



KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

A Skilled and Ethical Society

SENIOR SCHOOL CURRICULUM DESIGN

CHEMISTRY

GRADE 11

OCTOBER, 2025

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NATIONAL GOALS OF EDUCATION

Education in Kenya should:

1. Foster nationalism and patriotism and promote national unity.

Kenya's people belong to different communities, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help young people acquire this sense of nationhood by removing conflicts and promoting positive attitudes of mutual respect which enable them to live together in harmony and foster patriotism in order to make a positive contribution to the life of the nation.

2. Promote the social, economic, technological and industrial needs for national development.

Education should prepare the youth of the country to play an effective and productive role in the life of the nation.

a) Social Needs.

Education in Kenya must prepare children for changes in attitudes and relationships which are necessary for the smooth progress of a rapidly developing modern economy. There is bound to be a silent social revolution following in the wake of rapid modernization. Education should assist our youth to adapt to this change.

b) Economic Needs.

Education in Kenya should produce citizens with the skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building up a modern and independent economy which is in need of an adequate and relevant domestic workforce.

c) Technological and Industrial Needs.

Education in Kenya should provide learners with the necessary skills and attitudes for industrial development. Kenya recognizes the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system is deliberately focused on the knowledge, skills and attitudes that will prepare our young people for these changing global trends.

3. Promote individual development and self-fulfilment.

Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential interests and abilities. A vital aspect of individual development is the building of character.

4. Promote sound moral and religious values.

Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.

5. Promote social equity and responsibility.

Education should promote social equality and foster a sense of social responsibility within an education system which provides equal educational opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service irrespective of gender, ability or geographical environment.

6. Promote respect for and development of Kenya's rich and varied cultures.

Education should instil in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. Children should be able to blend the best of traditional values with the changing requirements that must follow rapid development in order to build a stable and modern society.

7. Promote international consciousness and foster positive attitudes towards other nations.

Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.

8. Promote positive attitudes towards good health and environmental protection.

Education should inculcate in young people the value of good health in order for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.

THE SENIOR SCHOOL IN THE COMPETENCY BASED CURRICULUM

Senior School is the fourth level of Basic Education in the Competency Based Curriculum (CBC) that the learner shall proceed to after the Pre-Primary School, Primary School and Junior School levels. The essence of Senior School is to offer learners a pre-tertiary/university/ pre-career experience in which the learners have an opportunity to choose pathways, tracks and subjects where they shall have demonstrated interest and/or potential at the earlier levels. Senior School comprises three years of education for learners generally in the 16-18 years age bracket and lays the foundation for further education and training at the tertiary level and the world of work. In the CBC vision, learners exiting this level are expected to be *engaged, empowered and ethical citizens* ready to participate in the socio-economic development of the nation.

At this level, the learner shall take seven (7) learning areas as recommended by the *Presidential Working Party on Educational Reforms* (PWPER, 2023). These shall comprise **four compulsory learning areas** namely: English, Kiswahili, Essential Mathematics/Core Mathematics and Community Service Learning (CSL). Learners will choose between Core Mathematics (for learners pursuing the Science Technology Engineering and Mathematics Pathway) and Essential Mathematics (for learners pursuing the non-STEM pathways). The learner will select three learning areas depending on their career choice, aptitude, interest and personality with guidance by the Senior School career teacher.

LEARNING OUTCOMES FOR SENIOR SCHOOL

By the end of Senior School, the learner should be able to:

1. communicate effectively and utilise information and communication technology across varied contexts,
2. apply mathematical, logical and critical thinking skills for problem solving,
3. apply basic research and scientific skills to manipulate the environment and solve problems,
4. exploit individual talents for leisure, self-fulfilment, career growth, further education and training,
5. uphold national, moral and religious values and apply them in day-to-day life,
6. apply and promote health care strategies in day-to-day life,
7. protect, preserve and improve the environment for sustainability,
8. demonstrate active local and global citizenship for harmonious co-existence,
9. demonstrate appreciation of diversity in people and cultures,
10. manage pertinent and contemporary issues responsibly.

TABLE 1: LIST OF SUBJECTS AT SENIOR SCHOOL

Core Subjects	Arts & Sports Science	Social Sciences	Science, Technology, Engineering & Mathematics (STEM)
1. English 2. Kiswahili/KSL 3. Core Mathematics/ Essential Mathematics 4. Community Service Learning (CSL)	5. Sports and Recreation 6. Music and Dance 7. Theatre and Film 8. Fine Arts	9. Literature in English 10. Indigenous Languages 11. Fasihi ya Kiswahili 12. Sign Language 13. Arabic 14. French 15. German 16. Mandarin Chinese 17. Christian Religious Education 18. Islamic Religious Education 19. Hindu Religious Education 20. Business Studies 21. History and Citizenship 22. Geography	23. Biology 24. Chemistry 25. Physics 26. General Science 27. Agriculture 28. Computer Studies 29. Home Science 30. Aviation 31. Building Construction 32. Electricity 33. Metalwork 34. Power Mechanics 35. Woodwork 36. Media Technology 37. Marine and Fisheries Technology

Note:

- Physical Education (PE) and Information Communication and Technology (ICT) will be offered to all learners to facilitate learning, enjoyment and acquisition of life skills.
- Every school shall offer Pastoral/Religious Programme of Instruction (P/RPI) to enhance moral, spiritual and character development of the learners.
- There shall be one (1) lesson for personal or group study to deepen knowledge and enhance skills in areas of choice by the learners.

Table 2 provides guidelines on distribution of lessons at Senior School.

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TABLE 2: LESSON DISTRIBUTION AT SENIOR SCHOOL

Subjects	No of Lessons Per Week (40 minutes per lesson)
Core Subjects 4	
1. English	5
2. Kiswahili	5
3. Essential Mathematics/Core Mathematics	5
4. Community Service Learning	3
Elective Subjects	
5. Elective 1	5
6. Elective 2	5
7. Elective 3	5
* Physical Education	3
* ICT Skills	2
*PPI	1
* Learner Personal /Group Study	1
Total Number of Lessons	40

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By the end of Senior School, the learner should be able to:

1. Acquire scientific knowledge, skills, values and attitudes for everyday use, and further education and training;
2. Conduct a range of scientific investigations, including collection of qualitative and quantitative data, analysis and interpretation of results;
3. Use scientific language in the study of Chemistry;
4. Develop skills and logical thinking in carrying out project work, field work and excursions, where chemistry can be appreciated on a larger scale;
5. Relate Chemistry in the classroom to modern industrial processes and real world situations;
6. Develop critical thinking skills to explain phenomena and address challenges in day to day life;
7. Explore, manipulate, manage and conserve the environment for learning and sustainable development;
8. Apply principles of Chemistry and acquired skills to invent, formulate, construct, produce or manufacture useful products from available resources for sustainable development;
9. Develop interest in and appreciation of Chemistry as a subject and its usefulness in the society.

SUMMARY OF STRANDS AND SUB STRANDS

Strand	Sub Strand
1.0 Inorganic Chemistry	1.1. The mole 1.2. Non-metals
2.0 Physical Chemistry	2.1. Salts 2.2. Gas Laws 2.3 Reaction Rates
3.0 Organic Chemistry	3.1 Hydrocarbons

STRAND 1.0: INORGANIC CHEMISTRY

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
1.0 Inorganic chemistry	1.1 The Mole - Amount of substance. - Relative atomic mass. - Conversion of mass to moles. - Conversion of moles to mass. - number of particles Determination of formulae - Empirical formula. - Molecular formula. Molar Solutions - Preparation.	By the end of the sub strand, the learner should be able to: - describe the mole as a unit of measurement, - determine the empirical and molecular formula of compounds, - prepare standard solutions from solid and liquid substances, - determine the concentration of solutions, - determine the amount of	The learner is guided to: - carry out activities to demonstrate the concept of mole as a unit of measurement, - discuss the relationship between the Avogadro's number, the mole and the molar mass of a substance, - practice calculations involving amount of substances, number of particles, (atoms, molecules, ions...) and molar quantities, - carry out activities to determine the empirical formula of compounds (<i>MgO</i>, <i>CuO</i>), - practice calculations involving determination of empirical and molecular formula of compounds, - perform experiments to prepare standard solutions from solid and liquid substances,	How is a mole a real quantity?

1

- Concentration and dilution. - Acid – base titrations. - redox titrations. - mole ratios - molar gas volume	substances in chemical reactions, appreciate the applications of redox titrations in industry	- carry out titrations and solve problems involving molar solutions, - work out amount of substances, number of particles and molar quantities using chemical equations (mole ratios and molar gas volume), - observe safety precautions while carrying out titrations and dispose waste responsibly, - discuss the applications of redox titrations in industry.	
Core competencies to be developed: Communication and Collaboration: The learner shows teamwork by contributing to group decision making through participating actively during the preparation of standard solutions.			
Values: - Responsibility: The learner observes safety precautions while carrying out titrations and dispose of waste responsibly, - Social justice: The learner works harmoniously with peers while discussing the relationship between the Avogadro's number, the mole and the molar mass of a substance.			
Pertinent and Contemporary Issues (PCIs) Waste management: The learner observes safety precautions while carrying out titrations and disposes waste responsibly.			

2

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Inorganic Chemistry	1.2 Non-metals - Sources of selected non-metals (<i>hydrogen, nitrogen and oxygen</i>), - General methods of gas collection, - Laboratory preparation (<i>oxygen, hydrogen, and nitrogen</i>). - Industrial isolation of oxygen and nitrogen (<i>Fractional distillation of liquid air</i>). - Physical and Chemical properties (<i>oxygen, hydrogen, nitrogen</i>), - Physical properties (<i>odour, colour, effect on moist litmus paper, effect on burning and/or glowing wooden splint and solubility in water</i>).	By the end of the sub strand, the learner should be able to: - identify sources of selected gases, - prepare selected gases in the laboratory, - describe the industrial isolation of oxygen and nitrogen from liquid air, - investigate the physical and chemical properties of selected gases, - outline uses of selected gases, - appreciate the importance of	The learner is guided to: - brainstorm on the sources of oxygen, nitrogen and hydrogen, - discuss the ways of collecting and drying gases in the laboratory, - carry out activities to prepare hydrogen, nitrogen and oxygen gases in the laboratory, - discuss the large scale (industrial) isolation of oxygen and nitrogen from liquid air, - use print or non print media to search for information on fractional distillation of liquid air, - carry out experiments to investigate the	How do gases affect our day-to-day life?

3

- Chemical properties: - oxygen (<i>reactions with metals, carbon and sulphur</i>), - nitrogen (<i>reactions with magnesium, hydrogen and oxygen</i>), - hydrogen (<i>reactions with metal oxides and oxygen</i>). - Uses of oxygen, hydrogen and nitrogen.	gases in day- to-day life.	physical properties of hydrogen, oxygen and nitrogen, - carry out activities to investigate chemical properties of oxygen, nitrogen and hydrogen, - brainstorm on the uses of the selected gases and their compounds.	
Core competencies to be developed: Citizenship: The learner engages effectively with others as they brainstorm on environmental effects of the industrial waste products. Self-efficacy: The learner effectively communicates when describing the process of large scale(industrial) isolation of oxygen and nitrogen from liquid air.			
Values: Unity: The learner shows cooperation as they carry out activities to prepare and investigate the physical and chemical properties of the selected gases. Respect: The learner shows patience as they brainstorm on the uses of the selected gases and their compounds.			
Pertinent and Contemporary Issues (PCIs) Environmental conservation: The learner discusses the large-scale isolation of oxygen and nitrogen from liquid air.			

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Suggested Assessment Rubrics

Level Indicator	Exceeding Expectations	Meeting Expectations	Approaching Expectations	Below Expectations
Determine Empirical and Molecular Formulas	Accurately determines both empirical and molecular formulae using logical steps and explains the reasoning clearly.	Correctly determines both empirical and molecular formulae.	Determines both empirical and molecular formulae with minor errors in some calculations.	Correctly determines empirical and molecular formulae with help.
Determine the Concentration of Solutions	Accurately determines concentrations using formulae and techniques, with detailed explanations of each step.	Accurately determines concentrations in most cases, with explanations of each step.	Accurately determines concentration but explanations are unclear in some steps.	Determines concentration but explanations are unclear in most steps.
Prepare Samples of Selected Gases	Correctly prepares gas samples safely and accurately, following appropriate methods explaining the procedure.	Prepare gas samples accurately, follow appropriate methods and explain the procedures.	Correctly sets up apparatus for gas preparation and follow some procedures to prepare gas samples.	Correctly sets up apparatus and follows procedures to prepare gases with assistance.
Investigate Chemical Properties of Gases	Conducts experiments to investigate all chemical properties of gases and explains results in detail.	Correctly investigates most chemical properties of gases and explains results in detail.	Correctly investigates some chemical properties of gases with explanation of results.	Attempts to explore a few chemical properties of gases with assistance from peers.

STRAND 2.0: PHYSICAL CHEMISTRY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Physical Chemistry	2.1 Salts - Action of heat on salts (<i>carbonates and hydrogen carbonates, nitrates, and sulphates</i>). - Solubility of salts in water (<i>chlorides, nitrates, sulphates, carbonates</i>). - Solubility and solubility curves (NaCl, KNO_3, KClO_3, CaSO_4, Na_2CO_3). - Fractional crystallisation. - complex ions - Tests for cations and anions (Pb^{2+}, Ca^{2+}, Mg^{2+}, Ba^{2+}, Zn^{2+}).	By the end of the sub strand, the learner should be able to: - investigate the effect of heat on salts, - explain the solubility of salts in water, - determine the mass of salt that crystallises from a saturated solution, - explain the process of preparation of insoluble salts by precipitation reactions,	The learner is guided to: - carry out activities to investigate the action of heat on salts, - discuss the effect of thermal decomposition of salts to the environment, - carry out experiments to investigate the solubility of different salts in water - perform experiments to investigate the effect of temperature change on solubility of salts, - draw solubility curves and use them to estimate the mass of salt that crystallises when a saturated solution is cooled, - brainstorm on the industrial applications of fractional crystallisation,	How are salts important in our day-to-day life?

	Al^{3+} , Cu^{2+} , Fe^{2+} , Fe^{3+}) and (Cl^- , SO_3^{2-} , SO_4^{2-} , NO_3^- , CO_3^{2-}) in solution using appropriate reagents. - Tests for any gas evolved. - Flame tests (Li^+, Na^+, K^+, and Ca^{2+}, Ba^{2+}).	e) analyse the ions present in a given salt, f) appreciate the importance of salts in day -to - day life.	- carry out experiments to demonstrate precipitation reactions, - practise writing stoichiometric and ionic equations for precipitation reactions, - use appropriate reagents to carry out qualitative analysis to investigate ions present in various salts, - carry out flame tests to identify some metallic ions (Li^+, Na^+, K^+, and Ca^{2+}, Ba^{2+}).	
Core competencies to be developed: - Critical thinking and problem solving: The learner develops interpretation and inferring skills as they use appropriate reagents to analyse ions present in various salts. - Learning to learn: The learner learns independently as they practise writing stoichiometric and ionic equations for precipitation reactions.				
Values: Unity: The learner includes others as they take turns and converse while carrying out experiments with peers to demonstrate precipitation reactions.				
Pertinent and Contemporary Issues (PCIs): Safety in the laboratory: The learner develops safety skills as he/she carries out activities to investigate the action of heat on salts.				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Physical Chemistry	2.2 Gas Laws - Boyle's and Charles' law. - Combined gas law equation. - Graham's law of diffusion. - Gay Lussac's law. - Avogadro's law.	By the end of the sub strand, the learner should be able to: - explain the behaviour of gases under different conditions of temperature and pressure, - apply gas laws to determine the volume, temperature and pressure of gases, - compare the rates of diffusion of gases at different conditions, - relate mole ratios to reacting volumes of gases, - outline applications of gas laws,	The learner is guided to: - carry out experiments to demonstrate how change of volume of a fixed mass of a gas affects its pressure if the temperature is constant, - draw graphs showing variation of volume and pressure in a fixed mass of gas, - discuss the behaviour of a gas at constant temperature (Boyle's law), - carry out experiments to demonstrate how the volume of a fixed mass of a gas varies with temperature at constant pressure, - draw graphs showing variation of volume and temperature in a fixed mass of gas, - brainstorm on the behaviour of a gas at constant pressure (Charles' law), - practise calculations involving Charles' and Boyle's law,	How do gases behave in different conditions?

		f) appreciate the role of diffusion in day-to-day life.	• derive combined gas law and use it to perform calculations involving the combined gas law, • brainstorm on the factors affecting the rate of diffusion of gases, • carry out experiments to demonstrate diffusion in liquids and gases, • carry out experiments to determine rate of diffusion of gases (Graham's Law of diffusion), • carry out calculations involving Graham's law of diffusion, • brainstorm on the number of particles contained in equal volumes of different gases (Avogadro's Law), • carry out experiments to determine the ratios of combining gases (Gay Lussac's Law), • practise calculations involving gases using Gay Lussac's Law and Avogadro's Law, • watch simulations on the behaviour of gases when subjected to different conditions, • discuss the applications of gas laws.	
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Core competencies to be developed: • Communication and collaboration: The learner speaks clearly and effectively when contributing to group decision making as they carry out experiments to demonstrate how change in volume of a fixed mass of a gas affects its pressure if the temperature is constant. • Digital literacy: The learner uses digital learning platforms for continuous learning and development as they watch simulations on the behaviour of gases when subjected to different conditions.
Values: Responsibility: The learner diligently handles equipment as they watch simulations on the behaviour of gases when subjected to different conditions.
Pertinent and Contemporary Issues (PCIs) Safety and security: The learner develops safety skills as he/she discusses the industrial applications of gas laws.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Physical Chemistry	2.3 Reaction Rates - Collision theory and activation energy. - Physical changes that indicate the progress of a chemical reaction (<i>colour, change in mass, formation of precipitates, volume of gas evolved, change in pH, change in temperature, change in concentration</i>). - Factors affecting reaction rates (<i>concentration, catalyst, surface area, light, pressure and temperature</i>).	By the end of the sub strand, the learner should be able to: - explain the collision theory in chemical reactions, - determine the rate of reactions in chemical processes, - examine the factors that affect the rate of chemical reaction, - assess the factors that affect the position of equilibrium, - appreciate the role of equilibrium in industrial processes.	The learner is guided to: - review kinetic theory of matter, - discuss the relationship between collision theory and rate of reaction, - carry out activities to illustrate observable physical changes that indicate the progress of a chemical reaction, - discuss factors affecting rates of reaction using the collision theory, - carry out experiments to investigate the effect of various factors on the rate of reaction, - use graphs to illustrate the effects of various factors on the rate of chemical reactions, - use the energy profile diagrams to explain rate of reactions with and without catalysts, - carry out activities to demonstrate reversible and irreversible reactions and write their chemical equations,	Why do some reactions happen in seconds while others take days or even years?

- Reversible reactions (heating zinc oxide, candle wax, iodine, hydrated copper (II) sulphate). - Equilibrium. (Le Chatelier's principle). - Factors affecting chemical equilibrium position and yield (<i>concentration, pressure, temperature</i>). - Industrial applications of chemical equilibrium (<i>Haber, Ostwald's and Contact process</i>).	- perform experiments to determine how concentration, pressure and temperature affect the position of equilibrium in a system, - discuss the characteristics of reactions in a state of dynamic equilibrium, - carry out experiments to investigate how change in <i>concentration, pressure and temperature</i> affect a dynamic equilibrium, - use Le Chatelier's principle to predict the effect of changes in concentration, pressure and temperature on a reaction at equilibrium, - discuss the applications of Le Chatelier's Principle in industrial processes.	
Core competencies to be developed: Communication and collaboration: The learner develops teamwork by contributing to group decision making as they carry out experiments to investigate factors that affect equilibrium position and yield (<i>concentration, pressure, temperature</i>).		

- **Critical thinking and problem solving:** The learner develops interpretation and inferring skills as they brainstorm on how Le Chatelier's principle can be used to predict the effect of changes in concentration, pressure and temperature on equilibrium reaction.

Values:

Unity: The learner exhibits equity as they share available resources amicably during experiments.

Pertinent and Contemporary Issues (PCIs)

Financial literacy: The learner develops saving and conservation skills as they discuss applications of Le Chatelier's Principle in industrial processes.

Suggested Assessment Rubric.

Level Indicator	Exceeding Expectations	Meeting Expectations	Approaching Expectations	Below Expectations
Determine the mass of salt that crystallises from a saturated solution	Accurately determines the mass of salt that crystallises from all saturated solutions with clear reasoning.	Correctly determines the mass of salt that crystallises from most saturated solutions.	Determines the mass of salt that crystallises from some saturated solutions	Determines the mass of salt that crystallises from a saturated solution with assistance.
Analyse for Ions Present in a given salt.	Performs qualitative analysis of all prescribed ions, applying proper tests and interpreting results with detailed explanations.	Correctly performs qualitative analysis of most prescribed ions, applying proper tests.	Correctly performs qualitative analysis and interprets results of some prescribed ions.	Performs qualitative analysis and interprets results of a few ions correctly with assistance.
Apply Gas Laws to Calculate Volumes, Temperature, and Pressure	Applies all gas laws accurately, showing detailed calculations of volumes, temperature, and pressure.	Applies most gas laws accurately, showing detailed calculations of temperature and pressure.	Applies some gas laws accurately, showing calculations of either volume, temperature or pressure.	Requires assistance to apply gas laws correctly, and apply principles involved.
Describe Factors Affecting Reaction Rates	Correctly describes all the factors affecting reaction rates with clear examples and reasoning.	Correctly describes most factors affecting reaction rates with clear examples and reasoning.	Correctly describes some factors affecting the rate of reaction.	Describes key factors affecting reaction rates with prompts.

STRAND 3.0: ORGANIC CHEMISTRY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Organic Chemistry	3.1 Hydrocarbons - Occurrence of organic compounds. - Fractional distillation of crude oil. - Bonding in hydrocarbons. - Homologous series - Classification of hydrocarbons. (<i>Saturated and unsaturated hydrocarbons</i>). - General molecular formula. - Nomenclature of hydrocarbons (<i>alkanes, alkenes and alkynes up to 10 carbon atoms</i>).	By the end of the sub strand, the learner should be able to: - identify sources of organic compounds in nature, - classify hydrocarbons as saturated or unsaturated, - determine the molecular formulae of hydrocarbons using the general formula, - assign names to hydrocarbons and their isomers using the IUPAC rules, - prepare hydrocarbons using appropriate	The learner is guided to: - explore occurrence of organic compounds in nature, - review components of crude oil as obtained through fractional distillation, - discuss the classifications of organic compounds as saturated or unsaturated, - use the general formula of a homologous series to determine and write the molecular and structural formulae of hydrocarbons, - illustrate isomerism in hydrocarbons, - name hydrocarbons and their isomers using the IUPAC nomenclature,	How are organic compounds important in our lives?

- Isomerism (<i>positional and structural up to 6 carbon atoms</i>). - Methods of preparing hydrocarbons (<i>alkanes, alkenes and alkynes</i>). - Physical properties of hydrocarbons (<i>colour, odour, density, melting point, boiling point, solubility</i>). - Chemical properties of alkanes (<i>cracking of alkanes, combustion, substitution (consider methane and ethane)</i>) alkenes (<i>combustion, addition, polymerisation and oxidation of alkenes</i>). - Uses of hydrocarbons.	methods in the laboratory, f) investigate the physical and chemical properties of hydrocarbons, g) appreciate the importance of hydrocarbons in our daily lives.	- model structural and positional isomers of hydrocarbons, - perform experiments to prepare methane, ethene and ethyne in the laboratory, - carry out activities to investigate the physical properties of alkanes, alkenes and alkynes, - carry out experiments to investigate the chemical properties of alkanes, alkenes and alkynes in the laboratory, - carry out experiments to test for saturation and unsaturation, - brainstorm on the uses of hydrocarbons, - discuss the safe disposal of organic waste,	
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Core competencies to be developed: • Creativity and imagination: The learner experiments with materials while carrying out activities to investigate the physical properties of hydrocarbons. • Learning to learn: The learner reflects on their own work while modelling and drawing structural formulae of isomers in alkanes, alkenes and alkynes.
Values: • Responsibility: The learner becomes accountable as they utilise materials to perform experiments to prepare alkanes, alkenes and alkynes in the laboratory. • Social justice: The learner works harmoniously with peers in groups while carrying out activities to investigate the physical and chemical properties of alkanes, alkenes and alkynes in the laboratory.
Pertinent and Contemporary Issues (PCIs) Waste management: The learner develops skills for handling organic and inorganic waste as they discuss the safe disposal of organic waste.

Suggested Assessment Rubric

Level Indicator	Exceeds expectations	Meets expectations	Approaching expectations	Below expectations
Determination of Molecular Formulae	Correctly determines molecular formulas for all given hydrocarbons, using appropriate formulas and logic.	Correctly determines molecular formulas for most given hydrocarbons, using appropriate formulas and logic.	Determines molecular formulas of some hydrocarbons with application of general formulas.	Determines molecular formulas of hydrocarbons with application of general formulas with assistance.
Name hydrocarbons using IUPAC rules	Names hydrocarbons and isomers accurately, applying all IUPAC rules systematically and clearly.	Names hydrocarbons and isomers accurately, applying most IUPAC rules systematically and clearly.	Names some hydrocarbons showing inconsistencies in applying IUPAC rules.	With prompts, names hydrocarbons and shows significant inconsistencies in applying IUPAC rules.
Investigation of physical and chemical properties of hydrocarbons	Independently and accurately investigates both physical and chemical properties of hydrocarbons, using appropriate procedures and materials.	Investigates most physical and chemical properties of hydrocarbons with minimal errors in procedure	Investigates some properties of either physical or chemical properties but may omit important steps or use incorrect procedures.	Investigates physical and chemical properties with significant guidance; limited understanding of procedures.

APPENDIX: SUGGESTED RESOURCES, ASSESSMENT METHODS AND NON-FORMAL ACTIVITIES

Strands	Sub Strands	Suggested Resources	Suggested Assessment Methods	Suggested Non - Formal activities
Inorganic Chemistry	• The mole. • Non-metals.	• Conventional laboratory resources. • Improvised resources. from the environment. • Digital devices. • Online resources.	• Question and answer method. • Written exercises. • Individual performance assessment. • Observations. • Project work. • Practicals.	• Excursions. • Field work. • Science Clubs and societies. • Games. • Science symposia.
Physical Chemistry	• Salts. • Gas law. • Reaction rates.	• Conventional laboratory resources. • Improvised resources. from the environment. • Digital devices. • Online resources.	• Question and answer method. • Written exercises • Individual performance assessment. • Project work. • Practicals.	• Excursions. • Field work. • Science Clubs and societies. • Games. • Science symposia.

Organic Chemistry	Hydrocarbons.	• Conventional laboratory resources. • Improvised resources. from the environment. • Digital devices. • Online resources.	• Question and answer method. • Written exercises. • Individual performance assessment. • Project work. • Practicals.	• Excursions. • Field work. • Science Clubs and societies. • Games. • Science symposia
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