	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Theme/Big Idea	**Oceans (O)** Exploring the chemistry and environmental importance of the oceans, from their composition and role in energy transfer to their impact on the global climate. Students develop an understanding of dissolving and associated enthalpy changes, the greenhouse effect, acid–base equilibria, pH and buffer systems. The theme also introduces solubility products and entropy, linking chemical principles to ocean processes and wider environmental systems. **Polymers and life (PL)** Exploring the chemistry of polymers and biological molecules, linking organic	**Developing metals (DM)** Exploring the chemistry and applications of metals, from their historical uses to their roles in modern technology, medicine and biology. Students develop an understanding of transition metals, redox reactions, electrochemical cells and electrode potentials, alongside d-block chemistry and complex ions. The theme also introduces redox titrations and colorimetry, while considering the importance of metal complexes in areas such as dental alloys, pigments, haemoglobin, medicines and catalytic converters. **Colour by design (CD)** Exploring the chemistry of colour through natural and synthetic pigments,	**Developing metals (DM)** Exploring the chemistry and applications of metals, from their historical uses to their roles in modern technology, medicine and biology. Students develop an understanding of transition metals, redox reactions, electrochemical cells and electrode potentials, alongside d-block chemistry and complex ions. The theme also introduces redox titrations and colorimetry, while considering the importance of metal complexes in areas such as dental alloys, pigments, haemoglobin, medicines and catalytic converters. **Colour by design (CD)** Exploring the chemistry of colour through natural and synthetic pigments,	**Techniques and Procedures:** Practical skills across the course Alongside the content above, students develop practical skills through the PAG programme, including measurement and moles, titration, enthalpy determination, qualitative analysis, organic synthesis, functional-group testing, electrochemical cells, rates of reaction and pH measurement. The OCR specification embeds these practical opportunities within the storylines and requires students to develop the competencies associated with PAG1–PAG12 for the Practical Endorsement.	**Revision and exams**	

	chemistry to materials, medicines and life processes. Students develop an understanding of condensation polymers, organic functional groups, amines and amides, amino acids, proteins and optical isomerism. The theme also introduces enzyme catalysis and molecular recognition, the structure and function of DNA and RNA, and advanced analytical techniques including mass spectrometry and NMR spectroscopy for determining molecular structure.	dyes and organic molecules. Students develop an understanding of delocalised systems, aromatic compounds and benzene chemistry, including electrophilic substitution and diazonium compounds. The theme also investigates how dyes interact with fibres, the chemistry of fats and oils, gas–liquid chromatography, carbonyl compounds and organic synthesis, linking molecular structure to the properties and applications of coloured substances.	dyes and organic molecules. Students develop an understanding of delocalised systems, aromatic compounds and benzene chemistry, including electrophilic substitution and diazonium compounds. The theme also investigates how dyes interact with fibres, the chemistry of fats and oils, gas–liquid chromatography, carbonyl compounds and organic synthesis, linking molecular structure to the properties and applications of coloured substances.			
Content What are they learning? (including keywords)	**What are they learning** **Oceans (O)** Students explore the chemistry of the oceans, beginning with the dissolution of ionic solids and the energy changes associated with dissolving. They	**What are they learning** **Developing Metals (DM)** Students explore the properties and applications of transition metals, developing their understanding of redox chemistry and electrochemical cells.	**What are they learning** **Developing Metals (DM)** Students explore the properties and applications of transition metals, developing their understanding of redox chemistry and electrochemical cells.	**What are they learning** **Techniques and Procedures:** Chemistry is a practical subject and the development of practical skills is fundamental to understanding the nature of chemistry.		

	develop their understanding of lattice enthalpy, hydration enthalpy and enthalpy of solution, using enthalpy cycles to explain energy changes. Students investigate the role of oceans in the greenhouse effect and global energy transfer, before studying acid–base equilibria, including Brønsted–Lowry theory, strong and weak acids, pH, Ka and buffer solutions. The topic also introduces solubility products and entropy, including the relationship between entropy, enthalpy and the feasibility of reactions. **Keywords:** dissolving, solubility, hydrated ion, lattice enthalpy, hydration enthalpy, enthalpy of solution, enthalpy cycle, greenhouse	They study redox titrations, electrode potentials and electrochemical cells, including half-equations, electron flow, salt bridges and the calculation of cell potentials. Students investigate the characteristic properties of **d-**block elements, including variable oxidation states, coloured ions, complex ions, coordination numbers and the shapes of complexes. The topic also introduces colorimetry and the use of transition metals and their compounds as catalysts, with applications including biological complexes, medicines and catalytic converters. **Keywords:** transition metal, d-block, redox, oxidation state, manganate(VII), titration, electrochemical cell, electrode potential, Ecell, half-cell, salt bridge, standard electrode potential,	They study redox titrations, electrode potentials and electrochemical cells, including half-equations, electron flow, salt bridges and the calculation of cell potentials. Students investigate the characteristic properties of d-block elements, including variable oxidation states, coloured ions, complex ions, coordination numbers and the shapes of complexes. The topic also introduces colorimetry and the use of transition metals and their compounds as catalysts, with applications including biological complexes, medicines and catalytic converters. **Keywords:** transition metal, d-block, redox, oxidation state, manganate(VII), titration, electrochemical cell, electrode potential, Ecell, half-cell, salt bridge, standard electrode potential,	Chemistry B gives learners many opportunities to develop the fundamental skills needed to collect and analyse empirical data. Skills in planning, implementing, analysing and evaluating, will be assessed in the written papers. **Keywords:** measurement, moles, titration, enthalpy determination, qualitative analysis, organic synthesis, functional-group testing, electrochemical cells, rates of reaction and pH measurement.		

	effect, greenhouse gas, Brønsted–Lowry acid, Brønsted–Lowry base, conjugate acid, conjugate base, strong acid, weak acid, Ka, pH, buffer, solubility product, Ksp, entropy, ΔS, feasibility. **Polymers and Life (PL)** Students explore the chemistry of polymers and biological molecules, beginning with condensation polymers such as nylons and polyesters and the chemistry of carboxylic acids, esters, amines and amides. They investigate amino acids and proteins, including peptide bond formation and hydrolysis, optical isomerism and the primary, secondary and tertiary structures of proteins. The topic introduces enzyme	feasibility, rusting, complex ion, ligand, coordination number, octahedral, tetrahedral, square planar, d-orbital, colourimetry, catalyst. **Colour by Design (CD)** Students explore the **chemical** origins of colour in organic molecules, focusing on delocalised electron systems and the structure of aromatic compounds. They develop their understanding of benzene and electrophilic substitution reactions, including halogenation, nitration, sulfonation and Friedel–Crafts reactions, alongside the formation and chemistry of diazonium compounds. Students investigate the structure of dyes and pigments, including chromophores and the interactions between dyes and fibres. The topic also develops	feasibility, rusting, complex ion, ligand, coordination number, octahedral, tetrahedral, square planar, d-orbital, colourimetry, catalyst. **Colour by Design (CD)** Students explore the chemical origins of colour in organic molecules, focusing on delocalised electron systems and the structure of aromatic compounds. They develop their understanding of benzene and electrophilic substitution reactions, including halogenation, nitration, sulfonation and Friedel–Crafts reactions, alongside the formation and chemistry of diazonium compounds. Students investigate the structure of dyes and pigments, including chromophores and the interactions between dyes and fibres. The topic also develops			

	catalysis and molecular recognition, including the role of enzyme inhibitors. Students develop their understanding of DNA and RNA, their structures and functions, and apply advanced analytical techniques including mass spectrometry and ^{1}H and ^{13}C NMR spectroscopy to determine molecular structures. **Keywords:** condensation polymer, nylon, polyester, amine, amide, amino acid, peptide bond, protein, hydrolysis, optical isomerism, stereoisomerism, intermolecular bonding, enzyme, catalyst, enzyme inhibitor, molecular recognition, pharmacophore, DNA, RNA, nucleotide, hydrogen bonding, double helix, mass spectrometry, NMR, structural analysis.	understanding of fats and oils, carbonyl compounds and gas–liquid chromatography, before applying organic chemistry to the synthesis and analysis of more complex, polyfunctional molecules. **Keywords:** colour, delocalisation, chromophore, aromatic, arene, benzene, electrophilic substitution, nitration, halogenation, sulfonation, Friedel–Crafts, diazonium compound, dye, pigment, intermolecular bonding, fats, oils, ester, unsaturation, gas–liquid chromatography, carbonyl, aldehyde, ketone, organic synthesis, polyfunctional compound.	understanding of fats and oils, carbonyl compounds and gas–liquid chromatography, before applying organic chemistry to the synthesis and analysis of more complex, polyfunctional molecules. **Keywords:** colour, delocalisation, chromophore, aromatic, arene, benzene, electrophilic substitution, nitration, halogenation, sulfonation, Friedel–Crafts, diazonium compound, dye, pigment, intermolecular bonding, fats, oils, ester, unsaturation, gas–liquid chromatography, carbonyl, aldehyde, ketone, organic synthesis, polyfunctional compound.			

Skills How are they learning it?	**PAG11 - pH measurement -** pH, acids and bases, acid–base equilibria, , buffers pH, acids and bases, acid–base equilibria, , buffers	**PAG 7 Qualitative analysis of organic functional groups** Organic functional groups, alcohols, phenols, carbonyls and other organic reactions	**PAG 8 - Electrochemical cells** – setting up cells and measuring voltages Redox chemistry, electrochemical cells, electrode potentials	**PAG 12- Research skills** – investigation, research and referencing Research skills, investigative approaches, evaluating sources and communicating findings		
Key Questions	**Polymers and Life (PL)** How can small organic molecules combine to form polymers with useful properties? How does the structure of amino acids determine the structure and properties of proteins? How do enzymes recognise molecules and catalyse biological reactions? How do the structures of DNA and RNA allow genetic information to be stored and transferred? How can analytical techniques such as mass spectrometry and NMR be	**Developing Metals (DM)** How do the properties of transition metals arise from their electronic structure? How can redox reactions be used to generate electrical energy in electrochemical cells? How can electrode potentials be used to predict whether redox reactions are feasible? **Colour by Design (CD)** Why do some organic molecules absorb visible light and appear coloured? How does the structure of benzene	**Developing Metals (DM)** Why do transition metals form coloured complexes, and how can their concentrations be measured? How are transition metals and their complexes used in medicine, biology and catalysis? **Colour by Design (CD)** How can chemists design and synthesise dyes with particular colours and properties? How can chromatography and chemical tests be used to identify and analyse organic compounds?	**Techniques and Procedures** How can we select and use appropriate apparatus and techniques to obtain accurate and reliable measurements? How can practical techniques such as titration, heating, filtration, distillation and chromatography be carried out safely and effectively? How can we collect, process and analyse experimental data to determine chemical quantities and relationships? How can we identify and minimise sources of error and uncertainty in practical investigations?		

	combined to determine molecular structures? **Oceans (O)** What happens energetically when ionic substances dissolve in water? How do the oceans influence the Earth's climate and the greenhouse effect? How can acid–base equilibria be used to explain the pH of natural systems such as seawater? How do solubility equilibria determine whether ionic compounds remain dissolved or form precipitates? How can entropy and enthalpy be used to predict whether a chemical reaction is feasible?	explain the characteristic reactions of aromatic compounds?	How can organic synthesis be used to create complex molecules with specific properties and applications?	How can we use observations, measurements and experimental evidence to evaluate the validity and reliability of a chemical investigation?		
Assessment (specific assessed piece(s); milestone(s))	**Peer assessment** – 2 x past papers a week **2xMarking Milestones:** PL and O **–** Past Paper question	**Peer assessment** – 2 x past papers a week **2xMarking Milestones:** DM and CD **–** Past Paper question	**Peer assessment** – 2 x past papers a week **2xMarking Milestones:** DM and CD **–** Past Paper question	**Peer assessment** – 2 x past papers a week **Summative assessment** – A-level paper 3 (H433-01)		

	2xSummative synoptic assessments: - PL and O topic **CPAC assessments –** PAG11	**1x Summative assessment** – Exams - Past Paper- papers 1 and 2 (H433-01) **CPAC assessments –** PAG7	**2xSummative synoptic assessments: -** DM and CD topic **CPAC assessments –** PAG8	**CPAC assessments –** PAG12		

Appendix 1

CPAC 1:

Follows written procedures (a) Correctly follows instructions to carry out the experimental techniques or procedures.

CPAC 2:

Applies investigative approaches and methods when using instruments and equipment (a) Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting. (b) Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments when necessary. (c) Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled. (d) Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results.

CPAC 3:

Safely uses a range of practical equipment and materials (a) Identifies hazards and assesses risks associated with these hazards, making safety adjustments as necessary, when carrying out experimental techniques and procedures in the lab or field. (b) Uses appropriate safety equipment and approaches to minimise risks with minimal prompting.

CPAC 4:

Makes and records observations (a) Makes accurate observations relevant to the experimental or investigative procedure. (b) Obtains accurate, precise and sufficient data for experimental and investigative procedures and records this methodically using appropriate units and conventions.

CPAC 5:

Researches, references and reports (a) Uses appropriate software and/or tools to process data, carry out research and report findings. (b) Sources of information are cited demonstrating that research has taken place, supporting planning and conclusions.