Noble gases The content is similar but CIE places more emphasis on the metallic and non-metallic character of the elements and also includes the uses of noble gases.</p> |
| 3.2 Structure, bonding and the properties of matter | | |

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| Content | Coverage | Coverage |
| <p>3.2.1 Chemical bonds: ionic, covalent and metallic</p> <p>3.2.2 How bonding and structure are related to the properties of substances</p> <p>3.2.3 Structure and bonding of carbon</p> | <p>1(f) Ionic bonding The content is similar but the Exexcel specification is more explicit about which dot-and-cross diagrams students need to be able to draw.</p> <p>1(g) Covalent bonding 1(h) Metallic bonding The content is very similar although Oxford AQA is more explicit in the different methods for representing covalent and metallic bonding in pictorial form. Both specifications include the structure and properties of diamond, graphite and fullerene but the Oxford AQA specification goes a little further by mentioning delocalised electrons in graphite. Edexcel does not include silicon dioxide as an example of a giant covalent structure.</p> | <p>3.2.1 Bonding: the structure of matter 3.2.2 Ions and ionic bonds 3.2.3 Molecules and covalent bonds 3.2.4 Macromolecules 3.2.5 Metallic bonding The content is very similar. The CIE specification limits the description of ionic bonding to the combination of Group 1 and Group 7 elements. The Oxford AQA specification is more explicit in the different methods for representing covalent and metallic bonding in pictorial form. The CIE specification states that students should be able to describe the giant covalent structures of diamond and graphite but there is less detail about what is required, CIE does not include the reason for the electrical conductivity of graphite and it does not mention fullerenes.</p> |
| 3.2.4 Nanoparticles | This topic is not included in the Edexcel specification. | This topic is not included in the CIE specification. |
| 3.3 Chemical changes | | |
| 3.3.1 Metals | <p>Topic 1(h) Metallic bonding. Edexcel contains the word 'malleability', whereas Oxford AQA makes reference only to 'bent or hammered into shape'. This section of the Oxford AQA specification includes alloys which are covered in Edexcel Topic 2(e). The Edexcel specification is more explicit about why alloys are harder than pure metals.</p> | <p>10.1 Properties of metals The content is similar but the Oxford AQA specification is more explicit about the properties of metals and the definition of an alloy. 10.4 Uses of metals Both specifications include the properties and uses of copper but Oxford AQA has much less detail about the uses of aluminium, steel and zinc.</p> |

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| 3.3.1.1 The reactivity series | <p>2(d) Reactivity series Exexcel includes displacement reactions between metals and metal oxides and between metals and aqueous solutions of metal salts. Oxford AQA only includes metals and aqueous solutions. Edexcel includes the conditions for rusting and the prevention of rusting but this is not included in the Oxford AQA specification. Both specifications include the reactions of metals with water and acid.</p> <p>2(e) Extraction and uses of metals There is more detail in the Oxford AQA specification regarding the extraction of particular metals. This includes an outline of the reactions involved in the production of iron in the blast furnace and the extraction of copper by phytomining and bioleaching. Oxford AQA places more emphasis on the recycling of metals.</p> | <p>10.2 Reactivity series CIE includes displacement reactions between metals and metal oxides and between metals and aqueous solutions of metal salts. Oxford AQA only includes metals and aqueous solutions. There are other differences: Oxford AQA includes lithium in the reactivity series and mentions the unreactivity of gold. Only CIE includes the apparent unreactivity of aluminum and the prevention of rusting. Rusting is included in CIE Topic 11.2 CIE includes the effect of heat on nitrates, hydroxides and carbonates but Oxford AQA only includes carbonates (Topic 3.3.1.2)</p> <p>10.3 Extraction of metals There are some differences: CIE includes the extraction of zinc from zinc blende whereas OxfordAQA includes copper extraction by phytomining and bioleaching.</p> |
| 3.3.1.2 Metal carbonates | The same content is covered in 2(c) and 2(g) of the Edexcel specification | <p>13.1 Carbonates Oxford AQA includes the decomposition of carbonates but not nitrates and hydroxides. Also Oxford AQA does not include the uses of calcium carbonate, lime and slaked lime. The production of carbon dioxide from the decomposition of carbonates and the reaction of acids and carbonates also appears in CIE Topic 11.4</p> |
| 3.3.2 Electrolysis | <p>1(i) Electrolysis Much of the content is the same. Oxford AQA also includes the effect of reactivity and concentration on which ion is discharged</p> | <p>5.1 Electricity and chemistry The coverage is very similar. CIE lists additional electrolytes: concentrated hydrochloric acid and dilute sulfuric acid.</p> |

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| Content | Coverage | Coverage |
| | <p>during electrolysis.</p> <p>Oxford AQA includes electroplating which only appears in Edexcel as a suggested practical investigation.</p> <p>Oxford AQA includes the industrial extraction of aluminium and the uses of the products of the electrolysis of sodium chloride solution. The electrolysis of copper sulfate solution is a required practical. Edexcel requires candidates to investigate the electrolysis of aqueous solutions including sodium chloride solution, copper sulfate solution and dilute sulfuric acid.</p> | <p>Investigating the products of the electrolysis of copper sulfate solution is an Oxford AQA required practical.</p> <p>The production of electrical energy from simple cells is covered in CIE Topic 5.1 (Electricity and chemistry)</p> |
| 3.4 Chemical analysis | | |
| 3.4.1 Purity and chromatography | <p>1(b) Elements, compounds and mixtures</p> <p>The content is very similar.</p> <p>Both specifications refer to chromatography experiments and the use of R_f values.</p> | <p>2.2.1 Criteria of purity</p> <p>2.2.2 Methods of purification</p> <p>The content is similar. The Oxford AQA specification does not include locating agents but does require students to know that solvents other than water can be used for paper chromatography.</p> |
| 3.4.2 Identification of common gases | <p>2(h) Chemical tests</p> <p>Both specifications include tests for the same five gases.</p> <p>2(c) Gases in the atmosphere</p> <p>Much of this topic goes beyond what is required by the Oxford AQA specification. Percentages of gases in the air, combustion of elements in oxygen and a practical to determine the percentage of oxygen in the air does not appear in Oxford AQA. However, thermal decomposition of metal carbonates and carbon dioxide as a greenhouse gas does appear in Oxford AQA in</p> | <p>8.4 Identification of gases</p> <p>Both specifications include tests for the same five gases but CIE also includes the test for sulfur dioxide using aqueous potassium manganate(VII)</p> |

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| Content | Coverage | Coverage |
| | Topics 3.3.1.2(a) and 3.10.1.2(d). | |
| 3.4.3 Identification of ions | <p>2(h) Chemical tests</p> <p>Both specifications include the identification of five positively charged ions using flame tests and this is one of the Oxford AQA required experiments. There are four ions in common but Oxford AQA has barium ions instead of copper ions.</p> <p>Oxford AQA includes the tests for six different positively charged ions using sodium hydroxide solution but does not include ammonium ions. Edexcel includes copper, iron(II) and iron(III) but not aluminum, calcium and magnesium ions.</p> <p>Both specifications include tests for the same five negatively charged ions.</p> <p>Both specifications include the effect of water on anhydrous copper sulfate but this is in Topic 3.9.1 (Exothermic and endothermic reactions) in the Oxford AQA specification.</p> | <p>8.4 Identification of ions</p> <p>Both specifications include the identification of positively charged ions using flame tests and this is one of the Oxford AQA required experiments. CIE only requires four ions including copper but not calcium and barium.</p> <p>Both specifications include tests for positively charged ions using sodium hydroxide solution. Oxford AQA includes magnesium ions but does not include ammonium, chromium and zinc ions.</p> <p>Both specifications include the tests for five different negatively charged ions but CIE also includes the test for nitrite and sulfite ions.</p> |
| 3.5 Acids, bases and salts | | |
| 3.5.1 The properties of acids and bases | <p>2(f) Acids, alkalis and titrations</p> <p>The Oxford AQA specification names universal indicator and litmus but the Edexcel specification also requires a description of the use of phenolphthalein and methyl orange.</p> <p>Both specifications require students to be able to describe how to carry out an acid-base titration. This is one of the Oxford AQA required experiments and it appears in Topic 3.6.4 (Molar concentrations).</p> <p>Edexcel includes the definition of an acid as a</p> | <p>8.1 The characteristic properties of acids and bases</p> <p>There are some differences. CIE defines acids and bases in terms of proton transfer and Oxford AQA emphasizes the role of hydrogen ions and hydroxide ions in solution.</p> <p>Both specifications refer to the measurement of pH using universal indicator but CIE also refers to litmus and methyl orange and the reaction of bases with ammonium salts. CIE includes the meaning of weak and strong acids and bases and</p> |

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| | proton donor and base as a proton acceptor whereas Oxford AQA emphasis the role of hydrogen ions and hydroxide ions in solution and includes the ionic equation for neutralisation. | Oxford AQA also refers to weak acids not ionising completely in Topic 3.10.3.2 (Carboxylic acids) Only Oxford AQA includes the ionic equation for neutralisation. 8.2 Types of oxides The classification of oxides as acidic or basic is not included in the Oxford AQA specification. |
| 3.5.2 Preparation of salts | 2(g) Acids, bases and salt preparations The content in both specifications is very similar but Edexcel includes the solubility rules for salts and is more explicit about which salts should be prepared by students: soluble copper sulfate and insoluble lead sulfate. | 8.3 Preparation of salts The content in CIE and Oxford AQA is very similar. |
| 3.6 Quantitative chemistry | | |
| 3.6.1 Conservation of mass including the quantitative interpretation of chemical equations 3.6.2 Use of amount of substance in relation to masses of pure substances 3.6.3 The mole concept 3.6.4 Molar concentrations | 1(e) Chemical formulae, equations and calculations There are some differences. Oxford AQA does not include: <ul style="list-style-type: none"> The experimental determination of the formulae of salts containing water of crystallisation. Percentage yield calculations. The determination of the formula of a metal oxide using combustion. Edexcel does not include the relative mass comparison with the carbon-12 isotope, use of the Avogadro constant and reasons why it may not be possible to obtain 100% yield during an experiment. Both specifications include acid-base titrations and this is an Oxford AQA required experiment. | 4.1 Stoichiometry 4.2 The mole concept Coverage is similar but Oxford AQA does not include percentage yield and percentage purity calculations. Although the CIE specification includes the calculation of solution concentrations there is no specific mention of acid-base titrations whereas establishing the concentration of an unknown strong acid through titration with a strong base is an Oxford AQA required experiment. |

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| Content | Coverage | Coverage |
| 3.7 Trends within the periodic table | | . |
| 3.7.1 Group properties | <p>2(a) Group 1 (alkali metals) 2(b) Group 7 (halogens)</p> <p>The content in Edexcel is similar but Oxford AQA does not require knowledge of the colours and physical states of Group 7 elements. Oxford AQA gives more detail about how students are expected to explain the relative reactivities of Group 1 and Group 7 elements.</p> | <p>9.3 Group properties</p> <p>The content is similar but in CIE the emphasis is on describing trends and Oxford AQA places much more emphasis on explaining the the relative reactivities of Group 1 and Group 7 elements.</p> |
| 3.7.2 Transition metals | <p>This content is not covered in the Edexcel specification. The Oxford AQA specification compares the melting point, density, strength, hardness and reactivity of the transition metals with Group 1 metals, as well as listing typical properties: ions with different charges, coloured compounds, and useful catalysts.</p> | <p>9.4 Transition elements</p> <p>Both specifications list the same properties of transition elements. Oxford AQA describes transition metal having ions with different charges but CIE uses the term variable oxidation states. Unlike Oxford AQA, CIE does not compare transition metals with Group 1 elements.</p> |
| 3.8 The rate and extent of chemical change | | |
| 3.8.1 Rate of reaction | <p>3(b) Rates of reaction</p> <p>The coverage is similar but the Oxford AQA specification includes two formulas which can be used for quantifying the rate of a reaction and requires students to interpret graphs of product formed with time. Edexcel includes experiments to investigate the effect of changing the size of marble chips and the concentration of hydrochloric acid on the rate of reaction also the effect of different solids on the catalytic decomposition of hydrogen peroxide. In contrast, the Oxford AQA required experiment is investigating the rate of reaction between sodium thiosulfate solution and dilute hydrochloric</p> | <p>7.2 Rate of reaction</p> <p>The content is similar but only CIE includes:</p> <ul style="list-style-type: none"> Explosive combustion with fine powders and gases The role of light in photochemical reactions including photosynthesis The use of silver salts in photography <p>There is an emphasis in CIE on using a practical method for the measurement of rate which involves gas evolution and the Oxford AQA specification includes two formulas which can be used for quantifying the rate of this type of reaction. However, the Oxford AQA required practical is the measurement of the rate of</p> |

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| Content | Coverage | Coverage |
| | acid. | reaction between sodium thiosulfate solution and dilute hydrochloric acid. |
| 3.8.2 Factors affecting equilibrium 3.8.3 Production of ammonia and sulfuric acid | <p>3(c) Reversible reactions and equilibria Both specifications include the dehydration of hydrated copper sulfate (this is covered in Oxford AQA Topic 3.9.1) but Edexcel also includes the effect of heat on ammonium chloride. Both specifications include the factors affecting equilibrium but Oxford AQA also includes more detailed examples from the Haber Process and the manufacture of sulfuric acid.</p> | <p>7.3 Reversible reactions Both specifications include the effect of heat and water on hydrated and anhydrous copper sulfate (This is covered in Oxford AQA Topic 3.9.1) but CIE also includes cobalt(II) chloride. Both specifications require candidates to have knowledge of the factors that affect the position of equilibrium but the Oxford AQA specification includes more detail about what candidates need to know.</p> <p>11.3 Nitrogen and fertilisers In the specification supplementary content CIE states that students should be able to describe and explain the conditions for the manufacture of ammonia. The Oxford AQA specification gives more detail about what students are expected to know about the Haber process. However, OxfordAQA does not mention phosphorus or potassium containing fertiliser.</p> <p>12.1 Sulfur In the specification supplementary content CIE states that students should be able to describe the manufacture of sulfuric acid. The Oxford AQA specification gives more detail about what students should know about the reactions and conditions in the contact process. Oxford AQA does not include the uses of sulfur dioxide as bleach.</p> |
| 3.8.4 Redox reactions | Redox reactions appear in Topic 2(d) of the Edexcel specification. Treatment is similar but the | <p>7.4 Redox Both specifications define oxidation and reduction</p> |

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| Content | Coverage | Coverage |
| | term reducing agent does not appear in the Oxford AQA specification. | in terms of loss or gain of oxygen or electrons but CIE also includes changes in oxidation state and colour in reactions involving potassium manganate(VII) and potassium iodide. CIE requires candidates to identify oxidising agents and reducing agents from equations but the term reducing agent does not appear in the OxfordAQA specification. |
| 3.9 Energy change | | |
| 3.9.1 Exothermic and endothermic reactions 3.9.2 Calculating and explaining energy change | 3(a) Energetics The content of the Edexcel and Oxford AQA specifications is very similar. Only the Oxford AQA specification states that students should be able to give examples of exothermic and endothermic reactions. | 6.1 Energetics of a reaction The content of the CIE and Oxford AQA specifications is very similar. 6.2 Energy transfer Oxford AQA includes simple calorimetry experiments, calculation of experimental energy changes and delta H conventions but this content does not appear in the CIE specification. The CIE specification describes uranium-235 as a source of energy but the uses of radioactive isotopes are not included in the Oxford AQA specification. 11.1 Water Both specifications include the effect of heat and water on hydrated and anhydrous copper sulfate but only CIE includes cobalt(II) chloride. Oxford AQA does not include the treatment of water or the large scale uses of water. |
| 3.9.3 Chemical cells and fuel cells | This content is not included in the Edexcel specification. | The production of electrical energy from simple cells is covered in Topic 5.1 (Electricity and chemistry) CIE has less detail about fuel cells which are |

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| Content | Coverage | Coverage |
| | | mentioned in Topic 6.2 (Energy transfer) |
| 3.10 Organic chemistry | | |
| 3.10.1.1 Crude oil 3.10.1.2 Hydrocarbons | <p>4(a) Introduction to organic chemistry Edexcel requires students to name organic compounds with up to six carbon atoms but Oxford AQA only names of compounds with up to three carbon atoms. The Edexcel specification uses the terms structural formula, displayed formula and isomer but Oxford AQA refers only to the term displayed structure and does not include structural isomerism. Also Oxford AQA does not use the terms substitution reaction and addition reaction.</p> <p>4(b) Crude oil The Edexcel specification requires students to know the names of the main fractions of crude oil. Also Edexcel goes into more detail about the poisonous effects of carbon monoxide and the formation of oxides of nitrogen during combustion. The cracking of alkanes is included in Topic 3.10.10.3 of the Oxford AQA specification. Oxford AQA has a section on biofuels and the production of ethanol by fermentation. Edexcel does not cover biofuels and the production of ethanol is covered in Topic 4(e).</p> <p>4(c) Alkanes Edexcel includes the reactions of alkanes with halogens but this is not included in the OxfordAQA specification.</p> | <p>14.1 Names of compounds The content is similar. CIE requires structural formulae but Oxford AQA also includes displayed structures.</p> <p>14.2 Fuels The Oxford AQA specification does not expect students to know the names and uses of the fractions of crude oil.</p> <p>14.3 Homologous series The content is similar but Oxford AQA does not include structural isomerism.</p> <p>14.4 Alkanes CIE only mentions methane and ethane. Oxford AQA goes up to propane but does not include substitution reactions with chlorine.</p> <p>11.2 Air Both specifications cover air pollution in similar depth but Oxford AQA does not include the composition of air or the separation of liquid air by fractional distillation. Oxford AQA does not include lead pollution or the effects of air pollution on health and buildings and Oxford AQA does not include rusting or methods of rust prevention.</p> <p>11.4 Carbon dioxide and methane The Oxford AQA specification includes most of the content of this topic in another part of the specification (Topic 3.3.1.2) but it does not include the production of carbon dioxide by respiration, the production of methane from living things or the carbon cycle.</p> |

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| | | Although fermentation is included in Topic 14.6, biofuels are not included in the CIE specification. |
| 3.10.1.3 Obtaining useful substances from crude oil | <p>4(d) Alkenes</p> <p>The Edexcel specification covers catalytic cracking in Topic 4(b)</p> <p>Both specifications include the reaction with bromine water and this is one of the Oxford AQA required experiments. Edexcel also includes the reaction with bromine to produce dibromoalkanes.</p> | <p>14.5 Alkenes</p> <p>Both specifications include the reaction of alkenes with bromine water and this is an Oxford AQA required practical.</p> <p>Oxford AQA does not include addition reactions with bromine, hydrogen and steam.</p> |
| 3.10.2 Synthetic and naturally occurring polymers | <p>4(h) Synthetic polymers</p> <p>Both specifications include poly(ethene) and poly(propene) but Edexcel also expects students to understand how to draw the repeat unit for poly(chloroethene) and poly(tetrafluoroethene).</p> <p>Both specifications focus on non-biodegradability and disposal problems but Edexcel also includes the production of toxic gases when some polymers are burned.</p> <p>Oxford AQA only deals with addition polymerisation but Edexcel includes condensation as well (polyesters) and requires students to understand how to write the displayed formula of a polyester.</p> <p>Edexcel mentions biodegradable polymers but Oxford AQA is more specific about biodegradable polymers made from cornstarch.</p> <p>Oxford AQA has a section on thermosoftening and thermosetting polymers but this topic is not included in the Edexcel specification.</p> | <p>14.8 Polymers</p> <p>CIE states that candidates should be able to explain the difference between addition and condensation polymers. The formation of poly(ethene) is mentioned in Topic 14.5.</p> <p>Oxford AQA covers only the addition polymers poly(ethene) and poly(propene) and requires students to explain the behaviour of thermosoftening polymers.</p> <p>Oxford AQA does not include the condensation polymers nylon and terylene.</p> <p>Oxford AQA does not include the natural polymers protein and carbohydrate.</p> <p>Both specifications mention the non-biodegradability of polymers but Oxford AQA goes into more detail about the problems this causes and it also mentions biodegradable plastics made from cornstarch.</p> |
| 3.10.3.1 Alcohols | <p>4(e) Alcohols</p> <p>Oxford AQA only mentions the first three</p> | <p>14.6 Alcohols</p> <p>The coverage is similar. The production of alcohol</p> |

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| Content | Coverage | Coverage |
| | members of the homologous series but Edexcel also includes butanol. Both specifications cover the oxidation of alcohols but Edexcel also names the reagents. Both specifications cover the manufacture of ethanol from ethene and by fermentation – these reactions are covered in Oxford AQA Topic 3.10.1.2 | by fermentation and the reaction of ethene with steam is covered in Oxford AQA Topic 3.10.1.2 |
| 3.10.3.2 Carboxylic acids | 4(f) Carboxylic acids Coverage is similar. The Oxford AQA specification mentions that carboxylic acids do not ionise completely because they are weak acids. | 14.7 Carboxylic acids The coverage is similar. The oxidation of ethanol to form ethanoic acid is covered in Oxford AQA Topic 3.10.3.1 but the specification does not name the oxidising agent. Although the CIE specification states that ethanoic acid is a weak acid, the Oxford AQA specification goes further: carboxylic acids are weak acids because they do not ionise completely. |
| 3.10.3.3 Esters | 4(g) Esters Coverage is similar. Edexcel includes the preparation of an ester as a student practical. | The Oxford AQA specification gives ethyl ethanoate as an example of an ester. CIE (Section 14.1) goes much further and requires extension candidates to name and draw the structural formulae of the esters which can be made from unbranched alcohols and carboxylic acids, each containing up to four carbon atoms |

SWITCHING FROM EDEXCEL (4CH1) TO OXFORD AQA (9202)

| Topics included in Edexcel but not in Oxford AQA | Topics included in Oxford AQA but not in Edexcel |
|--|---|
| Solubility rules and an experiment to investigate solubility Calculation of relative atomic mass Acid-base character of oxides Hardness of alloys Displacement reactions between metals and metal oxides Prevention of rusting in iron Gases in the atmosphere and the percentage of oxygen in air Flame test for copper ions Test for ammonium ions Use of phenolphthalein and methyl orange Definition of an acid as a proton donor Percentage yield calculations The determination of the formula of a hydrated salt The determination of the formula of a metal oxide using combustion. Colour and state of Group 7 elements The effect of heat on ammonium chloride Structural isomerism Names of fractions obtained from crude oil Reactions of alkanes with halogens Condensation polymers | Explanation of electrical conductivity in graphite Silicon dioxide as an example of a giant structure Nanoparticles Chemistry of the extraction of iron in the blast furnace Extraction of copper by phytomining and bioleaching. Flame test for barium ions Chemical tests for aluminium, magnesium and calcium ions Ionic equation for neutralisation Weak acids do not ionise completely Comparison with the carbon-12 isotope The Avogadro constant Reasons for less than 100% yield Transition metals – comparison with Group 1 Calculating rate of reaction and interpreting rate graphs The Haber process The manufacture of sulfuric acid Chemical cells and fuel cells Biofuels Thermosoftening and thermosetting polymers |

SWITCHING FROM CIE (0971) TO OXFORD AQA (9202)

| Topics included in CIE but not in Oxford AQA | Topics included in Oxford AQA but not in CIE |
|---|--|
| Physical and chemical changes Brownian motion Uses of radioactive isotopes Displacement reactions between metals and metal oxides Prevention of rusting in iron Effect of heat on nitrates and hydroxides Extraction of zinc from zinc blende Test for sulfur dioxide and uses of sulfur dioxide Flame test for copper Chemical tests for ammonium, chromium and zinc Test for nitrite and sulfite ions Classification of oxides Calculation of percentage yield Calculation of percentage purity Oxidation states Explosions, photochemical reactions and the use of silver salts in photography Water treatment Names and uses of the fractions obtained from crude oil Structural isomerism Reactions of alkanes with chlorine Composition of air and separation of liquid air by fractional distillation The carbon cycle Addition reactions of alkenes with hydrogen and steam Condensation polymers and natural polymers | Explanation of electrical conductivity in graphite Structure of fullerenes Nanoparticles Extraction of copper by phytomining and bioleaching. Flame tests for calcium and barium Chemical test for magnesium ions Ionic equation for neutralisation Weak acids do not ionise completely Acid-base titrations Calorimetry experiments Delta H conventions Biofuels Examples of biodegradable plastics Thermosoftening and thermosetting polymers |



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