Science Curriculum for Primary Schools

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Ministry of Education
Ghana
FOREWORD

The new curriculum for Ghana’s primary schools is standards-based, which is our demonstration of placing learning at the heart of every classroom and ensuring that every learner receives quality education. Provision of accessible quality education for all is non-negotiable if we are to meet the human capital needs of our country, required for accelerated sustainable national development. It is for this reason that the new curriculum sets out clearly the learning areas that need to be taught, how they should be taught and how they should be assessed. It provides a set of core competencies and standards that learners are to know, understand and demonstrate as they progress through the curriculum from one content standard to the other, and from one phase to the next. The curriculum and its related teachers’ manual promote the use of inclusive and gender responsive pedagogy within the context of learning-centred teaching methods so that every learner can participate in every learning process and enjoy learning. The curriculum encourages the use of Information and Communication Technologies (ICTs) for teaching and learning – ICTs as teaching and learning materials.

The new curriculum has at its heart the acquisition of skills in the 4Rs of Reading, Writing, Arithmetic and Creativity by all learners. It is expected that at any point of exit from formal education, all learners should be equipped with these foundational skills for life, which are also prerequisites for Ghana becoming a learning nation. The graduates from the school system would become functional citizens in the 4Rs and lifelong learners. They should be digital literates, critical thinkers and problem solvers. The education they receive through the study of the learning areas in the curriculum should enable them to collaborate and communicate well with others and be innovative. The graduates from Ghana’s schools should be leaders with a high sense of national and global identity. The curriculum therefore provides a good opportunity by its design to develop individuals who have the right skills and attitudes to lead the transformation of Ghana into an industrialised learning nation.

For this reason, the Ministry of Education expects that learners, as a result of the new knowledge, skills and values they would have acquired through the new curriculum, will show a new sense of identity as creative, honest and responsible citizens. These are our core values that underpin the identification and selection of the learning areas for this curriculum. These core values serve as fundamental building blocks for developing into our learners, the spirit of teamwork, respect, resilience and the commitment to achieve high excellence. The Ministry endorses a high quality learning experience as an entitlement for each school-going girl and boy in Ghana; the curriculum has rightly focused on learning and learning progression. The Ministry has also endorsed accountability as a critical domain for effective workings of the standards-based curriculum.

More importantly the role of the teacher is to make this curriculum useful for the intended purpose of inculcating to inculcate in learners the core competencies and values, and to make learning happen; improve learning outcomes – and the support that teachers need is duly recognised and endorsed by my Ministry. The Ministry will support the implementation of the curriculum to include capacity development of all teachers in the new curriculum. Teachers matter in the development and delivery of the standards-based curriculum and we will continue to support our teachers on this journey that we have started together to put learning at the centre of what we do best; teach!

I thank all those who have contributed their time and expertise to the development of this curriculum for primary schools in Ghana.

Dr. Matthew Opoku Prempeh (MP)
The Honourable Minister of Education
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RATIONALE FOR PRIMARY SCIENCE

Science forms an integral part of our everyday activities and it is a universal truth that development is hinged on Science. Science and Technology is the backbone of social, economic, political, and physical development of a country. 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 the 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 analyse causes and origins of things in our environment. The Science curriculum has considered the desired outcomes of education for learners at the 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 hands-on 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 which is needed for sustainable development should be inquiry-based. 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 teaching and learning approaches that engage learners physically and cognitively in the knowledge-acquiring 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 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 previous experiences. This makes learning more relevant to the learner and leads to the development of critical thinkers and problem solvers.

GENERAL AIMS

The curriculum is aimed at developing individuals to become scientifically literate, good problem solvers, have the ability to think creatively and have both the confidence and competence to participate fully in matters of the Ghanaian society as responsible local and global citizens.

SPECIFIC AIMS

The Science curriculum is designed to help learners to:

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

2. Develop skills, habits 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.

INSTRUCTIONAL GUIDELINES

1. Guide and facilitate learning by generating discourse among learners and challenging them to accept and share responsibility for their own learning based on their unique individual differences.

2. Select Science content, adapt and plan lessons to meet the interests, knowledge, understanding, abilities, and experiences of learners.

3. Work together as colleagues within and across disciplines and grade levels to develop communities of Science learners who exhibit the skills of scientific inquiry and the attitudes and social values conducive to Science learning.

4. Use multiple methods and systematically gather data about learners’ understanding and ability, to guide Science teaching and learning with arrangements to provide feedback to both learners and parents.

5. Design and manage learning environments that provide students with the time, space, and resources needed for learning Science.

CORE COMPETENCIES

The core competencies 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 competencies 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 out of a number of possible solutions. It requires that learners embrace the problem at hand, persevere and take responsibility for their own learning.
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 make use of languages, symbols and texts to exchange information about themselves and their life experiences. Learners actively participate in sharing their ideas. They engage in dialogue with others by listening to and learning from them. They also 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.

LEARNING DOMAINS (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

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 more higher level, the learner may be required to synthesise 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", "analysing", "synthesising", "evaluating" and "creating" fall under the domain "Knowledge, Understanding and Application".
In this curriculum, learning indicators are stated with action words 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, summarise, 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 notice that each of the indicators in the curriculum contains an “action word” 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 knowledge application.

Each action word in any indicator outlines the underlying outcome expected. 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 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.

**Analysing:**
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.

**Synthesising:**
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 pointed out. 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 already.
SKILLS AND PROCESSES
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 and apparatus 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.

Designing
This is the skill of Visualizing and drawing new objects or gargets from imagination.

Measuring
This is the skill of using measuring instruments and equipment for measuring, reading and making observations.

Interpreting
This is the skill of 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.

Generalising
This is the skill of being able to use the conclusions arrived at in an experiment 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.

**Attitudes and Values**

To be effective, competent and reflective citizens, 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.

i. **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.

ii. **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 national development. The curriculum promotes social cohesion.

iii. **Equity:** 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, and thus which require the provision of equal opportunities to all, and that, all strive to care for each other.
iv. **Commitment to achieving excellence:** Learners must be taught to appreciate the opportunities provided through the curriculum and persist in doing their best in their fields of endeavour as global citizens. The curriculum encourages innovativeness through creative and critical thinking and the use of contemporary technology.

v. **Teamwork/Collaboration:** Learners are encouraged to 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.

vi. **Truth and Integrity:** The curriculum aims to develop learners into individuals who will consistently tell the truth irrespective of the consequences, and be morally upright with an attitude of doing the right thing even when no one is watching. Learners are taught. 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 competencies learning processes to allow learners to apply skills and competencies in the world of work.

The action words 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 words 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.

**ASSESSMENT**
Assessment is a process of collecting and evaluating information about learners and using the information to make decisions to improve their learning.
In this curriculum, it is suggested that assessment is used to promote learning. Its purpose is to identify the strengths and weaknesses of learners to enable teachers ascertain their learner’s response to instruction. Assessment is both formative and summative. Formative assessment is viewed in terms of Assessment as learning and Assessment for learning.

**Assessment as learning:** Assessment as learning relates to engaging learners to reflect on the expectations of their learning. Information that learners provide the teacher forms the basis for refining teaching-learning strategies. Learners are assisted to play their roles and to take responsibility of their own learning to improve performance. Learners are assisted to set their own goals and monitor their progress.

**Assessment for learning:** It is an approach used to monitor learner’s progress and achievement. This occurs throughout the learning process. The teacher employs assessment for learning to seek and interpret evidence which serves as timely feedback to refine their teaching strategies and improve learners’ performance. Learners become actively involved in the learning process and gain confidence in what they are expected to learn.

**Assessment of learning:** This is summative assessment. It describes the level learners have attained in the learning and what they know and can do over a period of time. The emphasis is to evaluate the learner’s cumulative progress and achievement.
It must be emphasised that all forms of assessment should be based on the domains of learning. In developing assessment procedures, try to select indicators in such a way that you will be able to assess a representative sample from a given strand. Each indicator in the curriculum is considered a criterion to be achieved by the learners. When you develop assessment items or questions that are based on a representative sample of the indicators taught, the assessment is referred to as a “Criterion-Referenced Assessment”. In many cases, a teacher cannot assess all the indicators taught in a term or year. The assessment procedure you use i.e. class assessments, homework, projects etc. must be developed in such a way that the various procedures complement one another to provide a representative sample of indicators taught over a period.

**SUGGESTED TIME ALLOCATION**
A total of four periods a week, each period consisting of thirty minutes, is allocated to the teaching of Science at the lower basic level (B1- B2). It is recommended that the teaching periods be divided as follows:
- Theory: 2 periods per week (30 minutes per period)
- Practical: 2 periods per week (one double-period)

**PEDAGOGICAL APPROACHES**
These include the approaches, methods and strategies for ensuring that every learner benefits from appropriate and relevant teaching and learning episodes which are timely assessed, and feedback provided to the learner and other stakeholders such as parents and education authorities. It includes the type and use of appropriate and relevant teaching and learning resources to ensure that all learners attain the expected level of learning outcomes.

The curriculum emphasises:

- The creation of learning-centred classrooms through the use of creative approaches to teaching and learning as strategies to ensuring learner empowerment and independent learning.
- The positioning of inclusion and equity at the centre of quality teaching and learning.
- The use of differentiation and scaffolding as teaching and learning strategies for ensuring that no learner is left behind.
- The use of Information and Communications Technology (ICT) as a pedagogical tool.
- The identification of subject specific instructional expectations needed for making learning in the subject relevant to learners.
- The integration of assessment for learning, as learning and of learning into the teaching and learning process and as an accountability strategy.
- Using questioning techniques that promote deeper learning.
LEARNING-CENTRED PEDAGOGY

The learner is at the centre of learning. At the heart of the curriculum is an emphasis on learning progression and improvement of learning outcomes for Ghana’s young people with a focus on the 4Rs – Reading, Writing, Arithmetic and Creativity. It is expected that at each curriculum phase, learners would be offered the essential learning experiences to progress seamlessly to the next phase. Where there are indications that a learner is not sufficiently ready for the next phase a compensatory provision through differentiation should be provided to ensure that such a learner is ready to progress with his/her cohort.

At the primary school, the progression phases are: pre-primary (KG1 – 2), primary phases (B1 – B3 and B4 to B6).

The curriculum encourages the creation of a learning-centred classroom with the opportunity for learners to engage in meaningful “hands-on” activities that bring home to the learner what they are learning in school and what they know from outside of school. The learning-centred classroom is a place for the learners to discuss ideas and through the inspiration of the teacher, actively engage in looking for answers through working in groups to solve problems. This also includes researching information and analysing and evaluating the information obtained. The aim of the learning-centred classroom approach is to develop learner autonomy so that learners can take ownership of their learning. It provides the opportunity for deep and profound learning to take place.

The teacher should create a learning atmosphere that ensures:

- Learners feel safe and accepted.
- Learners are given frequent opportunities to interact with varied sources of information, teaching and learning materials and ideas in a variety of ways.
- The teacher assumes the position of a facilitator or coach who: Helps learners to identify a problem suitable for investigation via project work.
- Problems are connected to the context of the learners’ world so that it presents authentic opportunities for learning.
- Subject matter around the problem, not the discipline.
- Learners responsibly define their learning experience and draw up a plan to solve the problem in question.
- Learners collaborate whilst learning.
- Learners demonstrate the results of their learning through a product or performance.

It is more productive for learners to find answers to their own questions rather than for teachers to provide the answers and their opinions in a learning-centred classroom.

INCLUSION

Inclusion entails access and learning for all learners, especially, those disadvantaged. All learners are entitled to a broad and balanced curriculum in every school in Ghana. The daily learning activities to which learners are exposed should ensure that the learners’ right to equal access to quality education is being met. The curriculum suggests a variety of approaches that address learners’ diversity and their special needs in the learning process. These approaches when used in lessons, will contribute to the full development of the learning potential of every learner. Learners have individual needs and different learning styles, learning experiences and different levels of motivation for learning. Planning, delivery and reflection on daily learning episodes should take these differences into consideration. The curriculum therefore promotes:

- learning that is linked to the learner’s background and to their prior experiences, interests, potential and capacities;
- learning that is meaningful because it aligns with learners’ ability (e.g. learning that is oriented towards developing general capabilities and solving the practical problems of everyday life); and
- the active involvement of the learners in the selection and organisation of learning experiences, making them aware of their importance in the process and also enabling them to assess their own learning outcomes.
DIFFERENTIATION AND SCAFFOLDING

This curriculum is to be delivered through the use of creative approaches. Differentiation and Scaffolding are pedagogical approaches to be used within the context of the creative approaches.

**Differentiation** is a process by which differences among learners (learning styles, interest and readiness to learn etc.) are accommodated so that all learners in a group have their best chance of learning. Differentiation could be by task, support and/or outcome. Differentiation, as a way of ensuring each learner benefits adequately from the delivery of the curriculum, can be achieved in the classroom through:

- Task
- One-on-one support
- Outcome

**Differentiation by task** involves teachers setting different tasks for learners of different ability e.g. in sketching the plan and shape of their classroom some learners could be made to sketch with free hand while others would be made to trace the outline of the plan of the classroom.

**Differentiation by support** involves the teacher providing a targeted support to learners who are seen as performing below expected standards or at risk of not reaching the expected level of learning outcome. This support may include a referral to a Guidance and Counselling Officer for academic support.

**Differentiation by outcome** involves the teacher allowing learners to respond at different levels. In this case, identified learners are allowed more time to complete a given task.

**Scaffolding** in education refers to the use of a variety of instructional techniques aimed at moving learners progressively towards stronger understanding and ultimately greater independence in the learning process.

It involves breaking up the learning episodes, experiences or concepts into smaller parts and then providing learners with the support they need to learn each part. The process may require a teacher assigning an excerpt of a longer text to learners to read, engage them to discuss the excerpt to improve comprehension of its rationale, then guiding them through the key words/vocabulary to ensure learners have developed a thorough understanding of the text before engaging them to read the full text.

Common scaffolding strategies available to the teacher include:

- giving learners a simplified version of a lesson, assignment, or reading, and then gradually increasing the complexity, difficulty, or sophistication over time;
- describing or illustrating a concept, problem, or process in multiple ways to ensure understanding;
- giving learners an exemplar or model of an assignment, they will be asked to complete;
- giving learners a vocabulary lesson before they read a difficult text;
- clearly describing the purpose of a learning activity, the directions learners need to follow, and the learning goals they are expected to achieve;
- explicitly describing how the new lesson builds on the knowledge and skills learners were taught in a previous lesson.
INFORMATION AND COMMUNICATION TECHNOLOGY

ICT has been integrated into this curriculum as a teaching and learning tool to enhance deep and independent learning. Some of the expected outcomes that this curriculum aims to achieve through ICT use for teaching and learning are:

- improved teaching and learning processes.
- improved consistency and quality of teaching and learning.
- increased opportunities for more learner-centred pedagogical approaches.
- improved inclusive education practices by addressing inequalities in gender, language, ability.
- improved collaboration, creativity, higher order thinking skills.
- enhanced flexibility and differentiated approach of delivery.

The use of ICT as a teaching and learning tool helps to provide learners with access to large quantities of information online. It also provides the framework for analysing data to investigate patterns and relationships in a geographical context. Once learners have made their findings, ICT can then help them organise, edit and present information in many different ways.

Learners need to be exposed to the various ICT tools around them such as calculators, radios, cameras, phones, television sets and computers and related software like the Microsoft Office packages — Word, PowerPoint and Excel — as teaching and learning tools. The exposure that learners are given at the Basic level to use ICT in exploring learning will build their confidence and will increase their level of motivation to apply ICT use in later years, both within and outside of education. ICT use for teaching and learning is expected to enhance the quality and learners’ level of competence in the 4Rs.
ORGANISATION 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: B3 .2.4.1.2

<table>
<thead>
<tr>
<th>ANNOTATION</th>
<th>MEANING / REPRESENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>B3</td>
<td>Year or Class</td>
</tr>
<tr>
<td>2</td>
<td>Strand Number</td>
</tr>
<tr>
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<td>Sub-Strand Number</td>
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<td>Content Standard Number</td>
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<tr>
<td>2</td>
<td>Indicator Number</td>
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</tbody>
</table>

**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.
### ILLUSTRATION

**Strand 1: DIVERSITY OF MATTER**

**Sub-strand 1: Living and Non-Living Things**

<table>
<thead>
<tr>
<th>Class</th>
<th>Content Standards</th>
<th>Learning Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>B2</td>
<td>B3</td>
</tr>
<tr>
<td>B1.1.1.1: Show understanding of the physical features and life processes of living things and use this understanding to classify them</td>
<td>B2.1.1.1: Show understanding of the physical features and life processes of living things and use this understanding to classify them</td>
<td>B3.1.1.1: Show understanding of the physical features and life processes of living things and use this understanding to classify them</td>
</tr>
<tr>
<td>B1.1.1.1: Observe and describe different kinds of things in the environment.</td>
<td>B2.1.1.1: Describe the physical features of plants (roots, stem, leaves)</td>
<td>B3.1.1.1: Group living things into plants and animals based on their physical features</td>
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<td>B4</td>
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<tr>
<td>B4.1.1.1: Show understanding of the physical features and life processes of living things and use this understanding to classify them</td>
<td></td>
<td>B4.1.1.1: Group living things into plants and animals based on their uses</td>
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</table>
STRUCTURE
The Science curriculum is structured to cover B1 to B3 under five strands with a number of sub-strands as shown in the table below:

<table>
<thead>
<tr>
<th>STRAND</th>
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<th>B3</th>
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<tr>
<td></td>
<td>SUB-STRANDS</td>
<td>SUB-STRANDS</td>
<td>SUB-STRANDS</td>
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<tr>
<td>1. DIVERSITY OF MATTER</td>
<td>1. Living and Non-Living Things</td>
<td>1. Living and Non-Living Things</td>
<td>1. Living and Non-Living Things</td>
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<td>2. Life Cycles of organisms</td>
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<td>2. Ecosystems</td>
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<td>2. Electricity and electronics</td>
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<td>3. Forces and Movement</td>
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<tr>
<td>6. HUMANS AND THE</td>
<td>1. Personal Hygiene and Sanitation</td>
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<tr>
<td>ENVIRONMENT</td>
<td>2. Diseases</td>
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## SCOPE AND SEQUENCE

<table>
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<tr>
<th>STRAND</th>
<th>SUB-STRANDS</th>
<th>B1</th>
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<th>B3</th>
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<td>Sources and Forms of Energy</td>
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<td>Science and Industry</td>
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BASIC I
## STRAND 1: DIVERSITY OF MATTER
### SUB-STRAND 1: LIVING AND NON-LIVING THINGS

<table>
<thead>
<tr>
<th>CONTENT STANDARD</th>
<th>INDICATOR AND EXEMPLARS</th>
<th>SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES</th>
</tr>
</thead>
</table>
| **B1.1.1.1:** Show an understanding of the physical features and life processes of living things and use this understanding to classify them | **B1.1.1.1** Observe and describe different kinds of things in the environment  
- Go on a nature's walk to observe things in the environment (e.g. Plants, animals, plastics and stones. The things should come from the classroom or the school environment.  
- Learners work in groups to describe the different kinds of things observed.  
- Elaborate on the learners’ ideas to find out why they need to know about the characteristics of different things in their environment.  
- Sort things into living and non-livings based on common characteristics.  
- Watch videos/pictures of different kinds of living and non-living things in the environment. | **Core Competencies**  
Personal Development and Leadership  
Digital Literacy  
Communication and Collaboration  
Critical Thinking and Problem Solving  
Creativity and Innovation  
**Subject Specific Practices**  
Observing  
Classifying |
| **B1.1.1.2:** Understand the differences between living things, non-living things and things which have never been alive | **B1.1.1.2.1.** Identify and name animals and plants in their locality  
- Watch pictures or videos on animals and plants.  
- With guidance, learners identify the local names of plants and animals seen in the videos and pictures.  
- Learners come out with the local names of other plants and animals not seen in the video/pictures using the “think-pair-share”.  
- Learners Draw and colour any local plant or animal.  
- Compare their drawings and identify the type of animal or plant drawn through a peer activity. | **Core Competencies**  
Digital Literacy  
Communication and Collaboration  
Creativity and Innovation  
**Subject Specific Practices**  
Observing  
Classifying |
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</table>
| B1.1.1.2: Understand the differences among living things, non-living things, and things which have never been alive | **B1.1.1.2.2** Know the basic needs of living things (food, water and air)  
- Give some examples of living things (for example things that eat/drink, move, grow and produce young ones).  
- Work in pairs to identify the basic needs of living things (e.g. food, water, air, shelter, appropriate warmth).  
- Elaborate on learners’ ideas to guide them to brainstorm the importance of basic needs of the living things.  

**B1.1.1.2.3** Describe the differences between living and non-living things  
- Watch a video or observe pictures of living and non-living things or go on an observational trip around the school community to observe living and non-living things.  
- Learners mention the names of the specific living things and non-living things observed.  
- Describe the differences between living and non-living things using think–pair share (focus on differences in movement, growth, feeding, reproduction).  
- Give reasons for grouping things into living and non-living.  
- Learners reflect on what they have learnt about living and non-living things and answer questions like: *What are examples of living things? What are examples of non-living things? In what ways are living things different from non-living things? Come out with differences between non-living things and things that are dead.* | Core Competencies
Critical Thinking and Problem Solving.
Communication and Collaboration.
Personal Development and Leadership.
Digital Literacy

**Subject Specific Practices**
Observing
Analysis
Classifying |
## SUB-STRAND 2: MATERIALS

<table>
<thead>
<tr>
<th>CONTENT STANDARD</th>
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</tr>
</thead>
</table>
| **B1.1.2.1** Recognise materials as important resources for providing human needs | **B1.1.2.1.1 Identify and name a variety of everyday materials in their immediate environment**  
- Teacher engages learners with questions about metals, wood, plastics, soil, glass, textiles, water and stone they see around the playground and other places outside the school; or engages learners to go on a nature’s walk and observe and collect materials present in their environment.  
- In groups, learners observe, sort, identify and name materials collected such as wood, plastic, soil, metals glass, textile, water and stone; and explain the basis of their classification.  
- Reflect on what they have learnt and relate the lesson to everyday uses of the materials.  
**NB:** Teacher should build a stock of materials into a Science corner to annul any shortages. | **Core Competencies**  
- Critical Thinking and Problem Solving  
- Cultural Identity and Global Citizenship  
- Personal Development and Leadership.  
- Creativity and Innovation  
**Subject Specific Practices**  
- Observing  
- Classifying  
- Generalising  
- Communicating |
| **B1.1.2.1.2 Describe and group materials by their appearance (shape, size, colour, texture, mass)**  
- Collect different materials from the school environment and bring them to class.  
- Learners describe the appearance of the materials (in terms of colour, size, feel, length, etc.).  
- Group materials based on their observable properties such as shape, size (big/small), colour, texture (‘rough’, ‘smooth’, ‘sticky’ and ‘grainy’), mass (heavy / light).  
- Draw and colour several objects/materials based on their appearance such as **colour** and **shape**.  
- Display their drawings for class observation and talk about them.  
- Relate the lesson with everyday experiences (appearance and properties of common items). |
<table>
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<th>INDICATOR AND EXEMPLARS</th>
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</thead>
</table>
| B1.1.2.2 Know that substances can exist in different physical states (Solid, Liquid, Gas). Many substances can be changed from one state to another by heating or cooling | **B1.1.2.2.1 Identify and classify materials as solid, liquid or gas**  
- Learners explore and list materials they see in their environment.  
- In groups, sort the materials into solid, liquid or gas. NB: To demonstrate the presence of gas, learners can use paper cards/sheets of paper and wave them across their faces.  
- In groups, learners sort different substances into the solid, liquid or gaseous states with reasons.  
- Each group presents their work to the whole class for discussions.  
- Learners answer the following questions: What makes a solid different from a liquid? How is a liquid different from a gas?  
- Learners can be engaged in more activities to investigate and identify substances in the solid, liquid and gaseous states. E.g. inflating a balloon, breathing in and out; etc. | Core Competencies  
Creativity and Innovation  
Personal Development and Leadership  
Subject Specific Practices  
Observation  
Manipulating  
Communicating  
Evaluating  
Generalising |
| **B1.1.2.3 Understand mixtures, the types, their formation, uses and ways of separating them into their components** | **B1.1.2.3.1 Demonstrate understanding that a mixture is two or more objects or materials put together**  
- Present several different materials to the groups such as garri, sand, water, saw dust, milo, salt, sugar, milk powder, etc.  
- Learners work in groups to combine the materials in any proportion, two at a time, e.g. garri and sand; milo and milk powder; sugar and water etc. and describe what happens in each case.  
- Learners find out whether the products they have formed are the same as the individual materials.  
- In groups, learners give names to the combinations they have formed.  
- Provide learners with samples of mixtures, e.g. a mixture of different coloured beads, a mixture of chocolate pellets of different colours to separate.  
**NB:** The idea is for them to understand that when they mix two or more things together, they form a mixture and that no new thing forms even though the starting and ending substances may look different from each other. | Core Competencies  
Communication and Collaboration  
Personal Development and Leadership  
Subject Specific Practices  
Manipulating  
Observing  
Evaluating  
Generalising |
### SUB-STRAND 1: EARTH SCIENCE

<table>
<thead>
<tr>
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</tr>
</thead>
</table>
| **B1.2.1.1. Recognise that some events in our environment are recurrent** | **B1.2.1.1.1 Explain that some natural phenomena, such as day and night, occur repeatedly**  
- Learners can be engaged in an activity that explains cyclic movement. (The second hand of an analogue clock, merry-go-round and circular cards, musical chairs could be used).  
- Relate this activity to the occurrence of day and night and explain that the appearance of the Sun, Moon and stars follow a cyclic pattern.  
- Let learners suggest other events in their environment that happen over and over again in a cycle. For example, dry and wet seasons.  
- Learners make sketches displaying events that take place in the day and those that take place in the night. | Core Competencies  
Critical Thinking and problem solving  
Creativity and Innovation.  
Personal development and Leadership  
**Subject Specific Practices**  
Manipulating  
Generalising  
Observing  
Analysing  
Evaluating |
| **B1.2.1.2. Recognise the relationship between the Earth and the Sun** | **B1.2.1.2.1 Know that the sun is the main source of light to the Earth**  
- Engage learners with a number of questions to enable them explore where we get light, e.g. *What does the sun look like? Where is the sun located? Do you see clearly or otherwise when the sun is out?*  
- Display various sources of light such as torch, candles, matchstick, and lantern.  
- Brainstorm with learners to come out with one thing which is common to all the items you have displayed.  
- Engage learners to mention sources of light in their environment (i.e. sun, moon, other stars, torch, lantern, electric bulbs and others).  
- Learners brainstorm the main sources of light by considering the biggest source of light which makes them see clearly in the day time.  
- Learners use paper to design the sun as a source of light to the earth. |
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</thead>
</table>
| **B1.2.1.3** Show an understanding of the roles of condensation, evaporation, transpiration and precipitation in the hydrological cycle | **B1.2.1.3.1** Observe the disappearance of mist and pools of water after it rains  
- Let learners observe the disappearance of mist and run-off water after it rains and come and talk about it in class.  
  *(Note: This activity is to be carried out when it rains).*  
- Engage learners to predict where mist and run-off water go after rains and assist them to understand that they evaporate.  
  **NB:** Mists evaporate but run-off water either flows into surface water bodies or collects as stagnant pools of water. Run-off water takes a longer time to evaporate. | Core Competencies  
Critical Thinking and problem solving  
Creativity and Innovation  
Personal development and Leadership  
Subject Specific Practices  
Manipulating  
Generalising  
Observing  
Analysing  
Evaluating |
| **B1.2.1.4** Recognise water and air as important natural resources | **B1.2.1.4.1** Identify sources and uses of water in the home and at school  
- Ask learners where they get water (sources of water) at the home, community and school.  
- In a participatory manner, learners come out with sources of water in the home and at school  
- Show or draw pictures depicting different sources of water such as bore-holes, rivers, wells and the sea.  
- Discuss the various uses of water at their homes, school and community.  
- Learners demonstrate several uses of water, e.g. washing of face and hands, drinking and preparing beverages, rinsing of utensils, watering of flowers.  
- Use local materials to create different sources of water in an outdoor activity. E.g. artificial wells, rivers, rainfall and tap. | Core Competencies  
Critical Thinking and problem solving  
Creativity and Innovation  
Personal development and Leadership  
Subject Specific Practices  
Generalising  
Observing  
Analysing  
Evaluating |
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</table>
| **B1.2.1.4 Recognise water and air as important natural resources** | **B1.2.1.4.2 Demonstrate the existence of air in the environment**  
- Engage learners in a number of games/ fun activities that demonstrate the existence of air, e.g. waving a piece of paper across the face, leaving inflated balloons in an open space, watching a hoisted flag, observing the leaves of a plant in the school, closing their mouths and then taking a deep breath, asking learners to fan themselves or sit in front of a working fan.  
- Learners talk about their observations in each case, e.g. explain what causes the leaves and hoisted flag to move.  
- Ask learners to outline uses of air in their lives. e.g. whistling, blowing of trumpets, flying kites, sailing of boats, breathing, etc.  
Summarise the lesson by explaining to learners that air is everywhere. | Core Competencies  
Critical Thinking and problem solving  
Creativity and Innovation  
Personal development and Leadership  
Subject Specific Practices  
Generalising  
Observing  
Analysing  
Evaluating |

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

<table>
<thead>
<tr>
<th>CONTENT STANDARD</th>
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<th>SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES</th>
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</thead>
</table>
| **B1.2.2.1 Demonstrate understanding of the life cycle of plants** | **B1.2.2.1.1 Examine the structure of plants**  
- Assist learners to uproot young plants from the school environment and bring them to class  
- Learners examine the external parts of the plants (using hand lens if available),  
- Draw the external parts and display drawings for discussion.  
- Create weed albums using leaves of different plants.  
**B1.2.2.1.2. Observe different kinds of seeds**  
- Provide learners with different kinds of seeds (e.g. orange, pawpaw, mango, bean seeds, shea nut).  
- Learners examine the external parts of different seeds, draw and display them for discussion.  
- Through a matching game, learners identify different fruits and their seeds. | Core Competencies  
Critical Thinking and Problem Solving  
Personal Development and Leadership  
Communication and Collaboration  
Creativity and Innovation  
Subject Specific Practices  
Observation, Recording |
## STRAND 2: CYCLES
### SUB-STRAND 1: EARTH SCIENCE

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| **B1.2.1.1. Recognise that some events in our environment are recurrent** | **B1.2.1.1.1 Explain that some natural phenomena, such as day and night, occur repeatedly**  
- Learners can be engaged in an activity that explains cyclic movement. (The second hand of an analogue clock, merry-go-round and circular cards, musical chairs could be used).  
- Relate this activity to the occurrence of day and night and explain that the appearance of the Sun, Moon and stars follow a cyclic pattern.  
- Let learners suggest other events in their environment that happen over and over again in a cycle. For example, dry and wet seasons.  
- Learners make sketches displaying events that take place in the day and those that take place in the night. | **Core Competencies**  
Critical Thinking and problem solving  
Creativity and Innovation.  
Personal development and Leadership  
**Subject Specific Practices**  
Manipulating  
Generalising  
Observing  
Analysing  
Evaluating |
| **B1.2.1.2. Recognise the relationship between the Earth and the Sun** | **B1.2.1.2.1 Know that the sun is the main source of light to the Earth**  
- Engage learners with a number of questions to enable them explore where we get light, e.g. *What does the sun look like? Where is the sun located? Do you see clearly or otherwise when the sun is out?*  
- Display various sources of light such as torch, candles, matchstick, and lantern.  
- Brainstorm with learners to come out with one thing which is common to all the items you have displayed.  
- Engage learners to mention sources of light in their environment (i.e. sun, moon, other stars, torch, lantern, electric bulbs and others).  
- Learners brainstorm the main sources of light by considering the biggest source of light which makes them see clearly in the day time.  
- Learners use paper to design the sun as a source of light to the earth. | **Core Competencies**  
Critical Thinking and problem solving  
Creativity and Innovation.  
Personal development and Leadership  
**Subject Specific Practices**  
Manipulating  
Generalising  
Observing  
Analysing  
Evaluating |
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| B1.2.1.3 Show an understanding of the roles of condensation, evaporation, transpiration and precipitation in the hydrological cycle | **B1.2.1.3.1 Observe the disappearance of mist and pools of water after it rains**  
  - Let learners observe the disappearance of mist and run-off water after it rains and come and talk about it in class. *(Note: This activity is to be carried out when it rains).*  
  - Engage learners to predict where mist and run-off water go after rains and assist them to understand that they evaporate.  
  **NB:** Mists evaporate but run-off water either flows into surface water bodies or collects as stagnant pools of water. Run-off water takes a longer time to evaporate. |                                                 |
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<td><strong>B1.2.1.4 Recognise water and air as important natural resources</strong></td>
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</table>
| **B1.2.1.4.1 Identify sources and uses of water in the home and at school** | • Ask learners where they get water (sources of water) at the home, community and school.  
• In a participatory manner, learners come out with sources of water in the home and at school  
• Show or draw pictures depicting different sources of water such as bore-holes, rivers, wells and the sea.  
• Discuss the various uses of water at their homes, school and community.  
• Learners demonstrate several uses of water, e.g. washing of face and hands, drinking and preparing beverages, rinsing of utensils, watering of flowers.  
• Use local materials to create different sources of water in an outdoor activity. E.g. artificial wells, rivers, rainfall and tap. |  |
| **B1.2.1.4.2 Demonstrate the existence of air in the environment** | • Engage learners in a number of games/ fun activities that demonstrate the existence of air, e.g. Waving a piece of paper across the face, leaving inflated balloons in an open space, watching a hoisted flag, observing the leaves of a plant in the school, closing their mouths and then taking a deep breath, asking learners to fan themselves or sit in front of a working fan.  
• Learners talk about their observations in each case, e.g. explain what causes the leaves and hoisted flag to move.  
• Ask learners to outline uses of air in their lives. e.g. whistling, blowing of trumpets, flying kites, sailing of boats, breathing, etc.  
• Summarise the lesson by explaining to learners that air is everywhere. | Core Competencies  
Critical Thinking and problem solving  
Creativity and Innovation  
Personal development and Leadership  
Subject Specific Practices  
Generalising  
Observing  
Analysing  
Evaluating |
## SUB-STRAND 2: LIFE CYCLES OF ORGANISMS

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<th>CONTENT STANDARD</th>
<th>INDICATOR AND EXEMPLARS</th>
<th>SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES</th>
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</thead>
</table>
| B1.2.2.1 Demonstrate understanding of the life cycle of plants | B1.2.2.1.1 Examine the structure of plants  
- Assist learners to uproot young plants from the school environment and bring them to class  
- Learners examine the external parts of the plants (using hand lens if available),  
- Draw the external parts and display drawings for discussion.  
- Create weed albums using leaves of different plants  
B1.2.2.1.2 Observe different kinds of seeds  
- Provide learners with different kinds of seeds (e.g. orange, pawpaw, mango, bean seeds, shea nut).  
- Learners examine the external parts of different seeds, draw and display them for discussion.  
- Through a matching game, learners identify different fruits and their seeds. | Core Competencies  
Critical Thinking and Problem Solving  
Personal Development and Leadership  
Communication and Collaboration  
Creativity and Innovation  
Subject Specific Practices  
Observation, Recording |
## STRAND 3: SYSTEMS

### SUB-STRAND 1: THE HUMAN BODY SYSTEMS

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</thead>
</table>
| **B1.3.1.1** Recognise that different parts of the human body work interdependently to perform a specific function | **B1.3.1.1.1** Identify the external human body parts by their appropriate names (e.g. eyes, ears, mouth, nose, legs, hands, shoulders, knees, fingers, toes and chest)  
- Use songs to get learners to name the parts of their bodies e.g., “my head, my shoulders, my knees and toes” or “show me your head, show me your eyes”.  
- Use realia, videos or charts/pictures to guide learners identify the external parts of the human body.  
- Learners draw a human body and use a colour of their choice to colour their drawing.  
- Learners can trace an outline of the human body on a cardboard or paper.  
- Learners display their work for discussion | Core Competencies  
Personal Development and Leadership  
Digital Literacy  
Critical Thinking and Problem Solving  
Creativity and Innovation  
Subject Specific Practices  
Recording, Generating |

### SUB-STRAND 2: ECOSYSTEM

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</thead>
</table>
| **B1.3.2.1** Show an understanding and appreciation of the interactions and interdependencies of organisms in an ecosystem | **B1.3.2.1.1** Know the places where living things live (land, air, and water)  
- Learners observe different habitats around the school, e.g. a tree which houses some birds and insects, a bush or a pond.  
- Observe videos or pictures of places where living things live e.g. a marshy area, forest, a pond etc.  
- Display pictures of air, water and land habitats with different organisms.  
- Learners come out with the names of the living things found in the three habitats (living places) in the video, pictures or through the nature walk.  
- Engage learners to draw organisms in their natural homes. | Core Competencies  
Digital Literacy  
Critical Thinking and Problem Solving  
Communication and Collaboration  
Creativity and Innovation  
Subject Specific Practices  
Observation, Analysing  
Predicting, Evaluating  
Recording |
### STRAND 4: FORCES AND ENERGY
### SUB-STRAND 1: SOURCES AND FORMS OF ENERGY

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</thead>
</table>
| **B1.4.1.1** Demonstrate an understanding of the concept of energy, its various forms and sources and the ways in which it can be transformed and conserved | **B1.4.1.1.1 Understand energy and give examples of its uses**  
- Learners talk about why they eat food every day  
- Guide learners to undertake activities that involve the use of energy. E.g. clapping of hands, lighting of a candle or torch, or switching on the light in the classroom.  
- Assist learners to come-out with the meaning of energy.  
- Ask learners to brainstorm on what happens when a car runs short of fuel.  
- Summarise the learners’ responses by explaining to them that energy is what enables us to do work. | **Core Competencies**  
Personal Development and Leadership  
Critical Thinking and Problem Solving  
Communication and Collaboration.  
**Subject Specific Practices**  
Observing, Predicting, Analysing  
Evaluating, Generalising  
Communicating |
| **B1.4.1.2** Show an understanding of the concept of heat energy in terms of its importance, effects, sources and transfer from one medium to another | **B1.4.1.2.1 Explain the terms hot and cold**  
- Ask learners: What types of things are usually hot? What types of things are usually cold?  
- Display substances that are hot or cold (e.g. hot tea, ice cream, ice block, hot water, water at room temperature, cold water.  
- Learners sort the items into hot and cold in groups.  
- Show learners a hot item (learners should not touch) to differentiate it from warm items.  
- Learners compare the samples in terms of warmth (by touching/feeling the provided samples).  
- Learners talk about how we keep hot things hot and cold things cold for a long time.  
- What will happen if an object is placed in the sun? | **Core Competencies**  
Creativity and Innovation  
Personal Development and leadership  
Critical Thinking and Problem Solving  
**Subject Specific Practices**  
Manipulating, Predicting  
Analysing, Generalising  
Communicating |
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</table>
| **B1.4.1.2** Show an understanding of the concept of heat energy in terms of its importance, effects, sources and transfer from one medium to another **CONT’D** | • Tell how substances placed in a fridge feel when touched,  
• Learners explore other ways of making things warm (For example, putting them in the sun, touching a phone that has just been charged).  
**Precaution:** Unplug the phone before using it | |

**SUB-STRAND 2: ELECTRICITY AND ELECTRONICS**

| **B1.4.2.1** Demonstrate knowledge of generation of electricity, its transmission and transformation into other forms of energy | **B1.4.2.1.1** Know the importance of electricity and identify common household appliances that require electricity to work | Core Competencies  
Cultural Identity and Global Citizenship  
Creativity and innovation  
Personal Development and Leadership  
Critical Thinking and Problem Solving  
Digital Literacy  
**Subject Specific Practices**  
Analysing  
Predicting  
Generating |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------|
| • Learners mention items in their homes that use electricity.  
• Alternatively show them videos/drawings of items that use electricity.  
• Put learners into groups and give each group flashcards of items that use electricity and those that do not.  
• Assist learners to sort the items into two groups i.e, ‘uses electricity’ and ‘does not use electricity’.  
• Let learners match the items mentioned with their functions, e.g. washing machine is the item used for washing, the item used to play music is the sound system, etc.  
• Guide learners through questioning to understand why all such appliances are connected to a source of electricity.  
• Learners brainstorm on how daily living without electricity will affect our homes, schools and industries.  
• Summarise lesson by explaining that electricity is a form of energy thus it enables electrical items to work.  
• Learners talk about the importance of electricity in the home. | | |
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</table>
| 4.2.2 Know the functions and assemblage of basic electronic components | B1.4.2.2.1 Know examples of common electronic devices and their uses  
- Display real or pictures of electronic devices such as mobile phones, wrist watches, cameras and torches.  
- Let learners identify the devices displayed.  
- Engage learners in an activity to match the devices with their uses.  
- Assist learners to model any one electronic device of their choice using appropriate materials (Blu tack, clay or cardboard). | Core Competencies  
Communication and Collaboration  
Personal Development and Leadership  
Digital Literacy  
Critical Thinking and Problem Solving  
Creativity and Innovation  
Subject Specific Practices  
Analysing  
Predicting  
Generating |

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<tr>
<th>SUB-STRAND 3: FORCES AND MOVEMENT</th>
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</table>
| B1.4.3.1 Know that movement is caused by applied forces due to the release of stored energy | B1.4.3.1.1 Explain force as a pull or a push on an object.  
- Show pictures of, or ask learners to mention activities in the home and the community that involve a push or a pull, e.g. donkey pulling a cart, people pushing a car, people drawing water from a well, etc.  
- Take learners outside the classroom to participate in several games or activities involving pulling or a pushing force, e.g. kicking and throwing of balls, pushing and pulling of boxes, tables and chairs and tug of war, etc.  
- Learners observe the movement of things, e.g. leaves, plants, balloons and other materials under the influence of the wind. Pictures and videos can be used. Let them discuss other actions that will cause objects to move.  
- Guide learners to brainstorm why the pushed objects move.  
- Elaborate on learners’ responses to explain that a push or a pull causes objects to move. Such a push or pull is termed as a force.  
- Engage children in drawing activities involving pushing and pulling e.g. a friend pushing an object. | Core Competencies  
Personal Development and Leadership  
Communication and Collaboration  
Critical Thinking and Problem Solving  
Creativity and Innovation  
Subject Specific Practices  
Observing  
Analysing  
Predicting  
Generalising |
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</table>
| B1.4.3.2. Recognise some simple machines used for making work easier, analyse their advantages and know their uses. E.g. levers, inclined planes and pulleys | B1.4.3.2.1 Understand what simple machines are and cite common examples  
- Engage learners in an activity to identify common machines in their homes and school.  
- Assemble simple machines for learners to explore their uses in the home.  
- Help learners to demonstrate the use of the provided machines for undertaking various tasks, e.g. opening bottles, picking up granules, etc.  
- Elaborate on the importance of such machines in daily living.  
- Summarise learners’ responses by explaining that machines enable work to be done easier and faster.  
- Engage learners to draw any of the devices of their choice.  
Precaution: Knives and other sharp objects should not be used in this lesson. | Core Competencies  
Communication and Collaboration  
Personal Development and Leadership  
Critical Thinking and Problem Solving  
Creativity and Innovation  
Subject Specific Practices  
Manipulating  
Classifying  
Analysing |
### STRAND 5: HUMANS AND THE ENVIRONMENT
### SUB-STRAND 1: PERSONAL HYGIENE AND SANITATION

<table>
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<tbody>
<tr>
<td><strong>B1.5.1.1 Recognise the importance of personal hygiene</strong></td>
<td><strong>B1. 5.1.1.1 Explain the need for bathing and know how it is done</strong></td>
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<tr>
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<td>• Enquire from learners the routine activities they engage in before coming to school. (Activities may include sweeping, bathing, brushing of teeth, washing of face, etc.)</td>
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<td>• Lead learners to discuss the reasons for undertaking those activities (such as bathing).</td>
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<td>• Assist them to talk about the number of times they bath a day and how their parents bath them.</td>
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<td>• Display a video/pictures showing the items used in bathing.</td>
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<td>• Present real items (e.g. soap, sponge, water, and towel) to learners to talk about them in groups.</td>
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<td></td>
<td>• Guide learners to talk about what will happen if they do not take their bath regularly.</td>
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<td></td>
<td>• In groups, learners present their ideas about what will happen if they do not bath.</td>
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<td>• Learners sing familiar songs and recite rhymes as they demonstrate the process of bathing using a doll.</td>
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<td>• Learners draw some items used for bathing and display them for discussion.</td>
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</tbody>
</table>

| **B1.5.1.1 Recognise the importance of personal hygiene** | **B1. 5.1.1.2 Know the need for and how to clean the teeth** |
| | • Begin with a familiar song on cleaning the teeth. |
| | • Ask learners to mention the items used in cleaning the teeth, e.g. toothbrush and toothpaste, chewing stick, etc. |
| | • Let learners watch videos or pictures that show the right way to clean the teeth. |
| | • Demonstrate the right method of brushing the teeth (moving the toothbrush in an upward and downward motion) in front of the class and ask learners to do same. |
| | • Let learners individually draw and colour some items used in brushing the teeth and display their drawings for discussion. |
| | • Learners talk about what will happen if they do not brush their teeth regularly. |

**Core Competencies**
- Critical Thinking and Problem Solving
- Collaboration and Communication
- Creativity and Innovation
- Personal Development and Leadership
- Digital Literacy

**Subject Specific Practices**
- Analysing
- Predicting
- Evaluating
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</thead>
</table>
| **B1.5.1.1 Recognise the importance of personal hygiene (CONT'D)** | **B1. 5.1.1.3 Demonstrate an understanding of the need for and how to wash the hands**  
- Lead learners through questions to come out with the importance of washing the hands.  
- Elaborate on their responses to introduce the topic “Hand-Washing”.  
- Learners discuss when to wash their hands. (The hands must be washed after visiting the toilet, before and after eating, after practical activity, after returning home from school or the playground).  
- Ask learners to name items used in hand-washing, (soap and running clean water).  
- Bring to the classroom, items used for hand-washing and demonstrate the washing of hands to learners, emphasizing washing under running/flowing water.  
- Engage learners in groups to demonstrate washing of hands.  
- Learners brainstorm the possible health effects associated with failure to wash the hands properly.  
- Ask learners to draw illustrations of them washing their hands with water and soap. | **Core Competencies**  
Critical Thinking and Problem Solving  
Collaboration and communication  
Personal Development and Leadership  
Digital Literacy  

**Subject Specific Practices**  
Analysing  
Predicting  
Evaluating |
| **B1.5.1.2 Appreciate the natural and human features of the local environment and the need for keeping the environment clean** | **B1.5.1.2.1 know the need to keep the environment clean**  
- Go on a nature walk to observe the things in the environment.  
- Learners talk about what they observed during the nature walk.  
- Show pictures of the natural and human features of the environment.  
- Engage learners to discuss what will happen to them if the environment is very dusty and unclean.  
- Brainstorm with learners on what will happen if they do not weed or keep their school, home and community clean.  
- In groups, learners present their ideas by explaining further why it is important to keep the environment clean.  
- Learners compose songs on how to keep the environment clean and draw pictures to depict clean environments. | **Core Competencies**  
Critical Thinking and Problem Solving  
Collaboration and Communication  
Personal Development and Leadership  
Creativity and Innovation  
Digital Literacy  

**Subject Specific Practices**  
Analysing  
Predicting  
Evaluating |
### SUB-STRAND 2: DISEASES

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</tr>
</thead>
</table>
| B1.5.2.1 Know common diseases of humans, causes, symptoms, effects and prevention | **B1.5.2.1.1** Identify some common diseases that affect the skin and their causes  
- Engage learners to watch pictures and videos or tell a story on common skin diseases.  
- Learners in their groups name some common skin diseases that affect people in their communities, e.g. heat rashes, measles, eczema, ringworm, chicken pox, etc.  
- In groups learners share their ideas with the whole class.  
- Reinforce learners' ideas by writing all common skin diseases on the board.  
- Brainstorm with learners on the causes of common skin diseases.  
- Learners talk about the ways they can prevent skin diseases and role play some of the prevention scenarios. |  
  **Core Competencies**  
  Critical Thinking and Problem Solving  
  Collaboration and Communication  
  Personal Development and Leadership  
  Digital Literacy  
  **Subject Specific Practices**  
  Observing  
  Generalising |

### SUB-STRAND 3: SCIENCE AND INDUSTRY

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</thead>
</table>
| B1.5.3.1 Recognise the impact of Science and Technology on society | **B1.5.3.1.1** Identify technologies in the immediate environment and describe the impact of the technology on society  
- Engage learners to watch videos or pictures showing technologies and their impact on the society.  
- Bring electronic devices such as toys, laptops, smart phones, watches, radio and DVD players to class.  
- Learners in groups discuss other technological equipment they see in their immediate environment and their accompanying functions, e.g. cars, drones, thermometers.  
- Learners present their ideas in groups for discussion.  
- Ask learners to talk about what will happen if such technologies were absent in the society.  
- Guide learners to reshape their ideas and present key concepts on common technologies in the environment on the writing board.  
- Learners mention some technological devices and how these have impacted their lives.  
- In groups learners work to design and make simple technological devices of their choice using materials such as blu tack, clay, cardboard and paper. |  
  **Core Competencies**  
  Critical Thinking and Problem Solving  
  Collaboration and Communication  
  Personal Development and Leadership  
  Digital Literacy  
  Creativity and Innovation  
  **Subject Specific Practices**  
  Observation, Evaluating  
  Analysing |
## CONTENT STANDARD

B1.5.3.2 Exhibit knowledge of food processing and preservation

### INDICATOR AND EXEMPLARS

B1.5.3.2.1 Identify foods that can be processed and preserved at home
- Ask learners to mention foods they ate in the morning and what was used to prepare the food.
- Provide samples of preserved foods such as roasted plantain, dried fish, smoked fish.
- In groups, let learners name vegetables, fruits and other types of food that can be preserved at home, e.g. okro, pepper, tomato, onions, ginger, cassava, yam, plantain.
- Learners talk about how food is prepared in their homes.
- Ask learners to tell how their parents preserve food at home.
- The food processing and preservation methods must include common ones such as smoking, drying, frying, roasting, baking and refrigeration.

### SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES

**Core Competencies**
- Critical Thinking and Problem Solving
- Communication
- Collaboration and Leadership
- Personal Development and Leadership
- Cultural Identity and Global Citizenship

**Subject Specific Practices**
- Classifying, Generalising

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## SUB-STRAND 4: CLIMATE CHANGE

B1.5.4.1 Understand that climate change is an important environmental issue facing the world today

### INDICATOR AND EXEMPLARS

B1.5.4.1.1 Describe the conditions of the weather
- Take learners out to observe the weather and talk about whether they feel hot or cold.
- Guide learners to talk about other weather conditions, e.g. rainy, windy, sunny and cloudy.
- Show pictures or videos of different weather conditions and activities people do under different weather conditions.
- Learners talk about what they observe during different weather conditions: rainy, windy, sunny and cloudy.
- Let learners sing songs on the weather, e.g. rain, rain go away.
- Act a play on the lesson taught.

### SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES

**Core Competencies**
- Critical Thinking and Problem Solving
- Communication
- Collaboration and Leadership
- Digital Literacy
- Creativity and Innovation

**Subject Specific Practices**
- Observing, Predicting
- Analysing, Evaluating

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