GHANA EDUCATION SERVICE

(MINISTRY OF EDUCATION)

REPUBLIC OF GHANA

SCIENCE
COMMON CORE PROGRAMME CURRICULUM
(BASIC 7 - 10)

FEBRUARY 2020

NATIONAL COUNCIL FOR CURRICULUM & ASSESSMENT OF MINISTRY OF EDUCATION

Science Curriculum for B7- B10

Enquiries and comments on this Curriculum should be addressed to:
The Executive Secretary
National Council for Curriculum and Assessment (NaCCA)
Ministry of Education
P. O. Box CT PMB 77
Cantonments
Accra
Telephone: 0302909071, 0302909862
Email: info@nacca.gov.gh
Website: www.nacca.gov.gh

Ministry of Education
Ghana

INTRODUCTION

In the first four years of high school education, learners are expected to take a Common Core Programme (CCP) that emphasizes a set of high, internationally-benchmarked career and tertiary education ready standards. Learners need to acquire these for post-secondary education, the workplace or both. The standards articulate what learners are expected to know, understand and be able to do by focusing on their social, emotional, cognitive and physical development. The (CCP) runs from Basic 7 through Basic 10.

The common core attributes of the learner, which describe the essential outcomes in the three domains of learning (i.e. cognitive, psychomotor and affective), are at the centre of the CCP (see Figure 1). Inspired by the values which are important to the Ghanaian society, the CCP provides an education of the heart, mind and hands in relation to on the learner's lifetime values, well-being, physical development, metacognition and problem-solving. Ultimately, this will produce character-minded learners who can play active roles in dealing with the increasing challenges facing Ghana and the global society.

The features that shape the common core programme are shown in Figure 1. These are

- learning and teaching approaches – the core competencies, 4Rs and pedagogical approaches
- learning context – engagement service and project
- learning areas – mathematics, science, computing, language and literacy, career technology, social studies, physical and health education, creative arts and design and religious and moral education.

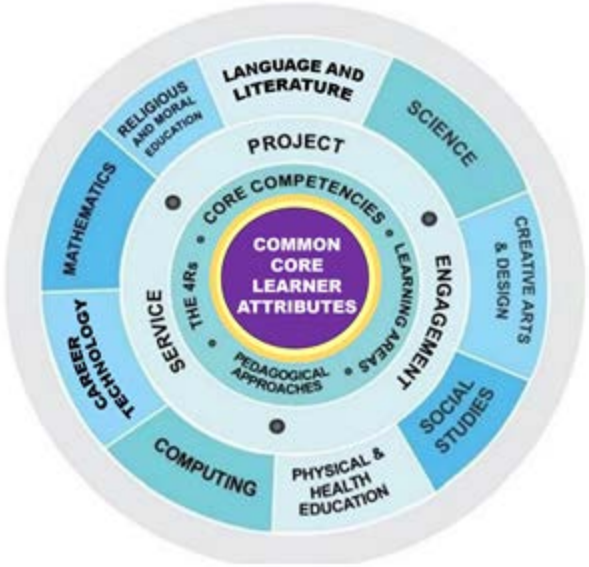


Figure 1: Features of the CCP

These are elaborated subsequently:

Learning and teaching approaches

- *The core competences:* Describe the relevant *global skills for learning* that the CCP helps learners to develop in addition to the 4Rs. The global skills for learning allow learners to become critical thinkers, problem-solvers, creators, innovators, good communicators, collaborators, digitally literate, culturally and globally sensitive citizens who are life-long learners that have keen interest in their personal development.
- *Pedagogical approaches:* The CCP emphasises creative and inclusive pedagogies that are anchored on authentic and enquiry-based learning, collaborative and cooperative learning, differentiated learning, and holistic learning as well as cross disciplinary learning.

- *The 4Rs across the Curriculum:* The 4Rs refer to Reading, wRiting, aRithmetic and cReativity, which all learners must become fluent in.

Learning context

The CCP places emphasis on engagement of learners in the classroom activities, projects (in and outside the classrooms). These projects can involve individual or group tasks which all learners are required to complete by the end of Basic 10. The CCP project provides learners with contexts to demonstrate creativity and inventiveness in various areas of human endeavor. Community service offers opportunity for learners to nurture, love and care for their community and solve problems in the community.

Learning Areas

The CCP comprises the following subjects:

1. Career Technology
2. Computing
3. Creative Arts and Design
4. Languages (English, Ghanaian Languages, French, Arabic)
5. Mathematics
6. Physical and Health Education
7. Religious and Moral Education (RME)
8. Science
9. Social Studies

This document sets out the standards for learning Science in the Common Core Programme (CCP). The standards in the document are posited in the expectation that CCP (B7 – B10) will offer quality education for all types of learners. The design of this curriculum is based on the features of the CCP as shown in Figure 1. It emphasizes a set of high internationally-benchmarked career and tertiary education ready standards. Learners need to acquire these competencies in Science for post-secondary education, the workplace training or both. The curriculum has been designed to be user friendly because it provides a detailed preamble that covers the rationale, philosophy, aims, profile of expected learning behaviours (i.e. knowledge, skills, attitudes and values), pedagogical approaches, core competencies and the 4Rs, assessment practices and instructional expectations.

ASSESSMENT IN THE CCP

Assessment is a process of collecting and evaluating information about learners and using the information to make decisions to improve their learning. Assessment may be formative, summative, diagnostic, or evaluative depending on its purpose. It is integral to the teaching-learning process, promotes student learning and improves instruction. In CCP, it is suggested that assessment involves assessment for learning, assessment of learning and assessment as learning, which are described in the subsequent paragraphs.

Assessment for Learning (AfL)

Assessment for Learning (AfL) is the process of seeking and interpreting evidence of learning for use by learners and their teachers to decide where the learner is in their learning, where they need to be (the desired goal), and how best to get them there. AfL is one of the most suitable methods for improving learning and raising standards (Black & Wiliam, 1998)[1]. Assessment for Learning also refers to all their activities undertaken by teachers and/or by their learners, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged. AfL can be achieved through processes such as sharing criteria with learners, effective questioning, and feedback.

AfL, therefore, provides timely feedback to ensure individual learners are assisted during the teaching and learning process using various strategies and questioning to measure the learning that has actually taken place. It is a continuous process that happens at all stages of the instructional process to monitor the progress of a learner and to offer feedback or change teaching strategies to achieve [performance standards of a lesson.

Assessment of Learning (AoL)

Assessment of learning provides a picture of the achieved standards of the teacher and performance of students at the terminal stage of the learning process. This information provides data for accountability and educational decisions such as grading, selection and placement, promotion and certification. Through AoL, stakeholders such as parents and guardians are informed about the extent students have attained expected learning outcomes at the end of their grade or program.

Assessment as Learning (AaL)

[1]Black , P., & Wiliam, D. (1998) .Assessment and Classroom Learning, *Assessment in Education:Principles, Policy & Practice*, 5 (1) 7-74, DOI: 10.1080/0969595980050102

Assessment as Learning develops and supports students' sense of ownership and efficacy about their learning through reflective practices. This form of self-assessment helps in building the competencies of learners to achieve deeper understanding of what their own learning and what they are taught.

What do we assess?

Emphasis in assessment in the CCP is on the Common Core Learner Attributes, which are essential outcomes in the three domains of learning (i.e. cognitive, psychomotor and affective).

Knowledge and skills with emphasis on the 4Rsin the learning areas

Core competencies with emphasis on attitudes and values developed through the learning and its context as well as the pedagogical approaches**.**

The Process is illustrated diagrammatically in Figure 2.

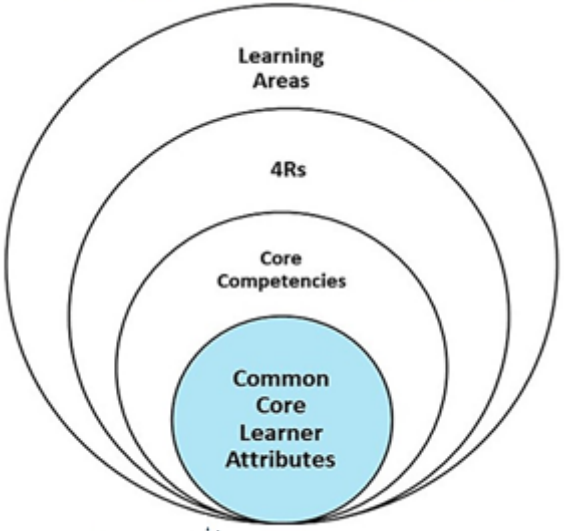


Figure 2 Essential Assessment Features

How do we monitor progress?

School Based Assessments (SBA) covers all forms/modes of assessment including AfL, AaL and AoL (see Table 1), that can be undertaken by any school-level actor (learner, teacher, head teacher) to monitor the learner's achievement over a period of time. Data collection and keeping records of the data are central to the conduct of SBA.

Table 1 Modes of Assessment

Assessment for Learning	Assessment of Learning	Assessment as Learning
Class exercises	Class Assessment Task (CAT)	Portfolio
Quizzes	End of term	Journal entries
Class tests (written, oral, aural and/or practical)	End of year	Project work
Class Assessment Task (CAT)		Checklist
		Questionnaire

The following are samples of relevant records that can be kept on the student's learning.

- Student's Progress Record (Cumulative Record)
- Student's Report Card
- School Based Assessment Termly Recording Register

Details of guidelines on SBA can be found in *the National Pre-tertiary Learning Assessment Framework (NPLAF)* document (Ministry of Education, 2020a)[2] and *the School-Based Assessment Guidelines* (Ministry of Education, 2020b)[3].

Reporting School-Based Assessment (SBA) in the CCP

The CCP uses a criterion-referenced model of presenting and reporting school-based assessment data. School-based assessment throughout the four-year duration of CCP, is done against criteria linked to performance standards and not against the work of other learners. The CCP provides levels of proficiency to be attained and descriptors for all grade levels of the programme (see Table 2). These levels and descriptors cannot be changed by individual schools and are, therefore, common to all learners as well as learning areas nationwide. For each assessment criterion or (benchmark for the level of proficiency), a number of descriptors are defined as shown in Table 2.

[2] Ministry of Education (2020a). *National Pre-tertiary Learning Assessment Framework(NPLAF)*. Accra: Ministry of Education.
[3] Ministry of Education (2020b). *School-Based Assessment Guidelines*. Accra: Ministry of Education.

Table 2. Benchmarks, levels of proficiency and the grade level descriptors

Level of Proficiency	Benchmark	Grade Level Descriptor
1:Highly proficient (HP)	80% +	Learnershows high level of proficiency inknowledge,skillsand values andcantransferthemautomaticallyandflexibly through authentic performancetasks.
2: Proficient (P)	68-79%	Learner demonstrates sufficient level of proficient knowledge, skills and core understanding; cantransfer them independently through authentic performance tasks
3:Approaching Proficiency (AP)	54-67%	Learner is approaching proficiency in terms of knowledge, skills and values with little guidance and can transfer understanding through authentic performance tasks
4: Developing (D)	40-53%	Learner demonstrates developing level of knowledge, skills and values but needs help throughout the performance of authentic tasks
5: Emerging (E)	39% and below	Learner is emerging with minimal understanding in terms of knowledge, skills, and values but needs a lot of help.

Thegradingsystempresented,showsthelettergradesystemandequivalentgradeboundaries.
Inassigninggradestopupils'testresults,oranyformofevaluation,theabovegradeboundaries and the descriptors may be applied. The descriptors (Highly Proficient [HP], Proficient [P], Approaching Proficiency [AP], Developing [D], Emerging [E]), indicate the meaning of eachgrade.

In addition to the school-based assessment (SBA), a national standards assessment test is conducted in Basic 8 to provide national level indicators on learners' achievement.

CREATIVE PEDAGOGICAL APPROACHES

The CCP emphasizes creative and inclusive pedagogies that are anchored on authentic and enquiry-based learning, collaborative and cooperative learning, differentiated learning, holistic learning, cross disciplinary learning (i.e. the 4Rs across the Curriculum) as well as developing the core competencies. This section describes some of the creative pedagogical approaches required for the CCP.

Core Competencies

The core competencies describe a body of skills that teachers at the basic level should seek to develop in their learners. The competencies describe a connected body of core skills that are acquired throughout the processes of teaching and learning. They are the relevant global skills for learning that allow learners to develop, in addition to the 4Rs, to become critical thinkers, problem-solvers, creators, innovators, good communicators, collaborators, culturally identified individuals, digitally literate and global citizens who are have keen interest in their personal development. In using this curriculum, we hope the core competencies will be developed in learners to help them develop our country, Ghana. These competencies include:

CORE COMPETENCES:

The core competences describe a body of skills that teachers at all levels should seek to develop in their learners. They are ways in which teachers and learners engage with the subject matter as they learn the subject. The competences presented here describe a connected body of core skills that are acquired throughout the processes of teaching and learning.

Critical Thinking and Problem Solving (CP)

This skill develops learners' cognitive and reasoning abilities to enable them analyse and solve problems. Critical thinking and problem solving skill enables learners to draw on their own experiences to analyse situations and choose the most appropriate among a number of possible solutions. It requires that learners embrace the problem at hand, analyze it, generate a number of possible solutions and decide on one and take responsibility to carry it out

Creativity and Innovation (CI)

Creativity and Innovation promotes the development of entrepreneurial skills in learners' through their ability to think of new ways of solving problems and developing technologies for addressing the problem at hand. It requires ingenuity of ideas, arts, technology and enterprise. Learners having this skill are also able to think independently and creatively.

Communication and Collaboration (CC)

This competence promotes in learners the skills to search for information and use appropriate languages, symbols, and texts to communicate and exchange information about their learning and life experiences. Learners actively participate in sharing their ideas. They engage in dialogue with others by listening to and learning from them. They also develop flexibility of mind to work together as a team, respect and value the views of others.

Cultural Identity and Global Citizenship (CG)

This competence involves developing learners to put country and service foremost through an understanding of what it means to be active citizens. This is done by inculcating in learners a strong sense of social and economic awareness. Learners make use of the knowledge, skills, competences and attitudes acquired to contribute effectively towards the socioeconomic development of the country and on the global stage. Learners build skills to critically identify and analyse cultural and global trends that enable them to contribute to the global community.

Personal Development and Leadership (PL)

This competence involves improving self-awareness and building self-esteem. It also entails identifying and developing talents, fulfilling dreams and aspirations. Learners are able to learn from mistakes and failures of the past. They acquire skills to develop other people to meet their needs. It involves recognising the importance of values such as honesty and empathy and seeking the well-being of others. Personal development and leadership enables learners to distinguish between right and wrong. The skill helps them to foster perseverance, resilience and self-confidence. PL helps them acquire the skill of leadership, self-regulation and responsibility necessary for lifelong learning.

Digital Literacy (DL)

Digital Literacy develops learners to discover, acquire knowledge, and communicate through ICT to support their learning. It also makes them use digital media responsibly.

For effective lesson planning for teaching, learning and assessment, it is suggested that teachers refer to Appendix A for details of the components of the core competencies. These details comprise the unpacked skills such as: listening, presenting and team work for collaboration.

RATIONALE FOR BASIC 7 TO BASIC 10 SCIENCE

Science is a collaborative and creative human endeavour arising from our desire to understand the world around us and the wider universe. The study of common core science programme at Basic 7 through Basic 10 enables learners to build on their learning at lower Basic school level and to further develop their knowledge of and about science.

We are surrounded by technology and the products of science every day. Government policy decisions that affect every aspect of our lives are based on scientific evidence. The immensely complex natural world that surrounds us illustrates infinite scientific concepts. As humans grow up in an increasingly technologically and scientifically advanced world, they need to be scientifically literate to understand issues and be able to live successfully.

Economic, political, social and physical development of a country is hinged on science, technology and innovation. It is a never-ending creative process, which serves to promote discovery and understanding. It consists of a body of knowledge which attempts to explain and interpret phenomena and experiences. Science has changed our lives and it is vital to Ghana's future development.

To provide quality science education, teachers must facilitate learning in enabling science classroom. This will provide the foundations for discovering and understanding the world around us and lay the grounds for science and science related studies at higher levels of education.

Learners should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave and analyze causes and origin of things in our environment. The science curriculum has considered the desired outcomes of education for learners at the upper basic level. Science is also concerned with the development of attitudes and therefore it is important for all citizens to be scientifically and technologically literate for sustainable development. Science therefore ought to be taught using practical and minds-on approaches which learners will find as fun and adopt science as a culture.

PHILOSOPHY

Teaching Philosophy

Ghana believes that an effective science education needed for sustainable development should be hinged on inquiry. Thus science education must provide learners with opportunities to expand, change, enhance and modify the ways in which they view the world. It should be pivoted on learner-centred approach to teaching that engages learners physically and cognitively in the knowledge-acquisition process in a rich and rigorous inquiry driven environment.

Learning Philosophy

Science Learning is an active contextualized process of constructing knowledge based on learners' experiences rather than acquiring it. Learners are information and knowledge constructors who operate as researchers. Teachers serve as facilitators by providing the enabling environment that promotes the construction of learners' own knowledge based on their prior experiences. This makes learning more relevant and meaningful to the learner and leads to the development of critical thinkers, problem solvers and innovators

Aims of Science

The curriculum of the common core science programme at B7 to B10 is designed for learners to achieve the following aims:

1. Develop the spirit of curiosity, creativity, innovation and critical thinking for investigating and understanding their environment.

2. Develop skills, habits of mind and attitudes necessary for scientific inquiry.

3. Communicate scientific ideas effectively.

4. Use scientific concepts in explaining their own lives and the world around them.

5. Live a healthy and quality life.

6. Develop humane and responsible attitude towards the use of all resources of Ghana and elsewhere.

7. Show concern and understanding of the interdependence of all living things and the Earth on which they live.

8. Design activities for exploring and applying scientific ideas and concepts.

9. Develop skills for using technology to enhance learning.

10. Use materials in their environment in a sustainable manner.

PROFILE OF EXPECTED LEARNING BEHAVIOURS

A central aspect of this curriculum is the concept of three integral learning domains that should be the basis for instruction and assessment. These are

- Knowledge, Understanding and Application

- Process Skills

- Attitudes and Values

- Performance

KNOWLEDGE, UNDERSTANDING AND APPLICATION

Under this domain, learners acquire knowledge through some learning experiences. They may also show understanding of concepts by comparing, summarising, re-writing etc. in their own words and constructing meaning from instruction. The learner may also apply the knowledge acquired in some new contexts. At a higher level of learning behaviour, the learner may be required to analyse an issue or a problem. At a much higher level, the learner may be required to synthesize knowledge by integrating a number of ideas to formulate a plan, solve a problem, compose a story, or a piece of music. Further, the learners may be required to evaluate, estimate and interpret a concept. At the last level, which is the highest, learners may be required to create, invent, compose, design and construct. These learning behaviours

"knowing", "understanding", "applying", "analyzing", "synthesizing", "evaluating" and "creating" fall under the domain "Knowledge, Understanding and Application".

In this curriculum, learning indicators are stated with commanding verbs to show what the learner should know and be able to do. For example, the learner will be able to describe something. Being able to "describe" something after teaching and learning has been completed means that the learner has acquired "knowledge". Being able to explain, summarize, and give examples etc. means that the learner has understood the concept taught.

Similarly, being able to develop, defend, etc. means that the learner can "apply" the knowledge acquired in some new context. You will note that each of the indicators in the curriculum contains an "action verb" that describes the behaviour the learner will be able to demonstrate after teaching and learning has taken place. "Knowledge, Understanding and Application" is a domain that should be the prime focus of teaching and learning in schools. Teaching in most cases tends to stress on knowledge acquisition to the detriment of other higher level behaviours such as applying knowledge.

Each action verb in any indicator outlines the underlying expected outcome. Each indicator must be read carefully to know the learning domain towards which you have to teach. The focus is to move teaching and learning from the didactic acquisition of "knowledge" where there is fact memorisation, heavy reliance on formulae, remembering facts without critiquing them or relating them to real world – surface learning – to a new position called – deep learning. Learners are expected to deepen their learning by knowledge application to develop critical thinking skills and to generate creative ideas to solve real life problems in their school lives and later in their adult lives. This is the position where learning becomes beneficial to the learner.

The explanation and the key words involved in the "Knowledge, Understanding and Application" domain are as follows:

Knowing: The ability to remember, recall, identify, define, describe, list, name, match, state principles, facts and concepts. Knowledge is the ability to remember or Recall concepts already learnt and this constitutes the lowest level of learning.

Understanding: The ability to explain, summarise, translate, rewrite, paraphrase, give examples, generalise, estimate or predict consequences based upon a trend. Understanding is generally the ability to grasp the meaning of some concepts that may be verbal, pictorial, or symbolic.

Applying: This dimension is also referred to as "Use of Knowledge". Ability to use knowledge or apply knowledge, apply rules, methods, principles, theories, etc. to situations that are new and unfamiliar. It also involves the ability to produce, solve, plan, demonstrate, discover etc.

Analyzing: The ability to break down concept/information into its component parts; to differentiate, compare, distinguish, outline, separate, identify significant points etc., ability to recognise unstated assumptions and logical fallacies; ability to recognise inferences from facts etc.

Synthesizing: The ability to put parts or ideas together to form a new whole. It involves the ability to combine, compile, compose, devise, plan, revise, organise, create, generate new ideas and solutions.

Evaluating: The ability to appraise, compare features of different things and make comments or judgment, contrast, criticise, justify, support, discuss, conclude, make recommendations etc. Evaluation refers to the ability to judge the worth or value of some concepts based on some criteria.

Creating: The ability to use information or materials to plan, compose, produce, manufacture or construct other products.

From the foregoing, creating is the highest form of thinking and learning and is therefore a very important behaviour. This unfortunately, is the area where most learners perform poorly. In order to get learners to develop critical thinking, skills beginning right from the lower primary level, it is advised that you do your best to help your learners to develop analytic skills as we have said already.

ATTITUDES AND VALUES

To be effective, competent and reflective citizens, who will be willing and capable of solving personal and societal problems, learners should be exposed to situations that challenge them to raise questions and attempt to solve problems. Learners, therefore need to acquire positive attitudes, values and psychosocial skills that will enable them participate in debates and take a stand on issues affecting them and others.

Attitudes

i. **Curiosity:** The inclination or feeling toward seeking information about how things work in a variety of fields.

ii. **Perseverance:** The ability to pursue a problem until a satisfying solution is found.

iii. **Flexibility in ideas:** Willingness to change opinion in the face of more plausible evidence.

iv. **Respect for Evidence:** Willingness to collect and use data in one's investigation, and also have respect for data collected by others.

v. **Reflection:** The habit of critically reviewing ways in which an investigation has been carried out to see possible faults and other ways by which the investigation could be improved upon.

The teacher should endeavour to ensure that learners cultivate the above scientific attitudes and process skills as a prelude to effective work in science.

Values

At the heart of this curriculum is the belief in nurturing honest, creative and responsible citizens. As such, every part of this curriculum, including the related pedagogy, should be consistent with the following set of values.

Respect: This includes respect for the nation of Ghana, its institutions and laws and the culture and respect among its citizens and friends of Ghana.

Diversity: Ghana is a multicultural society in which every citizen enjoys fundamental rights and responsibilities. Learners must be taught to respect the views of all persons and to see national diversity as a powerful force for nation development. The curriculum promotes social cohesion.

Equity: The socio-economic development across the country is uneven. Consequently, it is necessary to ensure an equitable distribution of resources based on the unique needs of learners and schools. Ghana's learners are from diverse backgrounds which require the provision of equal opportunities to all, and that, all strive to care for each other.

Commitment to achieving excellence: Learners must be taught to appreciate the opportunities provided through the curriculum and persist in doing their best in whatever field of endeavour as global citizens. The curriculum encourages innovativeness through creative and critical thinking and the use of contemporary technology.

Teamwork/Collaboration: Learners are encouraged to be become committed to team-oriented working and learning environments. This also means that learners should have an attitude of tolerance to be able to live peacefully with all persons.

Truth and Integrity: The curriculum aims to develop learners into individuals who will consistently tell the truth irrespective of the consequences. In addition, be morally upright with the attitude of doing the right thing even when no one is watching. Also, be true to themselves and be willing to live the values of honesty and compassion. Equally important, is the practice of positive values as part of the ethos

or culture of the work place, which includes integrity and perseverance. These underpin the learning processes to allow learners to apply skills and competences in the world of work.

The action verbs provided in the learning domains in each content standard should help you to structure your teaching to achieve the desired learning outcomes. Select from the action verbs provided for your teaching, for evaluation exercises and for test construction. Check the learning indicators to ensure that you have given the required emphasis to each of the learning domains in your teaching and assessment.

PROCESS SKILLS

These are specific activities or tasks that indicate performance or proficiency in the learning of science. They are useful benchmarks for planning lessons, developing exemplars and are the core of inquiry-based learning.

Equipment handling

This is the skill of knowing the functions and limitations of various apparatus, and developing the ability to select and handle them appropriately for various tasks.

Observing

This is the skill of using the senses to gather information about objects or events. This also includes the use of instruments to extend the range of our senses.

Classifying

This is the skill of grouping objects or events based on common characteristics.

Comparing

This is the skill of identifying the similarities and differences between two or more objects, concepts or processes.

Communicating/Reporting

This is the skill of transmitting, receiving and presenting information in concise, clear and accurate forms - verbal, written, pictorial, tabular or graphical.

Predicting

This is the skill of assessing the likelihood of an outcome based on prior knowledge of how things usually turn out.

Analysing

This is the skill of identifying the parts of objects, information or processes, and the patterns and relationships between these parts.

Generating possibilities

This is the skill of exploring all the options, possibilities and alternatives beyond the obvious or preferred one.

Evaluating

This is the skill of assessing the reasonableness, accuracy and quality of information, processes or ideas. This is also the skill of assessing the quality and feasibility of objects to inform decision-making.

Designing

This is the skill of visualizing and creating a mental or physical model of a process or event, or objects or gargets.

Measuring

This is the skill of using standard and non-standard instruments or devices to describe dimensions accurately.

Interpreting

This is the skill of organizing and evaluating data in terms of its worth: good, bad, reliable, unreliable; making inferences and predictions from written or graphical data; extrapolating and deriving conclusions. Interpretation is also referred to as "Information Handling".

Recording

This is the skill of drawing or making graphical representation boldly and clearly, well labelled and pertinent to the issue at hand.

Generalizing

This is the skill of being able to use the conclusions arrived at in an experiment or observation of events to what could happen in similar situations.

Designing of Experiments

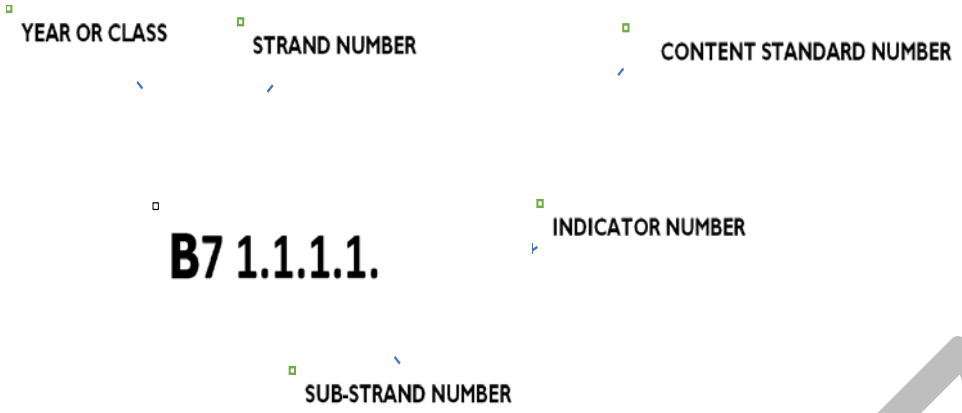
This is the skill of developing hypotheses; planning and designing of experiments; persistence in the execution of experimental activities; modification of experimental activities where necessary in order to reach conclusions.

ORGANIZATION AND STRUCTURE OF THE CURRICULUM

The curriculum has been structured into four columns which are Strands, Sub-strands, Content standards, Indicators and exemplars. A unique annotation is used for numbering the learning indicators in the curriculum for the purpose of easy referencing. The annotation is indicated in table 2.

Example: B7 .2.4.1.2

ANNOTATION	MEANING/ REPRESENTATION
B7	Year or Class
2	Strand Number
4	Sub-Strand Number
1	Content Standard Number
2	Indicator Number



Strands are the broad areas/sections of the science content to be studied.

Sub-strands are the topics within each strand under which the content is organised.

Content standard refers to the pre-determined level of knowledge, skill and/or attitude that a learner attains by a set stage of education.

Indicator is a clear outcome or milestone that learners have to exhibit in each year to meet the content standard expectation. The indicators represent the minimum expected standard in a year.

Exemplar: support and guidance which clearly explains the expected outcomes of an indicator and suggests what teaching and learning activities could take, to support the facilitators/teachers in the delivery of the curriculum.

Strand 1: DIVERSITY OF MATTER **Sub-strand1:** Materials			
B7	**B8**	**B9**	**B10**
B7.1.1.1 Recognize materials as important resources for providing human needs			
B7.1.1.1.1 Classify materials into liquids, solids and gas			

Common Core Science Standards:

LEVEL	**B7**	**B8**	**B9**	**B10**
STRAND	**SUB-STRANDS**	**SUB-STRANDS**	**SUB-STRANDS**	**SUB-STRANDS**
DIVERSITY OF MATTER	1. Materials 2. Living cells	1. Materials 2. Living cells	1. Materials 2. Living cells	1. Materials 2. Living cells

CYCLES	1. Earth Science 2. Life Cycles of Organisms 3. Crop Production 4. Animal Production	1. Earth Science 2. Life Cycles of Organisms 3. Crop Production 4. Animal Production	1. Earth Science 2. Life Cycles of Organisms 3. Crop Production 4. Animal Production	1. Earth Science 2. Life Cycles of Organisms 3. Crop Production 4. Animal Production
SYSTEMS	1. The Human Body Systems 2. The Solar System 3. The Ecosystem 4. Farming Systems	1. The Human Body Systems 2. The Solar System 3. Ecosystems 4. Farming systems	1. The Human Body Systems 2. The Solar System 3. Ecosystem 4. Farming systems	1. The Human Body Systems 2. The Solar System 3. Ecosystems
FORCES AND ENERGY	1. Energy 2. Electricity and Electronics 3. Conversion and Conservation of energy 4. Force and motion 5. Agricultural Tools	1. Electricity and Electronics 2. Conversion and Conservation of energy 3. Force and motion 4. Agricultural Tools	1. Electricity and Electronics 2. Conversion and Conservation of energy 3. Force and motion 4. Agricultural Tools	1. Electricity and Electronics 2. Conversion and Conservation of energy 3. Force and motion 4. Agricultural Tools
HUMANS AND THE ENVIRONMENT	1. Waste management systems 2. Human Health 3. Science and Industry 4. Climate Change and Green Economy 5. Understanding the Environment	1. Sanitation and waste management systems 2. Human Health 3. Science and Industry 4. Climate Change and Green Economy 5. Understanding the Environment 6. Soil as Components of the Environment	1. Sanitation and waste management system 2. Human Health 3. Science and Industry 4. Climate Change and Green Economy 5. Understanding the Environment 6. Soil as Components of the Environment	1. Sanitation and waste management systems 2. Human Health 3. Science and Industry 4. Climate Change and Green Economy 5. Understanding the Environment 6. Soil as Components of the Environment
5	**20**	**20**	**20**	**20**

SCIENCE SCOPE AND SEQUENCE

STRAND	**SUB-STRANDS**	**B7**	**B8**	**B9**	**B10**
DIVERSITY OF MATTER	Materials	√	√	√	√
	Living Cells	√	√	√	√

CYCLES	Earth Science	√	√	√	√
	Life Cycles of Organisms	√	√	√	√
	Crop Production	√	√	√	√
	Animal Production	√	√	√	√
SYSTEMS	The Human Body Systems	√	√	√	√
	The Solar system	√	√	√	√
	Ecosystems	√	√	√	√
	Farming Systems	√	√	√	X
FORCES AND ENERGY	Conversion and Conservation of Energy	√	√	√	√
	Electricity and Electronics	√	√	√	√
	Force and Motion	√	√	√	√
	Agricultural Tools	√	√	√	√
HUMANS AND THE ENVIRONMENT	Waste Management	√	√	√	√
	Human Health	√	√	√	√
	Science and Industry	√	√	√	√
	Climate Change and Green Economy	√	√	√	√
	Understanding the Environment	√	√	√	√
	Soil as Component of the Environment	x	√	√	√

BASIC 7

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 1: MATERIALS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCES
B7.1.1.1 Recognize materials as important resources forproviding human needs	**B7.1.1.1.1 Classify materials into liquids, solids and gas**	**Creativity and Innovation (CI), Critical Thinking and Problem solving (CP), Communication and Collaboration (CC)**
	Exemplars:	
	1. Create and complete a table to record the texture, appearance, colour and shape of group of materials assembled from the environment	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing
	2. Group materials into liquids, solids and gases	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	3. Discuss the differences between liquids, solids and gases	**CC:** Explain ideas in a clear order with relevant detail
	4. Give examples of solids, liquids and gases that can be identified from your environment	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCES
B7.1.1.1 Recognize materials as important resources forproviding human needs	**B7.1.1.1.2 Discuss the importance of liquids in the life of humans**	**Communication and Collaboration (CC), Critical Thinking and Problem solving (CP)**
	Exemplars:	
	1. Present a report on the importance of liquids to human life	**CC:** Speak clearly and explain ideas Can vary the level of detail and the language use when presenting to make it appropriate to the audience.
	2. Describe the need to preserve liquids for human use.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	3. Record liquid they see being used in their community	**CP:** Being open-minded

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCES
	B7.1.1.1.3 Discuss the importance of specific solids to life	**Critical Thinking and Problem solving (CP), Creativity and Innovation (CI)**
	Exemplars	
	1. Identify solids in the environment that support the survival of humans and other life forms.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Explain the need to preserve useful solid materials in the environment for life	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument Provide new insight into controversial situation or task
	3. Model objects from solid materials that can be useful to humans and other life forms.	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing Reflect on work and explore thinking behind thoughts and

		processes
CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCES**
B7.1.1.2 Understand the periodic table as different elements made up of metals and non-metals and noble gases arranged in an order.	**B7.1.1.2.1 Demonstrate the knowledge of the orderly arrangement of metals, non-metals and noble gases in the Periodic Table**	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP)**
	Exemplars	
	1. Name and write the chemical symbol of the first 20 elements in the periodic table	**DL:** Ability to ascertain when information is needed and be able to identify, locate and evaluate
	2. Identify metals, non-metals and noble gases in the periodic table	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	3. Deduce from the periodic table that the elements are arranged in order of their atomic number and those in the same group have common properties	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 2: LIVING CELLS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFICS AND CORE COMPETENCIES
B7.1.2.1Demonstrate understanding of the structure of organisms and functions of cells in living systems	**B7.1.2.1.1 Describe the structure and function of living cells of an animal.**	Digital Literacy (DL), Communication &Collaboration (CC), Critical Thinking % Problem solving (CP), Creativity &Innovation (CI)
	Exemplars:	
	1. Identify and describe the structure of animal cell seen in a video, a chart and a magnifier	**DL:** Evaluate the quality and validity of information
	2. State the function of each organelle in the animal cell	**CC:** Explain ideas in a clear order with relevant detail
	3. Look at a sample of animal cell from different parts of an animal with a microscope, magnifier or watch a video or pictures of cells and draw the conclusion that animals are made up of cells	**CP:** Provide new insight into controversial situation or task **DL:** Knowledge and recognition of ethical use of information
	4. Draw and label an animal cell	**CI:** Anticipate and overcome difficulties relating initiatives
	5. Develop a model to represent an animal cell	**CI:**Identification of requirements of a given situation and justification of more than one creative tool

		that will be suitable
CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFICS AND CORE COMPETENCIES**
B7.1.2.1Demonstrate understanding of the structure of organisms and functions of cells in living systems	**B7.1.2.1.2 State the functions of each organelle in a plant cell**	**Digital Literacy (DL), Communication and Collaboration (CC), Critical Thinking and Problem (CP), Creativity and Innovation (CI)**
	Exemplars:	
	1. Identify and describe the structure of a plant cell seen in a video, a chart, pictures and magnifiers	**CC:** Speak clearly and explain ideas **DL:** Ability to find and consume digital content
	2. State the function of each organelle in the plant cell	**CC:** Speak clearly and explain ideas
	3. Look at a sample of a plant cell from different parts of a plant with a microscope, magnifier or watch a video or pictures and confirm that plants are made up of cells	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion **DL:** Adhere to behavioural protocols that prevail in cyberspace
	4. Draw and label a plant cell	**CI:** Anticipate and overcome difficulties relating initiatives
	5. Develop a model to represent a plant cell	**CI:** Identification of requirements of a given

		situation and justification of more than one creative tool that will be suitable

STRAND 2: CYCLES
SUB-STRAND 1: EARTH SCIENCE

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.2.1.1 Recognize that water cycle is an example of repeated patterns of change in nature and understand how it occurs	**B7.2.1.1.1 Know how water cycle occurs as a repeated pattern in nature.**	**Critical Thinking and Problem Solving (CP) Digital Literacy (DL), Creativity and Innovation (CI)**
	Exemplars:	
	1. Identify the natural sources of water and list the stages of the water cycle: Evaporation, Condensation, Precipitation and Transpiration while watching pictures and videos,	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them
	2. Draw a flow chart or diagram to show the order of the stages in the water cycle and how they are linked to each other.	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing. Ability to select the most effective creative tools for working and preparedness to give explanations
	3. Explain why water cycle is a repeated pattern in nature through search from internet, books, journals, TV news,	**CP:** Ability to combine information and ideas from several sources to reach a conclusion. **DI:**

	Radio news and any other sources	Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.2.1.1 Recognize that water cycle is an example of repeated patterns of change in nature and understand how it occurs	**B7.2.1.1.2 Describe the importance of water cycle in nature.**	**Communication & Collaboration (CC), Digital Literacy (DL), Communication and Collaboration (CC), Creativity and Innovation (CI), Critical and Problem Solving (CP)**
	Exemplars:	
	1. Describe the stages of the water cycle by watching a video or a picture of it.	**CC:** Speak clearly and explain ideas. **DL:** Preparedness to make better decision with information at hand

	2. Describe the importance of water cycle. In terms of: a) Energy source (release of energy to warm the environment) b) Carrier of nutrients c) Improving water table d) Regulating weather pattern e) Provision of clean water.	**CP:** Ability to combine information and ideas from several sources to reach a conclusion.**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	3. Illustrate the importance of the water cycle in a community with a diagram.	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing

STRAND 2: CYCLES
SUB-STRAND 2: LIFE CYCLE OF ORGANISMS

CONTENT STANDARD	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.2.2.1 Demonstrate the skills of carrying out activities to show the stages of the life cycle of housefly,effects of its activitieson humans and how to reduce them	**B7.2.2.1.1 Describe the life cycle of the housefly.**	**Communication & Collaboration (CC), Digital Literacy (DL)**
	Exemplars	
	1. Identify and describe the stages of the life cycle of the housefly.	**DL:** Ability to find and consume digital content. **CC:** Share a narrative or extended answer

		while speaking to a group
	2. Show the order of the stages of the life cycle of the housefly e.g. Eggs –Pupa-Larva-Adult. Arrange flashcards or the cut-outs to illustrate the stages	**DL:** Preparedness to make better decision with information at hand. **CC:** Ability to work with all group members to complete a task successfully
	3. Draw each stage of the life cycle of the housefly and use arrows to link the stages to make the cycle complete.	**CI:** Ability to try alternatives and fresh approaches. Ability to reflect on approaches to creative task and evaluate the effectiveness of tools used
	4. Write notes on each of the stages of the housefly.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
CONTENT STANDARD	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.2.2.1 Demonstrate the skills of carrying out activities to show the stages of the life cycle of housefly,effects of its activitieson humans and how to reduce them	**B7.2.2.1.2 Discuss the activities of the housefly as a menace to humans and show how to reduce the activities e.g. feeding, reproduction and any other**	**Creativity and Innovation (CI), Communication and Collaboration (CC), Digital Literacy (DL)**
	Exemplars	
	1. Describe with the aid of drawing, pictures and cartoon to demonstrate their knowledge of housefly feeding habit. e.g.	**CI:** Ability to look at alternatives in creating new things, being open

	feeding on dead animals, rotten food, manure, solid and liquid waste	minded, adapting and modifying ideas to achieve creative results
	2. Discuss how the activities of the housefly affect humans in terms of a) transfer of types of diseases (such as dysentery). b) food poisoning c) nuisance in the environment	**CC:** Speak clearly and explain ideas. **DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	3. Design an intervention that can reduce the effects of the activities of the housefly on humans and educate people of your community about the intervention	**CI:** Identification of requirements of a given situation and justification of more than one creative tool that will be suitable. Ability to select the most effective creative tools for working and preparedness to give explanations. **DL:** Preparedness to make better decision with information at hand

STRAND 2: CYCLES
SUB-STRAND 3: CROP PRODUCTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.2.3.1Demonstrate understanding of the different plant	**B7.2.3.1.1 Observe and list all plant nutrient sources available in a community and categorize them into organic**	**Communication and Collaboration (CC), Critical Thinking and Problem**

nutrients (organic, and inorganic fertilizers) and their application in school farming (school gardening)	**and inorganic nutrient sources.**	**Solving (CP)**
	Exemplars	
	1. Create a table to explain the differences between organic and inorganic plant nutrients	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing
	2. Compare the volumes of organic and inorganic nutrient source required by different plants	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation. Provide new insight into controversial situation or task

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.2.3.1Demonstrate understanding of the different plant	**B7.2.3.1.2 Describe the physical characteristics of different plant nutrients (organic and inorganic) and how each is applied to plants in the field**	**Digital Literacy (DL), Communication and Collaboration (CC),**

nutrients (organic, and inorganic fertilizers) and their application in school farming (school gardening)		**Creativity and Innovation (CI), Personal Development and Leadership (PL)**
	Exemplars	
	1. Identify each plant nutrient source and explain how its physical structure and appearance affect its application	**DL:** Evaluate the quality and validity of information **CC:** Explain ideas in a clear order with relevant detail
	2. Describe in groups how each type of nutrient source may be applied to plants in the field (e.g. school garden).	**CC:** Demonstrate behaviour and skills of working towards group goals. Can see the importance of including all team members in discussions and actively encourage contributions from their peers in their team **PL:** Division of task into solvable units and assign group members to task units
	3. Demonstrate practical application of each type of nutrient source to plants in the field (e.g. school garden)	**CI:** Ability to try alternatives and fresh approaches

STRAND 2: CYCLES

SUB-STRAND 4: ANIMAL PRODUCTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE

		COMPETENCIES
B7.2.4.1Demonstrate understanding of the differences among domestic animals such as ruminants, monogastric and poultry (monogastric herbivore)	**B7.2.4.1.1 Examine and list domestic animals in the community**.	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC)**
	Exemplars:	
	1. Identify different types of domestic animals in the community	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them
	2. Match different domestic animals with their breeds	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	3. List and discuss the characteristics, such as shape, colour, size, food/feeding and others, that can be used to classify domestic animals	**DL:** Preparedness to make better decision with information at hand. **CC:** Demonstrate behaviour and skills of working towards group goals. Explain ideas in a clear order with relevant detail

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.2.4.1 Demonstrate understanding of the differences among domestic animals such as ruminants, monogastric and poultry (monogastric herbivore)	**B7.2.4.1.2 Show the differences and similarities among domestic animals.**	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC)**
	Exemplars:	
	1. Classify domestic animals into ruminants, monogastric and poultry	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	2. Give examples of animals classified as ruminants, monogastric, and poultry	**CC:** Speak clearly and explain ideas. **DL:** Ability to find and consume digital content
	3. Discuss and write the differences among ruminants, monogastric and poultry	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem. **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.**CP:** Ability to combine Information and ideas from several sources to reach a

		conclusion
	4. Write similarities in the nature and characteristics of ruminants, monogastric and poultry in Ghana and other countries.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion Analyse and make distinct judgment about viewpoints expressed in an argument
B7.2.4.2 Show understanding of the usefulness of the different types of animals for domestic and commercial purposes	**B7.2.4.2.1 Discuss and write the domestic and commercial uses of different types of animals.**	**Digital Literacy (DL), Communication and Collaboration**
	Exemplars	
	1. Explain the concepts of domestic use and commercial use of animals.	**DL:** Knowledge and recognition of ethical use of information **CC:** Explain ideas in a clear order with relevant detail
	2. Describe domestic uses of ruminants, monogastric and poultry	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group **DL:** Evaluate the quality and validity of information

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
	B7.2.4.2.2 Observe and compare the uses of the different types of animals.	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC)**
	Exemplars:	
	1. Observe and discuss different uses of different animals found in the communities	**CC:** Identify words or sentences in context or appropriately. Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group **DL:** Evaluate the quality and validity of information **CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	2. List and match the different domestic animals to their commercial uses including their by-products (such as animal waste)	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a

		problem **CP:** Analyse and make distinct judgment about viewpoints expressed in an argument

STRAND 3: SYSTEMS
SUB-STRAND: 1 THE HUMAN BODY SYSTEM

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.3.1.1 Show understanding of the concept of food, the processof digestion and appreciate its importance in humans	**B7.3.1.1.1 Explain the concept of food and the need for humans to eat**	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP)**
	Exemplars:	
	1. Explain what food is, the nutrients found in them and deduce its definition	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Compare and contrast the appearance of people who have been starved for some period of time with those	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate

	who have been eating and look healthy and strong.	and effectively use them to solve a problem. Knowledge and recognition of ethical use of information**CP:** Identify and prove misconceptions about a generalised concept or fact specific to a task or situation

B7.3.1.1 Show understanding of the concept of food, the processof digestion and appreciate its importance in humans	3. Deduce from the comparison in exemplar 2 the importance of feeding in humans	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	B7.3.1.1.2 Examine what happens to food at the stages of digestion in humans	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC), Creativity and Innovation (CI)**
	Exemplars:	
	1. identify the parts of the alimentary canal in a drawing of the digestive system	**CC:** Identify underlying themes, implications and issues when listening **DL:** Evaluate the quality and validity of information
	2. Research and describe what happen to food e.g. a	**DL:** Ability to ascertain when

	piece of boiled yam/cassava/plantain/cocoyam/bread, egg, meat, orange, palm oil and many others when it gets into the mouth, stomach, large and small intestine	information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem Adhere to behavioural protocols that prevail in cyberspace Knowledge and recognition of ethical use of information **CP:** Generate hypothesis to help answer complex problems Identify and prove misconceptions about a generalised concept or fact specific to a task or situation
	3. Draw and label the digestive system of humans	**CI:** Ability to reflect on approaches to creative task and evaluate the effectiveness of tools used
	B7.3.1.1.3 Identify the end product of digestion of starchy, protein and oily foods and explain how absorption of the digested food occurs in humans	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC), Creativity and Innovation (CI)**

	Exemplar:	
	1. Observe and describe how digested food is absorbed into the body of humans using animation.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CC**: Speak clearly and explain ideas
	2. Draw a flow chart to show that starch is digested to sugar, protein is digested to amino acids and oils are digested into fatty acids	**CI:** Identification of requirements of a given situation and justification of more than one creative tool that will be suitable Ability to merge simple/ complex ideas to create novel situation or thing
	3. Perform practical test on food: starch, glucose, protein and fats and oils	**CC:** Understand roles during group activities **PL:** Ability to manage time effectively

STRAND 3: SYSTEMS
SUB-STRAND 2: THE SOLAR SYSTEM

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.3.2.1 Demonstrate knowledge of the inner planets of the solar system and understand their movement in the system	**B7.3.2.1.1 identify the inner planets of the solar system and describe their properties**	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC), Creativity and Innovation (CI)**
	Exemplars	
	1. Identify and describe what constitutes the inner planets	**DL:** Ability to ascertain when information is needed and be

	of the solar system using pictures, videos etc.	able to identify, locate, evaluate and effectively use them to solve a problem **CC:** Speak clearly and explain ideas.
	2. Describe the galaxy, milky way, and elliptical shape of the path of movement of the inner planets	**CC:** Explain ideas in a clear order with relevant detail **DL:** Ability to find and consume digital content **CP:** Identify and prove misconceptions about a generalised concept or fact specific to a task or situation
	3. Design and construct a model of the solar system	**CI:** Ability to look at alternatives in creating new things Identification of requirements of a given situation and justification of more than one creative tool that will be suitable Being open-minded, adapting and modifying ideas to achieve creative results
	B7.3.2.1.2 Discuss the properties and the relative	**Digital Literacy (DL), Critical Thinking and**

	motions of the planets Mercury and Venus	**Problem Solving (CP), Communication and Collaboration (CC), Creativity and Innovation (CI)**
	Exemplars:	
	1. Outline properties peculiar to each of the planets Mercury and Venus	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	2. Describe the movement of planets Mercury and Venus around the Sun.	**DL:** Evaluate the quality and validity of information **CC:** Explain ideas in a clear order with relevant detail **CP:** Ability to combine Information and ideas from several sources to reach a conclusion

STRAND 3 SYSTEMS
SUB-STRAND 3 THE ECOSYSTEM

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.3.3.1 Recognize the components and their interdependence in an ecosystem and appreciate their interaction	**B7.3.3.1. 1 Analyse the components of ecosystems and identify the interactions within.**	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC), Creativity and Innovation**

		(CI)
	Exemplars:	
	1. Describe an ecosystem as a self-sustaining unit in which components interact E.g. A pond, a forest and many others	**CC:** Ability to work with all group members to complete a task successfully Speak clearly and explain ideas. Anticipate different responses from the audience and plan for them. **DL:** Evaluate the quality and validity of information Preparedness to make better decision with information at hand
	2. Group the ecosystems into terrestrial, aquatic and arboreal	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion Implement strategies with accuracy
	3. Identify and list the components, such as biotic and abiotic, of each ecosystem	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a

		problem **CC:** Speak clearly and explain ideas. **CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	4. Differentiate organisms in different ecosystems mentioned in exemplar 2	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	5. Explain how the function of the components of each affects the other in the ecosystem	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group

STRAND 3: SYSTEMS
SUB-STRAND4: FARMING SYSTEMS

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.3.4.1 Demonstrate understanding of the differences among the various farming systems; Land Rotation; Crop Rotation; Mixed Cropping; Mixed Farming; and Organic Farming	**B7.3.4.1.1 Examine and discuss the differences among the various farming systems.**	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC), Creativity and Innovation (CI), Cultural Identity and Global Citizenship (CG)**
	Exemplars:	
	1. Identify and define types of farming systems in Ghana and elsewhere	**DL:** Ability to find and consume digital content Understand sociological and emotional aspects of work in cyberspace **CG:** Develop and exhibit a sense of cultural identity **CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group
	2. Discuss the characteristics of the different farming	**DL:** Ability to ascertain when

	systems in Ghana	information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CP:** Ability to combine Information and ideas from several sources to reach a conclusion **CG:** Develop and express respect, recognition and appreciation of others' culture
	3. Compare and contrast the characteristics of the different farming systems	**CP:** Generate hypothesis to help answer complex problems Analyse and make distinct judgment about viewpoints expressed in an argument Ability to combine Information and ideas from several sources to reach a conclusion

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
	B7.3.4.1.2 Categorize different farming systems	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP), Cultural Identity and Global Citizenship (CG)**
	Exemplars:	
	1. Classify different descriptions of farming systems under Land Rotation; Crop Rotation; Mixed Cropping; Mixed Farming and Organic Farming	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion **CG:** Develop and exhibit ability to defend one's cultural beliefs, practices and norms **DL:** Ability to find and consume digital content
	2. Group farming systems prevailing in their community under Land Rotation, Crop Rotation, Mixed Cropping, Mixed Farming, and Organic Farming	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
	B7.3.4.1.3 Discuss the usefulness of different farming systems	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI) Cultural Identity and Global Citizenship (CG)**
	Exemplars:	
	1. Discuss and tabulate the reasons behind the use of various farming systems	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience. **CI:** Ability to try alternatives and fresh approaches
	2. Debate the merits and demerits of the different farming systems	**CP:** Generate hypothesis to help answer complex problems Ability to combine Information and ideas from several sources to reach a conclusion. Implement strategies with accuracy **CC:** Can vary the level of detail and the language use when presenting to

		make it appropriate to the audience. **CG:** Develop and express respect, recognition and appreciation of others' culture

STRAND 4: FORCES AND ENERGY
SUB-STRAND 1: ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.4.1.1 Demonstrate understanding of forms of energy and their daily application	**B7.4.1.1.1 Identify the various forms of energy and show how they are related**	**Digital Literacy (DL), Cultural Identity and Global Citizenship (CG), Communication and Collaboration (CC)**
	Exemplars:	
	1. List forms of energy in terms of Potential, Kinetic, Heat, Sound, Solar, Electrical, Nuclear, Chemical and Light	**DL:** Ability to find and consume digital content. Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem. **CC:** Explain ideas in a clear order with relevant detail
	2. Demonstrate how Potential Energy (P.E) is related to Kinetic Energy (K.E) (Mechanical Energy= PE+ KE) using a diagram	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience **CI:** Ability to merge simple/ complex ideas to create novel situation or thing Ability to reflect on approaches to creative task and evaluate the effectiveness of tools used.Ability to visualise alternatives, seeing possibilities, problems and challenges

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.4.1.1 Demonstrate understanding of forms of energy and their daily application	**B7.4.1.1.2 Explain daily application of forms of energy**	**Digital Literacy (DL), Cultural Identity and Global Citizenship (CG), Communication and Collaboration (CC), Creativity and Innovation (CI)**
	Exemplars:	
	1. Discuss how forms of energy are used in daily life	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group **DL:** Evaluate the quality and validity of information. Knowledge and recognition of ethical use of information
	2. Match forms of energy to appliances (gadgets) used daily at school, in the home and community	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation. **CI:** Ability to merge simple/ complex ideas to create novel situation or thing
	3. Explain factors that affect Potential and Kinetic energy in their application in daily life	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem.**CC:** Explain ideas in a clear order with

		relevant detail
	4. Use mathematical expressions for both Potential energy (P.E = mgh) and Kinetic energy (K.E = ½ mv^2) and use the expressions to solve problems involving mechanical energy.	**CI:** Ability to visualise alternatives, seeing possibilities, problems and challenges Recognise and generalise information and experience; search for trends and patterns Interpret and apply learning in new context Reflect on work and explore thinking behind thoughts and processes
B7.4.1.2 Demonstrate understanding of concept of heat transfer and its application in life	**B7.4.2.1.1 Explain how heat is transferred in various media**	**Digital Literacy (DL), Communication and Collaboration (CC)**
	Exemplar:	
	1. Explain how heat is transferred through different media (gas, plastic, metal, liquid)	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CC:** Explain ideas in a clear order with relevant detail

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.4.1.3 Demonstrate understanding of characteristics of light, such as travelling in a straight line, reflection, refraction and dispersion	**B7.4.1.3.1 Demonstrate how light travels in a straight line**	**Digital Literacy (DL), Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplars:	
	1. Perform experiments to show that light travels in a straight line and can be reflected and refracted and produce reports, posters or diagrams	**DL:** Ability to find and consume digital content **CI:** Understand and use analogies and metaphor. Putting forward constructive comments, ideas, explanations and new ways of doing things Recognise and generalise information and experience; search for trends and patterns
	2. Perform experiment to show dispersion of light into colours	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation. Provide new insight into controversial situation or task

STRAND 4: FORCES AND ENERGY
SUB-STRAND 2: ELECTRICITY AND ELECTRONICS

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.4.2.1Demonstrate understanding of forms of electricity, its generation and effects on the environment.	**B7.4.2.1.1 Describe the various forms of electricity generation**	**Digital Literacy (DL), Communication and Collaboration (CC),**
	Exemplar:	
	1. Search for and discuss information about the nature and generation of thermal and nuclear electricity and produce reports, posters, diagrams and charts about your findings.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem Preparedness to make better decision with information at hand **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	B7.4.2.1.2 Explain the impact of electricity generation on the environment	**Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**

	Exemplar:	
	1. Debate the negative effects of both thermal and nuclear electricity generation on the environment and how to reduce the effects. Create posters leaflets of the outcome of the debate	**CP:** Generate hypothesis to help answer complex problems Ability to combine Information and ideas from several sources to reach a conclusion Implement strategies with accuracy **CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience.
B7.4.2.2 Demonstrate knowledge of how to assemble and explain the functions of basic electronic components and their interdependence in an electronic circuit	**B7.4.2.2.1 Demonstrate how to assemble basic electronic components in an electronic circuit**	**Digital Literacy (DL), Creativity and Innovation (CI)**
	Exemplar:	
	1. Examine electronic components such as types of LEDs, P-N Junction diodes, colour code resistors and capacitors, and arrange them in an electronic circuit.	**DL:** Ability to find and consume digital content **CI:** Recognise and generalise information and experience; search for trends and patterns

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
Demonstrate knowledge of how to assemble and explain the functions of basic electronic components and their interdependence in an electronic circuit	**B7.4.3.2.2 Discuss the function of each electronic component and their interdependence with each other**	**Communication and Collaboration (CC), Creativity and Innovation (CI)**
	Exemplars:	
	1. Dismantle and assemble spoilt electronic gadgets such as Radio, TV, Mobile phones, Electronic watch and others that can be found in the home and at school and name the parts.	**CI:** Being open-minded, adapting and modifying ideas to achieve creative results Recognise and generalise information and experience; search for trends and patterns
	2. Identify the Positive (P) region and Negative (N) region of the P-N junction diode and construct a simple electronic circuit comprising a 3V battery made of two dry cells in series with a switch and an LED.	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing Recognise and generalise information and experience; search for trends and patterns Being open-minded, adapting and modifying ideas to achieve

		creative results
	3. Explain what happens when the switch in an electronic circuit is closed and opened	**CC:** Explain ideas in a clear order with relevant detail. **CI:** Recognise and generalise information and experience;

CONTENT STANDARDS	**INDICATOR AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
Demonstrate knowledge of how to assemble and explain the functions of basic electronic components and their interdependence in an electronic circuit	**B7.4.3.2.3 Discuss the function of each electronic component such as resistor, diode, and. inductor and their interdependence for the functioning of an electronic gadget**	**Communication and Collaboration (CC),Creativity and Innovation (CI), Critical Thinking and Problem Solving (CP)**
	Exemplar:	
	1. Discuss the roles and the significance of electronic components: i. LED, ii. resistor iii. diode, and iv. inductor in a circuit and how they affect each other	**CC:** Explain ideas in a clear order with relevant detail. **CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation. Provide new insight

		into controversial situation or task
	2. Explain changes in brightness in an LED in relation to addition of resistors, diodes, and inductors in an electronic circuit	**CC:** Explain ideas in a clear order with relevant detail. **CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation. Provide new insight into controversial situation or task

STRAND 4: FORCES AND ENERGY

SUB-STRAND 3: CONVERSION AND CONSERVATION OF ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.4.3.1.Demonstrate understanding of the principle of conservation and conversion of energy and their application in real life situations	**B7.4.3.1.1 Explain the principle underlying conservation and conversion of energy**	**Digital Literacy (DL), Creativity and Innovation (CI), Critical Thinking and Problem Solving (CP)**
	Exemplar:	
	1. Explain the law of conservation of energy by using diagram to show that in a closed system the value of chemical energy, for example in dry cell which changes into electrical, heat and light energy will remain the same	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them. **CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Use exemplar 1 to explain energy conversion and its application to life	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing Recognise and generalise information and experience; search for trends and patterns Being open-minded, adapting and modifying ideas to achieve creative results

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.4.3.1.Demonstrate understanding of the principle of conservation and conversion of energy and their application in real life situations	**B7.4.3.1.2 Demonstrate the conversion of energy into useable forms**	**Creativity and Innovation (CI)**
	Exemplar:	
	1. Illustrate everyday use of conversion of energy and show diagrammatically the conversion of energy to other forms.	**CI:** Interpret and apply learning in new context Recognise and generalise information and experience; search for trends and patterns Reflect on work and explore thinking behind thoughts and processes
	B7.4.3.1.3 Know how energy could be conserved for future use in life	**Digital Literacy (DL), Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP)**
	Exemplar:	
	1. Explain why energy should be conserved and describe how it can be done for the benefit of humans and other life forms	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them. **CP:** Ability to combine Information and ideas from

		several sources to reach a conclusion **CC:** Explain ideas in a clear order with relevant detail

STRAND 4: FORCES AND ENERGY

SUB-STRAND 4: FORCE AND MOTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.4.4.1Examine Newton's First Law of motion and understand its application to life	**B7.4.4.1.1 State and explain Newton's First Law of motion**	**Digital Literacy (DL)Communication and Collaboration (CC)**
	Exemplar:	
	1. Research to find what Newton's first law is and discuss it.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem. Adhere to behavioural protocols that prevail in cyberspace. Knowledge and recognition of ethical use of information **CC:** Explain ideas in a clear order with relevant detail **CI:** Ability to merge simple/ complex ideas to create novel situation or thing. Recognise and generalise information and

		experience; search for trends and patterns. Being open-minded, adapting and modifying ideas to achieve creative results
CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.4.4.1Examine Newton's First Law of motion and understand its application to life	**B7.4.4.1.2 Examine the application of Newton's First Law of motion in life**	**Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplars:	
	1. Discuss some applications of Newton's First Law of Motion. E.g. when a metallic ball is put on a smooth surface and given a push it will be in motion until it gets to a blockade and it stops. Use of seat belts in a vehicle	**CC:** Explain ideas in a clear order with relevant detail. Can see the importance of including all team members in discussions and actively encourage contributions from their peers in their team **DL:** Evaluate the quality and validity of information **CP:** Ability to combine Information and ideas from several sources to reach a conclusion **CI:** Ability to merge simple/

		complex ideas to create novel situation or thing. Recognise and generalise information and experience; search for trends and patterns. Being open-minded, adapting and modifying ideas to achieve creative results

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
	2. Explain the importance of Newton's First Law of Motion	**CC:** Explain ideas in a clear order with relevant detail Can see the importance of including all team members in discussions and actively encourage contributions from their peers in their team **CP:** Ability to combine Information and ideas from several sources to reach a conclusion
B7.4.4.2 Recognize some simple machines, and show understanding of their efficiency in doing work	**B7.4.4.2.1 Identify simple machines**	**Digital Literacy (DL), Communication and Collaboration (CC)**
	Exemplar:	

	1. List examples of simple machines	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CC:** Speak clearly and explain ideas

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.4.4.2 Recognize some simple machines, and show understanding of their efficiency in doing work	**B7.4.4.2.2 Describe the types and functions of levers**	**Digital Literacy (DL), Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP)**
	Exemplars:	
	1. Name the types of levers and explain their general functions.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CC:** Speak clearly and explain ideas
	2. Classify levers into First, Second and Third classes and demonstrate how the principles involved in each class make	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation.

	work easier in everyday life	Implement strategies with accuracy
	B7.4.3.2.3 Know Work Input, and Output and Efficiency as they apply to machines.	**Digital Literacy (DL), Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplars:	
	1. Explain of the terms work input, work output and efficiency.	**CC:** Explain ideas in a clear order with relevant detail. **DL:** Ability to find and consume digital content Recognise ownership of information

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.4.4.2 Recognize some simple machines, and show understanding of their efficiency in doing work	2. Explain efficiency of a machine as the ratio of work output to work input expressed as a percentage.	**CC:** Explain ideas in a clear order with relevant detail **DL:** Ability to find and consume digital content Recognise ownership of information **CP:** Ability to combine Information and ideas from several sources to reach a conclusion Develop and defend a logical plausible

		resolution to a confusion, uncertainty or contradiction surrounding an event
	3. Explain the concept of efficiency of a machine.	**CC:** Explain ideas in a clear order with relevant detail **DL:** Ability to find and consume digital content **CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	4. Describe how efficiency of simple machines can be improved (e.g. by oiling its parts to reduce friction)	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CI:** Recognise and generalise information and experience; search for trends and patterns Being open-minded, adapting and modifying ideas to achieve creative results Putting forward constructive comments, ideas, explanations and new ways of doing t

STRAND 4: FORCES AND ENERGY
SUB-STRAND 5: AGRICULTURAL TOOLS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.4.5.1Demonstrate knowledge and skills in handling and maintenance of basic and simple agricultural tools	**B7.4.5.1.1 Explain the basic rules in handling and maintaining simple agricultural tools.**	
	Exemplars:	
	1. List some simple or basic farm tools in agriculture (give examples found in animal and crop farms)	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem. **CG:** Develop and exhibit ability to defend one's cultural beliefs, practices and norms **CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	2. Discuss the meaning and importance of handling and maintenance of agricultural tools	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	3. List and match the basic rules in handling and maintenance of tools with specific simple tools used in	**CI:** Ability to merge simple/ complex ideas to create novel

	agriculture.	situation or thing Recognise and generalise information and experience; search for trends and patterns Being open-minded, adapting and modifying ideas to achieve creative results
	4. Describe how handling and maintenance of simple and basic agricultural tools are done.	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group **CI:** Ability to try alternatives and fresh approaches
	B7.4.5.1.2 Apply the handling and maintenance of basic and simple agricultural tools in their community	**Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI), Digital Literacy (DL), Cultural Identity and Global Citizenship (CG)**
	Exemplars:	
	1. Observe and discuss the handling and maintenance of basic and simple agricultural tools used in farms visited in the community and write a report.	**CC:** Interpret correctly and respond to non- verbal communication such as facial expressions, cues and gestures

		Identify underlying themes, implications and issues when listening Apply appropriate diction and structure sentences correctly for narrative, persuasive, imaginative and expository purposes **CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Assemble agricultural tools from the community and practice handling the tools to perform simple agricultural operations. Write down the operational rules of handling agricultural tools	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CG:** Develop and exhibit ability to defend one's cultural beliefs, practices and norms **CI:** Identification of requirements of a given situation and justification of more than one creative tool that will be suitable Ability to reflect on approaches to creative task and evaluate the effectiveness of tools used

		Ability to select the most effective creative tools for working and preparedness to give explanations
	3. Assemble agricultural tools from the community and practice the basic rules in tools maintenance and list the rules used.	**CI:** Putting forward constructive comments, ideas, explanations and new ways of doing things Recognise and generalise information and experience; search for trends and patterns Reflect on work and explore thinking behind thoughts and processes

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 1: WASTE MANAGEMENT

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.5.1.1 Exhibit knowledge and skill of scientific basis for management practices of types of waste in the environment	**B7. 5.1.1.1 Apply information from research on good management practices of waste to make the environment clean**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Research for information on good waste management practices and use it to carry out a project to make their environment clean	**CP**: Ability to combine Information and ideas from several sources to reach a conclusion **DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	2. Write a report for presentation on the outcome of the project carried out in exemplar 1	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	3. Discuss how to manage types of waste and explain the science underlying it.	**CC**: Speak clearly and explain ideas. Share a narrative or

		extended answer while speaking to a group

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 2: HUMAN HEALTH

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.5.2.1 Demonstrate knowledge of common deficiency diseases of humans, their causes, symptoms, effects and prevention	**B7. 5.2.1.1 Explain the relationship between food nutrients and common deficiency diseases and how they affect humans**	**Critical Thinking and Problem Solving (CP)** **Communicationand Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Name and analyze food nutrients such as carbohydrates, proteins, fatty acids, and their uses in the human body.	**CP**: Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
	2. Discuss and make presentations on deficiency diseases associated with lack of food nutrients such as carbohydrates, proteins, fatty acids, vitamins and others in the human body.	**CI**: Ability to merge simple/ complex ideas to create novel situation or thing
	3. Relate the nutrients they gain or lack to the foods they normally eat e.g. lack of protein leads to kwashiorkor, lack of iron lead to anemia etc.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation. **CC**: Explain ideas in a clear order with relevant detail, using conjunctions to

		structure and speech.
	4. Describe symptoms, effects and prevention of common deficiency diseases such as night blindness, rickets, scurvy, kwashiorkor and others	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 3: SCIENCE AND INDUSTRY

Content Standard	**Indicators and Exemplars**	**Subject Specific Practices and Core Competencies**
B7.5.3.1 Realise how careers in science can improve life of humans and research about Ghanaian and internationally recognized scientists and science educators and model after them	**B.7. 5.3.1.1 Discover and explain how careers in science can improve human conditions and relate these careers to the work of great national and international scientists and science educators**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Describe various careers in science and relate them to the work of national scientist E.g. Prof. Ibok Nsa Oduro, Prof. Francis Allotey Professor Ewurama Addy, and Science Educationists: Professor Anamuah-Mensah, Professor Theophilus Ossei-Anto, Professor Christian Anthony-Krueger and others	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Describe various careers in science and relate them to the work of international scientists: Albert Einstein, Alexander Fleming, Charles Darwin, Paul Ratnei, Stephen Hawkins etc through presentations	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	3. Research, and build portfolio on the impact of science	**DL**: Ability to ascertain when

	and technology and innovation in homes, schools, communities, and the universe and make a presentation.	information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	4. Identify the science and technology careers that Ghana must focus on and give reasons.	**CP**: Ability to combine Information and ideas from several sources to reach a conclusion

STRAND 5: HUMANS AND THE ENVIRONMENT

SUB-STRAND 4: CLIMATE CHANGE AND GREEN ECONOMY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B7.5.4.1 Demonstrate understandingof sustainable energy choices and their impact on the environment	**B7.5.4.1.1 Search for information on ways sustainable energy choices and scientific ideas are used to protect the environment.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativityand Innovation (CI)**
	Exemplars:	
	1. Describe how people use sustainable energy choices and scientific ideas to protect the environment	**CP**: Ability to combine Information and ideas from several sources to reach a conclusion
	2. Analyze greenhouse effects on the environment and	**CP**: Ability to combine Information and ideas from

	show how they can be minimized.	several sources to reach a conclusion
	3. Design a project to show how energy can be locally sustained through the use of scientific processes to protect the environment	**CP:** Generate hypothesis to help answer complex problems

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 5: UNDERSTANDING THE ENVIRONMENT

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B7.5.5.1 Demonstrate understanding of different plants and animals found in different land forms and how they survive(with emphasis land forms in Ghana)	**B7.5.5.1.1 List and describe the different types of plants and animals that live in different land forms such as plateau plain, mountain valley and others(with emphasis on land forms in Ghana)**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Identify different types of plants and animals found in different landforms (plateau plain, mountain valley and others.)	**CP**: Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
	2. Describe the characteristics that enable different types of animals to live in different landforms (plateau plain,	**CP**: Ability to combine Information and ideas from

	mountain valley and others).	several sources to reach a conclusion
	3. Describe the characteristics that enable different types of plants to survive in different landforms(plateau plain, mountain valley and others).	**CP**: Ability to combine Information and ideas from several sources to reach a conclusion
	4. Make an album of different types of plants and animals that live in different landforms(plateau plain, mountain valley and others)	**CP**: Generate hypothesis to help answer complex problems.

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
	B7.5.5.1.2 Explain the nature of associations that exist among plants and animals in different landforms and their mechanisms for survival	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Describe the nature of associations such as mutualism, parasitism, commensalism among plants and animals and explain the effects on their habitats	**CP**: Demonstrate a thorough understanding of a generalised concept and facts

		specific to task or situation **CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience.
	2. Carry out research about the different ways that different plants and animals survive in the landforms in which they are found.	**DL**: Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem

BASIC 8

STRAND 1: DIVERSITY OF MATTER

SUB-STRAND 1: MATERIALS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFICS AND CORE COMPETENCIES
B8.1.1.1. Demonstrate knowledge of types of mixtures, and understanding of the processes of scientific ways of separating the components of mixtures	**B8.1.1.1.1 Identify types of mixtures by name and characteristics**	**Critical Thinking and Problem solving (CP), Communication and Collaboration (CC)**
	Exemplars:	
	1. Group materials such as powder, pebbles, bottle tops, salt, sugar, sand, gari, gravel, oil, water and others into two main categories: solids and liquids.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Put any two of the materials (in 1) together and describe the resultant nature of the product formed.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	3. Draw observable conclusion on homogenous and heterogeneous characteristics from mixtures of two or more materials such as *sand and gravels, sand and water, oil and water and others.*	**CP:** Ability to explain plans for attaining goals
	4. Compare and contrast solutes and solvents based on their physical characteristics.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument **CC:** Explain ideas in a clear order with relevant detail,

		using conjunctions to structure and speech.

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFICS AND CORE COMPETENCIES
B8.1.1.1. Demonstrate knowledge of types of mixtures, and understanding of the processes of scientific ways of separating the components of mixtures	5. Identify and separate mixtures such as*: sand and sugar mixture, sugar and salt mixture* and solutions such as*: Salt Solution, Sugar solution, fruit Juice, vinegar solution* based on their physical properties.	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	6. Identify a suspension as a type of mixture e.g. *mixture of groundnut paste and water in a glass*	**CP:** Ability to identify important and appropriate criteria to evaluate each alternative
	7. Differentiate between a colloid and suspension and show the *colloidal effect.*	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument **CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFICS AND CORE COMPETENCIES
B8.1.1.1. Demonstrate knowledge of types of mixtures, and understanding of the processes of scientific ways of separating the components of mixtures	**B8.1.1.1.2 Design and Perform processes for separating kinds of mixtures**	**Creativity and Innovation (CI)** **Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)**
	Exemplar:	
	1. Perform activities such as distilling, filtering, sieving and others to separate different kinds of mixtures and present report on your findings using drawing and written work.	**CI:** Ability to look at alternatives in creating new things. **CC:** Identify and analyse different points of views of speaker
B8.1.2.2 Demonstrate understanding of atoms and the atomic structure of elements in the periodic table	**B8.1.2.2.1 Describe atoms as composed of sub-atomic particles**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)**
	Exemplars:	
	1. Explain an atom and structure of an element using (linking them to) the periodic table.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternative
	2. List the sub-atomic particles found in the atom and indicate their location in the atom (e.g. proton, electron, neutron).	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	3. State the electrical charges on the sub-atomic	**CP:** Identify important and appropriate

	particles.	alternatives

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFICS AND CORE COMPETENCIES
B8.1.2.2 Demonstrate understanding of atoms and the atomic structure of elements in the periodic table	4. Describe the differences between atomic number and mass number of elements.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	5. Determine the number of protons, neutrons and electrons in an atom.	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	B8.1.2.2.2 Explain the arrangement of elements in terms of the number of protons in the nuclei of atoms of each element	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)**
	Exemplars:	
	1. Explain how elements are arranged in order of the number of protons using the periodic table.	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	2. Draw the distribution of electrons (electron configuration) in the atoms.	**CP** Ability to combine Information and ideas from several sources to reach a conclusion **DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	3. Explain the formation of ions.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to

		task or situation
	4. Describe a molecule as combination of atoms.	**CP:** Create simple logic trees to think through problems

STRAND 1: DIVERSITY OF MATTER

SUB-STRAND 2: LIVING CELLS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFICS AND CORE COMPETENCIES
B8.1.2.1 Demonstrate understanding of types of cells and their structure in relation to different organisms	**B8.1.2.1.1 Examine and describe the structure of prokaryotic and eukaryotic cells**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Compare and contrast prokaryotic and eukaryotic cells.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternative
	2. Create a table to show a chart or a slideshow depicting images and labels of the types of cells. Identify differences and similarities after observation.	**DL:** Evaluate the quality and validity of information
	3. Draw and label a prokaryotic cell and eukaryotic cell and make a presentation on what is observed.	**CP:** Ability to select alternative(s) that adequately meet selected criteria **CC**: Identify and analyse different points of views of speaker

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFICS AND CORE COMPETENCIES
	B8.1.2.1.2 Classify organisms (plants or animals) as prokaryotic or eukaryotic based on the type of cells they are made of.	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Observe and list examples of organisms; plants and animals as prokaryotic or eukaryotic based on each cell type.	**CP:** Ability to select alternative(s) that adequately meet selected criteria **DL:** Evaluate the quality and validity of information
	2. Explain the impact of prokaryotes and eukaryotes on human's health and devise safety measures to protect them.	**CP:** Ability to explain plans for attaining goals **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

STRAND 2 CYCLES
SUB-STRAND 1 EARTH SCIENCE

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.2.1.1 Demonstrate understanding of the process of Carbon cycle as an example of repeated pattern of change in nature and how it relates to the environment	**B8.2.1.1.1 Explain the process of carbon cycle.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Identify the carbon cycle from the internet, charts or pictures and write short notes on what happens at each stage.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	2. Produce a flow chart to trace the process of carbon cycle in nature.	**CP:** Ability to select alternative(s) that adequately meet selected criteria **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.2.1.1 Demonstrate understanding of the process of Carbon cycle as an example of repeated pattern of change in nature and how it relates to the environment	3. Explain the process of carbon cycle depicting processes such as a) Photosynthesis b) Respiration c) Burning d) Decay.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternative **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	4. Compile information on the carbon cycle and give reasons why it is a repeated pattern e.g.it is because the carbon is circulated continuously in the environment.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	B8.2.1.1.2 Describe the role of carbon cycle to the environment	**Critical Thinking and Problem Solving (CP)** **Communication and**

		Collaboration (CC) **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Describe the role of carbon cycle in maintaining balance in the composition of air in the environment. E.g. plants absorb carbon in the form of Carbon (IV) Oxide from the air for photosynthesis and oxygen is produced for respiration and in return, respiration gives out carbon in the form of Carbon (IV) Oxide).	**CP:** Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Explain using diagram the effect of carbon cycle on food chain.	**CP:** Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem DL**:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	3. Describe the relationship between the greenhouse gases and carbon cycle.	CP: Ability to effectively define goals towards solving a problem

STRAND 2 CYCLES

SUB-STRAND 2 LIFE CYCLE OF ORGANISMS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.2.2.1 Demonstrate an activity to show the life cycle of *Anopheles* mosquito and understanding of how the effects of the mosquito on humans can be managed	**B8.2.2.1.1 Describe the life cycle and economic importance of *Anopheles* mosquito.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Observe and draw the different stages of the life cycle of *Anopheles* mosquito e.g. by breeding the mosquito in a glass jar.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternatives **DL:** Evaluate the quality and validity of information
	2. Describe the economic importance of the *Anopheles* mosquito.	**CP:** Ability to explain plans for attaining goals **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

	B8.2.2.1. 2 Discuss the impact of *Anopheles* mosquito on humans and how it can be controlled	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Discuss the impact of female *Anopheles* mosquito as a vector of plasmodium on humans.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Generate solutions to control malaria in Ghana.	**CP:** Ability to effectively define goals towards solving a problem

STRAND 2 CYCLES
SUB-STRAND 3 CROP PRODUCTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.2.3.1Demonstrate knowledge and skills in planting crops on different seed beds.	**B8.2.3.1.1 Explore the different seed beds for planting crops in your community.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Observe and discuss different seed beds for planting different crops.	**CP:** Ability to explain plans for attaining goals
	2. List and compare the differences and similarities among seed beds in the community.	**CP:** Create simple logic trees to think through problems
	3. Match the types of seed beds with the types and stages of crops planted in your community.	**CP:** Create simple logic trees to think through problems
	B8.2.3.1.2 Plant different types of crops on different seed beds.	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)**

		Creativity and Innovation (CI)
CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
	Exemplars:	
B8.2.3.1Demonstrate knowledge and skills in planting crops on different seed beds.	1. Observe and discuss the practice of planting different crops in different seed beds.	**CP:** Ability to explain plans for attaining goals **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Select different plant parts, (seeds, seedlings, cuttings, leaves, roots) and plant them in different seed beds.	**CP:** Ability to explain plans for attaining goals
B8.2.3.2Demonstrate understanding of the differences in height, size, and flowering of crops grown in different seed beds	**B8.2.3.2.1 Compare and contrast the differences in height, size, and flowering of crops grown in different seed beds.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Measure the heights, sizes, number of flowers, and number of fruits of plants grown in different seed beds.	**CP:** Can effectively evaluate the success of solutions they have used to attempt to solve a

		complex problem
	2. Discuss the differences and similarities in the heights, sizes, number of flowers and fruits of plants grown in different seed beds using tables and graphs.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	3. Write and give presentations on the reasons for differences in the heights, sizes, number of flowers and fruits of plants grown in different seed beds.	**CC :** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

STRAND 2 LIFE CYCLES OF ORGANISMS
SUB-STRAND 4 ANIMAL PRODUCTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.2.4.1Recognize the different types of feed for different types of animals	**B8.2.4.1.1 Compare and contrast the different types of feed for different types of animals.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Match the different types of feed with different types of animals.	**CP:** Ability to effectively define goals towards solving a problem

	2. Discuss the types of nutrients and their sources in the different types of animal feed.	**CP:** Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
	3. Select and discuss appropriate feed for animal based on the proportions of nutrients indicated on the package or labels.	**CP:** Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
B8.2.4.2Demonstrate understanding of the importance of water and animal feed to the growth of animals.	**B8.2.4.2.1 Explain the importance of water and animal feed to the growth of animals.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. List and discuss the usefulness of water to the growth of different nutrients in different types of feed for the growth and reproduction of animals.	CP: Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

	2. Predict what will happen to animals who are not provided with adequate water.	**CP:** Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem

STRAND 3 SYSTEMS

SUB-STRAND 1 THE HUMAN BODY SYSTEM

CONTENT STANDARDS	**INDICATOR AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B8. 3.1.1 Demonstrate knowledge of parts of mammalian tooth and the functions of the different types of teeth in relation to feeding in man	**B8.3.1.1.1 Identify parts of mammalian tooth**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Label parts, such as Crown, Neck, and Root of mammalian tooth.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternatives **DL:** Evaluate the quality and validity of information

	2. Explain the functions of each part of the mammalian tooth of human.	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8. 3.1.1 Demonstrate knowledge of parts of mammalian tooth and the functions of the different types of teeth in relation to feeding in man	**B8.3.1.1.2 Discuss the functions of the different types of teeth such as incisors, canines, premolars, and molars**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)** **Creativity and Innovation**
	Exemplars:	
	1. Discuss the functions of the different types of human teeth.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience.
	2. Draw the different types of teeth.	**CP:** Implement strategies with accuracy **DL:** Evaluate the quality and validity of information

CONTENT	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE

STANDARDS		COMPETENCIES
	B8.3.1.1.3 Explain the causes and prevention of tooth and gum decay	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Describe the causes of tooth decay, gum diseases and formation of plaque and the proper way of preventing tooth decay.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternatives **CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience
	2. Demonstrate proper ways of cleaning the teeth.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation

STRAND 3 SYSTEMS
SUB-STRAND 2 THE SOLAR SYSTEM

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES

B8.3.2.1Demonstrate knowledge of the outer planets of the solar system	**B8.3.2.1.1 identify the outer planets of the solar system and describe their properties**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Describe the composition of the solar system using charts, pictures and digital content.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience
	2. Identify and draw the planets that form the outer solar system.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternative
	3. Discuss the properties that are peculiar to each of the planet: Jupiter, Saturn, Uranus, and Neptune.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternatives
	4. Search and explain why there is no life on Jupiter, Saturn, Uranus, and Neptune.	**DL:** Evaluate the quality and validity of information
	5. Construct a model of the outer solar system (Jupiter, Saturn, Uranus, and Neptune**)** and display it for discussion.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument

STRAND 3 SYSTEMS
SUB-STRAND 3 ECOSYSTEM

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES

		AND CORE COMPETENCIES
B8.3.3.1 Demonstrate understanding of the interdependence of organisms in an ecosystem and their interaction	**B8.3.3.1.1 Explore the feeding relationships within an ecosystem**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Discuss how life on earth will be like without the sun.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternatives
	2. Explain the terms: producer, primary consumer, secondary consumer, food chain and food web as applied in energy transfer in an ecosystem.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience
	3. Illustrate with diagram how energy from the sun flows through a food chain and food web in an ecosystem.	**CP:** Create simple logic trees to think through problems

STRAND 3 SYSTEMS
SUB-STRAND 4 FARMING SYSTEMS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES

B8.3.4.1Demonstrate understanding of the different crop, animal and land combinations under various farming systems	**B8.3.4.1.1 Identify and describe the types of crops, animals and land combinations for the different farming systems.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Describe the types of crops, animals and land combinations in the different farming systems in your community.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience.
	2. Discuss the advantages and disadvantages of each farming system identified.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience **CP:** Ability to identify important and appropriate criteria to evaluate each alternative

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B8.3.4.1Demonstrate understanding of the different crop, animal	**B8.3.4.1.2 Discuss the usefulness of the different crops and animals involved in the different farming systems.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration**

and land combinations under various farming systems		**(CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Explain how different components of farming systems contribute to each other.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Discuss and write down the contribution of crops and animals towards the sustainability of each farming system.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience **CP:** Analyse and make distinct judgment about viewpoints expressed in an argument

STRAND 4 FORCES AND ENERGY

SUB-STRAND 1 ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.1.1Demonstrarte the skill to evaluate the conversion of energy from one form to another	**B8.4.1.1.1Describe energy conversion**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**

	Exemplar:	
	1. Describe how energy is converted from one form to another.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument **CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.1.1Demonstrarte the skill to evaluate the conversion of energy from one form to another	**B8.4.1.1.2 Discuss the importance of conversion of energy** **Exemplars:**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	1. Explain the processes that a dammed river goes through to produce electricity.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument **CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Describe how to harness natural forms of energy to other forms.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument **CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience

CONTENT	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES

STANDARDS		
B8.4.1.2 Show understanding of the sources of renewable energy and how to manage these sources in a sustainable manner	**B8.4.1.2.1 Describe renewable and non-renewable forms of energy.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Explain renewable and non-renewable sources of energy.	CC: Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Identify the various sources of renewable and non-renewable forms of energy and classify them e.g. Wind, Coal, Hydro, Crude oil, Natural gas, Solar and Biogas.	CP: Analyse and make distinct judgment about viewpoints expressed in an argument
	3. Describe how to produce energy from a renewable source	CP: Analyse and make distinct judgment about viewpoints expressed in an argument CC: Can vary the level of detail and the language use when presenting to make it appropriate to the audience

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.1.2 Show understanding of the sources of renewable energy and how to manage these sources in a sustainable manner	**B8.4.1.2.2 Demonstrate how to manage sources of renewable energy sustainably**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplar:	
	1. Research about information on the stages involved in managing renewable energy sources.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	2. Create a table to describe challenges associated with the management of different sources of renewable energy.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.1.3 Demonstrate understanding of the relationship between	**B8.4.1.3.1 Discuss the differences and the relationship between heat and temperature in the**	**Critical Thinking and Problem Solving (CP)**

heat and temperature	**environment**	**Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	
	1. Create a table to show the distinguishing features of temperature and heat.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	2. Discuss the relationship between temperature and heat.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience

STRAND 4 FORCES AND ENERGY
SUB-STRAND 2 ELECTRICITY AND ELECTRONICS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.2.1Demonstrate knowledge of electricity transmission	**B8.4.2.1.1 Explain how electricity transmission occurs**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Digital Literacy (DL)** **Creativity and Innovation (CI)**
	Exemplars:	

	1. Identify different stages of electricity transmission.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Draw a flow chart to show the stages of electricity transmission from the point of generation to the point of consumption.	CP: Create simple logic trees to think through problems

B8.4.2.2 **Demonstrate understanding of the functions of capacitors in relation to LEDs, Diodes and resistors in electronic circuits**	**B8.4.2.2.1 Demonstrate the charging and discharging action of a capacitor in a dc electronic circuit**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)**
	Exemplar:	
	1. Research information about capacitors in electronic circuits and explain their functions when connected with direct current (d.c).	**DL:** Evaluate the quality and validity of information Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	1. Describe the charging and discharging actions of a capacitor and explain its effect in an electronic circuit.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion

STRAND 4 FORCES AND ENERGY

SUB-STRAND 3 CONVERSION AND CONSERVATION OF ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.3.1 Evaluate the impact of conversion of energy and energy conservation on the environment	**B8.4.3.1.1. Explain the importance of conversion of energy and energy conservation in daily life**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Classify the importance of energy conversion and energy conservation in daily life.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Search from multimedia sources, books, internet for information on the impact of energy conversion and conservation in their environment and make a poster presentation on their findings.	**DL:** Evaluate the quality and validity of information **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

STRAND 4: FORCES AND ENERGY
SUB-STRAND 4: FORCE AND MOTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.4.1Analyze Newton's	**B8.4.4.1.1. Explain Newton's Second Law of motion and**	**Critical Thinking and**

Second law of motion and its application in everyday life.	**demonstrate its application to life**	**Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Explain Newton's Second Law of motion with examples from daily life.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Perform an experiment to determine the total force needed to make an object move or stop using the principle of Newton's Second Law of Motion.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B8.4.4.2Demonstrate understanding of complex machines and h	**B8.4.4.2.1 Identify complex machines and describe their functions in life**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**

	Exemplars:	
	1. Recap what simple machines are from B7.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Explain what complex machines are and show how different they are from simple machines.	**CP:** Identify and prove misconceptions about a generalised concept or fact specific to a task or situation
	3. Identify simple machine in complex machines.	**CP:** Identify and explain a confusion, uncertainty, or a contradiction surrounding an event
	4. Explain how the functions of a complex machine can improve the quality of life.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

STRAND 4: FORCES AND ENERGY
SUB-STRAND 5: AGRICULTURAL TOOLS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.4.5.1 Demonstrate knowledge and skills in the use of basic and simple	**B8.4.5.1.1 Show and discuss the use of basic and simple agricultural tools for basic on-farm activities.**	**Critical Thinking and Problem Solving (CP)** **Communication and**

agricultural tools for basic on-farm activities.		**Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Collect and list different types of agricultural tools used for on-farm activities.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	2. Match each tool with the familiar type of agricultural activity it is used for and create an album of the tools.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B8.4.5.1Demonstrate knowledge and skills in the use of basic and simple agricultural tools for basic on-farm activities.	**B8.4.5.1.2 Engage in the use of basic and simple agricultural tools for basic farm activities.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Explain how the different agricultural tools are used	**CP:** Provide new insight into

	on a farm or school garden to perform specific agricultural activities.	controversial situation or task
	2. Practice the use of different agricultural tools for specific activities on a farm or school garden.	**CI:** Ability to try alternatives and fresh approaches
	3. Select appropriate tools for specific agriculture tasks.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 1 WASTE MANAGEMENT

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.5.1.1 Demonstrate knowledge of waste management systems and apply it in an environment	**B8.5.1.1.1 Explain sustainable waste management practices.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Outline approaches of waste management in promoting sustainable management.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Conduct a survey in a community's waste management	**DL:** Knowledge and recognition of ethical use of information

	practices and present a report.	

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.5.1.1 Demonstrate knowledge of waste management systems and apply it in an environment	**B8.5.1.1.2. Apply Knowledge of waste management practices to manage waste in a community**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Carry out an activity to manage waste using knowledge acquired in indicator (1) in their communities.	**CP:** Ability to effectively define goals towards solving a problem
	2. Evaluate the waste management practices carried out in a community and present a report.	**CP:** Ability to effectively define goals towards solving a problem **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

STRAND 5: HUMANS AND THE ENVIRONMENT

SUB-STRAND 2: HUMAN HEALTH

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES

		AND CORE COMPETENCIES
B8.5.2.1 Demonstrate knowledge of common communicable diseases, such as Hepatitis, of humans, causes, symptoms, effects and their prevention	**B8. 5.2.1.1 Explain the symptoms, effects and prevention of common communicable diseases**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Compile data on the number of males and females who suffer from common communicable diseases such as Hepatitis, from a medical center and determine the possible causes of these diseases.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	2. Identify causes, symptoms, effects and prevention of Hepatitis, HIV, measles and others and make a presentation.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B8.5.2.1 Demonstrate	3. Search for the causes, symptoms and	**CP:** Ability to combine Information and

knowledge of common communicable diseases, such as Hepatitis, of humans, causes, symptoms, effects and their prevention	prevention of Hepatitis and develop a plan to minimize the disease.	ideas from several sources to reach a conclusion
	B8. 5.2.1.2. Analyze the risk factors of communicable diseases	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Search for information that is associated with communicable diseases.	**DL:** Evaluate the quality and validity of information
	2. Create awareness about risk factors of communicable diseases such as Hepatitis, HIV, measles and others in order to prevent the diseases in their school and communities.	**CC:** Apply appropriate diction and structure sentences correctly for narrative, persuasive, imaginative and expository purposes

STRAND 5 HUMANS AND THE ENVIRONMENT
SUB-STRAND 3 SCIENCE AND INDUSTRY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.5.3. 1 Demonstrate	**B8. 5.3.1.1 Examine the relationship among**	**Critical Thinking and Problem Solving**

understanding of connections among science, technology, innovation, society and the environment	**science, technology, innovation and society**	**(CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Explain the interrelationship of science and technology and innovation.	**CP**: Ability to effectively define goals towards solving a problem **CC**: Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Discuss technological advancement in the world and its impact on Ghanaian environment.	**DL:** Evaluate the quality and validity of information CC: Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech

STRAND 5 HUMANS AND THE ENVIRONMENT
SUB-STRAND 4 CLIMATE CHANGE AND GREEN ECONOMY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.5.4.1 Demonstrate understanding of the effects of climate change	**B8.5.4.1.1 Explain the concept of climate change and its effect on the environment**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration**

in the world and greening of other tropical countries including Ghana.		**(CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Describe the signs of climate change.	**CP**: Ability to combine Information and ideas from several sources to reach a conclusion **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Search for causes and effects of climate change and present a report.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion **DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B8.5.4.1 Demonstrate understanding of the effects of climate change in the world and greening of other tropical countries	3. Explain how countries in the continents are adapting to climate change for example tree planting and legislation on bush burning.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion **DL:** Ability to ascertain when

including Ghana.		information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	B8.5.4.1.2. Describe climate change and green economy actions	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Describe climate change adaptation measures that can be applied in the community.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion **CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B8.5.4.1 Demonstrate understanding of the effects of climate change in the world and greening of other tropical countries	2. Discuss mitigation strategies that your community can adapt to reduce the effects of climate change.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech. **DL:** Ability to ascertain when information is needed and be able to

including Ghana.		identify, locate, evaluate and effectively use them to solve a problem

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 5: UNDERSTANDING THE ENVIRONMENT

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.5.5.1Demonstrate understanding of the differences among soils, plant roots, stems, leaves, flowers, and fruits of plants in the different environments	**B8.5.5.1.1 Discuss physical properties of soils**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Collect and describe different samples of soils (sandy soil, loamy soil, clay soil, etc.) from the school garden and the community.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	2. Discuss how each soil type retains water and supports the root system of plants.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion **CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and

		speech.
	3. Conduct an experiment to demonstrate how different soil types retain water to support the root system of crops	

CONTENT STANDARDS	INDICATOR AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B8.5.5.1Demonstrate understanding of the differences among soils, plant roots, stems, leaves, flowers, and fruits of plants in the different environments	**B8.5.5.1.2 Analyze the physical properties of soils and demonstrate their importance for crop production.**	**Critical Thinking and Problem Solving (CP)** **Communication and Collaboration (CC)** **Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplars:	
	1. Examine and discuss the different physical properties of each soil type and how these properties help support crop production	**CP:** Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
	2. Observe and describe the growth of different plants on different soil types.	**CP:** Create simple logic trees to think through problems **CC**: Speak clearly and explain ideas. Share a narrative or extended

		answer while speaking to a group

BASIC 9

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 1: MATERIALS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.1.1.1 Show understanding of formation of binary chemical compounds	**B9.1.1.1.1 Identify by name binary chemical compounds and discuss their uses**	**Critical Thinking and Problem Solving(CP)** **Communication and**

and their uses (Acids, Bases and Salt)		**Collaboration(CC)**
	Exemplars:	
	1. Identify and name chemical compounds from a collection of materials commonly found at home, school and the community such as table salt, water, vinegar, fuel (*take precaution),* soap, detergents, marble and fertilizers	**CP** : Ability to combine Information and ideas from several sources to reach a conclusion
	2. Write the chemical symbols of the elements identified in the chemical compounds.	**CP:** Ability to effectively define goals towards solving a problem **CC:** Ability to effectively define goals towards solving a problem

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.1.1.1 Show understanding of formation of binary chemical compounds and their uses (Acids, Bases and Salt)	**B9.1.1.1.2 Discuss the formation of binary chemical compounds**	**Critical Thinking and Problem Solving(CP)** **Communication and Collaboration(CC)** **Creativity and Innovation(CI)**
	Exemplars:	

	1. Distinguish among elements, molecules, ions and compounds.	**CP:**Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation **CP:**Preparedness to recognise and explain results after implementation of plans
	2. Write molecular formula of binary compounds and describe their formation.	**CC:** Ability to work with all group members to complete a task successfully
	3. Compare and contrast different binary chemical compounds based on their composition and properties.	**CP :** Generate hypothesis to help answer complex problems **CP :** Ability to identify important and appropriate criteria to evaluate each alternatives

B9.1.1.1 Show understanding of formation of binary chemical compounds and their uses (Acids, Bases and Salt)	4. Form models to represent chemical compounds such as water, carbon (IV) oxide, iron (II) sulfide and magnesium oxide.	**CI:**Ability to look at alternatives in creating new things
	B9.1.1.1.3 Describe the characteristics of common acids, bases and salts	**Critical Thinking and** **Problem Solving(CP)** **Communication and Collaboration(CC) Creativity and Innovation(CI)**

	Exemplars:	
	1. Identify acids, bases and salts by their characteristics	**CP:** Identify and prove misconceptions about a generalised concept or fact specific to a task or situation
	2. Create a model of a pH Scale and use it to determine the strength of common acids and alkali solutions. using indicators	**CI:** Ability to look at alternatives in creating new things **CI :** Anticipate and overcome difficulties relating initiatives

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.1.1.2 Demonstrate knowledge of atomic bonding in the formation of chemical compounds	**B9.1.1.2.1 Recognize that chemical bond results from the attraction between atoms in a compound**	**DigitalLiteracy(DL), Personal Development and Leadership(PD), Communication and Collaboration(CC)**
	Exemplars:	
	1. Identify types of inter- atomic bonds.	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group **CC:** Understand and use interpersonal skills
	2. Describe the formation of inter-atomic bonds.	**DL** : Ability to find and consume digital content **PD :**Build a concept and understanding

		of one's self (strength and weaknesses, goals and aspiration, reaction and adjustment to novel situation)
	3. Identify examples of substances that exhibit ionic, covalent and metallic bonding.	DL : Evaluate the quality and validity of information

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 2: LIVING CELLS

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.1.2.1 Appreciate that different atoms in living molecules account for diverse organisms	**B9.1.2.1.1 identify biological molecules and show atoms in the molecules**	**Critical Thinking and Problem Solving(CP) Communication and Collaboration(CC) Digital Literacy(DL), Creativity and Innovation(CI)**
	Exemplars:	
	1. Name biological molecules such as *Nucleic acids,Proteins,Carbohydrates and Lipids* found in organisms.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion **CP:** Ability to effectively define

		goals towards solving a problem
	2. Identify the atoms in the biological molecules in exemplar 1.	**DL:** Preparedness to make better decision with information at hand **DL :** Understand sociological and emotional aspects of work in cyberspace
	3. Search for modules of biological molecules as in exemplar 1 and use it to explain the differences among organisms.	**CI:** Imagining and seeing things in a different way

STRAND 2: CYCLES
SUB-STRAND 1: EARTH SCIENCES

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.1.1Demonstrate understanding of the processes of Nitrogen cycle as a repeated pattern of change in nature and how it relates to the environment	**B9.2.1.1.1 Explain the process of Nitrogen cycle as a repeated pattern in nature.**	**Critical Thinking and Problem Solving(CP)** **Communication and Collaboration(CC) Digital Literacy(DL), Creativity and Innovation(CI)**
	Exemplars:	
	1. Identify nitrogen cycle from the internet, charts, or pictures	**DL:**Ability to construct knowledge from a non-linear hyper textual navigation
	2. Explain the process of nitrogen cycle depicting processes such	**CP:**: Demonstrate a thorough

	as: Nitrogen fixation Nitrification (converting ammonia into nitrates). Assimilation (plants and animals using nitrogen) Ammonification (adding organic nitrogen compounds to ammonia or ammonia formation). Denitrification	understanding of a generalised concept and facts specific to task or situation

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.1.1Demonstrate understanding of the processes of Nitrogen cycle as a repeated pattern of change in nature and how it relates to the environment	3. Explain the relationship between the nitrogen cycle and the environment.	**CG** :Develop and express respect, recognition and appreciation of others' culture
	4. Explain why the nitrogen cycle is a repeated pattern in nature.	**CC** :Provide feedback in areas of ideas, organization, voice, word choice and sentence fluency in communication
	B9.2.1.1.2 Describe the importance of the Nitrogen cycle to the environment.	
	Exemplars :	
	1. Describe the importance of nitrogen to the environment	**CI** :Identification of requirements of a given situation and

		justification of more than one creative tool that will be suitable
	2. Carry out a project to show how certain plants such as leguminous crops can replenish nitrogen in the soil.	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group
	3. Predict what will happen if the nitrogen cycle is interrupted by actions such as leaching, bush burning, destruction of leguminous plants.	**CI:** Imagining and seeing things in a different way

STRAND 2: CYCLES
SUB-STRAND 2: LIFE CYCLE OF ORGANISMS

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.2.1 Demonstrate understanding of the life cycle of grasshopper and assess how their activities affect humans	**B9.2.2.1.1 Describe the life cycle of grasshopper which depicts incomplete metamorphosis**	**Critical Thinking and Problem Solving(CP) Communication and Collaboration(CC) Digital Literacy(DL), Creativity and Innovation(CI)**
	Exemplars :	
	1. Draw the stages of the life cycle of grasshopper from Egg through Nymph to Adult.	**CI:** Ability to select the most effective creative tools for working and preparedness to give

		explanations **DL:** Use digital tools to create novel things
	2. Identify the behavior of each stage of life cycle of a grasshopper.	**CC:** Speak clearly and explain ideas. Share a narrative or extended answer while speaking to a group

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.2.1 Demonstrate understanding of the life cycle of grasshopper and assess how their activities affect humans	3. Explain why the life cycle of the grasshopper is described as incomplete metamorphosis as compared to complete metamorphosis of housefly and mosquito in B7 and B8 respectively.	**CP:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech. **CP**: Understand and use interpersonal skills
	B9.2.2.1.2 Examine how the activities of grasshopper affect humans.	**Critical Thinking and Problem Solving(CP)** **Communicationand Collaboration(CC) Digital Literacy(DL)**
	Exemplars :	

	1. Outline the activities of the grasshopper in everyday life (e.g. feeding on grasses and weeds.	**CP:** Provide feedback in areas of ideas, organisation, voice, word choice and sentence fluency in communication
	1. Carry out a search for information on activities of a grasshopper that are harmful or beneficial to humans.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.2.1 Demonstrate understanding of the life cycle of grasshopper and assess how their activities affect humans	2. Generate activities to promote or reduce the effect of grasshoppers on humans.	**DL:** Preparedness to make better decision with information at hand **DL**: Knowledge and recognition of ethical use of information **CP:** Implement strategies with accuracy

STRAND 2: CYCLES
SUB-STRAND 3: CROP PRODUCTION

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.3.1Show	**B9.2.3.1.1 Observe and describe differences in maturities**	**Critical Thinking and**

understanding of differences in maturities of different crops grown in different soil medium and different seed beds	**of crops grown in different soil medium and different seed beds.**	**Problem Solving(CP)** **Communication and Collaboration(CC) Digital Literacy(DL),**
	Exemplars	
	1. Observe and record the maturity stages of different crops on different soil media and seed beds.	**DL :** Evaluate the quality and validity of information **CP :** Apply appropriate diction and structure sentences correctly for narrative, persuasive, imaginative and expository purposes
	2. Discuss the differences in maturity stages among the different crops on the different soil media and seed beds.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	3. Compare and contrast the maturity stages of crops and seedlings in the community/school garden with others grown elsewhere.	**CC:** Apply appropriate diction and structure sentences correctly for narrative, persuasive, imaginative and expository purposes

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.3.2 Demonstrate	**B9.2.3.2.1 Observe and record the uses of different crops at**	**Communication and**

knowledge and understanding of uses of different crops at different maturity stages.	**different maturity stages.**	**Collaboration(CC) Digital Literacy(DL),Critical Thinking and problem solving(CP)**
	Exemplars:	
	1. Discuss and write the uses of each maturity stage of each crop identified.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech. **DL** :Evaluate the quality and validity of information
	2. Categorize crops by their different maturity stages and uses.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.3.2 Demonstrate knowledge and understanding of uses of different crops at different maturity stages	**B9.2.3.2.2 Evaluate the importance of knowledge of maturity stages of different crops to human beings**	**Communication and Collaboration(CC) Digital Literacy(DL),Critical Thinking and problem solving(CP)**
	Exemplars:	
	1. Explain the specific use(s) of each maturity stage of different crops to humans, other crops, animals, and the environment.	**CC:** Provide feedback in areas of ideas, organisation, voice, word choice and sentence fluency in

		communication
	2. Discuss the differences in maturity stages among the different crops on the different soil media and seed beds.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	3. Compare and contrast the maturity stages of crops and seedlings in the community/school garden with others grown elsewhere.	**CC:** Apply appropriate diction and structure sentences correctly for narrative, persuasive, imaginative and expository purposes

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.3.2 Demonstrate knowledge and understanding of uses of different crops at different maturity stages.	**B9.2.3.2.1 Observe and record the uses of different crops at different maturity stages.**	**Communication and Collaboration(CC) Digital Literacy(DL),Critical Thinking and problem solving(CP)**
	Exemplars:	
	1. Discuss and write the uses of each maturity stage of each crop identified.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech. **DL** :Evaluate the quality and validity of information
	2. Categorize crops by their different maturity stages and uses.	**CP:** Ability to combine

		Information and ideas from several sources to reach a conclusion

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.2.3.2 Demonstrate knowledge and understanding of uses of different crops at different maturity stages.	**B9.2.3.2.2 Evaluate the importance of knowledge of maturity stages of different crops to human beings**	**Communication and Collaboration(CC) Digital Literacy(DL),Critical Thinking and problem solving(CP)**
	Exemplars:	
	1. Explain the specific use(s) of each maturity stage of different crops to humans, other crops, animals, and the environment.	**CC:** Provide feedback in areas of ideas, organisation, voice, word choice and sentence fluency in communication
	2 Explain how the knowledge of the maturity stages of different crops helps a farmer in crop selection, time of harvest, and others.	**CP:** Create simple logic trees to think through problems **CP**: Ability to identify important and appropriate criteria to evaluate

		each alternatives
	3. Compare different stages of maturity of crops used in the community with those used in other places	**DL:** Ability to find and consume digital content

STRAND 2: CYCLES
SUB-STRAND 4: ANIMAL PRODUCTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.2.4.1Demonstrate understanding of the preparation of feed for domestic and commercial animals.	**B9.2.4.1.1List the ingredients and the method of preparation of different feed for different domestic and commercial animals.**	**Critical Thinking and Problem Solving(CP) Communication and Collaboration(CC) Digital Literacy(DL),Personal development and leadership(PD)**
	Exemplars:	**CC:** Provide feedback in areas of ideas, organisation, voice, word choice and sentence fluency in communication
	1. Demonstrate how farmers prepare feed for different domestic and commercial animals with ingredients.	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation

	2. Write down the process of preparing feed for different domestic and commercial animals with the ingredients.	**PD:** Division of task into solvable units and assign group members to task units

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.4.1Demonstrate understanding of the preparation of feed for domestic and commercial animals.	3. Compile a table, matching feed, ingredients and method of preparation.	**DL:** Knowledge and recognition of ethical use of information
	4. Formulate and prepare feed for domestic and commercial animals.	**DL:** Knowledge and recognition of ethical use of information
B9.2.4.2Demonstrate skills and knowledge of feeding domestic and commercial animals	**B9.2.4.2.1 Describe and select appropriate feed for different domestic and commercial animals**	**Critical Thinking and Problem Solving(CP) Communication and Collaboration(CC) Digital Literacy(DL),Personal development and leadership(PD)**
	Exemplars:	
	1. Compile a list of feed commonly consumed by the different domestic and commercial animals in the environment	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and

		speech.
	2. Compare and contrast the characteristics of different kinds of feed commonly consumed by categories of domestic and commercial animals (ruminants, monogastric and poultry).	**DL:** Ability to find and consume digital content

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.4.2Demonstrate skills and knowledge of feeding domestic and commercial animals	3. Record feed used to feed domestic and commercial animals on farms over a period of time.	**CP:** Ability to combine Information and ideas from several sources to reach a conclusion
	4. Identify named samples of feed for three categories of domestic and commercial animals (ruminants, monogastrics and poutry.	**PD:** Demonstrate sense of feeling or belongingness to a group
	B9.2.4.2.2 Differentiate between different types of feed for different stages of domestic and commercial animals.	**Critical Thinking and Problem Solving(CP)** **Communication and Collaboration(CC) Personal development and leadership(PD)**
	Exemplars:	
	1. Categorize different types of animals according to how their stages of growth (young, growing and matured stages).	CP: Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
	2. List the types of feed used for the various stages of growth in their domestic and commercial ruminants, monogastrics and poutry.	**CC:** Understand and use interpersonal skills

	3. Compare and construct the major functions of feed in each growth stage of different animals.	**PD:** Build a concept and understanding of one's self (strength and weaknesses, goals and aspiration, reaction and adjustment to novel situation)
	4. Discuss types of feed used to feed different domestic and commercial animals at different stages of growth.	**CC:** Ability to keep group working on relevant activities

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.2.4.4.2Demonstrate skills and knowledge of feeding domestic and commercial animals	**B9.2.4.2.3 Perform the feeding of domestic and commercial animals**	**Critical Thinking and Problem Solving(CP)** **Communication and Collaboration(CC)**
	Exemplar:	
	1. Demonstrate how to feed domestic and commercial animals at different stages of growth and production with appropriate feed in the school farm or a farm in the community.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience **CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation

STRAND 3: SYSTEMS

SUB-STRAND 1: THE HUMAN BODY SYSTEM

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.3.1.1 Demonstrate understanding of the blood circulatory system, health problems associated with the system and its relationship with the respiratory system in humans	**B9.3.1.1.1 Explain the concept of the circulatory system, state the function of each part of the system and health challenges associated with it**	**Critical Thinking and Problem Solving(CP)** **Communication and Collaboration(CC), Digital literacy(DL),Creativity and Innovation(CI)**
	Exemplars:	
	1. Discuss blood circulatory system in humans and the composition and functions of blood	**CP:** Identify and prove misconceptions about a generalised concept or fact specific to a task or situation
	2 Explain the functions of the parts of the circulatory system	**CC:** Demonstrate behaviour and skills of working towards group goals
	3 Draw and label the longitudinal section of a mammalian heart	**DL:** Use digital tools to create novel things
	4 Describe diseases, causes and prevention of the circulatory system	**CI:** Ability to reflect on approaches to creative task and evaluate the effectiveness of tools used
	5 Describe what blood pressure is and ways of managing it.	**CC:** Ability to keep group working on relevant activities

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES

B9.3.1.1 Demonstrate understanding of the blood circulatory system, health problems associated with the system and its relationship with the respiratory system in humans	**B9.3.1.1.2 Explain the concept of respiration and show how respiratory system and the circulatory system complement each other.** **Exemplars :**	**Communication and Collaboration(CC),** **Critical Thinking and** **Problem Solving(CP)**
	1. Explain the concept of respiration	**CC:** Identify and analyse different points of views of speaker
	2. Explain how deoxygenated blood from circulation is oxygenated through inhalation for respiration to take place.	**CP :** Create simple logic trees to think through problems

STRAND 3: SYSTEMS
SUB-STRAND 2: THE SOLAR SYSTEM

Content Standard	Indicators and Exemplars	Subject Specific Practices and Core Competencies
B9.3.2.1Demonstrate knowledge of other non- planetary bodies such as comets, asteriods, and their relationship with the solar system	**B9.3.2.1.1 Understand the movement of non-planetary bodies in the solar system.**	**Communication and Collaboration(CC), Digital Literacy(DL)**
	Exemplars:	
	1. Research for information on the movement of non-planetary bodies in the solar system. E.g. asteroids and	**DL :** Preparedness to make better decision with information at hand

	comets	
	2. Compare and contrast the movement of the non-planetary bodies in the solar system.	**CC :** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.

STRAND 3: SYSTEMS
SUB-STRAND 3: ECOSYSTEM

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.3.3.1Recognise the interdependence of organisms in an ecosystem and appreciate their interaction to maintain balance in the system	**B9.3.3.1.1 Conduct research into the composition of an ecosystem and discuss how the components depend on each other for survival**	**Communication and Collaboration(CC), Digital Literacy(DL),Creativity and Innovation(CI)**
	Exemplars :	
	1. Describe how organisms depend on each other in different ecosystems from pictures, charts and videos	**DL :** Ability to find and consume digital content
	2. State the differences between an ecosystem and a habitat	CC: Understand roles during group activities
	3. Construct food chain and food web found in an ecosystem	

	4. Predict and justify your predictions on how interferences such as earthquake volcanic eruptions hunting, farming,mining, galamsey, pollution, pesticides and bush burning will affect the balance in an	**CI:** Ability to visualise alternatives, seeing possibilities, problems and challenges

STRAND 3: SYSTEMS
SUB-STRAND 4: FARMING SYSTEMS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.3.4.1Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	**B9.3.4.1.1 List and explain the different plant and animal waste used in preparing different types of manure**	
	Exemplars:	
	1. List types of manure used by farmers	**CC:** Demonstrate behaviour and skills of working towards group goals
	2. Identify and write down the materials used in preparing manure and their sources	**CP:** Create simple logic trees to think through problems
	3. Categorize manure into those from plant wastes and animal wastes	**CI:** Anticipate and overcome difficulties relating initiatives

	4. Compile a list of plant parts/wastes and animal parts/wastes that are used to prepare manure	**CC:** Provide feedback in areas of ideas, organisation, voice, word choice and sentence fluency in communication
	5. Justify the use of different animal and plant manures (poultry droppings, cow dung, animal parts and carcasses, pig dung, human excreta, domestic refuse, leaves, waste fruits, plant parts and shavings, etc) under different soil and climatic conditions	**CP:** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.3.4.1Demonstrate knowledge and skills in the preparation of different types of manure from animal and plant waste	**B9.3.4.1.2 Demonstrate the preparation of different types of manure**	**Communication and Collaboration(CC), ,Creativity and Innovation(CI),Critical Thinking and Problem Solving(CP)**
	Exemplars:	
	1. Prepare manure from the different plant and animal waste	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	2. Discuss the preparation of manure using the plants and animal wastes that are available in a community.	**CC:** Can vary the level of detail and the language use when presenting to make it appropriate to the audience.
	B9.3.4.1.3 Engage in the preparation of different types of manure	**Communication and Collaboration(CC), Critical Thinking and Problem Solving(CP)**
	Exemplars:	
	1. Treat various plant and animal wastes to produce manure (cleaning/sorting, curing/composting) in the field or school garden	**CC:** Demonstrate behaviour and skills of working towards group goals

STRAND 4: FORCES AND ENERGY

SUB-STRAND 1: ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.4.1.1 Show understanding of the concept of conservation of energy and ways of conserving energy	**B9.4.1.1 .1 List the ways such as ironing in bulk, using energy efficient appliances and switching off appliances when not in use to conserve energy.**	**Creativity and Innovation (CI)** **Communication and Collaboration (CC)**
	Exemplar:	
	1. Identify and discuss various strategies of conserving energy	**CI:** Identification of requirements of a given situation **CC:** Speak clearly to convey simple ideas
	B9.4.1.1 .2 Explain the importance of energy conservation in daily life	**Digital Literacy(DL)**
	Exemplar:	
	1. Research information about energy conservation and discuss its importance to life	**DL:** Ability to find and consume digital content; ability to research and communicate information

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.4.1.2 Evaluate the application of light energy.in life.	**B9.4.1.2.1 Demonstrate that light changes path when it travels from one medium to a different medium**	**Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplar:	
	1. Carry out a practical activity to show that light bends as it travels from one medium to another. E.g. A rod appears bent in water, deep water appears shallow than its real depth.	**CI:** Exhibit the skill of inquisitiveness and curiosity **DL:** Ability to find and consume digital content; ability to research and communicate information
	B9.4.1.2.2 Describe how images are formed in cameras	
	Exemplar:	**Creativity and Innovation (CI)**
	1. Create a model of a camera and describe how it works to form an image.	**CI:** Identify and use different components of ideas to create new things
	B9.4.1.2.3 Describe the formation of shadows	**Communication and Collaboration (CC)**
	Exemplar:	
	1. Discuss the terms umbra and penumbra in relation to the formation of shadows and explain how they are formed	**CC: Speak clearly to convey simple ideas**

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.4.1.2 Evaluate the application of light energy.in life.	**B9.4.1.2.4 Demonstrate the formation of an eclipse**	**Creativity and Innovation (CI)** **Digital Literacy (DL)**
	Exemplar:	
	1. Use a model to illustrate how eclipse is formed,	**CI:** Ability to merge simple ideas to create novel thing; look at alternatives in creating new things **DL:** Ability to find and consume digital content

STRAND 4: FORCES AND ENERGY
SUB-STRAND 2: ELECTRICITY AND ELECTRONICS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.4.2.1Construct electrical circuits and illustrate how electrical energy is transformed into other forms of energy and perform	**B9.4.2.1.1 Demonstrate transformation of electrical energy to other forms of energy in both series and parallel circuits and perform simple calculations involving flow of current in circuits**	**Communication and Collaboration (CC)** **Critical Thinking and Problem Solving (CP)**

electrical calculations		
	Exemplars:	
	1. Predict the impact of changes in electrical circuits with regards to the output of bulbs. Describe how electrical energy transformation occurs in series and parallel circuits.	**CC:** Speak clearly to convey ideas; logically order information in a way that could be understood by an audience
	2. Construct simple electrical circuits and measure the voltage, current and resistance.	**CP:** Ability to understand features of a problem; ask for support to solve a problem; following instructions to solve a problem
	3. Calculate the potential difference in a circuit using the formula: V = IR (where I is the current and R the resistance).	**CP:** Ability to understand features of a problem; ask for support to solve a problem; following instructions to solve a problem

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.4.2.2 Demonstrate understanding of Forward and Reverse Bias and explain the behaviour of LEDs, Diodes, Resistors and Capacitors in electronic	**B9.4.2.2.1 Describe Forward Bias and Reverse Bias and explain the relationship among the components, such as: LEDs, Diodes, Resistors and Capacitors, in an electronic circuit.**	**Communication and Collaboration (CC)** **Creativity and Innovation (CI)**

circuits		
	Exemplars:	
	1. Explain Forward Bias and Reverse Bias in an electronic circuit	**CC:** Logically order information in a way that could be understood by an audience
	1. Construct different electronic circuits (the forward and reverse bias). and observe what happens to the LED.	**CI:** Use mind mapping as a creative tool to support how to generate, develop and link ideas
	2. Construct different electronic circuits involoving resistors and capacitors and observe what happens to the LED and report on their findings.	**CI:** Use mind mapping as a creative tool to support how to generate, develop and link ideas

STRAND 4: FORCES AND ENERGY
SUB-STRAND 3: CONVERSION AND CONSERVATION OF ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.4.3.1 Show understanding of conversion and conservation of energy and their application to life	**B9.4.3.1.1. Describe how energy can be converted from one form to another and show how conservation of energy occurs**	**Communication and Collaboration (CC)**
	Exemplar:	
	1. Differentiate between conversion of energy and conservation of energy and show their application to life	**CC:** Identify and analyse different points of view

	B9. 4.3.1.2 Describe how conversion and conservation of energy are applied in life	**Communication and Collaboration(CC)**
	1. Distinguish between examples of conversion and conservation using everyday examples.	**CC:** Identify and analyse different points of view
	2. Identify opportunities to conserve energy and produce a report.	**CC:** Identify and analyse different points of view

STRAND 4: FORCES AND ENERGY
SUB-STRAND 4: FORCE AND MOTION

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.4.4.1Demonstrate understanding of Newton's Third Law of Motion and its application in everyday life.	**B9.4.4.1.1 Explain the importance of Newton's Third Law of motion in life**	**Communication and Collaboration (CC)**
	Exemplar:	
	1. State Newton's Third Law of Motion	**CC:** Apply appropriate diction and structure sentences correctly; convey simple answers or thoughts
	2. Discuss Newton's Third Law of Motion and show its importance to life	**CC:** Explain ideas in a clear order with relevant detail, using appropriate conjunctions to structure and speech.

	B9.4.4.1.2 Demonstrate the application of Newton's Third Law of motion in life	**Creativity and Innovation (CI)**
	Exemplar:	
	1. Predict what happens when a force is exerted on an object the reaction from the object and is the same as the force exerted. perform an activity to confirm your predictions,	**CI:** Reflect on work and explore thinking behind thoughts

STRAND 4: FORCES AND ENERGY
SUB-STRAND 5: AGRICULTURAL TOOLS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	**B9.4.5.1.1 Identify materials used in making simple agricultural tools**	**Creativity and Innovation (CI)** **Communication and Collaboration (CC)** **Critical Thinking and Problem Solving (CP)**
	Exemplars	
	1. Describe simple agricultural tools assembled from their environment	**CI:** Putting forward constructive comments and ideas. **CC:** Speak clearly and convey simple ideas; use appropriate language structure and gesture to engage audience

	2. Identify the materials used to make the tools assembled in exemplar 1 and show how the parts are connected	**CI:** Identification of requirements of a given situation and justificationof more than one creative tool. **CP:** Ability to combine information and ideas from several sources to reach a conclusion

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B9.4.5.1 Demonstrate knowledge and skills in making simple agricultural tools for on-farm activities	**B9.4.5.1.2 Discuss and write activities involved in making simple agricultural tools**	**Communication and Collaboration (CC)**
	Exemplars	
	1. Describe the activities and processes involved in making different agricultural tools	**CC:** Speak clearly to convey simple ideas; logically order information in a way that could be understood by an audience
	2. Explain the materials, processes, constraints and precautions involved in manufacturing simple agricultural tools	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure the speech.
	B9.4.5.1.3 Manufacture simple agricultural tools	**Creativity and Innovation (CI)**
	Exemplar	
	1. Produce simple farm tools using materials from the environment	**CI:** Generate and merge simple ideas; identify and use different component of ideas to create new things

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 1: WASTE MANAGEMENT

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.5.1.1Demonstrate understanding of the processes of scientific ways used in various waste management systems	**B9. 5.1.1.1 Investigate the scientific methods used in waste management**	**Communication and Collaboration(CC), ,Creativity and Innovation(CI),Critical Thinking and Problem Solving(CP)**
	Exemplars:	
	1. Identify scientific methods such as recycling, composting used in waste management.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Explain the scientific principles underling the methods used in waste management.	**CP:** Create simple logic trees to think through problems
	3. Conduct waste management audit in schools and assess the effectiveness of each.	**CI :** Ability to visualise alternatives, seeing possibilities, problems and challenges

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 2: HUMAN HEALTH

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.5.2.1 Demonstrate	**B9.5.2.1.1 Explain the symptoms, effects and prevention of common non- common communicable diseases and analyze**	**Communication and Collaboration(CC), ,Critical**

knowledge of common non-communicable diseases of humans, their causes, symptoms, effects and prevention	**the risk factors associated with them**	**Thinking and Problem Solving(CP),Digital Literacy(DL), Cultural Identity and Global citizenship(CG)**
	1. Describe non- communicable diseases and determine their common causes	**CC :** Provide feedback in areas of ideas, organisation, voice, word choice and sentence fluency in communication
	2. Identify symptoms, effects and prevention of non-communicable diseases (refer to teachers pack for specific diseases) that are associated with malnutrition, poor working environment and exposure to drugs.	**CP :** Ability to select alternative(s) that adequately meet selected criteria
	3. Explain the causes, symptoms, effects and prevention of cancer	**DL :** Evaluate the quality and validity of information
	4. Identify common cancers that affect humans and link them to life style	**CG :** Adjustment to the demands of customs, traditions, values and attitudes of society

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 3: SCIENCE AND INDUSTRY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.5.3.1 Analyze the	**B9.5.3.1.1 Investigate the scientific concepts, principles and**	**Communication and**

scientific concepts, principles and processes applied in industries in and outside their community	**processes involved in industries in their environment**	**Collaboration(CC), ,Critical Thinking and Problem Solving(CP),Digital Literacy(DL),**
	1. Identify products of industries within and outside their community and describe the process of production	**CC :** Demonstrate behaviour and skills of working towards group goals **CP:** Identify and prove misconceptions about a generalised concept or fact specific to a task or situation
	2. Investigate and outline scientific concepts, principles and processes underlying the production of common everyday industrial products.	**DL:** Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 4: CLIMATE CHANGE AND GREEN ECONOMY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.5.4.1 Demonstrate understanding of natural and human factors that influence climate change and green economy	**B9.5.4.1.1 Examine various natural and human factors that influence climate change and green economy in their localities**	**Communication and Collaboration(CC), ,Creativity and Innovation(CI) Digital Literacy(DL),**
	1. Identify natural factors that influence climate change.	**DL :** Adhere to behavioural protocols that prevail in cyberspace
	2. Describe ways of minimizing human activities that influence climate change.	**CC :** Identify and analyse different points of views of speaker
	3. Compare natural and human factors that influence climate change and green economy.	**CI :** Ability to select the most effective creative tools for working and preparedness to give explanations

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 5: UNDERSTANDING THE ENVIRONMENT

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.5.5.1 Demonstrate knowledge and skills in the use of plant roots, stems, leaves, flowers, and fruits for agricultural and non-agricultural purposes	**B9.5.5.1.1 Show and list the uses of different plant parts for agricultural and non-agricultural purposes.**	**Communication and Collaboration(CC), ,Creativity and Innovation(CI) Digital Literacy(DL),Critical Thinking and Problem Solving(CP)**
	Exemplars	
	1. Identify plant parts that are used for agricultural and non-agricultural purposes	**CC :** Provide feedback in areas of ideas, organisation, voice, word choice and sentence fluency in communication
	2. Describe how plant parts are used for agricultural and non-agricultural purposes	**CP :** Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
	3. List the uses of the plant parts for agricultural purposes (such as planting, tools, animal housing, animal feed, soil improvement, pest and disease control, etc.)	**CI :** Identification of requirements of a given situation and justification of more than one creative tool that will be suitable
	4. List the uses of the plant parts for non-agricultural purposes (such as herbal medicine, construction of houses, bridges and furniture, artifacts, ceremonies, rituals, education, etc.)	**DL :** Evaluate the quality and validity of information

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B9.5.5.1 Demonstrate knowledge and skills in the use of plant roots, stems, leaves, flowers, and fruits for agricultural and non-agricultural purposes	**B9.5.5.1.2 Demonstrate the use of different plant parts for agricultural and non-agricultural purposes**	**Communication and Collaboration(CC), Digital Literacy(DL),Critical Thinking and Problem Solving(CP),Creativity and Innovation(CI)**
	Exemplars	
	1. Create agricultural materials from different plant parts that are used to carry out agricultural activities to	**CC :** Demonstrate behaviour and skills of working towards group goals
	2. Create non-agricultural materials from different plant parts to carry out non-agricultural activities.	**CP :** Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation **CI** : Identification of requirements of a given situation and justification of more than one creative tool that will be suitable

BASIC 10

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 1: MATERIALS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.1.1.1 Prepare	**B10.1.1.1.1 demonstrate understanding of the preparation of**	**Critical Thinking and**

compounds and mixtures and compare and contrast their characteristics; then determine the concentration of solutions	**standard solutions**	**Problem Solving (CP) (CP)**
	Exemplars**:**	
	1. Determine the mass number of a given element based on given number of protons or electrons and number of neutrons	CP: Ability to combine Information and ideas from several sources to reach a conclusion
	2. Calculate the molar mass and formula mass of compounds given the molecular formula and relative atomic masses	CP: Ability to effectively define goals towards solving a problem
	3. Calculate the amount of substance (n) in moles given the mass (m) and molar mass (M) of a compound	CP:Ability to effectively define goals towards solving a problem
	4. Explain the concentration of a solution in mol/dm^3; g/dm^3,. Identify the constituents of mixtures.	CP:Ability to combine Information and ideas from several sources to reach a conclusion
	5. Prepare solutions of a given concentration e.g. IM solution of a) NaOH (b) NaCl	CP: Ability to explain plans for attaining goals
	6. dilute solutions of given concentrations and discuss everyday application of dilution. E.g. food preparation, drug preparation.	CP: Ability to explain plans for attaining goals
	B10.1.1.1.2 To write concentration indicator here. Demonstrate understanding of the preparation of standard solution	**Critical Thinking and Problem Solving (CP) (CP)**
	1. Explain how chemical compounds and mixtures are similar in	CP:Analyse and make distinct

	terms of properties, mode of combination end products and separation processes.	judgment about viewpoints expressed in an argument
2.	3.	
B10.1.1.2 Demonstrate understanding that the arrangement and characteristics of metals, non-metals and the noble gases in the periodic table are related to their reactivity.	**B10.1.1.2.1 Recognise that the arrangement of elements on the Periodic Table is related to their properties and reactivities.**	**Critical Thinking and Problem Solving (CP) (CP),Creativity and Innovation(CI)**
	Exemplars :	
	1. Classify the elements on the Periodic Table into metals, non-metals and noble gases	CI: Identification of requirements of a given situation and justification of more than one creative tool that will be suitable
	2. Describe the properties of metals and non-metals	CI: Recognise and generalise information and experience ; search for trends and patterns
	3. Explain the reactivity of elements of group I and group II metals in the (e.g. metals or non-metals) in the Periodic Table.	CP:Ability to combine Information and ideas from several sources to reach a conclusion

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 2: LIVING CELLS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.1.2.1 Demonstrate knowledge of specialist cells of dicotyledonous plants and humans, their formation and functions for the existence of the plants and humans	**B10.1.2.1.1 Discuss the concepts of specialised cells and how they are formed in dicotyledonous plants and humans**	**Communication and Collaboration (CC), Critical Thinking and Problem Solving (CP) (CP)**
	Exemplars:	
	1. Brainstorm to bring out the meaning of specialised cells.	**CC:** Demonstrate behaviour and skills of working towards group goals
	2. Discuss how specialised cells are formed in dicotyledonous plants and humans.	**CC:** Demonstrate behaviour and skills of working towards group goals CP: Ability to identify important and appropriate criteria to evaluate each alternatives
	B10.1.2.1.2 Examine the functions of specialised cells in	**Digital Literacy (DL),**

	dicotyledonous plant such as epidermal, guard cells, cambium, xylem in relation to the existence of the plants	**Critical Thinking and Problem Solving (CP)**
	Exemplar:	
	1. Observe specialised dicotyledonous plant cells such as **epidermal, guard cells, cambium, xylem** from videos and charts and identify them by their names and shapes.	DL: Ability to find and consume digital content CP: Ability to combine Information and ideas from several sources to reach a conclusion
	2. Search from books and internet for information on the functions of the specialised cells of dicotyledonous plants and how they relate to the existence of the plants.	DL: Ability to find and consume digital content CP: Ability to combine Information and ideas from several sources to reach a conclusion
	B10.1.2.1.3 Examine the functions of specialised animal cells such as (nerve, blood cells, muscle cells and sperm cells) in relation to the existence of humans.	**Digital Literacy (DL), Critical Thinking and Problem Solving (CP)**
	1. Observe specialised animal cells such as nerve cells, blood cells, muscle cells and sperm cells from pictures, videos and charts and identify them by their names and make models to represent their shapes.	DL: Ability to find and consume digital content CP: Ability to combine Information and ideas from several sources to reach a conclusion

	2. Search from books, journals and internet for information on specialised cells in exemplar 1 and how they relate to the existence of humans.	DL: Ability to find and consume digital content

STRAND 2: CYCLES
SUB-STRAND 1: EARTH SCIENCE

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.2.1.1 Demonstrate the skill to organize and carry out a research on Phosphorus cycle and how it relates to other cycles (water, carbon and nitrogen) in the environment	**B10.2.1.1.1 Design a research plan on phosphorus cycle and relate it to other cycles.**	**Critical Thinking and Problem Solving (CP)**
	Exemplars :	
	1. Describe a research plan including the stages, and retrieval of phosphorus from the phosphorus cycle	CP: Ability to explain plans for attaining goals
	2. Explain differences and similarities among the phosphorus, water, carbon and nitrogen cycles.	CP: Ability to combine Information and ideas from several sources to reach a conclusion
	B10.2.1.1.2 Demonstrate activities involving the phosphorus cycle.	**Critical Thinking and Problem Solving (CP)**
	Exemplars :	
	1. Discuss activities of phosphorus cycle in terms of : a) Sources of phosphorus in nature b) Why phosphorus cycle occurs slowly in nature. c) The effect of phosphorus on the growth of plants and animals.	CP: Demonstrate a thorough understanding of a generalised concept and facts specific to task or

		situation
	2. Design an investigation of the impact of phosphorus on plant growth.	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	3. Use secondary data to analyse and predict the effect of phosphorus on animal growth.	CP: Ability to combine Information and ideas from several sources to reach a conclusion
	4. Identify sources of phosphorus in plants and animals	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	B10.2.1.1.3 Examine the roles of phosphorus within the environment.	**Critical Thinking and Problem Solving (CP)**
	Exemplars:	
	1. Identify the roles of phosphorus within the environment (e.g. serves as ingredient of nucleic acids, phosphorous lipids and ATP in vertebrates as a mineral).	CP: Ability to select alternative(s) that adequately meet selected criteria
	2. Identify the negative effects of phosphorus within the environment (E.g. eutrophication in aquatic habitat)	CP: Ability to select alternative(s) that adequately meet selected criteria
	3. Predict what will occur if there were changes to interrupt the	CP: Ability to visualise alternatives, seeing

	phosphorus cycle	possibilities, problems and challenges

STRAND 2: CYCLES
SUB-STRAND 2: LIFE CYCLE OF ORGANISMS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.2.2.1 Demonstrate knowledge of the life cycle of cockroach and the effect of its activities on humans	**B10.2.2.1.1 Describe the life cycle of a cockroach**	**Creativity and Innovation (CI)**
	Exemplars :	
	1. Describe the stages of the life cycle (E.g egg, nymph and adult) of a cockroach and its behaviours at each stage.	CI: Recognise and generalise information and experience ; search for trends and patterns
	2. Illustrate and describe the life cycle of a cockroach from the video	CI: Recognise and generalise information and experience ; search for trends and patterns
	B10.2.2.1.2 Discuss the effect of the activities of cockroaches on humans	**Critical Thinking and Problem Solving (CP) (CP)Communication and Collaboration (CC)**

	Exemplars :	
	1. In a tabular form state and discuss the positive and negative effects of the activities of cockroaches on humans.	**CC:** Demonstrate behaviour and skills of working towards group goals **CP:** Ability to identify important and appropriate criteria to evaluate each alternatives
	2. Design a strategy to be used to reduce the impact of cockroach on humans	**CP**: Ability to select alternative(s) that adequately meet selected criteria

STRAND 2: CYCLES
SUB-STRAND 3: CROP PRODUCTION

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**
B10.2.3.1Demonstrate understanding of why and how pests and diseases are controlled.	**B10.2.3.1.1 Explain the control of pests and diseases on crops in a community.**	**Critical Thinking and Problem Solving (CP) Creativity and Innovation (CI)**
	Exemplars:	

	1. Match pest and diseases with the specific crops that are affected by different pest and diseases.	CP: Ability to try alternatives and fresh approaches
	2. Describe pests and diseases found in a community and how they are controlled.	CI: Recognise and generalise information and experience ; search for trends and patterns
	3. Describe the control measures of pests and diseases on plants in their communities.	CI: Recognise and generalise information and experience ; search for trends and patterns
	B10.2.3.1.2 Explain the effects of pests and diseases on plants and crop products	**Critical Thinking and Problem Solving (CP) Digital Literacy (DL), Communication and Collaboration (CC)**
	Exemplars:	
	1. Observe, list and discuss data from farm records (pictures, videos infested and infected plant materials) the effects of specific pest and diseases on the growth and yield of crops.	**DL:** DL: Ability to find and consume digital content **CC:** Demonstrate behaviour and skills of working towards group goals
	2. Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation	CP: Demonstrate a thorough understanding of a generalised concept and

		facts specific to task or situation
	3. Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation	CP: Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation
	B10.2.3.1.3 Demonstrate how pests and diseases are controlled	**Critical Thinking and Problem Solving (CP) Creativity and Innovation (CI)**
	Exemplars:	
	1. Describe how specific pests and diseases of specific crops are controlled and use them for presentation in class.	CI: Recognise and generalise information and Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation experience search for trends and patterns
	2. Match specific pest and disease control methods with specific crops affected by pests and diseases.	CPAbility to explain plans for attaining goals CP:Identify important and appropriate alternatives
	3. Apply the identified control measures in the school farm garden/home/ communities and compare their effectiveness.	CP: Implement strategies

	Note: Some chemical used in controlling pest are hazardous.	with accuracy

STRAND 2: CYCLES
SUB-STRAND 4: ANIMAL PRODUCTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.2.4.1Demonstrate knowledge and skills in preparing housing for commercial animal production.	**B10.2.4.1.1Describe and evaluate different types of materials based on affordability, suitability, availability, strength, transportability and durability used to construct housing for commercial animals.**	**Critical Thinking and Problem Solving(CP) Creativity and Innovation (CI)**
	Exemplars	
	1. Research to compile a list of all materials that could be used to construct housing for named commercial animals.	**CP:** Identify important and appropriate alternatives
	2. Identify and match specific materials with in terms of affordability, suitability, availability, strength, transportability and durability with specific housing for named commercial animals	**CP** Identify important and appropriate alternatives
	3. Describe different types of materials and procedures used to construct housing for named commercial animals	**CI**:Ability to select the most effective creative tools for working and preparedness to give explanations
	B10.2.4.1.2 Show the construction of housing for commercial	**Critical Thinking and**

	animals	**Problem Solving (CP) Creativity and Innovation (CI)**
	Exemplars	
	1. Compare and contrast the characteristics of commercial and domestic housing for animals.	CP: Ability to identify important and appropriate criteria to evaluate each alternatives
	2. Describe and evaluate the methods used to construct housing for different commercial animals.	CP: Can effectively evaluate the success of solutions they have used to attempt to solve a complex problem
	3. Outline the constraints in constructing animal housing for commercial production and propose remedies or solutions to the constraints.	CI: Anticipate and overcome difficulties relating initiatives
	B10.2.4.1.3 Construct housing for commercial animals.	**Creativity and Innovation (CI)Communication and Collaboration (CC)**
	Exemplars:	
	1. Sketch and construct housing for named commercial animals using local materials and evaluate the suitability of the housing constructed.	CI: Ability to merge simple/ complex ideas to create novel situation or thing

	2. Discuss and justify the usefulness of good housing to the growth and reproduction of commercial animals.	CC: Demonstrate behaviour and skills of working towards group goals
B10.2.4.2Demonstrate understanding of the differences between housing for domestic and other animals	**B10.2.4.2.1 Explain and discuss the differences among housing for domestic and commercial animals.**	**Critical Thinking and Problem Solving (CP) Communication and Collaboration (CC)**
	Exemplars	
	1. Discuss and tabulate the differences in the characteristics of domestic and commercial animals	CC: Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech.
	2. Match the characteristics of domestic and commercial animals with the characteristics of their housing/habitat.	CP: Ability to identify important and appropriate criteria to evaluate each alternatives
	3. Predict and discuss the effects of housing of the different types of animals on their growth and commercial values.	CP: Ability to combine Information and ideas from several sources to reach a conclusion
	4. Explain the reasons for the differences among different housing and habitats for the different types of animals.	CP: Ability to combine Information and ideas from several sources to reach a conclusion

CLASS: BASIC 10

STRAND 3: SYSTEMS
SUB-STRAND 1: THE HUMAN BODY SYSTEM

CONTENT STANDARD	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.3.1.1 Evaluate the process of mammalian reproductive system and understand how inheritance occurs	**B10.3.1.1.1 Explain the functions of each part of the reproductive system**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI), Digital Literacy (DL)**
	Exemplars :	
	1. Explain the term reproduction and state the functions of the parts of the reproductive system.	**CI**: Exhibit strong memory, intuitive thinking; and respond appropriately
	2. Identify the parts of the male and female reproductive system of humans using charts and models.	**DL:** Ability to find and consume digital content
	3. Draw and label the male and female reproductive systems of humans..	**CP**:Implement strategies with accuracy **DL**: Evaluate the quality and validity of information
	B10.3.1.1.2 Describe the main stages in the process of reproduction in humans	**Critical Thinking and Problem Solving (CP), Digital Literacy (DL), Communication and Collaboration (CC)**

	Exemplars :	
	1. Describe and illustrate with sketch the stages of reproduction in humans from animations.	**CP:**Implement strategies with accuracy **DL**: Evaluate the quality and validity of information
	2. Explain the importance of reproduction in humans	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech
	B10.3.1.1.3 Explain how offsprings inherit certain characteristics of parents	**Critical Thinking and Problem Solving (CP), Digital Literacy (DL), Communication and Collaboration (CC)**
	Exemplars :	
	1. Explain the term *heredity and genes as the basis for hereditary.*	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech
	2. List and compare characteristics that can be inherited and those that cannot be inherited from parents.	**CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	3. Research for information to discuss the importance of heredity and make a write up.	**DL:** Ability to ascertain when information is needed and be able to identify,

		locate, evaluate and effectively use them to solve a problem
B10.3.1.2 Demonstrate understanding of the nervous system and its importance to humans.	**B10.3.1.2.1 Examine the functions of the various parts of the nervous system**	**Critical Thinking and Problem Solving (CP), Digital Literacy (DL), Communication and Collaboration (CC)**
	Exemplars :	
	1. Explain the composition and the importance of the nervous system	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech
	2. Draw and label the parts of the nervous system and discuss their functions.	**CP**: Implement strategies with accuracy **DL**: Evaluate the quality and validity of information
	3. Predict the consequences on humans if parts of the nervous system (sensory neuron, motor neuron and receptors) malfunctions.	**CP**: Ability to visualise alternatives, seeing possibilities, problems and challenges

CLASS: **B 10**
STRAND 3: **SYSTEMS**
SUB-STRAND 2: **THE SOLAR SYSTEM**

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE**

		COMPETENCIES
B10.3.2. 1 Demonstrate an understanding of the concept of satellite in the solar system and their uses	**B10.3.2. 1.1 Explain the concept of satellite and identify the types and the importance in the solar system**	**Critical Thinking and Problem Solving (CP), Digital Literacy (DL),Communication and Collaboration (CC)**
	Exemplars :	
	1. Research about satellite and come up with a definition of satellite.	**CP**: Implement strategies with accuracy **DL:** Evaluate the quality and validity of information
	2. Illustrate with a sketch with an example of a satellite.	**CP**: Implement strategies with accuracy **DL**: Evaluate the quality and validity of information
	3. Brainstorm, search on the internet and identify types of satellite and their importance (E.g. moon).	**CC:** Demonstrate behaviour and skills of working towards group goals

CLASS: **BASIC 10 (SHS 1)**
STRAND 3: **SYSTEMS**
SUB-STRAND 3: **THE ECOSYSTEM**

CONTENT STANDARDS	**INDICATORS AND EXEMPLARS**	**SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES**

B10.3.3.1Recognize the interdependence of organisms in an ecosystem and appreciate their interaction	**B10.3.3.1.1 Identify the interactions between the living and non-living components within an ecosystem**	**Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC)**
	Exemplars :	
	1. Explain the terms abiotic and biotic factors and give examplesofeach**.**	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech
	2. Discuss how abiotic factors affect living things.	**CC:** Demonstrate behaviour and skills of working towards group goals CP: Ability to identify important and appropriate criteria to evaluate each alternatives
	3. Explain how biotic and abiotic factors affect organisms in an ecosystem.	**CC:** Explain ideas in a clear order with relevant detail, using conjunctions to structure and speech
	4. Predict the impact of changes on abiotic factors on population sizes of organisms in an ecosystem.	**CP**: Ability to combine Information and ideas from several sources to reach a conclusion

CLASS BASIC 10 (SHS 1)
STRAND 4: FORCES AND ENERGY

SUB-STRAND 1: ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.4.1.1 Demonstrate understanding and capability to do calculations involving energy and how to conduct energy audit	**B10.4.1.1.1 Explain how to calculate energy consumed over a period of time**	**Critical Thinking and Problem Solving (CP)**
	Exemplar:	
	1. Calculate electrical energy consumed by the use of electrical appliances in Kilowatt-hour (kWh). P = IV, where P is power, I is current, V is voltage	**CP**: Ability to effectively define goals towards solving a problem
	B10.4.1.1.2 Demonstrate how energy audit is conducted	
	Exemplar:	
	1. Conduct energy audit to inform accountability for energy usage in daily life	**CI:** Ability to select the most effective creative tools for working and preparedness to give explanations
B10.4.1.2 Demonstrate knowledge of interpreting heat equation and relating it to everyday life.	**B10.4.1.2.1. Explain the importance of the quantity of heat energy consumed by different materials using heat equation.**	**Critical Thinking and Problem Solving (CP),** **(DL),Communication and Collaboration (CC)**

	Exemplars:	
	1. Identify items in your environment that are either producing or consuming heat.	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	1. Discuss the importance of heat energy equation (*eg.Q = mc ΔT, where Q is the heat energy transferred (in joules), m is the **mass** of the substance being heated (in grams/kilogram), c is the specific heat capacity of the substance (joule per gram degrees Celsius) and ΔT is the change in temperature of the substance)*	**CC:** Demonstrate behaviour and skills of working towards group goals **CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	2. Calculate heat capacity of different materials	**CP**: Ability to effectively define goals towards solving a problem

CLASS: BASIC 10 (SHS 1)
STRAND 4: FORCES AND ENERGY
SUB-STRAND 2: ELECTRICITY AND ELECTRONICS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.4.2.1Demonstrate the skill of doing calculations involving electricity and applying the knowledge in conserving electrical	**B10.4.2.1.1 Describe how the knowledge in energy conservation can help save electrical energy in school and home.**	**Critical Thinking and Problem Solving (CP) (CP)Creativity and Innovation (CI)**

energy		
	Exemplar:	
	1. Calculate energy consumption for household appliances such as electric iron, microwave, water kettle or heater and light bulb over a period of time.	**CP**: Ability to effectively define goals towards solving a problem
	2. Compare the calculated energy consumed with the meter reading.	**CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	3. Develop energy saving plans based on their calculations to promote energy savings.	**CI**: Ability to merge simple/ complex ideas to create novel situation or thing
	4. Demonstrate how knowledge in energy conservation can help reduce/save electrical energy consumption in school and at home	**CP:** Ability to select alternative(s) that adequately meet selected criteria **CI**: Ability to look at alternatives in creating new things
B10.4.2.2 Evaluate the use of transistors in relation Light Emitting Diode (LED), Diodes, Resistors Capacitors Transistors in electronic gadgets	**B10.4.2.2.1 Demonstrate how to build electronic circuits with transistors, LEDs, Diodes, Resistors and Capacitors and identify the functions of the transistor in the electronic circuits**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplar:	

	1. Connect a simple electronic circuit comprising a d.c. source, a transistors, LEDs, Diodes, Resistors and Capacitors in series and in parallel and explain any observations in the LED.	CI: Ability to select the most effective creative tools for working and preparedness to give explanations
	2. Predict the impact of changes in the transistor on the output of the electronic circuit.ss	CP: Ability to visualise alternatives, seeing possibilities, problems and challenges

CLASS: BASIC 10 (SHS 1)
STRAND 4: FORCES AND ENERGY
SUB-STRAND 3: CONVERSION AND CONSERVATION OF ENERGY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.4.3.1 Demonstrate understanding of energy conversion and energy conservation and show how they can be used to improve the environment	**B10.4.3.1.1.Explain energy conversion and show how it improves quality of life**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI), Communication and Collaboration (CC)**
	Exemplars:	
	1. Explain energy conversion as a process of changing energy from one form to another and give examples.	**CP**: Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Discuss the first law of thermodynamics with reference to the principle that energy can neither be created or	**CC:** Demonstrate behaviour and skills of working towards

	destroyed	group goals **CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	3. Describe how lives can be improved through conversion of energy in the environment.	**CI**: Recognise and generalise information and Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation experience search for trends and patterns
	4. Discuss the impact of efficient conversion on the environments	**CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	B10.4.3.1.2. Explain how energy is conserved in an industrial setting and show it improves quality of life in the environment	**Critical Thinking and Problem Solving (CP)**
	Exemplars:	
	1. Explain energy conservation as a process of reducing energy use of an energy service and give examples of actions to reduce energy use.	**CP**: Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Deduce from the Law of conservation of energy how energy conservation can help man in his environment.	**CP**: Ability to merge simple/ complex ideas to create novel

		situation or thing

CLASS: BASIC 10 (SHS 1)
STRAND 4: FORCES AND ENERGY
SUB-STRAND 4: FORCE AND MOTION

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.4.4.1Demonstrate understanding of Newton's Laws of motion and ability to apply the laws to solve problems in everyday life	**B10.4.4.1.1 Explain Newton's Laws of motion and their application to daily life.**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplars:	
	1. Explain Newton's laws of motion and relate them to momentum.	**CP**: Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Demonstrate the application of Newton's Laws of motion in everyday life	**CI**: Ability to look at alternatives in creating new things
	3. Derive the formula, $f = ma$, *where* f is the force, m the mass of the object, and a, the acceleration,from Newton's three Laws of Motion and use it to calculate the force of a moving mass of body exerts	**CP**: Ability to merge simple/ complex ideas to create novel situation or thing

	when moving with known acceleration.	
B10.4.4.2 Exhibit knowledge of designing appropriate simple machines that can be used to solve problems in society	**B10.4.4.2.1 Develop a simple machine that can be used to solve problems in society**	**Creativity and Innovation (CI),**
	Exemplar:	
	1. Describe the principles upon which simple machines that are appropriate to solve societal problems work.	**CI**: Recognise and generalise information and experience ; search for trends and patterns
	2. Develop a simple machine to do work and evaluate its performance based on its user friendliness and easy acquisition of its effectiveness.	**CI:** Ability to merge simple/ complex ideas to create novel situation or thing

CLASS: BASIC 10
STRAND 4: FORCES AND ENERGY
SUB-STRAND 5: AGRICULTURAL TOOLS

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.4.5.1Demonstrate knowledge of the different types of motorized agricultural tools and their uses for on-farm activities.	**B10.4.5.1.1 List and describe different types of motorized agricultural tools.**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI), Digital Literacy (DL),**

	Exemplars:	
	1. Make photographs, and labeled drawings from videos of agricultural tools and implements.	**DL:** Use digital tools to create novel things
	2. Explain and distinguish between motorized and un-motorized tools or implements.	**CP:** Analyse and make distinct judgment about viewpoints expressed in an argument
	3. Group the tools and implements from exemplar (2) into motorized and non-motorized.	**CI**: Ability to select the most effective creative tools for working and preparedness to give explanations
	4. Create a list of motorized tools and identify those that are available in the community and neighbouring environment.	**CP**: Ability to select alternative(s) that adequately meet selected criteria
	B10.4.5.1.2 Show and categorize motorized agricultural tools into their uses for on-farm activities	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI), Personal Development and Leadership (PL)**
	Exemplars	
	1. Write the specific uses of the motorized tools.	**CI**: Ability to select the most effective creative

		tools for working and preparedness to give explanations **CP:** Identify important and appropriate alternatives
	2. Categorize the motorized tools according to their uses on the farm (land clearing/weeding, land cultivation, spraying, harvesting, conveying, etc).	**CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	3. Participate in the use of some motorized tools in the field/school garden for specific purposes.	**PL:** Actively promote effective group interaction and the expression of ideas and opinions in a way that is sensitive to the feelings and background of others

CLASS: BASIC 10 (SHS 1)
STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 1: WASTE MANAGEMENT

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.5.1.1 Demonstrate understanding of the impact of waste on an environment, innovative	**B10.5.1.1.1 Describe innovative ways of waste management for sustainable development**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**

waste management technologies for sustainable development and waste management practices in Ghana		
	Exemplars:	
	1. Explain the impact of waste produced on the environment	**CP**:Analyse and make distinct judgment about viewpoints expressed in an argument
	2. Identify innovative ways to manage waste for sustainable development	**CP**: Ability to select alternative(s) that adequately meet selected criteria
	3. Describe the types of waste produced within communities in Ghana	**CI:** Recognise and generalise information and experience ; search for trends and patterns
	4. Examine and critique the waste management practices in Ghana identifying positives and negatives and opportunities for improvement.	**CP**: Ability to select alternative(s) that adequately meet selected criteria

CLASS: BASIC 10 (SHS 1)
STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 2: HUMAN HEALTH

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC

		PRACTICES AND CORE COMPETENCIES
B10.5.2.1 Demonstrate understanding of the relationship of health and disease, concept of common disease in the environment and how to control it.	**B10.5.2.1.1 Explain the concepts of health and disease and show their relationship**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplar:	
	1. Define health as stipulated by World Health Organisation (WHO) and show the relationship between health and disease.	**CI:** Exhibit strong memory, intuitive thinking; and respond appropriately
	B10.5.2.1.2 Explain the concept of common disease in an environment	
	1. Conduct a survey about common diseases and analyze their findings to show what constitutes common disease in a community.	**CP:** Identify important and appropriate alternatives
	2. Identify causes, symptoms and prevention of common diseases.	**CP**: Ability to select alternative(s) that adequately meet selected criteria

CLASS: BASIC 10 (SHS 1)
STRAND 5: HUMANS AND THE ENVIRONMENT

SUB-STRAND 3: SCIENCE AND INDUSTRY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.5.3.1 Demonstrate understanding of the concept of industry, the science underpinning the processes of production in industries the technologies in indigenous industries and western industries	**B10 5.3.1.1 Explain the concept of industry and distinguish between modern and indigenous industries**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplars:	
	1. Identify an industry as individual firms producing the same commodity and give examples of industries in their environment	**CP**: Ability to combine Information and ideas from several sources to reach a conclusion
	2. Describe how technology affects industry and compare the technologies in indigenous and modern industries.	**CI:** Recognise and generalise information and Demonstrate a thorough understanding of a generalised concept and facts specific to task or situation experience search for trends and patterns

	B10.5.3.1.2 Examine indigenous industries in their communities and show the scientific processes in the stages of production	**Critical Thinking and Problem Solving (CP), Communication and Collaboration (CC)**
	Exemplars:	
	1. Discuss indigenous industries in their communities and identify the scientific processes, concepts and principles underlying the stages of production of in in the industries.	**CC:** Demonstrate behaviour and skills of working towards group goals **CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	2. Identify indigenous practices at home school and community and the science involved in the practices.	**CP:** Ability to select alternative(s) that adequately meet selected criteria

CLASS: BASIC 10 (SHS 1)
STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 4: CLIMATE CHANGE AND GREEN ECONOMY

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE

		COMPETENCIES
B10.5.4.1 Evaluate the effectiveness of initiatives that address the issue of climate change and green economy in Ghana and the world at large.	**B10.5.4.1.1 Assess data on climate change and green economy actions/ activities globally including Ghana and other countries.**	**Critical Thinking and Problem Solving (CP), Digital Literacy (DL)**
	Exemplars: 1. Research into climate change and green economy actions in Ghana.	**CP:** Identify important and appropriate alternatives
	2. Access climate change and green economy actions in other countries.	**DL**: Ability to ascertain when information is needed and be able to identify, locate, evaluate and effectively use them to solve a problem
	3. Compare and contrast climate change and green economy actions in Ghana and other countries.	**CP:** Ability to identify important and appropriate criteria to evaluate each alternatives
	4. Identify and write the effective initiatives that address climate change and green economy issues in Ghana and other countries.	**CP:** Ability to select alternative(s) that adequately meet selected criteria
	5. Prescribe with reasons best practices to serve as possible solutions to address climate change and green economy issues in	**CP**: Ability to combine Information and ideas from

	Ghana.	several sources to reach a conclusion

CLASS: BASIC 10 (SHS 1)
STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 5: UNDERSTANDING THE ENVIRONMENT

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.5.5.1Demonstrate understanding of the uses of non-living things (rocks, rivers, stones and soil) for agricultural purposes	**B10.5.5.1.1Show and explain the uses of non-living things for agricultural purposes.**	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI), Communication and Collaboration (CC)**
	Exemplars	
	1. Make a list of non-living things found on the crops farm and animal farm (stones, metals, water, rock/soil particles, plastic materials).	**CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	2. Describe how various non-living things are used for agricultural purposes in the community and environment.	**CI:** Recognise and generalise information and experience ; search for trends and patterns

	3. Discuss and explain other possible roles or uses of each non-living material for agricultural purposes.	**CC:** Demonstrate behaviour and skills of working towards group goals **CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	B10.5.5.1.2Observe and discuss the uses of non-living things for agricultural purposes in school garden and local communities	**Critical Thinking and Problem Solving (CP), Creativity and Innovation (CI)**
	Exemplars	
	1. Prepare a list of non-living things and their use for agricultural purposes in a tabular format.	**CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	2. Plan and demonstrate the use of different non-living things for agricultural purposes in the field or school garden.	**CI**: Ability to merge simple/ complex ideas to create novel situation or thing

CLASS: BASIC 10 (SHS 1)
STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 6: SOIL AS COMPONENT OF THE ENVIRONMENT

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B10.5.6.1Recognize the different types of rocks as origin of different types of soils.	**B10.5.6.1.1Observe and describe different types of rocks as origin of soils.**	**Critical Thinking and Problem Solving (CP) (CP)Creativity and innovation**
	Exemplars	
	1. Identify different labeled samples of rocks presented in the classroom/laboratory.	**CP**: Ability to select alternative(s) that adequately meet selected criteria
	2. Describe the visible characteristics of each rock.	**CI:** Recognise and generalise information and experience ; search for trends and patterns
	3. Collect samples of rocks from around the community and label them rock identification guide and compare them with the labeled laboratory samples in exemplar one (1).	**CP**: Ability to identify important and appropriate criteria to evaluate each alternatives
	4. Research and report the stages of weathering of rocks to form soil.	**CP:** Identify important and appropriate alternatives