

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

INSTITUTE OF ADULT EDUCATION



**THE ENHANCEMENT OF ACCESS AND QUALITY TO SECONDARY EDUCATION THROUGH
ALTERNATIVE EDUCATION PATHWAY**

**CHEMISTRY SYLLABUS
FOR ALTERNATIVE SECONDARY EDUCATION PATHWAY**

STAGE I & II

2026

Designed and prepared by:
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1.0 Introduction

Chemistry syllabus for the Alternative Secondary Education Pathway comprises of both Stage One (equivalent to Form One and Two) and Stage Two (equivalent to Form Three and Four) is written in a modular format. It has integrated components that originate from formal education syllabus. The integrated syllabus has been prepared to allow learners to complete the intended course within two years' time. It is designed for learners outside the formal education system to enable them to sit for Ordinary Certificate of Secondary Education Examinations using acquired competencies, both competently and professionally, in their daily undertakings.

The syllabus uses the Competence-Based Education and Training (CBET) approach, which is result-based, indicating what a learner is actually expected to do after completing the course.

2.0 Objectives of Education in Tanzania

The objectives of education in Tanzania are to:

- (a) Guide the development and improvement of the personalities of the citizens of Tanzania, their human resources and effective utilization of their resources in bringing about individual and national development;
- (b) Promote the acquisition and appreciation of culture, customs and traditions of the people of Tanzania;
- (c) Promote the acquisition and appropriate use of literary, social, scientific, vocational, technological, professional and other forms of knowledge, skills and understanding for the development and improvement of man and society;
- (d) Develop and promote self-confidence and an inquiring mind; an understanding and respect for human dignity and human rights and readiness to work hard for self-advancement and national improvement;
- (e) Promote and expand the scope of acquisition, improvement and upgrading of mental, practical, productive and other skills needed to meet the changing needs of industry and the economy;
- (f) Enable every citizen to understand and uphold the fundamentals of the National Constitution as well as the enshrined human and civil rights, obligations and responsibilities;
- (g) Promote love and respect for work, self and wage employment and improved performance in the production and service sectors;

- (h) Inculcate principles of national ethics and integrity, national and international cooperation, peace and justice through the study, understanding and adherence to provisions of the National Constitution and other international basic charters;
- (i) Enable a rational use, management and conservation of the environment.

3.0 Objectives of Secondary Education in Tanzania

The objectives of Secondary Education in Tanzania are to:

- a) Consolidate and broaden the scope of baseline ideas, knowledge, skills and principles acquired and developed at primary education level;
- b) Enhance further development and appreciation of national unity, identity and ethical personal integrity, respect for and readiness to work, human rights, cultural and moral values, customs, traditions and civic responsibilities and obligations;
- c) Promote the development of competence in linguistic ability and effective use of communication skills in Kiswahili and at least one foreign language;
- d) Provide opportunities for the acquisition of knowledge, skills, attitudes and understanding in prescribed or selected fields of study;
- e) Prepare learners for tertiary and higher education; vocational, technical and professional training;
- f) Inculcate a sense and ability for self-study, self-reliance and self-advancement in new frontiers of science and technology, academic and occupational knowledge and skills;
- g) Prepare the learner to join the world of work.

4.0 Objectives of Secondary Education through Alternative Education Pathway in Tanzania

The objectives of Secondary Education through Alternative Education Pathway are to;

- a) Provide equivalent education to children, youth and adults who could not get the opportunity in the formal education system;
- b) Complement government efforts of achieving education for all (EFA) objectives;
- c) Cater for youth and adults who dropped out of school due to various reasons; and
- d) Provide education to disadvantaged and marginalized groups of people including girls.

5.0 Main Competences for the Subject

At the end of this course, the learner is expected to be able to:

1. Demonstrate mastery of basic concepts, theories and principles in Chemistry;
2. Demonstrate mastery of basic terminologies in Chemistry;
3. Conduct experiments in Chemistry;
4. Demonstrate mastery of basic principles of extraction of metals; and
5. Conduct a project in Chemistry;

6.0 Structure of the Syllabus

The syllabus for Chemistry subject comprises of the following:

(i) Name of the Module

This implies set of separate units that can be joined together to form a part of the subject course of study.

(ii) Main competences

These imply what learners are expected to acquire as the general competences after the completion of the subject course.

(iii) Specific competences

These imply specific competences which learners are expected to acquire after the completion of a particular topic.

(iv) Learning Activities

These are the observable tasks to be done by facilitators and learners to enhance acquisition of knowledge, skills and attitude in various subjects.

(v) Suggested facilitation and / learning methods

This part indicates what a facilitator and learners are expected to apply in both facilitation and learning. This includes self-learning and face to face tutorial sessions.

(vi) Assessment criteria

This includes a set of conditions to be used to gauge learners' performance.

(vii) Facilitation/learning resources

These are learning and facilitation materials used to support facilitation and learning processes.

(viii) Estimated time of study

This implies time duration allocated for self-study and face to face facilitation sessions.

(ix) Number of modules

This syllabus has two stages which makes a total of eight modules as shown.

Stage I

Module 1: Applying knowledge, principles of chemistry, laboratory techniques and safety in daily life.

Module 2: Applying knowledge and skills of fire, fire-fighting and flames in daily life.

Module 3: Analysing the concept of matter, atomic structure, periodic classification, formula, bonding and nomenclature.

Module 4: Applying the skills and principles of chemical reactions, acids, bases and salt in daily life.

Stage II

Module 1: Applying the skills and principles of moles concept, volumetric analysis and electrolysis in daily life.

Module 2: Investigating the properties of metals and their compounds.

Module 3: Analysing properties of non-metals, their compounds and basic tenets of qualitative analysis.

Module 4: Applying properties of organic compounds, aliphatic hydrocarbons and alcohols in daily life.

8.0 Further readings

Different books are suggested for further reading in each module.

CHEMISTRY SYLLABUS STAGE I

COMPETENCES FOR CHEMISTRY STAGE I

Upon completion of stage I modules of Chemistry, a learner should be able to:

1. Demonstrate mastery of basic concepts, theories and principles of Chemistry;
2. Demonstrate mastery of basic terminologies in Chemistry;
3. Conduct experiments in Chemistry;
4. Demonstrate understanding of the physical and chemical properties of elements on the basis of their arrangements in the periodic tables;
5. Use international union of pure and applied Chemistry, nomenclature to name chemical species; and
6. Use chemical symbols, formula and equations to represent chemical reactions.

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
1. APPLYING KNOWLEDGE, PRINCIPLES OF CHEMISTRY, LABORATORY TECHNIQUES AND SAFETY IN DAILY LIFE.	1.1 Demonstrate mastery of concepts, theories and principles in Chemistry	1.1 Demonstrate mastery of concepts of, theories, and principles in Chemistry	(a) Describe the concept of Chemistry (meaning, branches, applications and relationships with other disciplines)	Library search: Learner uses library to search information on concepts of chemistry. Podcasts and Audiobooks: Learner listens to educational podcasts and audiobooks about concepts of chemistry, its applications, and its relationship with other disciplines	Brainstorming: Assign a learner in manageable groups to brainstorm on chemical basis of materials from their environment, give the meaning of Chemistry and justifying the reasons for studying Chemistry Project works: Guide a learner to explore the common industrial products in Tanzania and relate their applications to the importance of Chemistry	The concept, theories and principles of Chemistry are clearly described	Pictures, diagrams, simulations, animations or videos illustrating the meaning, branches, application and relationship with other disciplines,	5 Hours	2 Hours

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			(b) Discuss the contribution of Chemistry in the development of a society	online sources Learner should search information about contribution of chemistry on development of modern society	Field visit: Guide a learner to visit any nearby industry, health facilities, mining sites and agricultural farms to appreciate the importance of Chemistry in the development of societies	The contribution of Chemistry in the development of modern society is clearly recognised	<ul style="list-style-type: none"> - Wall picture of a factory - Pictures of hospitals and pharmacies - Picture of domestic kitchen - Fertilizers - Soap and detergents - Soft drinks - Drugs - Medicines - Insecticides - Hard drinks 	4 Hours	2 Hours
	1.2 Conduct experiments in Chemistry	1.2 Conduct experiments in Chemistry	(a) Describe basic Chemistry laboratory skills (<i>chemistry laboratory rules and safety measures, first aid, and Chemistry laboratory</i>)	Virtual Study Groups: Learner to join or form virtual study groups on basic chemistry laboratory skills. Lab visit: Learner visits a nearby		Basic Chemistry laboratory skills are clearly described	Laboratory manuals, models, pictures, wall charts with written laboratory rules, first aid kit, laboratory apparatus, fire extinguishers and videos illustrating basic chemistry laboratory skills, Wall chart showing warning	10 Hours	5 Hours

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			<i>apparatus)</i>	chemistry laboratory to observe various laboratory apparatus			signs		
2. APPLYING KNOWLEDGE AND SKILLS OF FIRE, FIRE FIGHTING AND FLAMES IN DAILY LIFE	2.1 Demonstrate mastery of basic terminologies concepts, theories and principles in Chemistry	2.1 Demonstrate mastery of concepts, theories and principles in Chemistry	(a) Explain the meaning of fire and its economic importance.	Self-Paced Learning: Learner has to conduct self-study by using self-learning modules and T.I.E books on meaning of fire, causes and its economic importance.	Experimentation Guide a learner to perform experiments basing on, causes of fire and the general procedures for firefighting.	Basic skills on fire and firefighting techniques are clearly described	<ul style="list-style-type: none"> - Heat source - Magnesium ribbon - HCl solution - Kerosene - Spirit - Paper - Charcoal - Portable fire extinguishers. 	6 Hours	3 Hours
				Online search: learner uses internet to search information on the causes of fires.	Guide a learner to identify the reasons why various types of fires should be extinguished by specific types of				

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					fire extinguishers		<ul style="list-style-type: none"> - Sand bucket - Water hose 		
	2.3 Conduct experiments in Chemistry;	2.3 Conduct experiments in Chemistry;	Prepare a small fire extinguisher of the soda-acid type and use to extinguish a small fire	Podcasts and Audiobooks: Listen to educational podcasts and audiobooks related to fire extinguishers. E-Libraries and LMS: Learner accesses digital libraries or LMS on types of fire extinguishers,	Experimentation Guide a learner to perform experiments basing on, rusting of iron and nails, fire fighting Guest speaker from fire brigade: Guide a learner to interpret fire, classes of fire and practice on firefighting basing on speaker's instructions and write a report Outdoor activity: Guide a learner to practice on extinguishing	Basic skills and principles on causes of fire and fire fighting are clearly described	<ul style="list-style-type: none"> - Iron fillings - Iron nails - Water - Cotton wool - Heat source - Magnesium ribbon - HCl solution - Kerosene - Spirit - Paper - Charcoal - Match box - Portable fire extinguishers. 	8 Hours	4 Hours

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					small fires				
3. ANALYSING THE CONCEPT OF MATTER, ATOMIC STRUCTURE, PERIODIC CLASSIFICATION, FORMULA, BONDING AND NOMENCLATURE	3.1 Demonstrate mastery of basic concepts, theories and principles in Chemistry;	3.1 Demonstrate mastery of concepts, theories and principles in Chemistry	(a) Describe the concept of matter (<i>physical and chemical changes of matter</i>)	Interactive Simulations and Labs: Learner utilizes online simulations and virtual labs to get information about concepts of matter.	Practical work: Guide a learner to carry-out hands- on activities to investigate the physical and chemical changes of matter using samples of substances found in their environment Experimentation: Guide a learner to perform experiments basing on sublimation of compounds, rusting of iron nails, freezing and evaporation of water and dissolving of salts using distilled water	The concept of matter, is clearly described.	Ice, water, source of heat, evaporating basin, metal nails, beaker, table salt, sugar, iodine crystals, magnet, magnesium ribbon, acids, fruits, paper, CuSO ₄ solution, aluminum foil, candle, CaCO ₃ , Pb (NO ₃) ₂ solution and simulations and videos illustrating physical and chemical changes of matter. Laptop phone	2 Hours	1 Hour
			(b) Describe	Online	Think-ink-pair-	The modern	Diagrams, pictures,	2 Hours	1 Hour

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				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			the modern concept of atomic structure (<i>Dalton's atomic structure and sub-atomic particles</i>)	studies: Attend a live or recorded webinars and workshops about concept of Dalton's <i>atomic structure and sub-atomic particle</i> .	share: Guide a learner in pair to think about the meaning of an atom and its structure Technological-based learning: Guide a learner to account for the structure of an atom basing on ICT facilities and write a report	theory of atomic structure is clearly described.	wall charts, simulations and videos illustrating Dalton's atomic structure and sub-atomic particles		
			(c) Describe the concepts of chemical elements (<i>criteria for assigning chemical symbols</i>), compounds (<i>binary compound</i>) and mixtures (<i>types of solution and separation of mixtures</i>)	Online studies: Learner searches information using YouTube channel on chemical elements (<i>criteria for assigning chemical symbols</i>), compounds	Think-ink-pair-share: Guide a learner in pairs to think and share about various types of industrial products they commonly use in their homes for various activities, reflect on their constituent elements and explain the meaning of 'element,	The concepts of chemical elements, compounds and mixture are clearly described	Periodic table, copper, zinc, aluminium, iron, sulphur, hydrogen, common salt, iron filings, magnet, powdered sulphur, crucible and lid, heat source, HCl solution, water, chalk FeS, milk, clay soil,	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					<p>compound and mixture</p> <p>Hands-on-minds-on: Assign a learner to prepare solutions using materials available in their home settings and reflect their properties in using them for various applications such as pharmaceuticals and domestic activities</p>				
			(d) Compare the properties of compounds with those of constituent elements	Online studies: Learner uses online sources to get materials about the properties of compound.	Group discussion: Guide a learner in manageable groups to explore the properties of chemical compounds useful in real-life situation	The properties of compounds are correctly compared with those of constituent elements	margarine, filter paper, funnel, ethanol, iodine crystals, kerosene, ink, sugar, wall charts, and pictures of distillers	2 Hours	1-Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					Technological - based learning: Guide a learner to analyse features of compounds and element from real substances using visual aids				
			(e) Explain the concept of the periodic table (<i>1st 20 elements in the Periodic Table; metals and non-metals</i>)	Online studies: Learner uses online sources to get materials about the concept of periodic table	Outdoor activity: Assign a learner to collect materials in their environment and classify into metals and non-metals Project works: Assign a learner to carry-out a project task to investigate on different properties of metals and non-metals available in their real life	The concept of the periodic table is clearly explained	Diagrams, pictures, wall charts, simulations and videos illustrating 1 st 20 elements in the periodic table; metals and non-metals	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					setting and write a report				
			(f) Describe the concept of electronic arrangements	(g) Online studies: Learner to use online sources to get materials on the concept of electronic arrangements	Technological-based learning: Guide a learner to watch visual aids for simulations and animations, showing the arrangements of electrons in atoms of elements in their shells and write a report Group activity: Assign a learner in manageable groups to practice the arrangement of electrons in shells of atoms of different elements through models designing using locally available	The concept of electronic arrangements in atoms is clearly described	Diagrams, pictures, wall charts, simulations and videos illustrating energy shell diagram, and locally available materials for designing electronic models	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					materials				
			(h) Use the concept of atomic structure to determine the atomic number and mass numbers of an element	(i) Online studies: Learner uses online sources to get materials about the concept of atomic structure to determine the atomic number and mass numbers of an element	Group discussion: Guide a learner in manageable groups to calculate the atomic number and mass number of an element for the given compound	Atomic numbers and mass numbers of elements are correctly determined	Models, charts and pictures showing the atomic number of elements, and wall charts showing the number of protons and neutrons of elements	4 Hours	2 Hour
			(j) Explain the concept of chemical formulae and nomenclature (<i>valence, oxidation state, radicals and</i>	(k) Online studies: Learner uses online study materials to get information about concept of the concept	Inquiry-based learning: Assign a learner to collect commonly used substances and give their common names and identify their constituent	The concept of chemical formulae and nomenclature are clearly explained	Valence cards, modern periodic table, wall charts showing oxidation states and common radicals, and labelled bottles containing different laboratory	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			<i>naming of binary inorganic compounds using the IUPAC system)</i>	of chemical formulae and nomenclature (valence, oxidation state, radicals and naming of binary inorganic compounds using the IUPAC system)	elements Group discussion: Guide a learner in manageable groups to describe the concepts of chemical formula, valence, oxidation state, radicals and name binary inorganic compounds using the IUPAC system Gallery work: Guide a learner to brainstorm and share key rules in writing chemical formula		chemicals		
			(1) Determine empirical and molecular formulae of common	Online studies: Learner uses online study sources to get materials	Group discussion: Guide a learner in manageable groups to determine	Empirical and molecular formula of different compounds are correctly	A model depicting empirical and molecular formula, wall charts showing molecular formulae and modern	4Hours	2 Hours

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			compounds	about the concepts of empirical and molecular formulae of common compounds	percentage compositions of each element and in a compound Problem solving: Guide a learner to apply steps for calculating empirical formulae and molecular formulae of different compounds	determined	periodic table		
			(m)Describe the concept of chemical bonding (<i>covalent and electrovalent bonding</i>)	Online studies: Learner uses online sources to get information about the concept of chemical bonding (<i>covalent and electrovalent bonding</i>)	Outdoor activity: Guide a learner to reflect on real-environment about bonding such as building blocks erecting a wall and relate with the concepts of bonding Technological-based learning: Use software such as	The concept of chemical bonding is clearly described	Selected organic and inorganic structures, Computers installed with Chemistry software	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					ChemDraw to demonstrate the process of bonding				
		3.2 Demonstrate an understanding of the physical and chemical properties of elements on the basis of their arrangements in the periodic table	(a) Explain the changes in the physical and chemical properties of elements across and down the periodic table	(b) Online studies Learner uses online sources to get information about the concept of changes in the physical and chemical properties of elements across and down the periodic table	Group discussion: Guide a learner in manageable groups to explain the trends of metallic and non-metallic elements across the periods and down the groups of the periodic table	Changes in properties of elements across and down the periodic table are correctly explained	Diagrams, pictures, wall charts, simulations and videos illustrating changes in the physical and chemical properties of elements across and down the periodic table	2 Hours	1 Hour
			(c) Use the electronic configuration of an element to locate their positions in the periodic	Online studies: Learner uses online sources to get information about the concept of electronic	Group discussion: Guide a learner in manageable groups to apply the periodic law in locating elements in the periodic table	The electronic configurations of elements are correctly used to locate the positions of elements in the periodic	Wall charts of modern periodic table showing electronic configuration of some elements	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			table	configuration of an element to locate their positions in the periodic table		table			
	3.2 Conduct experiments in Chemistry	3.2 Conduct experiments in chemistry	(a) Perform experiments on the changes of matter from one state to another	Online studies: Learner uses online sources to get information about changes of matter.	Experimentation: Guide a learner to perform experiments on various materials from the environment and laboratory,	Experiments on the changes of matter from one state to another are correctly performed	Ice, water, iron chips, heat source, clay soil, margarine, filter paper, funnel, iodine crystals, anhydrous CuSO ₄	4 Hours	2 Hours
			(b) Perform experiments on separation of different mixtures using different methods	Online studies: Learner uses online sources to get information about separation of different mixtures using different methods	Home-based project: Assign a learner to carry- out simple experiments on separating mixtures in their daily life Experimentation: Guide a learner to perform experiments on separating mixtures basing on specific	Experiments on separation of different mixtures using different methods are correctly performed	Common salt, iron filings, magnet, powdered Sulphur, crucible and lid, heat source, HCl solution, FeS, milk, clay soil, margarine, kerosene, filter paper, funnel, ethanol, kerosene, ink, sugar, distillation system and animations or videos illustrating separation of	4 Hours	2 Hours

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					<p>properties of substances such as solubility and boiling point</p> <p>Questions and answers: Guide a learner to present the common and commercial applications of the various methods for separating mixtures, for examples simple distillation, fractional distillation and decantation</p>		different mixtures using different methods		
	3.3 Demonstrate mastery of basic terminologies in Chemistry	3.3 Demonstrate mastery of basic terminologies in Chemistry;	(a) Demonstrate the changes of matter from one state to another	Online studies: Learner uses online study to get information about changes of matter from one state to another	Demonstration: Guide a learner to freeze water and melt it as one of the examples. Include other possible physical changes that a matter may change into a new state.		<ul style="list-style-type: none"> - Ice - Iodine - Stove - Water - Kettle - Evaporating dish 	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
	.		(b) Describe the modern concept of atomic structure and radius	Online studies: Learner uses online source to get information about concept of the atomic structure and radius	Think-ink-pair-share: Guide a learner in pair to think about the meaning of an atom and its structure Technological-based learning: Guide a learner to account for the structure of an atom basing on ICT facilities and write a report	The modern concept of atomic structure is clearly described	<ul style="list-style-type: none"> - Piece of chalk, marble chips, paper mortar and pestle - Wall charts and pictures showing Dalton's atomic structure - Modern periodic table pestle 	2 Hours	1 Hour
	.		(c) Describe the concept of electronic arrangements	Online studies: Learner uses online study to get information about concept of the electronic arrangements	Technological based learning: Guide a learner to watch visual aids for simulations and animations, showing the arrangements of electrons in atoms of elements in their	The concept of electronic arrangements in atoms is clearly described	<ul style="list-style-type: none"> - Model of an atom, or picture or chart - IAE learner's module 	2Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					shells and write a report Group activity: Assign a learner in manageable groups to practice the arrangement of electrons in shells of atoms of different elements through models designing using locally available materials				
			(d)Use the concept of atomic structure to determine the atomic and mass numbers of an element	Online studies: Learner uses online sources to get information about the atomic and mass numbers of an element	Think pair share Group discussion: Guide learners in manageable groups or an individual to calculate the atomic number and mass number of an element for the given		<ul style="list-style-type: none"> - Atomic diagrams - IAE learner's module - Energy shell diagrams - Books 	6 Hours	3 Hours

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					compound				
4. APPLYING THE SKILLS AND PRINCIPLES OF CHEMICAL REACTIONS, ACIDS, BASES AND SALTS IN DAILY LIFE.	4.1 Demonstrate mastery of basic concepts, theories, and principles in Chemistry	4.1 Demonstrate mastery of concepts, theories, and principles in Chemistry	(a)Describe the concept of chemical reactions (<i>chemical equations, balancing chemical equations, and types of chemical reactions</i>)	Online studies: Learner uses online sources to get information about the concept of chemical reactions (<i>chemical equations, balancing chemical equations, and types of chemical reactions</i>)	Group discussion: Guide a learner in manageable groups to write simple word equations and chemical equations with symbols Think-ink-pair-share: Guide a learner in pairs to identify types of chemical reactions, balance chemical equations, interpret word equations into chemical equations Experimentation: Guide a learner to perform an experiment to verify the law of conservation of	The concepts of chemical reactions, are clearly described	- Wall charts showing: a. Reaction equations b. State symbols in a chemical reaction c. Marker pens Manila sheets d. Kerosene, candles, KOH/NaOH, HCl, glycerine, selected apparatus and equipment	2Hours	1Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					matter and write the report				
					<p>Group discussion: Guide a learner in manageable groups to write simple word equations and chemical equations with symbols</p> <p>Think-ink-pair-share: Guide a learner in pairs to identify types of chemical reactions, balance chemical equations, interpret word equations into chemical equations</p> <p>Experimentation: Guide a learner to perform an experiment to verify the law of</p>	The concept of chemical reactions is clearly described	Kerosene, candles, KOH/NaOH, HCl, glycerine, selected apparatus and equipment	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					conservation of matter and write the report				
			(c) Relate the types of chemical reactions with common processes in daily life such as burning of fuel and digestion in living organisms	Online studies: Learner uses online sources to get materials about types of chemical reactions with common processes in daily life such as burning of fuel and digestion in living organism	Project works: Lead a learner to carry-out project to examine applications of chemical reactions in the burning of fuel and digestion in living organisms.	The types of chemical reactions are clearly related with common processes in daily life	Laboratory note book, heat source and fuel such as charcoal	2 Hours	1 Hour
			(d) Describe acids, bases and salts (<i>reactions of acids and bases with various substances</i>) and their applications in daily life	Online studies: Learner uses online sources to get information about concept of the acids, bases and	Inquiry-based learning: Guide a learner to analyse various substances with acidic and basic properties commonly found in their environment and describe the	The concepts of acids, bases and salts are clearly described	Citrus fruits, vinegar, sour milk, apples, wood ash, tooth paste, baking powder, mineral acids, hydroxides and indicators	2 Hours	1 Hour

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				salts (<i>reactions of acids and bases with various substances</i>) and their applications in daily life	<p>concepts of acids, bases and salts</p> <p>Group discussion: Guide a learner in manageable groups to describe the reactions of acids and bases</p> <p>Field trips: Guide a learner to visit nearby food and beverages processing industries to examine the applications of acids, bases and salts</p>				
	4.2 Conduct experiments in Chemistry	4.2 Conduct experiments in Chemistry	(a)Conduct an experiment to identify acids and bases using prepared indicators	Online studies: Learner uses online sources to get information about identification	Outdoor activity: Guide a learner to prepare acid-base indicators from	Acid-base indicators are correctly prepared using locally available	- Lemon, citrus fruits, vinegar, sour milk, apples, wood ash, oranges, tooth paste, dry leaves, - Coloured	6 Hours	3 Hours

MODULES	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/ LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			(b)Prepare acid- base indicators using locally available materials	acids and bases using prepared indicators (b)Prepare acid- base indicators using locally available materials	locally available materials and write reports	materials.	flowers, - Coloured leaves - methyl orange indicator (MO), - Phenolphthalein (POP) indicator - Wall charts, Pictures which showing the application of neutralization property; Anti- acid tables		
			(c) Use the prepared indicators to test acidity and alkalinity of substances found in the locality	Online studies: Learner uses online sources to get information about test acidity and alkalinity of substances found in the locality	Experimentation: Guide a learner to perform experiments using locally made indicators to test acidity and alkalinity of substances found in the locality	Acidity and alkalinity of substances found in the locality are correctly tested using the prepared indicators	Locally prepared indicator, POP indicator, MO indicator, lemon juice, tomato juice, sour milk, vinegar and soft	2 Hours	1Hour

CHEMISTRY SYLLABUS STAGE II

COMPETENCES FOR CHEMISTRY STAGE II

Upon completion of stage II modules of Chemistry, a learner should be able to:

1. Demonstrate mastery of concepts, theories and principles of chemistry
2. Conduct experiment in chemistry
3. Demonstrate mastery of the principles of extraction of metals
4. Use international union of pure and applied Chemistry nomenclature to name chemical species.
5. Conduct the project in chemistry.

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				1. APPLYING THE SKILLS AND PRINCIPLES OF MOLE CONCEPT, VOLUMETRIC ANALYSIS AND ELECTROLYSIS IN DAILY LIFE.	1.1 Demonstrate mastery of basic concepts, theories and principles in Chemistry			1.1 Demonstrate mastery of concepts, theories and principles in Chemistry	(a) Describe the mole concept (Comparison of the mole with other units of measurements and molar quantities of substances)

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			(b) Explain Avogadro's law in relation to molar quantities	Self-Paced Learning: learner to follow self-paced learning modules and T.I.E books that allow a learner to Explain Avogadro's law in relation to molar quantities	Group discussion: Guide a learner in manageable groups to use the Avogadro's Law in explaining the molar quantities	The Avogadro's Law is clearly explained and correctly applied in calculating molar quantities	Scientific calculator and analytical balance	3 Hours	2 Hour
			(c) Explain the principles of Volumetric analysis (Preparation of standard solutions and volumetric calculations)	Online studies: Learner uses online sources to get information about Explain the principles of Volumetric analysis (preparation of standard solutions and	<ul style="list-style-type: none"> Brainstorming Assign a learner to brainstorm on the concept of volumetric analysis Project works: Guide a learner to carry- 	The principles of volumetric analysis are clearly	Analytical balance, pipette, burette, volumetric flasks, beakers, distilled water, petri	4 Hours	3 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				volumetric calculations)	<p>out a visit to nearby possible industries e.g. Foods, drinks, cosmetics and pharmaceutical industries to analyse procedures for determining amounts of chemical substances.</p> <p>Group discussion: Guide a learner in manageable groups to perform volumetric calculations and make classroom presentations</p>		dish, watch glass, funnels, wash bottles, HCl, H ₂ SO ₄ , HNO ₃ , CH ₃ COOH, NaOH, Ca(OH) ₂ , Na ₂ CO ₃ , NaHCO ₃		
			(d) Describe the application	Online studies: Learner uses online sources to get information	Experimentation: Guide a learner to perform	The applications of	- Wall chart showing the purification process	2 Hours	1 Hour

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			<p>s of volumetric analysis in real life and industrial settings as in soft drinks and cocktail making, medicine and in agriculture</p>	<p>about applications of volumetric analysis in real life and industrial settings as in soft drinks and cocktail making, medicine and in agriculture</p>	<p>experiments related to the applications of volumetric analysis.</p>	<p>volumetric analysis in real life and industrial settings are undoubtedly described.</p>	<p>- Impure copper rod Pipettes, burettes, volumetric flasks, beakers, distilled water, petri dish, watch glass, funnels, wash bottles, backing powder, vinegar, processed juice, antacids tablets and suspensions, fertiliser, NaOH, HCl, H₂SO₄, HNO₃, CH₃COOH, Ca(OH)₂, Na₂CO₃ and NaHCO₃</p>		

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
									(e) Explore the basic tenets of ionic theory and electrolysis (ionic theory, mechanism of electrolysis and laws of electrolysis)

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
	2.1 Conduct experiments in Chemistry	2.1 Conduct experiments in Chemistry	(a) Perform experiments on volumetric analysis	Online studies: Learner uses online sources to get information about Performance of experiments on volumetric analysis	Experimentation: Guide a learner to perform titrations for various standard solutions Field trips: Guide a learner to execute a field trip to nearby industries mainly concerned with quantification of species in different substances and write a report for	Experiments on volumetric analysis is performed correctly	Analytical balance, pipette, burette, volumetric flasks, beakers, distilled water, laboratory glassware, funnels, wash bottles, NaOH, HCl, H ₂ SO ₄ , HNO ₃ , CH ₃ COOH, Ca(OH) ₂ ,	2 hours	1 hour

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			b) Perform experiments on the applications of electrolysis in corrosion inhibition and purification	Online studies: Learner uses online sources to get information about applications of electrolysis in corrosion inhibition and purification	Experimentation: Guide a learner to investigate the applications of electrolysis in the electroplating process for common items in the environment	Experiments on the applications of electrolysis in corrosion inhibition and purification of metals are correctly performed	Graph papers, sand papers, dry cells Li-ion (3 V & 6 V), Lead acid cells (12 V, 5 Ah-7 Ah), Sulphuric acid, Copper (II) sulphate, copper ores and sheets, spoon, copper wires, sodium chloride, graphite rods plate, aluminium ores, gold, zinc, impure copper plates, chloride/ sulphate, iron plates, distilled water,	5 Hours	3 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			(c) Use appropriate software to sketch the set-ups of experiments	Online studies: Learner uses online sources to get information about	Experimentation: Guide a learner to use various software in sketching experimental set-ups	The set-ups of experiments are correctly sketched using Chemistry software	Chemistry based computer software		
2. INVESTIGATING THE PROPERTIES OF METALS AND	2.1 Conduct experiments in Chemistry	2.1 Conduct experiments in Chemistry	(a) Describe the extraction of iron from its ore (<i>ores, stages, and methods of extraction</i>)	Online studies: Learner uses online sources to get information about extraction of iron from its ore (<i>ores,</i>	Group discussion: Organise a learner in manageable groups to describe stages and methods involved in extraction of metals and make	The methods for iron extraction from its ore are clearly described	Wall charts showing the metals ores and their methods for extraction, and real ores for metals present	6 Hours	3 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
THEIR COMPOUNDS				<i>stages, and methods of extraction</i>	presentation Field trips: Organise a learner field trip to nearby mining sites/ factories to analyse the process for extraction of iron from its ores and write the report		in Tanzania		
			(b) Describe the preparation and properties of various compounds of metals (<i>oxides, hydroxides, carbonates, hydrogen carbonates, nitrates, chlorides and sulphates of metals</i>)	Online studies: Learner uses online sources to get information about preparation and properties of various compounds of metals (<i>oxides, hydroxides, carbonates, hydrogen carbonates, nitrates, chlorides and</i>	Inquiry-based learning: Guide a learner to investigate properties of compound of metals and relate with extraction of metals, making of paints, textiles, drinking water, soaps, and detergents	The preparation and properties of various compounds of metals are clearly described	Periodic table, lead metal, iron strips, magnesium nitrate, zinc sulphate, lead nitrate, copper sulphate, silver nitrate, magnesium ribbon, aluminium foil, laboratory glassware, water trough, flasks, gas jars, kipp's	4 Hours	2 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				<i>sulphates of metals</i>			apparatus, combustion tube, heat sources, hydrochloric acid, sulphuric acid and the first 20 elements of the periodic table		
3. ANALYSING PROPERTIES OF NON-METALS, THEIR COMPOUNDS AND BASIC TENETS OF QUALITATIVE ANALYSIS	2.1 Conduct experiments in Chemistry	2.1 Conduct experiments in Chemistry	a) Demonstrate oxidizing and displacement properties of non-metallic compounds (Oxygen, hydrogen, chlorine, hydrogen chloride, sulphur dioxide, nitrogen, ammonia and carbon	Group discussion: Learner in manageable groups to describe properties of non-metal compounds and make presentations Inquiry-based learner: to investigate industrial mechanisms	Group discussion: Guide learner in manageable groups to describe properties of non-metal compounds and make presentations Inquiry-based learning: Guide Learner to investigate industrial mechanisms involving oxidizing	Oxidizing and displacement properties of non-metal compounds are correctly demonstrated	Periodic table, oxygen gas, hydrogen gas, chlorine gas, hydrogen chloride gas, sulphur dioxide gas, nitrogen gas, ammonia gas, carbon dioxide gas, coloured flower, dyes, hydrogen	8 Hours	4 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			dioxide	involving oxidizing and displacement properties of non metals	and displacement properties of non metals		sulphide, iron (II) chloride, potassium dichromate and potassium permanganate and		
			b) Prepare sulphuric acid from Sulphur-dioxide	Experimentation: Learner prepares sulphuric acid by using sulphur dioxide through experimentation	Experimentation: Guide students to prepare sulphuric acid by using sulphur dioxide	Sulphuric acid from sulphur dioxide is correctly prepared	Wall charts showing the laboratory / industrial preparation of sulphuric acid, sulphur dioxide, distilled water, delivery tubes and flasks with side arms	4 Hours	2 Hours
	1:0 Demonstrate mastery of basic concepts,	1:1 Demonstrate mastery of concepts,	c) Explore the basic tenets of qualitative analysis	Group discussion: Learner in manageable groups	Group discussion: Guide learner in manageable groups to explain the concept	The basic tenets of qualitative analysis are clearly	Qualitative analysis reagents, apparatus for qualitative	8 Hours	4 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					theories and principles in Chemistry			theories and principles in Chemistry	(Preliminary analysis, tests in solution and confirmatory test)
4, APPLYING PROPERTIES OF ORGANIC COMPOUNDS, ALIPHATIC HDROCARBONS AND ALCOHOLS IN DAILY	1.0 Demonstrate mastery of basic concepts, theories and principles in Chemistry	1.1. Demonstrate mastery of concepts, theories and principles in Chemistry	Explore the basic tenets of Organic Chemistry (organic compounds; aliphatic hydrocarbons and alcohols)	<ul style="list-style-type: none"> Library search Internet search Resources centres Online platforms Virtual study groups Interactive Simulations and Labs Field work to Explore the basic tenets of 	<p>Brainstorming:</p> <p>Guide a learner to brainstorm on the concept of Organic Chemistry</p> <p>Group discussion:</p> <p>Guide a learner in manageable groups to describe categories of hydrocarbons and</p>	The basic tenets of Organic Chemistry are clearly explained	Molecular models and organic substances present in environment	4 Hours	2 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				LIFE.					
	2.0 Demonstrate mastery of basic terminologies in Chemistry	2.1 Use the International Union of Pure and Applied Chemistry nomenclature to name chemical species	(a) Use Chemistry software to draw organic structures of hydrocarbons and alcohols with 1 carbon to 10 carbon atoms	Online studies: Learner uses online sources to get information about Use Chemistry software to draw organic structures of hydrocarbons and alcohols with 1 carbon to 10 carbon atoms	Experimentation: Guide a learner to use the Chemistry software to draw organic structures of organic compounds such as hydrocarbons and alcohols	Organic structures of hydrocarbons and alcohols with 1 carbon to 10 carbon atoms are correctly drawn using the Chemistry software	Chemistry-based computer software, organic model and wall chart		
			(b) Name aliphatic hydrocarbons and alcohols with 1 carbon	Interactive Simulations and Labs: Learner to utilize online simulations and virtual labs to	Group discussion: Guide a learner in manageable groups to identify and name the	Aliphatic hydrocarbons and alcohols with 1	Wall charts showing structures of hydrocarbons, molecular model	6 Hours	4 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
									to 10 carbons atoms using the IUPAC system and Chemistry software
		2.2 Use chemical symbols, formulae and	(c) Describe the Chemical reactions of aliphatic	Interactive Simulations and Labs: Learner utilizes online simulations and	Gallery walks: Guide a learner to describe chemical reactions and	Chemical reactions of aliphatic hydrocarbons	Wall charts, pictures and videos showing chemical	6 Hours	4 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
								equations to represent chemical reaction	hydrocarbons and alcohols in relation to their structures

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
	3.0 Conduct experiments in Chemistry	3.0 Conduct experiments in Chemistry	(a) Demonstrate the local and industrial preparations of aliphatic hydrocarbons and alcohols	<p>Online studies: Learner uses online sources to get information preparations of aliphatic hydrocarbons and alcohols</p>	<p>Hands-on-minds on: Guide a learner to demonstrate local and industrial preparations of aliphatic hydrocarbons and alcohols and write the reports</p> <p>Experimentation: Assign a learner to perform experiment on reactions involving preparations of aliphatic hydrocarbons and alcohols</p>	The local and industrial preparation of aliphatic hydrocarbons and alcohols are clearly demonstrated	Wall charts showing distillers, and relevant chemicals and solvents for preparation of alcohols and hydrocarbons with 1 carbon to 10 carbon atoms		
	4.0 Conduct a project in Chemistry	4.0 Conduct a project in Chemistry	(b) Design and carry-out a simple research project in Chemistry	<p>Interactive Simulations and Labs: Learner to utilize online simulations and virtual labs to get hands-on experience in project in Chemistry</p>	<p>Group discussion: Guide a learner in manageable groups to analyse social and scientific challenges such as water pollutions, water purifications, rusting, fire outbreak, pesticides, acid and</p>	A simple research project in Chemistry is designed and developed correctly	Library resources and videos, animations or simulations illustrating simple projects in chemistry	6 Hours	2 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				Online studies: Learner uses online sources to get information about carry-out a simple research project in Chemistry	chemical waste management Project works: Guide a learner to apply Chemistry principles to investigate on domestic strategies for water purifications, metals purification, metal extraction. and develop local and scientific mechanisms for addressing the identified scientific challenges				
			(b) Complete and submit a report for the project you did.		Project works: Guide a learner to apply Chemistry principles to investigate scientific processes such as water purification, environmental user- friendly metal extraction and	Scientific report of the project is clearly written and quality project product(s) are obtained	Samples, project guidelines, sample of project reports and chemistry-based software		

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					purification, food processing and beverage production				
	4.0 Conduct a project in Chemistry	4.1 Conduct a project in Chemistry	a) Design and carry-out a simple research project in Chemistry	<p>Online studies: Learner uses online sources to get information about carry-out a simple research project in Chemistry.</p> <p>Interactive Simulations and Labs: Learner utilizes online virtual labs to get hands-on experience in carry-out a simple research project in Chemistry</p>	<p>Group discussion: Guide a learner in manageable groups to analyse social and scientific challenges such as water pollutions, water purifications, rusting, fire outbreak, pesticides, acid and chemical waste management</p> <p>Project works: Guide a learner to apply Chemistry principles to investigate on domestic strategies for water purifications, metals purification, metal extraction. and develop local and scientific</p>	A simple research project in Chemistry is designed and developed correctly	Library resources and videos, animations or simulations illustrating simple projects in chemistry	4 Hours	2 Hours

MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND/ LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION/LEARNING AIDS	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
					mechanisms for addressing the identified scientific challenges				

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