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| **Term**  | **INTENT**[OCR GCSE (9-1) Chemistry A (Gateway Science) J248 Specification](https://www.ocr.org.uk/Images/234598-specification-accredited-gcse-gateway-science-suite-chemistry-a-j248.pdf) | **IMPLEMENTATION** | **IMPACT**  |
| **Substantive Knowledge**This is the specific, factual content for the topic, which should be connected into a careful sequence of learning. | **Disciplinary Knowledge (Skills)**This is the action taken within a particular topic in order to gain substantive knowledge. | **Assessment opportunities**What assessments will be used to measure student progress?Evidence of how well students have learned the intended content. |
| **Autumn****Term****Y11****Term 1** | C5.1 Monitoring Chemical reactions.This topic tackles the relationship of moles to the concentration of a solution and the volume of a gas. It also tackles the calculation of the mass of a substance in terms of its molarity. The topic then moves on to look at using equations to make predictions about yield by calculations and to calculate atom economy.* Calculating theoretical yields
* Calculating % yields and atom economies
* Choosing reaction pathways
* Calculation moles in solutions
* Performing a titration
* Molar gas volumes
 | * Introduction of limiting reactant
* Calculation of theoretical yields using moles
* Revision calculating of RFM
* Knowledge of formula for percentage yield
* Introduction of atom economy
* Comparison between the two to measure efficiency of a chemical reaction.
* Knowledge of formula for percentage yield
* Introduction of atom economy
* Comparison between the two to measure efficiency of a chemical reaction.
* Looking at reaction pathway, using ethanol as example

By hydration or fermentation.* Introduction to calculating concentration in solutions, either g/dm3 or mol/dm3
* Explanation of a titration
* Practical task, acid-base titration
* Students to be able to name chemical equipment- burette, pipette, indicator, conical flask, retort stand, boss and clamp.
 | In class teacher assessment through Q & AKnowledge recall activityHomework to develop fluency, problem solving, reasoning and mastery.Teacher assessment during lessonEnd of C5.1 testEnd of Year assessments |
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| **Autumn****Term****Y11****Term 2** | C5.2 Controlling reactions.* The rate and yield of a chemical reaction can be altered by changing the physical conditions.
* Explain meaning of rate of reaction.
* Interpretation of rate of reaction graphs.
 | * Introduction to rates of reaction.
* Factors affecting the rate of reaction: Temp, concentration, particle size and use of catalysts.
* Drawing concentration time graphs
* Drawing tangents to calculate rate.
* Practical on temperature change
* Introduction to inversely proportional graphs
* Practical on Concentration-Thiosulphate with acid expt
* Demo particle size -Marble chips and acid expt
* Graph drawing measuring rate- comparing particle size and rate.
* Practical finding a good catalyst- Hydrogen peroxide evolution of oxygen.
* Biological catalysts, use of enzymes.
 | In class teacher assessment through Q & AKnowledge recall activityHomework to develop fluency, problem solving, reasoning and masteryTeacher assessment during lessonEnd of C5.2 testTo be included in End of Year assessments |
| * Factors affecting rates of reaction.
* Temperature
* Concentration
* Surface area
* Catalysts
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| **Autumn****Term****Y11****Term 2** | C5.3 EquilibriaIn a reaction, when the rate of the forward reaction equals the rate of the backwards reaction, the reaction in a closed system is said to be in equilibrium. | * Meaning of term reversible, forward and backward reaction.
* Explanation of Term water of crystallisation.
* How eqm position is changed by temperature, pressure and concentration
* Le Chatelier’s Principle- Industrial processes
* Production of ethanol-Choosing reaction pathway.
 | In class teacher assessment through Q & AKnowledge recall activityHomework to develop fluency, problem solving, reasoning and mastery.Teacher assessment during lessonEnd of unit C5 testTo be included in End of Year assessments |
| * Reversible reactions
* Dynamic equilibria
* Le Chatelier’s principle
* Optimum conditions
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| **Spring Term****Y11****Term 1** | **C6 Global Challenges** | * compare the industrial production of fertilisers with laboratory syntheses of the same products.
* recall the importance of nitrogen, phosphorus and potassium compounds in agricultural production.
* describe the industrial production of fertilisers as several integrated processes using a variety of raw materials.
* explain the importance of the Haber process in agricultural production.
* Explain the importance of the contact process.
* 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.
* explain why and how electrolysis is used to extract some metals from their ores.
* Biological extraction of metals- Bioleaching and phytoextraction.
* describe the composition of some important alloys in relation to their properties and uses.
* describe the process of corrosion and the conditions which cause corrosion.
 | In class teacher assessment through Q & AKnowledge recall activityHomework to develop fluency, problem solving, reasoning and mastery.Teacher assessment during lessonEnd of 6.1 testTo be included in End of Year assessmentsIn class teacher assessment through Q & AKnowledge recall activityHomework to develop fluency, problem solving, reasoning and mastery.Teacher assessment during lessonEnd of unit C6.2 testTo be included in End of Year assessments |
| **C6.1 Improving processes and product.**Know the role of fertilisers.Looking at industrial processes. Haber and contact process.Manufacture of alcohol.Extraction of metalsProperties of metalsLooking at composites |
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|  |  | * explain how mitigation of corrosion is achieved by creating a physical barrier to oxygen and water and by sacrificial protection.
* compare quantitatively the physical properties of glass and clay ceramics, polymers, composites and metals.
* explain how the properties of materials are related to their uses and select appropriate materials given details of the usage required.
* Knowledge of recycling materials.
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| **Spring Term****Y11****Term 2** | **C6.2 Organic Chemistry** | * recognise functional groups and identify members of the same homologous series.
* 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.
* 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.
* combustion; addition of bromine and hydrogen across a double bond; oxidation of alcohols to carboxylic acids using potassium manganate (VII).
* describe the separation of crude oil by fractional distillation.
* describe the fractions as largely a mixture of compounds of formula C nH2n+2 which are members of the alkane homologous series.
* recall that crude oil is a main source of hydrocarbons and is a feedstock for the petrochemical industry.
* describe the production of materials that are more useful by cracking.
* explain how modern life is crucially dependent upon hydrocarbons and recognise that crude oil is a finite resource.
* recall that a chemical cell produces a potential difference until the reactants are used up.
* evaluate the advantages and disadvantages of hydrogen/oxygen and other fuel cells for given uses.
 | In class teacher assessment through Q & AKnowledge recall activityHomework to develop fluency, problem solving, reasoning and mastery.Teacher assessment during lessonEnd of 6.1 testTo be included in End of Year assessmentsIn class teacher assessment through Q & AKnowledge recall activityHomework to develop fluency, problem solving, reasoning and mastery.Teacher assessment during lessonEnd of unit C6.2 testTo be included in End of Year assessments |
| Introduction to the alkanesIntroduction to the alkenesLooking at alcoholsLooking at carboxylic acidsSeparation of alkanes and crackingPolymerisationProducing electricity using chemistry |
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| **Summer Term Y11****Term 2** | **Earth Systems** | * interpret evidence for how it is thought the atmosphere was originally formed.
* describe how it is thought an oxygen-rich atmosphere developed over time.
* describe the greenhouse effect in terms of the interaction of radiation with matter within the atmosphere.
* describe the potential effects of increased levels of carbon dioxide and methane on the Earth’s climate and how these effects may be mitigated
 | Production of Mind maps by students for revision purposesCovering Units C1-C6Review of required practicals see revision sheet. |
| knowledge of how the composition of the atmosphere has changed over time.   |
|  | the correlation between change in atmospheric carbon dioxide .concentration and the consumption of fossil fuels. | * describe the major sources of carbon monoxide, sulphur dioxide, oxides of nitrogen and particulates in the atmosphere and explain the problems caused by increased amounts of these substances.
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| consideration of scale, risk and environmental implications. |
| **Summer Term Y11****Term 2** | Revision of topics C1-C3Revision of topics C4-C6 | Paper 3 topicsPaper 4 topics | Use of past papers available from OCR website and Physic and maths tutor website. |

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