REPUBLIQUE DU CAMEROUN
Paix -Travail -Patrie

REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTERE DES ENSEIGNEMENTS SECONDAIRES
MINISTRY OF SECONDARY EDUCATION

TEACHING SYLLABUS : *CHEMISTRY*

Form 1 & 2







Observer son environnement pour mieux orienter ses choix de formation et réussir sa vie

Juin 2023

PREFACE FOR CAMEROON SYLLABI

In an era where achieving emergence by 2035 remains a concern for Cameroon, secondary education is called upon to address some major challenges such as:

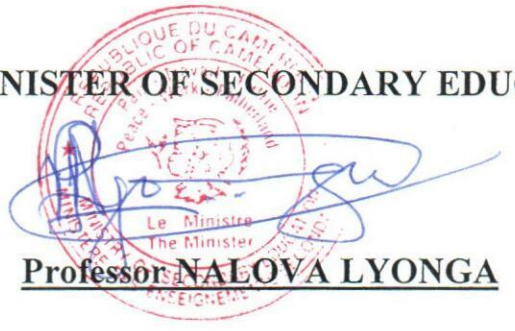
- providing quality education to future citizens in an environment where pedagogic standards increasingly require perfectibility;
- better contextualization of the teaching/learning by adapting them as much as possible to real life;

Based on the 1998 Law of Orientation of Education and the 2009 Growth and Employment Strategy Paper (DSCE), this new vision of our education system, which is now also supported by the NDS30, has led to the adoption of a new pedagogic paradigm: the Competency-Based Approach (CBA), which has been tested since 2012 and implemented by regulators since 2014. After twelve years of CBA syllabuses, an objective assessment of the effectiveness of their implementation enabled us to identify strengths and weaknesses of the approach. Some of the weaknesses include: the dense nature of the teaching/learning contents, inaccuracy in the definition of the competences to be acquired, inadequate link between resources and competences to be acquired, failure to take into account interdisciplinarity, which has led to contradictions in the objectives of some subjects.

By complying with the prescriptions of the main bodies in charge of education such as UNESCO, which advocate the development of quality curricula, the revision of our syllabi consisted in clearly redefining the targeted competencies, fine-tuning the logical frameworks and resources, while staying in line with interdisciplinarity.

I acknowledge the fact that these revised and corrected syllabi will constitute a foundation for quality teaching/learning and a decisive milestone towards meeting educational objectives of the NDS30. I congratulate all the members of the pedagogic chain who contributed to this revision work and urge the education community in general and pedagogic supervisors and teachers in particular, to adopt the said syllabi so that they can be effectively implemented for the benefit of our education system.

THE MINISTER OF SECONDARY EDUCATION



Professor NALOVA LYONGA

REPUBLIC OF CAMEROON **PEACE-WORK-FATHERLAND**

ORDER No. 238/23 **/MINESEC OF** 14 JUIN 2023

TO REDEFINE THE SYLLABUSES OF THE FIRST CYCLE OF GENERAL SECONDARY EDUCATION OF THE ENGLISH-SPEAKING AND FRENCH-SPEAKING SUB-SYSTEMS OF EDUCATION

THE MINISTER OF SECONDARY EDUCATION,

Mindful of the Constitution;
Mindful of Law No. 98/004 of 14 April 1998 to lay down Education Guidelines in Cameroon;
Mindful of Decree No. 2011/408 of 9 December 2011 to organise the Government, as amended and supplemented by Decree No. 2018/190 of 2 March 2018;
Mindful of Decree No.2012/267 of 11 June 2012 to organise the Ministry of Secondary Education;
Mindful of Decree No. 2018/191 of 02 March 2018 to reorganise the Government;
Mindful of Decree No. 2019/001 of 04 2019 to appoint the Prime Minister, Head of Government;
Mindful of Order No. 239/23 /MINESEC of 14-06-2023 to define the content, duration and coefficients (number of credits) of subjects in the first cycle of General Secondary Education in the English-speaking and French-speaking sub-systems of education,

SERVICES DU PREMIER MINISTRE VISA 002687 06 JUIN 2023 PRIME MINISTER'S OFFICE

HEREBY ORDERS:

ARTICLE 1. - This Order redefines the syllabuses of the First Cycle of General Secondary Education francophone and Anglophone subsystems.

ARTICLE 2. - The syllabuses are redefined per subject.

ARTICLE 3. - The technical contents of the syllabuses referred to in article 2 above are set out in the appendices, which are an integral part of this Order.

ARTICLE 3. - The syllabuses redefined in this Order shall be implemented from the start of the 2024-2025 school year.

ARTICLE 4. - All previous provisions contrary to this Order are hereby repealed.

ARTICLE 5. - The Inspector General of Education, the Registrar of the GCE Board, the Director of Examinations and Certification, Regional and Divisional Delegates of Secondary Education, Secretaries of Education, are responsible, each in his or her own area of competence, for the strict implementation of this Order, which shall be registered, published in accordance with the procedure of

urgency, and inserted in the Official Gazette in English and French, and communicated wherever necessary./-

Yaounde, 14 JUIN 2023

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VISA
002687 06 JUIN 2023
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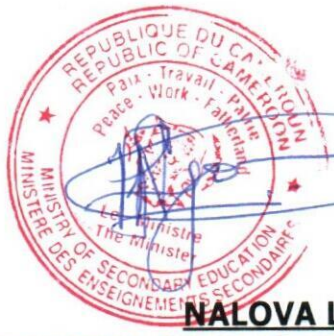

NALOVA LYONGA
THE MINISTER OF SECONDARY EDUCATION

REPUBLIC OF CAMEROON

PEACE – WORK - FATHERLAND

ANNEX N°.XXXIII. OF ORDER N° 238/23 /MINESEC OF 14 JUNE 2023
TO REDEFINE THE SYLLABUSES OF THE FIRST CYCLE OF GENERAL SECONDARY EDUCATION OF THE ENGLISH-SPEAKING AND FRENCH-SPEAKING SUB-SYSTEMS OF EDUCATION

CHEMISTRY TEACHING SYLLABUS

FORM 1 and FORM 2

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The syllabuses of the first cycle of Secondary General Education are broken down into 5 areas of learning, each of them containing a given number of disciplines as shown in the table below.

Areas of learning	Disciplines
1- Languages and Literature	- French - English - Living Languages II - Ancient Languages - Literature(in English and in French)
2- Science and Technology	- Mathematics
	- The Sciences(Physics, Chemistry, Technology, Life and Earth Sciences) - Computer Science
3- Social Sciences/Humanities	- History - Geography - Citizenship Education
4- Personal Development	- Sports and Physical Education - Manual Labour
5- Arts and National Cultures	- National Languages - National Cultures - Arts

END - OF - FIRST CYCLE LEARNER'S EXIT PROFILE

The first cycle of Secondary General Education admits young graduates from primary schools aged between ten and fourteen. Its general objectives are not only to build intellectual, civic and moral skills in these children but also competences and fundamental knowledge which will either enable them to foster their education in the second cycle, or to prepare them for a smooth insertion into the job market after professional training.

Thus, within the framework of these new syllabuses, the learner is expected , after the first cycle of secondary education, to be able to use his/her competences to solve problems through family of situations relating to domains of life as indicated in the table below:

N°	Domains/Areas of life	Families of situations to be treated in the 1st cycle
1	Family and social life	• Participation in family life • Healthy professional relationships • Social integration
2	Economic life	• Discovery of income generating activities • Discovery of the job market, social roles, jobs and professions • Self-confidence, aspirations, talents, self-potential • Practising healthy eating habits
3	Environment , health and well being	• Preservation of the Environment • Quest for a healthy life style • Choosing and practising a healthy life style
4	Citizenship	• Mastery of rules and regulations governing the Cameroonian society • Discovery of cultural values and customs of the Cameroonian society
5	Media and Communications	• Discovery of the media world • Discovery of Information and Communication Technologies

In order to achieve these objectives, the learner should be able to mobilise, within the various disciplines and constructive areas of learning of the syllabuses, all the pertinent resources in terms of knowledge, know-how and attitudes.

The next table gives you a general overview of the afore-mentioned objectives, while the syllabus for each subject unfolds, in details, all the expected competences per level and at the end of the 1st cycle.

Areas of Learning	Disciplines	Expected outcomes at the end of the 1st cycles
1-Languages and	**Living languages:**	**French and English , L1**
Literature	English, French , German, Italian, Spanish, Chinese, Etc.	Receptive skills: reading and listening Read in an autonomous way, different types of texts related to areas of life as defined in the syllabus; Listen and understand various texts related to the above mentioned areas of life Productive skills: speaking and writing Produce various types of texts , of average length related to these areas of life; Language tools: appropriate use of various language tools in order to produce and read types of texts related to that level;
	English to Francophone learners French to Anglophone learners	Communicate accurately and fluently using all four basic skills in language learning; Be able to transfer knowledge learnt in class to real life situations out of the classroom; Be able to cope and survive in problem solving situations;
		Living languages II Receptive skills: reading and listening Read and understand simple texts on social life, citizenship, the environment, well-being and health, media etc.. Listen and get oral information in order to simply interact during communication situations related the various domains of life. Productive skills: speaking and writing Sing, recite, dramatise , orally answer questions related to the various domains of life as defined in the syllabus; Write short passages on various familiar topics.
	Ancient languages: Latin, Greek **National languages** **Literature** Cameroon Literature; French Literature; Francophone Literature; Other literatures	Develop general knowledge through ancient languages and cultures; know the origins of the French language for linguistic mastery; Carry out elementary tasks in translation.
2-Science and Technology	Mathematics, The Sciences	Use mathematics knowledge skills and values with confidence to solve real life problems within the different domains of life;
	Computer Science	Communicate concisely and unambiguously and develop power of mathematical reasoning (logical thinking, accuracy and spatial awareness).
		The Sciences:

		Acquire the fundamentals of sciences in order to understand the functioning of the human body, the living world, the earth and the environment; Acquire methods and knowledge to understand and master the functioning of technical objects made by man to satisfy his needs; Demonstrate attitudes to protect his/her health and environment.
		Computer Science: Master the basics of Information and Communication Technologies; Exploit and use ICTs to learn.
3- Social Sciences /Humanities	**History** **Geography** **Citizenship Education**	Possess cultural references to better locate events in time and space within a democratic system and become a responsible citizen. **History:** Acquire a common culture; be aware of heritage from the past and current challenges; **Geography:** Develop one's curiosity and knowledge of the world; Get acquainted with landmarks to find your way and fit in the world. **Citizenship Education:** Possess essential knowledge in rights and duties in order to fulfil his/her citizenship.
4- Personal Development	**Moral Education;** **Home Economics;** **Sports and Physical Education** **Health Education**	Develop his / her physical abilities/skill; Get ready for physical challenges, save and regain energy after physical efforts; Identify risk factors; possess basic knowledge and principles in hygiene and health education; Demonstrate a sense of self control and appreciate the effect of physical activities. Conceive and draw up sports and cultural animation projects; Acquire methods and develop a high sense of efforts;
		Conceive, draw up and implement projects that will enable one to project his/her image and feel the well-being inspired by self-confidence.
5- Arts and National Cultures	**Arts/Artistic Education;** **National Cultures**	**Artistic Education:** Observe and appreciate works of art; Carry out an artistic activity; Gradually acquire the love for personal expression and creativity; Possess a mastery of creativity in music, plastic arts and the performing arts. Dramatise, recite texts (poems, tales, proverbs, etc.) relating to various areas of society; Practise the different dramatic genres: sketches, comedy, tragedy, drama, etc. **National languages and Cultures** Demonstrate a mastery of Cameroon cultures; Visit the various cultural areas of the country in order to discover their characteristics;

		Demonstrate a mastery of basic rules in writing Cameroonian languages as well as basic grammatical notions applied to these languages; Demonstrate a mastery of one of the national languages at 3 levels: morpho-syntax, reception and production of simple oral and written texts.
Even though the learners acquire skills in different disciplines, these competences are accompanied by other skills known as cross curricular competences related to intellectual, methodological, social and personal areas of learning.		
6- Cross curricular competences	Intellectual and Methodological domains	Solve Problem in a given situation; Use knowledge skills and values with confidence in order to solve real life problems within the different domains of life; With confidence, find useful information to solve problems he/she is faced with; Give his/her opinion; Support his/her opinion with strong arguments ;
		Assess him/herself with a view to remediation; Demonstrate basic knowledge in note taking; Conceive and realise individual projects; Analyse and summarise information, give feedback and report orally or in writing. Develop problem solving approaches; Exploit and use ICTs in his/her activities.
	Social and Personal Domains	Interact positively and assert his/her personality while respecting that of other people; Join team work, fit in a common initiative project /group; Demonstrate interest in cultural activities; Develop a sense of effort, love for work, perseverance in tasks or activities carried out; Understand and accept others in intercultural activities; Accept group assessment.

The resources to be mobilised by the learner are found in many disciplines and areas of learning. So it is important to implement these syllabuses not in isolation but as interrelated subjects. These remarks hold both for subject and cross curricular competences. They are so called to show that they should be developed through teaching/learning activities of the different subjects. The development of subject and cross curricular competences concern the entire education family as they are capable of inspiring an educative project and the putting in place of extra-curricular activities. The ultimate training goal of these syllabuses, at the end of the first cycle, is to enable the learner to be self-reliant, to be able to keep on learning throughout his/her life, to contribute to sustainable development and become a responsible citizen.

LEARNING AREA: SCIENCE AND TECHNOLOGY

SUBJECT: CHEMISTRY

CLASSES: FORM 1 AND FORM 2

ANNUAL WORKLOAD: 60 PERIODS

WEEKLY WORKLOAD: 02 PERIODS

COEFFICIENT: 02

GENERAL INTRODUCTION:

The chemistry teaching syllabus is designed as an integrated course to create awareness in the student about their physical and chemical environment. It enables the leaner who just graduated from primary school to acquire competences to observe, interpret, investigate physical and chemical changes in the environment and communicate the findings using appropriate language.

1. TEACHING/LEARNING

The Chemistry syllabus is conceived to be taught using the Competency-Based Approach to equip the leaner with skills, knowledge and attitudes to be able to solve problems in society. This teaching/learning approach takes into consideration real life situations. In this approach goals and objectives are defined in terms of measurable knowledge, skills and attitudes which learners should possess at the end of the lesson.

Competence here refers to proven ability to use the knowledge, skills and attitudes for professional and personal development.

Emphases here is more on what learners can do with the knowledge they have acquired.

In the Competency-Based Approach (CBA), daily life situations are the focal point, using the student-centred experimental approach to the teaching of chemistry in each of the classes. The experimental resources to be used at all levels of the teaching syllabus include:

- Simple material in the environment;
- Conventional laboratory chemicals and equipment;
- Microchemistry equipment.

2. PROFILE OF THE LEARNER AT THE END OF THE COURSE:

The learner is expected to acquire certain knowledge, skills and attitudes by the end of the course in chemistry which will enable him/her to:

- Observe and explain natural phenomena
- Face the challenges of life, through the use of scientific approach in problem solving
- Manage the environment in a sustainable manner
- Safeguard his/her health and that of others in his/her surrounding
- Imbibe the scientific method that can be used to carry out investigations
- Read security and hazard notices
- Communicate using appropriate scientific terminology

3. HOW TO ACHIEVE THE PROFILE:

To achieve this profile in the learner, chemistry will be taught in three modules, 7 topics for Form 1 and 8 topics for Form 2 with the durations as seen in the table below:

Sub-cycle	Level	Title of module	Topic	Practical Activities to be carried out	Duration/ (Periods)
Observation	Form 1	**MODULE I:** Matter: Properties and Transformation	1. Understanding chemistry	1)Visit to the laboratory to get acquainted with lab equipment	08
			2. Effect of heat on substances	2)Melting candle wax, ice, etc	08
			3. Simple classification of substances	3)Separation of mixtures	10
			4. Chemical elements	4) Testing physical properties of metals and non-metals	08
			5. Acids and bases (alkalis)	5)Preparation of natural indicators and testing of acids and bases	08
		MODULE II: Environmental Education	6. Air	6)Determine the active part of air	08
			7. Water and solutions	7) Tests of water using anhydrous $CuSO_4$ and $CoCl_2$	10
	Form 2	**MODULE I:** Matter: Properties and Transformation	1. The Atom		08
			2. Periodic table: Families of elements and Relative reactivity		06
			3. Chemical symbols, formulae and valency		08
			4. Chemical reactions and equations	1)Action of heat on sugars	08
			5. Reactions with oxygen of air	2)Iron sponge, Nails kept in dry and moist conditions	10
			6. Mixtures and pure substances	3)Simple distillation, paper chromatography	06
		MODULE III: Energy	7. Action of heat on materials	4)Heat Calcium carbonate and test gas evolved with lime water.	06
			8. Action of electricity on materials	5)Electrolysis of aqueous NaCl	08

4. COMPETENCIES TO BE ACQUIRED:

Through the teaching/learning process using the Competency-Based Approach (CBA), the learner is expected to acquire some competencies which will enable the learner to act when faced with a situation. The competencies are categories into knowledge, skills and personal attributes.

Through the learning of chemistry, the learner will acquire the following competencies:

- Observe physical and chemical changes
- Interpret natural phenomena
- Interpret chemical signs and symbols
- Measure quantities
- Calculate quantities
- Carry out simple scientific procedures
- Recognize and use basic scientific equipment

- Leadership
- Creativity
- Communication
- Team spirit
- Self-control

5. EVALUATION OF COMPETENCIES

The evaluation of this syllabus will aim to test the knowledge and competencies (skills, abilities) in different areas:

- Ability to apply the understanding in solving problems
- Ability to use the scientific information given, for example in graphical or tabular form.
- Ability to organize material and present ideas in a clear and logical manner.
- Ability to handle patterns in chemical knowledge and show critical, imaginative and inferential thinking skills.
- Practical skills will be evaluated with respect to:
  - Use of and care for equipment
  - Design and use of experiments
  - Quantitative and/or qualitative analyses.
- By the end of the these first two years of the first cycle, the learner will be required to have shown proof of the acquisition of a specified number of competencies.

All forms of evaluation will place emphasis on the specified competencies/aptitudes outlined for each topic/module.

These competencies will be acquired through the study of chemistry under some families of situations which the learner will encounter in life.

6. FAMILY OF SITUATIONS

No	Title of module	Family of situations
I	Matter: Properties and Transformation	Observing, interpreting and investigating physical and chemical changes in the material world
II	Environmental Education	Management of natural resources in a sustainable manner
III	Energy	Investigating the Sources of energy and their effects on substances

7. CATEGORY OF ACTIONS

This syllabus will equip the learner with knowledge, skills and attitudes which will enable them;

- Measure quantities of substances
- Recognize safety and hazard signs
- Write symbols of elements
- Carry out mixing of substances
- Separate mixtures
- Heat substances and see the effect
- Manage natural resources such as water
- Dissolve substances in water
- Recognize and Use basic laboratory equipment
- Fight against pollution
- Write equations of reactions
- Identify acids and bases in daily life
- Prepare indicators from natural sources and use them

8. A COMPREHENSIVE TABLE SHOWING THE MODULES, TOPICS AND SPECIFIC COMPETENCIES

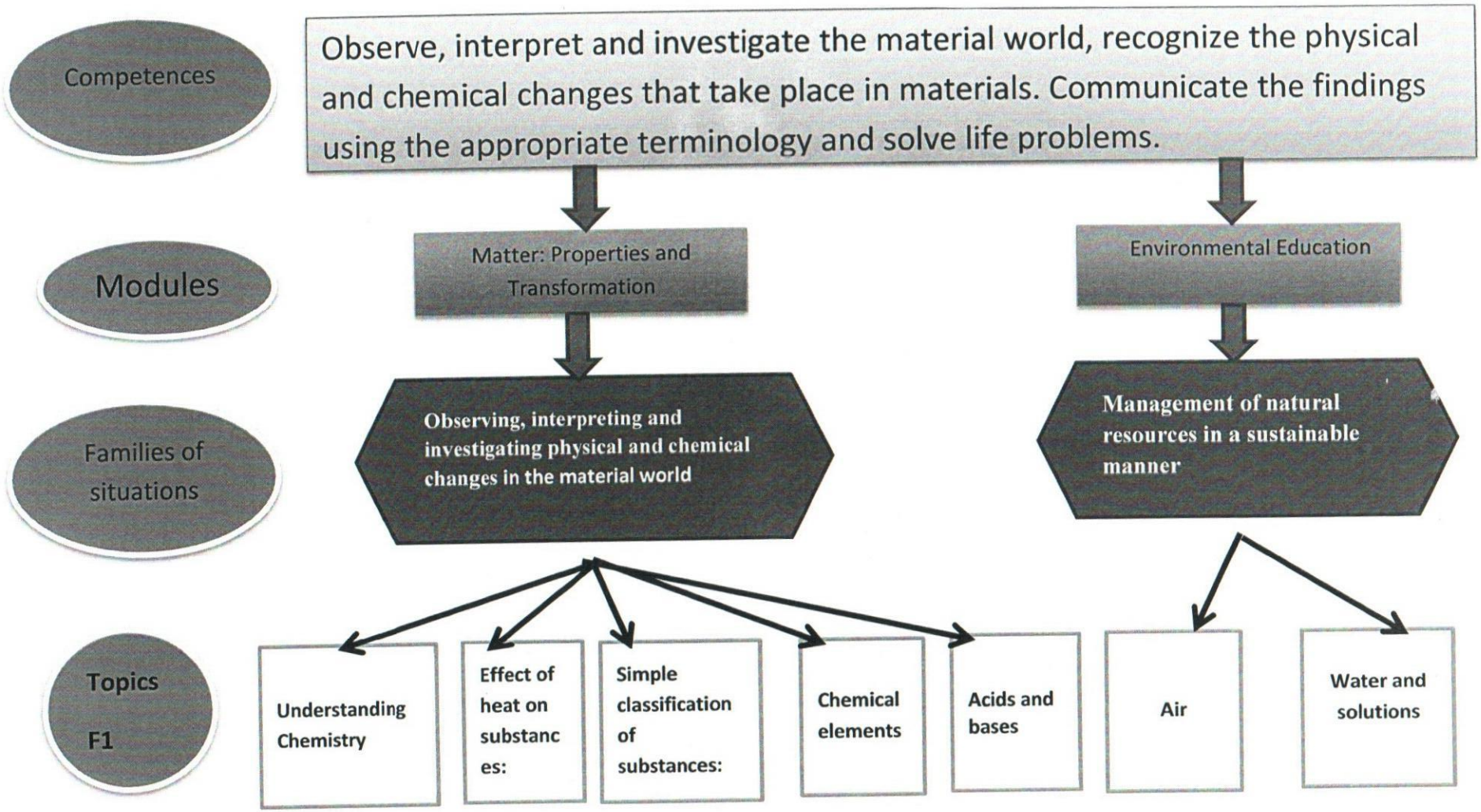
The Competency-Based Approach (CBA) paradigm requires that the syllabus be written in modules. The syllabus for the first two years of secondary education in Chemistry comprises three modules in Science and Technology (Matter: Properties and Transformation, Energy and Environmental Education); having seven topics in Form 1 and eight in Form 2.

Level	Title of module	Topic	COMPETENCIES
Form 1	Matter: Properties and Transformation	1 Understanding Chemistry	Measure quantities using appropriate instruments. Identify common laboratory equipment. Master common hazard signs. Observe laboratory safety rules.
		2 Effect of heat on substances	Carry out permanent (chemical) and non-permanent (physical) changes.
		3 Simple classification of substances	Prepare/recognise different types of mixtures. Separate various types of mixtures. Differentiate compounds from mixtures.
		4 Chemical elements	Classify some common elements as metals and non-metals. Demonstrate some physical properties of metals.
		5 Acids and bases (alkalis)	Identify substances in daily life that contain acids or bases. Prepare indicators from plant extracts. Use indicators to identify acids and bases. Carry out reactions of acids with bases and carbonates.
	Environmental Education	6 Water and Solutions	Sources of water and uses. Methods of purification of water. Test for water. Dissolve different substances in water.

			Prepare a solution, suspension, saturated solution. Demonstrate the effect of heating on solubility of a substance.
		7 Air	Quantitative determination of active and inactive parts of air. Air pollution, its causes and consequences
Form 2	Matter: Properties and Transformation	1 The Atom	Identify the three subatomic particles and their characteristics. Know the simple structure of the atom (Bohr's model). Relate atomic number to number of protons or electrons. Calculate mass number of an atom from numbers of protons and neutrons.
		2 Chemical symbols, formulae and valency	Know the symbols of the first 20 elements of the Periodic Table. Write formulae of simple compounds from table of valencies of atoms and/or radicals.
		3 Periodic table: Families of elements and Relative reactivity	Classify the first 20 elements of the Periodic Table into periods and groups. Know the different families of elements and their relative reactivity.
		4 Chemical reactions and equations	Carryout some simple chemical reactions. Write simple balanced equations of chemical reactions in words and symbols.
		5 Reactions with oxygen of air	Burn some common elements in air and write their balanced equations in words and symbols. Experiment to show the rusting of iron and conditions necessary for rusting. Methods to prevent rusting.
		6 Mixtures and pure substances	Further techniques for separation of mixtures. Criteria for identification of pure substances, examplified
	Energy	7 Action of heat on materials	Know the common sources and uses of energy to man. Effect of heat on some chemical substances. Establish reversibility of reactions using copper (II) sulphate pentahydrate.
		8 Action of electricity on materials	Effect of electric current on substances. Carry out experiments to classify substances as conductors and non-conductors; and also as electrolytes and non-electrolytes.

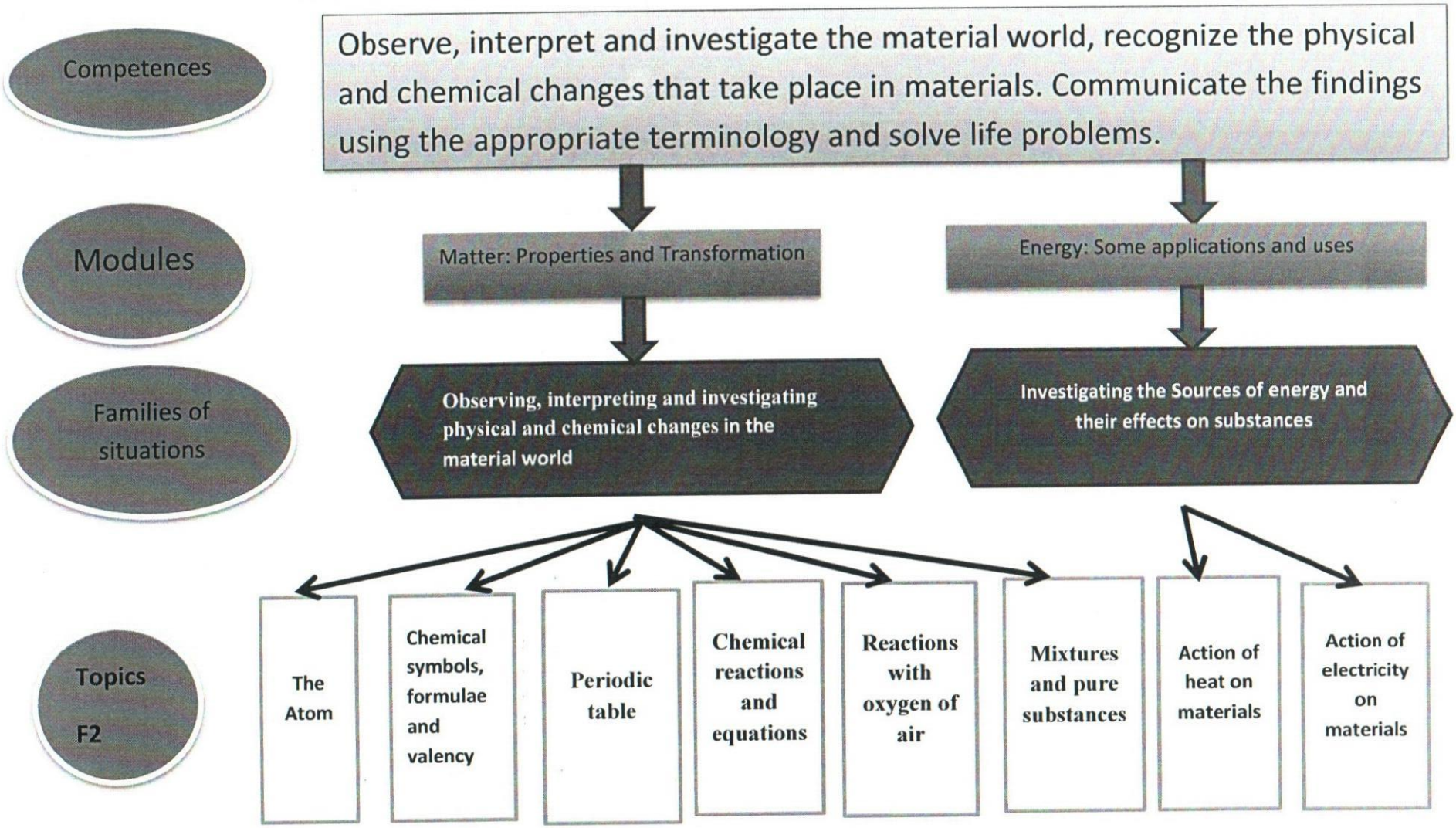
9. FLOW CHART FOR FORM 1

STRUCTURE OF THE UPDATED TEACHING/LEARNING PROGRAM FOR FORM 1 CHEMISTRY



10.FLOW CHART FOR FORM 2

STRUCTURE OF THE UPDATED TEACHING/LEARNING PROGRAM FOR FORM 2 CHEMISTRY



11. PRESENTATION OF PROGRAMME MATRIX

The table is made up of three major columns:

- The **Contextual framework** embodies the families of situations and examples of real life situations where the knowledge and skills (competencies) can be applied.
- The **Competencies** are made up of categories of actions and examples of actions: These are groups of some actions which are related to the mastery of the competencies expected for the module.
- The **Resources** have the essential or core knowledge which gives all the set of cognitive and affective resources which the learner needs to mobilize to successfully treat a family of situations. It is divided into four components: the subject content, the aptitude (skills or know-how), attitudes to be disposed or displayed as well as other resources (material, human, finances, etc.) necessary for the acquisition of the competencies.

The table has the following presentation:

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDES (SKILLS)	ATTITUDES	OTHER RESOURCES

12. TIME ALLOCATION

To cover this syllabus, the recommended **weekly** time allocation for each of Forms 1 & 2 is:

CLASS	TIME ALLOCATION (A period is 50 minutes)	Theory, demonstrations, experiments.
Form 1	Two single periods	50 min. x 2
Form 2	Two single periods	50 min. x 2

FORM 1

MODULE I: MATTER: PROPERTIES AND TRANSFORMATION

1. TIME ALLOCATION: 42 PERIODS

2. PRESENTATION OF MODULE

This module consists of the following topics:

- Understanding Chemistry.
- Action of heat on substances.
- Simple classification of substances.
- Chemical elements.
- Acids and bases (alkalis).

3. TARGETED COMPETENCES

- Measuring quantities
- Observing safety and hazard signs
- Classify substances into elements, compounds, metals, non-metals and mixtures
- Recognise acids and bases in daily life

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
Measurement of quantities. Identification of laboratory equipment. Mastery of common hazard signs.	-Measuring specified quantities of substances in the laboratory, market, home etc.. -Distinguishing harmful from non-harmful chemicals.	-Identify and use basic laboratory apparatus. -Measurements of mass, volume, temperature and time using laboratory apparatus. -Practice and respect laboratory safety rules. -Master and recognise hazard signs.	-Use of balance to measure mass of solids. -Use of measuring cylinder to measure volume of liquids. -Use of thermometer to measure temperature. -Use of time piece to measure time. -Read and interpret labels on reagent bottles and food products. - Read, interpret and appropriate hazard signs.	**Topic 1: Understanding Chemistry** 1.1 Chemistry and its importance in everyday life 1.2 Some basic equipment used in the study of Chemistry: glassware, Bunsen burner (parts of a Bunsen burner, how to use it, parts of the Bunsen flame and the other apparatus) 1.3 Safety rules for working in a Chemistry laboratory including signs and symbols on reagent bottles and the meanings.	-Discuss importance of Chemistry. -Measure mass, volume, time and temperature in their appropriate units. -Read, identify and understand labels on product containers. -Identify and use basic laboratory apparatus. -Set-up and operate basic equipment.	-Great care when handling glassware. -Observe laboratory safety rules. -Care in handling doubtful products -Respect hazard signs.	-Glass ware -Bunsen burner -Balance(s) -Stopwatches -Thermometer -Labeling tags -Reagent bottles -Wash bottles -Hazard signs -Other basic apparatus -etc.
Effect of heat on substances	Non-permanent changes. Permanent changes	Heating substances which produce non-permanent changes. Heating substances which produce permanent changes.	-Heat ice, candle wax, water, camphor balls and observe. -Freeze water. -Condense steam -Heat hydrated copper sulphate, lead nitrate; zinc carbonate. -Burn paper or wood -Burning a candle and cooking (permanent and non-permanent changes)	**Topic 2: Effect of heat on substances** 2.1 Physical and chemical changes: Action of heat on ice as an example of a physical change; and action of heat on copper (II) sulphate pentahydrate as an example of a permanent chemical change; lead nitrate; zinc carbonate. Burning of candle as an example of physical and chemical change. 2.2 States of matter: solid, liquid, gas phases and the interchange between these i.e. change in state; including the processes involved. 2.3 Simple kinetic theory : Changes in state explained in terms of the simple kinetic theory.	-Heat a substance. -Observe reactions. -Differentiate a chemical change from a physical change. -Identify the states of matter. Convert water to ice or steam and vice versa. -Explain changes of state in terms of the simple kinetic theory.	-Care in handling heat source, chemicals and heated matter.	-Heat source -Ice -water -Copper sulphate pentahydrate -Lead nitrate -Zinc carbonate -Refrigerator. -Candle -Camphor -Match -Paper -Wood, etc.
Classification and separation of	Mixing substances (at home, in the	Mix substances to get various types of mixtures.	-Mix (corn & beans, salt & water, water & kerosene, sulphur & iron fillings, a	**Topic 3: Simple classification of substances.** 3.1 Mixtures and pure substances:	-Define mixture and pure substance.	Care when handling glassware,	- Heat source -water -distillation

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
mixed substances.	laboratory. and the market). Classifying substances. Separating mixed substances. -Identification of pure and impure substances, homogeneous and heterogeneous mixtures.	Classify mixtures into the various types. Carry out simple experiments to obtain pure substances from mixtures. Distinguish between mixtures and compounds. -Determining purity of substances -Differentiating pure substances from mixtures.	Fanta drink etc.) -Dissolve sugar or table salt in water. -inflect a balloon or uncork a fanta bottle -Classify the mixtures under the various types. -Prepare a flour mixture for cake. -Prepare a common salt solution for rehydration. -Use appropriate techniques to separate the various mixtures -Sieving e.g. corn flour/corn bran, fine sand/pebbles, -Filtration e.g. Muddy water, corn beer/chaffs -Distillation e.g. salty water, ethanol/water, Petroleum or Crude oil -Magnetization e.g. iron filings/sand -Winnowing e.g. patched groundnut/groundnut husk, rice/bran -Sublimation e.g. Ammonium chloride/common salt, -Separating funnel e.g. kerosene/water -Paper chromatography e.g. green leaf pigments, components of ink. -Centrifugation e.g. blood components, Decantation, etc -Use boiling & melting points to distinguish between pure substances and mixtures.	definitions of a mixture and a pure substance. Classification of matter as a pure substance or a mixture. 3.2 Types of mixtures: Examples of solid/solid, solid/liquid, liquid/liquid and gas/liquid mixtures, gas/gas mixtures 3.3 Methods of separating mixtures. Methods of separating solid/solid, solid/liquid, liquid/liquid and gas/liquid mixtures, gas/gas mixtures (Separation of air) 3.4 Pure substances. Differences between mixtures and pure substances. 3.5 Matter and its constituents: Matter as a pure substance or a mixture. Pure substances as either elements or compounds. Composition of elements (same type of particles: atoms); composition of compounds (different types of atoms); simple definition of an atom. 3.6 Differences between compounds and mixtures.	-Classify matter as either a pure substance or a mixture. -State the differences between pure substances and a mixture. -Identify the various types of mixtures. -Use appropriate separating techniques to separate different mixtures. -Classify pure substances as either elements or compounds. - State the composition of matter. -Define an atom. -Differentiate between compounds and mixtures.	during mixing & separating mixtures. Care when heating volatile liquids during the separation of liquid mixtures.	apparatus, iron fillings, corn, beans, maize, magnet, table salt, pure substances, ethanol kerosene, - separating funnel, a sieve. -Gases e. g water vapour, air, bromine gas, -fanta drink -balloon , -fume cupboard -sulphur -beakers -clamp and stand. etc.
Classificatio n of	Physical properties of	Distinguish metals from non-	Heat a piece of copper wire and wood and handle for	**Topic 4: Chemical elements** 4.1 Elements and compounds:	-Recall the definition of	-Care when heating metal	-water. -Copper wire.

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
elements as metals and non-metals.	metals and non-metals. Uses of metals and non-metals. Definition of elements and compounds with examples.	metals. Discuss physical properties of metals and non-metals (conductivity, malleability, ductility, etc.) Know examples of metals and non-metals and their respective uses.	some time. Put hot water in a plastic cup and in a silver cup and hold. Let a piece of paper and a nail fall simultaneously. Complete an electrical circuit using a nail and then a piece of paper in turn. Place the substances tested above as metal or non-metal. Twist or beat a copper wire into various forms and shapes. Explain uses of metals as in: knife, coin, pot, thermometer, overhead electric cables, etc.	examples from substances met so far. 4.2 Metals and non-metals: physical properties (electrical conductivity, malleability, heat conductivity, etc.).	elements and compounds with examples. -Distinguish between metals and non-metals. -State properties of metals and non-metals. -State uses of metals and non-metals.	and non-metal objects. - Care when handling an electric circuit. - Curiosity. -Should demonstratepr actically the differences between metals and non-metals, i.e. conductivity, malleability, ductility, etc.	-piece of paper and wood. -Aluminum foil. -Heat source. -Thermometer. Knife, coin, -An electric circuit. -Periodic table chart. -etc.
Identification of substances in daily life that contain acids or bases; and some reactions of acids.	Identification using plant extracts as acid-base indicators. Identification using traditional acid-base indicators Classification of solutions as acidic, basic or neutral.	Investigate the natural as well as industrial sources of acids and bases Extracting and preparing indicators from plants extract. Preparing and using plant extracts as indicator. Using indicators to identify and classify substances (at home, in the market and in the laboratory etc.) as acidic, basic, or neutral.	Purchase lemon, lime, lime stone, soap, sour milk, vinegar, car battery acid, aqueous NaOH, Dil. HCl etc. and test for their acidity and alkalinity using a familiar indicator. -Harvest plant leaves (red cabbage), crush and extract the juice. -Add red cabbage extract, to vinegar, lemon or lime juice, salt solution, soapy water, baking powder, water, "kanwa", sour milk, rain water, dilute sulphuric acid, dilute hydrochloric acid, aqueous sodium hydroxide etc and classify the solutions as either acids, bases or neutral. - Use universal indicator to classify substances on a pH scale.	**Topic 5: Acids and bases (alkalis)** 5.1 Acids in everyday life: citrus fruits, sour fruits, vinegar, car battery acid 5.2 Bases in everyday life: baking powder, "kanwa", wood ash extract, anti-acid tablet or powder 5.3 Test for acids and bases with familiar indicators 5.4 Extraction of indicators: from flowers, red cabbage and use to classify solutions as acids, bases or neutral. 5.5 pH scale: use of universal indicator to classify solutions as acids, neutral or bases (car battery acid, vinegar, lime juice, salt solutions, rain water, soapy water, kanwa, baking powder). pH scale as series of numbers that indicate whether a substance	-Know some common acids and bases in everyday life. -Use familiar indicators to identify and classify substances as acidic, basic, and neutral. -Extract and prepare plant extracts for use as indicators. -Classify substances as being strong acid, weak acid, neutral, weak base or strong base and therefore establish a pH scale.	-Follow instructor's advice strictly. -Avoid tasting substances with the mouth. -Avoid substances from dropping on the skin. Great care in handling chemicals. -Know whether a fruit is acidic or basic	-Red cabbage, - Stigma of okara flower, -Coloured flower & leaves. -Mortar and pestle.(crusher) -Water, Beaker -Test-tubes -Citrus fruits -Vinegar -Caustic soda -Car battery acid -Soapy water -"Kanwa" -pH meter -Litmus paper -Universal indicator -pH scale -Wood ash solution -dilute (HCl and

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
			-Mix equal volumes and concentrations of any acid with any base and then test the resulting solution with an indicator.	is acidic, neutral or basic. 5.6 Reactions of acids with bases (neutralization) and acids with carbonates.	- Define neutralization and give examples.		H_2SO_4) - NaOH(aq) -Indicator (phenolphthalein or methyl orange) -piece of clean cloth. -various fruits.

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MODULE II: ENVIRONMENTAL EDUCATION

1. TIME ALLOCATION: 18 PERIODS

2. PRESENTATION OF MODULE

This module consists of the following topics:

- Air.
- Water and solutions

3. TARGETED COMPETENCES

- Knowledge of active and inactive air
- Prevention of air pollution
- Sustainable management of natural sources of water
- Treatment of water for domestic use
- Prevention of water pollution

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
Air management	Demonstrating that air is a form of matter. Identifying the gases in air. Quantitative determination of active and inactive parts of air. Identifying sources of air pollution and pollutants. Burning substances in air. -Global warming and climate change, destruction of the ozone layer (depletion).	Carry out experiments to show that air is a form of matter, that oxygen is the active part of air, to determine the percentage of oxygen in air. State the percentage composition of air by volume. Identify air pollutants. -Fight against air pollution, -Limitation of global warming to conserve the ozone layer -Burning of substances in air -Breathing -Prevention of air pollution.	-Measure the mass of air using an inflated balloon. - Push an empty bottle beneath water in a bucket. -Place a lighted candle in water and cover it with a measuring cylinder or beaker. -State causes of air pollution and name some pollutants. -Burn grass and identify the air pollutants (solid particles and gases). -Limit the discharge of toxic substances into the air. Construct industries away from residences. Oblige industries to properly manage toxic products. -Limit the emission of greenhouse gases and use of fossil fuels. Limit the discharge of CFCs. Plant trees; limit the use of bush fires. -Use refrigerators and aerosols free of CFCs. -burning of wood -Inflating balloons	**Topic 6: Air** 6.1 Composition of air: active and inactive parts. 6.2 Active part of air: oxygen (burning, rusting; rusting to be mentioned only). 6.3 Inactive part of air: nitrogen; 6.4 Air as a mixture: oxygen, nitrogen, carbon dioxide, water vapour, rare gases. 6.5 Air pollution: pollutants: solid particles and gases, effects on the environment.	- Conduct simple experiments to show that air is made of active and inactive parts. -Conduct simple experiment to show that the active part of air is that responsible for combustion. - List the other gases in air or percentage composition of air. -Discuss air pollution and its causes and ways of reducing it. -Identify the factors that influence rusting. -Contribute to proper management of toxic and waste products. Choice of house-hold apparatus, aerosols with no CFCs. -Waste management	-Care when handling and setting up of equipments. -Care when lighting and handling flame from match. - Control the inflation of balloon. - care when handling the balance. -Avoid burning of tyres, plastics, bush fires, etc. -Plant trees and flowers for purification of air.	-Water -Beaker -Measuring cylinder -Candle -Match -bottle -Nail or iron sponge -Test tubes -Grease. -Personnel from the ministry of environment, nature protection and agricultural protection.

Water management	-Identifying natural sources of water. -Protection of natural sources of water -Pollution of water, sources of pollution and pollutants. -Physical and chemical treatment of polluted water.	-Identify various sources of water. -Identify water pollutants and their sources. -Testing physically and chemically for pure water. -State the uses of water. -Prevention of water pollution -Treatment of water for domestic use -Purification of water for laboratory / industrial use	-Allow water collected in bucket, jar etc. to stand for solid particles to settle, then decant. -Use clean white cloth to filter water collected -Construct and use sand filters. -Measure specific quantities of chemicals: NaOCl, $(Ca(ClO)_2$, etc to add to water for treatment. -Carry out simple distillation of impure water to get pure water. -Draw the water cycle. - State physical properties (colour, taste, smell) of pure water. -Chemical test for pure water. -Re-cycling of refuse -Disposal of garbage in appropriate sites -Construction of latrines far from water sources -Boil, cool and filter water for domestic use. -Chlorinate water for drinking. -Purify water by distillation for laboratory use	**Topic 7: Water and solutions** 7.1 Natural sources of water and the water cycle: rain, springs, streams, wells, rivers, seas, oceans; 7.2 Methods of purification of water for domestic use and laboratory use: water treatment work for domestic use, distillation to obtain pure water for laboratory use; 7.3 Test for water. Anhydrous Copper (II) sulphate, Cobalt (II) chloride used to test for water. 7.4 Uses of water in the home and in the laboratory. 7.5 Water pollution. Definition of pollution; sources of pollution: industry, agriculture and sewage.	-Enumerate sources of natural water. -Describe and draw the water cycle. -Construct and use of local sand filter. -Weighing chemicals and measuring volumes. -Purify water for domestic and laboratory use. -Use Cobalt(II) Chloride paper, anhydrous copper(II) sulphate and other physical methods(b.pt. and m.pt., taste, smell) to test for water. -State water pollutant sources. -List uses of water. -Define pollution, identify sources of pollution and name some pollutants. -Planting of water friendly trees around water catchment areas. - Skills in water purification.	-Care when collecting water from the various sources. - care when heating and distilling. -Use a clean white piece of cloth. -Care when constructing the sand filter. -Care when handling chemicals. -Care when handling a thermometer -Respect of personal Hygiene rules, -Avoid discarding refuse and waste in natural sources of water.	-Gravel of various sizes, sand, charcoal -transparent plastic container -Source of heat. -Chemicals (la croix, NaOCl, $Ca(ClO)_2$, $Ca(OH)_2$ etc. -Bucket, or jar. -Water from the various natural sources. -White piece of cloth (filter paper) -Distillation apparatus. -Thermometer. -Wall charts showing large scale water treatment plant and uses of water. -Balance -Rivers, Streams, lakes, rain, etc -Chlorine -Sand filter -anhydrous Copper sulphate, etc.

Solubility of substances in water. Crystallization	Preparing different types of solutions: homogeneous, heterogeneous and colloidal. Determining the solubility and the insolubility of substances in water. Subjecting saturated solutions to different conditions (e .g temperature.) Crystallizing substances. Prepare saturated solutions. Solubility in water and factors that affect solubility.	Dissolving solutes in solvents. Identify soluble and insoluble substances. Stating the effect of heating on solubility. Crystallizing salts from solutions. Define terms related to solutions (aqueous, saturated unsaturated, homogenous, crystallization, solubility, etc.). -Diluting a saturated solution	Dissolve table salt, sugar and potassium nitrate in water. Dissolve powdered chalk in water. Dissolve table salt in water until some of it remains undissolved. Dissolve sugar in hot and cold water and observe. Heat a saturated salt solution, observe and add more salt. Evaporate a copper (II) sulphate solution to dryness. Cool a saturated solution of table salt progressively and observe. Verify factors that affect solubility: temperature, amount of solvent and amount of solute.	7.6 Solutions: Preparation of solutions of sugar and table salt in water (aqueous solutions). Homogeneous nature of solutions. Preparation of saturated solutions. Definitions of solution, solvent, solute. 7.7 Solubility in water: soluble and insoluble substances. Effect of heating on solubility. 7.8 Crystallisation: The procedure of crystallisation. Crystallisation as a method of purifying solids.	-Water as universal solvent. -Define solute, solvent, solution, suspension. -Homogeneous and heterogeneous solutions. -Prepare solutions, saturated solutions and suspensions. -Identify soluble and insoluble substances. -State the effect of heating on solubility of substances. -Crystallize salts from solutions. -Gentle cooling of hot solution during crystallization.	-Care when stirring solution. -Care when measuring salts. Care when heating solutions and handling flame. -Care when handling the thermometer and other glassware. Never taste any salt.	-Stirrer - Thermometer. -Water - Heat source -NaCl, Sugar, KCl, $CuSO_4$, $CaCO_3$, KNO_3 etc. -Beakers - Test-tubes, -Chalk powder -Spatula

FORM 2

MODULE I: MATTER: PROPERTIES AND TRANSFORMATION

1. TIME ALLOCATION: 46 PERIODS

2. PRESENTATION OF MODULE

This module consists of the following topics:

- The Atom.
- Chemical symbols, formulae and valency
- Chemical reactions and equations
- Reactions with oxygen of air.
- Periodic table: Families of elements and Relative reactivity
- States of matter

3. TARGETED COMPETENCES

- Identify the subatomic particles of the atom
- Recognise symbols and formulae of substances
- Write symbols and formulae of substances
- Recognise chemical reactions and equations
- Write chemical equations of reactions
- Understand the atom as the fundamental particle of matter
- Identify the families of elements and their properties
- Separate mixtures
- Carryout the change of state of matter

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	**EXAMPLES OF SITUATIONS**	**CATEGORIES OF ACTIONS**	**EXAMPLES OF ACTIONS**	**CONTENT (CORE KNOWLEDGE)**	**APTITUDE (SKILLS)**	**ATTITUDES**	**OTHER RESOURCES**
Identification of the smallest particles of matter.	- Limitation of Dalton's atomic theory. -Identification, characteristics and location of subatomic particles in an atom.	-Identifying subatomic particles and locating them in an atom. -Explaining the property of each particle in an atom. -Relating atomic number to number of protons and calculating mass number.	-Identify protons, neutrons, and electrons. -Discuss properties of each particle in an atom. -Draw circle to depict energy shells and arrange electrons on them. -Relate atomic number to number of protons or electrons. -Calculate mass number of an atom from numbers of protons and neutrons. -Use of electronic structure to position elements in the periodic table.	**Topic 1: The Atom** 1.1 Composition of the atom: subatomic particles (electrons, protons and neutrons); nucleus and electrons. 1.2 Simple structure (Bohr's model) of the atom. 1.3 Simple electronic structure (Identification of group and period from the electronic structure)	-Identify and state properties of subatomic particles in an atom (mass, charge and location). -Relationships between mass number, atomic number and numbers of protons, neutrons and electrons. -Describe simple structure of the atom.	-Curiosity	Picture, model or chart of an atom. -manila paper -Bold maker. -Models, charts and pictures showing the atomic numbers of elements.
Symbols and formulae of chemical substances.	Writing symbols of elements. Writing the formulae of compounds.	-Using some letters of the alphabet to represent symbols. -Combining some symbols of atoms to represent compounds. -Use Dalton's theory and valencies to explain how formulae of simple compounds are derived. -Know elements and compounds from their symbols and formulae respectively. -Read, identify and interpret some labels on	-Write and recognise symbols of the first twenty elements on the Periodic Table. -Understand the use of Latin names for some elements e.g. sodium, potassium, iron, etc. -Use tables of valencies of atoms and radicals to write the formulae of simple compounds such as sodium chloride, sodium hydroxide, copper sulphate, water, calcium carbonate, hydrochloric acid, sulphuric acid, etc. -Identify simple compounds from their formulae. List elements found on a label.	**Topic 2: Chemical symbols, formulae and valency.** 2.1. Dalton's atomic theory: brief history of John Dalton and Dalton's atomic theory. Statement of the theory. 2.2. Chemical symbols, formulae and valency: Need for symbols, how to derive symbols of elements, definition of symbols, formulae, distinguishing between symbols and formulae; definition of valency, construction of tables of: a) Symbols and valency of some elements b) Name, formula and valency of some groups of atoms (radicals: hydroxide, carbonate, sulphate, nitrate, phosphate, ammonium) 2.3. Use of tables to derive the formulae of compounds.	-State Dalton's atomic theory. -Combine letters of the alphabet to form symbols of elements. - Combine symbols of elements to form formulae of compounds. -Read and identify symbols and formulae of compounds on labels of farm or agricultural products, pharmaceutical products, market products, beverages etc,	-Curiosity. - Handle the periodic chart with care. -Respect prescription labels on food products and drugs	-Picture of John Dalton. -Periodic Table chart -Water -Laboratory chemicals containers. -drug containers. -empty fertilizer bags. -Empty market product containers. -etc.

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
		farm and market products, drugs, beverages, etc.					
Classification of elements into families and their relative reactivity.	-Historical development and contributions towards modern periodic table. -Identify the position of metals and non-metals on the periodic table. - Relate reactivity to the families of elements.	-Grouping elements into families. -Naming some families. -Stating some scientists who contributed to the development of the periodic table. -Showing the positions of metals and non-metals on the periodic table. -State changes in properties (general trends) of elements across the period and down the group.	-Place the first 20 elements into groups and periods in a table. -Group the elements into metals, metalloids and non-metals. - Give names to some families of elements (alkali metals, alkaline-earth metals, halogens, noble gases.) -State the contributions of Dobereiner, Newlands, Meyer, and Mendeleyev leading to development of the modern periodic table. -Discuss physical properties and relative reactivity of families.	**Topic 3: Periodic Table: Families of elements & Relative reactivity.** 3.1. The periodic table: the need to classify elements. Brief history: Dobereiner, Newlands, Meyer, Mendeleyev leading to the modern periodic table. Metals and non-metals in the table. Periods and groups. 3.2. Families of elements: alkali, alkaline-earth, halogens and noble gases. Reactivity of families. Limit to first 20 elements of the Periodic Table.	-The purpose of classifying elements. -Classify elements on a table. -Give a brief historical background development of the Periodic Table. -State the modern periodic law. -Identify positions of metals, metalloids and non-metals on the Periodic Table. -Discuss physical properties and relative reactivity of families of elements.	-Care when handling members of some groups. E.g. sodium, potassium, Fluorine etc	-The modern Periodic Table. -Element cards. -paraffin oil. -sodium and potassium. -Spatula, -water. -Beaker, -gloves. Pictures of the first contributors and their versions of the Periodic Table.
Chemical changes and their representation	-Converting substances into others. -Proving that matter is conserved when substances are converted to others substances.	-Heating and burning substances. -Putting two or more substances together and making them to react. -Using words equations, symbols and formulae to represent simple chemical changes. -Balancing chemical equations.	-React iron with sulphur. -Heat calcium and copper carbonates. -Prepare salts by precipitation. -Weigh masses of reacting substances before and after reactions. -React dilute acid with carbonate and alkali. -Write simple balanced equations of chemical reactions in words and symbols.	**Topic 4: Chemical reactions and equations.** 4.1 Chemical changes: revision with examples of chemical changes. Reactions of iron with sulphur, heating of calcium carbonate, heating of copper carbonate, reaction of acid with carbonate, reaction of acid with alkali. 4.2 Equations: representation of chemical reactions by means of balanced equations in words and symbols. 4.3 Law of conservation of mass. Simple experiments to illustrate the law.	-Briefly recall the definition of chemical change and some examples. -Write balanced equations for chemical reactions. -State the law of conservation of mass -Demonstrate, with some common reactions, the conservation of mass when substances react.	-Care when handling flame, test-tubes, and when using the balance. -Be careful when mixing substances.	-Chemical balances. -Test-tubes and the holders. -Matches -source of heat -Paper, sugar -Conical flask. -Beaker. -Carbonates of copper and calcium. -Dilute acid and alkali. -etc.

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
		-State the law of conservation of mass.					
Chemical changes in the burning of substances in air and rusting.	-Listing the various components of air. -Burning substances at home, in the laboratory and in the industry. -Rusting of iron.	-Separate air into its various components. -Burn substances in air. -Exposure of iron (fillings, sponge, nail) to air and moisture. -Preventing rusting.	-Use fractional distillation apparatus to separate liquid air into its various components. -Burn Ca, Mg, Cu, C, S, etc. in air. - Use iron (nails or sponge) to show conditions necessary for rusting. -Leave iron sponge/nail in moist air for three days and observe. -Write balanced equations for the above reactions. -Rub iron or material made of metals with oil, grease or paint.	**Topic 5: Reactions with oxygen of air** 5.1 Composition of air: determination of percentage by volume of oxygen and nitrogen of air. Separation of the components of air by fractional distillation. 5.2 Reactions of substances with oxygen of air (burning): calcium, magnesium, iron, carbon, copper, sulphur, town gas (cooking gas), hydrogen. 5.3 Rusting (iron): conditions, composition and prevention.	-Mount and use set-up for fractional distillation to separate air into its various components. -Use the active part of air to burn substances. -State conditions necessary for rusting to occur. -Methods used to prevent rusting.	-Care when handling glassware. -Care when burning substances. -Care when handling oil, grease and paint.	-Source of heat. -Material for carrying fractional distillation. -Ca, Mg, Cu S, C, cooking gas -Safety glasses. -Test-tubes and boiling tubes. -Water, oil, grease, petroleum jelly and paint. -iron fillings, -cotton wool. -Beakers. - etc.
Separation of mixtures and identification of pure substances	-Separating miscible liquids. -Separating solid/solid mixture by heating. -Separating solutes from solution. -Testing the purity of substances.	-Using a simple distillation apparatus. -Using a fractional distillation column. -Using a chromatography paper or column. -Heating solid/ solid mixture. -Know the criteria for purity of liquids and solids.	-Use a distillation apparatus to separate liquid mixtures. -Produce distilled water. -Use paper or column chromatography to separate pigments and ink. -Heat a mixture of NaCl and NH_4Cl or iodine and sand. -Determine the boiling point of distilled water. -Determine the melting point of ice. - Mount and dismount distillation apparatus	**Topic 6: Mixtures and pure substances** 6.1 States of matter: revision of states of matter, pure substances, and mixtures. 6.2 Techniques for separation: distillation (simple and fractional), paper chromatography. 6.3 Definitions: sublimation, melting point and boiling point. 6.4 Simple criteria for purity: melting and boiling points.	-Recall the states of matter and their inter-conversion. -Recall techniques for separation of mixtures already seen -Use distillation apparatus to separate miscible liquid mixtures. -Define sublimation, melting and boiling points. -Determine the purity of liquid and solid substances.	-Care when handling the thermometer , test-tubes and beakers. - Care when heating substances. -Care when mounting & dismantling distillation apparatus.	-Simple and fractional distillation apparatus. -Sand, iodine, NaCl, NH_4Cl. -Thermometer. -Test tubes, beakers, -Source of heat. -Coloured leaves /flowers. -Ink, dyes. - Chromatography paper and column. -etc.

MODULE III: ENERGY: SOME APPLICATIONS AND USES

1. TIME ALLOCATION: 14 PERIODS

2. PRESENTATION OF MODULE

This module consists of the following topics:

- Action of heat on materials
- Action of electricity on materials

3. TARGETED COMPETENCES

- Sustainable management of sources of energy
- Burning of substances
- Calculate masses of substances
- Weigh substances
- Heat substances and explain its effect on materials
- Identify coductors and non-coductors of heat and electricity
- Set up an electric circuit
- Explain the effect of electriciy on substances
- Identify electrolytes and non-electrolytes

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
Sources of energy. Effect of heat on chemical substances.	- Types, sources and uses of energy -Fossil and non-fossil sources of energy. -Action of heat on inorganic and organic substances. -Change in mass that occurs when substances are heated. -Representing chemical changes by equations.	-Burn some fossil or non-fossil substance to produce heat energy. -Heat an inorganic substance. - Heat an organic substance. -Determine the difference in mass of a substance after heating. -Observe chemical reactions and make conclusions. -Represent observations by words and chemical equations.	-Measure given mass of $CaCO_3$ or $BaCO_3$, in crucibles and heat. -Test any gas evolved. -Weigh the mass of the substances after heating. -Represent observations by word and chemical equations. -Heat $CuSO_4.5H_2O$ and represent what happens by an equation. -Add water to the product of heated $CuSO_4.5H_2O$ and represent the effect by an equation. -Link the equation of action of heat on $CuSO_4.5H_2O$ to that of water on its product after heating to bring out the concept of reversibility. -Heat a sugar cube.	**Topic 7: Action of heat on materials.** 7.1 Sources of energy (fossil and non-fossil) and their uses. Traditional fuels (fuelwood, crop wastes, dung and nuclear fuels) and the various non-traditional renewable energy sources (hydro, modern biomass, solar, wind, ocean, and geothermal) as non-fossil sources. 7.2 Action of heat on hydrates, oxides, carbonates and sugar: copper (II) sulphate pentahydrate, lead (IV) oxide, calcium carbonate, sugar, sodium carbonate. Balanced equations of these chemical reactions. 7.3 Experimental study of change in mass resulting from the action of heat on calcium carbonate or copper carbonate. 7.4 The concept of reversibility introduced with the action of heat on copper (II) sulphate pentahydrate.	-Name examples of fossil fuels (coal, lignite, natural gas, oils, etc.) -Non-fossil fuels (traditional and non-traditional), examples and their uses. -General uses of heat energy include heating, cooling, cooking, lighting, mobility, and motive power. -Weigh out masses of chemical substances. -Predict the effect of heat on substances. -Write balanced equations to represent effect of heat on chemical substances. -Carryout experiments to show change of mass when substances are heated. -Explain the concept of reversibility.	-Care when handling chemical balance. -Care when heating chemical substances. -Awareness that chemical substances change in composition when they are heated.	-Chemical balance. -Boiling tubes, pyrex test-tubes. -Crucibles and crucible lids. -Source of heat. -Pair of tongs. -Desiccators. -water. -Droppers -Tripod -Gauze -$CaCO_3$. -PbO_2 $CuSO_4.5H_2O$ -$CuCO_3$. -$MgCO_3$. -Li_2CO_3. -Sugar. -etc.
Effect of electric current on substances.	-Action of electric current on metals and non-metals. -Action of electric current on	-Complete an electrical circuit using a metallic object and then replace with a	-Complete an electric circuit having a bulb with a nail, copper wire, piece of zinc, sulphur, chalk, piece of wood	**Topic 8: Action of electricity on materials.** 8.1 Action of electricity on metals (copper, zinc), non-metals (sulphur), plastic, wood, ethanol,	-Define and distinguish between conductors and non-conductors	-Care when handling electric circuits. -Select good	-batteries(dry) -Daniel cell. -Bulbs. -Solution of copper sulphate.

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
FAMILIES OF SITUATIONS	EXAMPLES OF SITUATIONS	CATEGORIES OF ACTIONS	EXAMPLES OF ACTIONS	CONTENT (CORE KNOWLEDGE)	APTITUDE (SKILLS)	ATTITUDES	OTHER RESOURCES
	electrolytes, non-electrolytes and fused salts. -Classification of substances as conductors and non-conductors; and solutions as electrolytes and non-electrolytes.	non-metallic object. -Insert the electrodes of an electrical circuit into an electrolyte and then into a non-electrolyte. -Complete an electrical circuit with a crystalline salt and then with the fused salt. -Record your observations in each case.	etc. Observe what happens to the bulb in each case. Classify the substances as conductors or as non-conductors. -Insert the electrodes of a circuit into ethanol, sugar solution, sodium chloride solution, fused lead bromide and sodium chloride, etc. -Observe their respective effect on the bulb. -Classify them as electrolytes or non-electrolytes.	water, sugar; solutions: sodium chloride solution, fused salts (lead bromide, potassium bromide). Classification as conductors and non-conductors; Definition of conductors and non-conductors. 8.2 Electrolytes and non-electrolytes. Ions as particles in electrolyte solutions and fused electrolytes Molecules as particles in non-electrolytes.	(insulators). -Define and distinguish between electrolytes and non- electrolytes. -Know the particles involved when substances conduct and when they do not conduct electricity. -Classify substances as conductors and non-conductors; as electrolytes and non-electrolytes.	electrodes and take care of the electrodes. -Care when connecting metal to circuits.	-Nail, wood , -Broom stick or bamboo, -Sulphur. -Copper wire. -crocodile teeth. -connecting wires -Graphite rod or platinum rod. -Sugar cubes. -Water,Beakers. -Plastic cups. -Rubber bands. -NaCl, $PbBr_2$ -piece of Chalk. -Stirrer. -heat source. -crucible/lid