GHANA EDUCATION SERVICE

(MINISTRY OF EDUCATION)

REPUBLIC OF GHANA

MATHEMATICS

CURRICULUM FOR PRIMARY SCHOOLS

(BASIC 1 - 3)

SEPTEMBER 2019

NATIONAL COUNCIL FOR CURRICULUM & ASSESSMENT OF MINISTRY OF EDUCATION

Mathematics Curriculum for Primary Schools

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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 a 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 should 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 in its design to develop individuals with 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 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 achieving excellence. The Ministry endorses a quality learning experience as an entitlement for each of Ghana's school-going girl and boy; the curriculum has rightly focused on learning and learning progression. The Ministry has also endorsed accountability as a critical domain for effective workings of standards-based curriculum.

More importantly the role of the teacher is to make this curriculum work for the intended purpose - 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 MATHEMATICS

Mathematics forms an integral part of our everyday lives. It is a universal truth that development is hinged on Mathematics. It 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. Mathematics has changed our lives, and is vital to Ghana's future development.

To provide quality Mathematics education, teachers must facilitate learning in the Mathematics classroom. This will provide the foundations for discovering and understanding the world around us and lay the grounds for Mathematics and Mathematics related studies at higher levels of education. Learners should be encouraged to understand how Mathematics can be used to explain what is occurring, predict how things will behave and analyse causes and origins of things in our environment. The Mathematics curriculum has considered the desired outcomes of education for learners at the basic level. Mathematics is also concerned with the development of attitudes and is important for all citizens to be mathematically and technologically literate for sustainable development. Mathematics therefore ought to be taught using hands-on and minds-on approaches which learners will find as fun and adopt as a culture.

PHILOSOPHY

- **Teaching Philosophy**

Ghana believes that an effective Mathematics education needed for sustainable development should be inquiry-based. Thus Mathematics 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 Mathematics 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**

Mathematics learning is an active contextualised 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 learners and leads to the development of critical thinkers and problem solvers.

GENERAL AIMS

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

SUBJECT AIMS

The Mathematics curriculum is designed to help learners to:

1. recognise that Mathematics permeates the world around us;
2. appreciate the usefulness, power and beauty of Mathematics;
3. enjoy Mathematics and develop patience and persistence when solving problems;
4. understand and be able to use the language, symbols and notation of Mathematics;
5. develop mathematical curiosity and use inductive and deductive reasoning when solving problems;
6. become confident in using Mathematics to analyse and solve problems both in school and in real-life situations;

7. develop the knowledge, skills and attitudes necessary to pursue further studies in Mathematics; and
8. develop abstract, logical and critical thinking and the ability to reflect critically upon their work and the work of others.

INSTRUCTIONAL EXPECTATIONS

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 Mathematics 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 Mathematics learners who exhibit the skills of mathematical inquiry and the attitudes and social values conducive to mathematics learning.
4. Use multiple methods and systematically gather data about learner understanding and ability to guide Mathematics teaching and learning with arrangements to provide feedback to both learners and parents.
5. Design and manage learning environments that provide learners with the time, space and resources needed for learning Mathematics.

CORE COMPETENCIES

The core competencies for Mathematics describe a body of skills that teachers in Mathematics at all levels should seek to develop in their learners. They are ways in which teachers and learners in Mathematics 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 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, competencies and attitudes acquired to contribute effectively towards the socio-economic 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 enable 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 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 may acquire some 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 synthesise knowledge by integrating a number of ideas to formulate a plan, solve a problem, compose a story, or a piece of music. Further, 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 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, 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 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 has tended to stress 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, explain reasoning, and 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: This refers to the ability to remember, recall, identify, define, describe, list, name, match, state principles, facts, concepts. Knowledge is the ability to remember or recall material already learned. This constitutes the lowest level of learning.

Understanding: This refers to 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 material that may be verbal, pictorial or symbolic.

Applying: This dimension is also referred to as "Use of Knowledge". It is the 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.

Analysis: This dimension is the ability to break down material/information into its component parts; to differentiate, compare, distinguish, outline, separate, identify significant points etc., ability to recognise unstated assumptions and logical fallacies; and the ability to recognise inferences from facts etc.

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

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

Creating: This is the ability to use information or materials to plan, compose, produce, manufacture or construct other products. From the foregoing, creation is the highest form of thinking and learning, and is therefore the most important behaviour. This unfortunately is the area where most learners perform poorly. In order to get learners to develop critical thinking and behavioural skills beginning right from the lower primary level, it is advised that you do your best to help your learners to develop analytic and application skills as we have said already.

SKILLS AND PROCESSES

The mathematical method is the means by which a mathematician solves problems or seeks to gain information about events. Learners should be exposed to situations that challenge them to raise questions and attempt to solve problems. The more often they are faced with these challenges, the more likely they are to develop a positive attitude toward mathematics, and the more likely they are to develop the relevant process skills. Details of each sub-skill in the "Values, Attitudes and Process Skills" dimension are as follows:

Observing:	This is the skill of using our 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. It also involves 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: This is the skill of developing hypotheses; planning and designing of experiments; persisting in the execution of experimental activities and

Experiments modifying experimental activities where necessary in order to reach conclusions.

Learners therefore need to acquire positive attitudes, values and psychosocial skills that will enable them to participate actively in lessons and take a stand on issues affecting them and others.

ATTITUDES

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 to participate in debates and take a stand on issues affecting them and others. The Mathematics curriculum thus focuses on the development of attitudes and values.
The Mathematics curriculum aims at helping learners to acquire the following:

(i) **Commitment**: determination to contribute to national development.

(ii) **Tolerance**: willingness to respect the views of others.

(iii) **Patriotism**: readiness to defend the nation.

(iv) **Flexibility in ideas**: willingness to change opinion in the face of more plausible evidence.

(v) **Respect for evidence**: willingness to collect and use data on one's investigation, and also have respect for data collected by others.

(vi) **Reflection**: the habit of critically reviewing ways in which an investigation or observation has been carried out to see possible faults and other ways in which the investigation or observation can be improved upon.

(vii) **Comportment**: conforming to acceptable societal norms.

(viii) **Co-operation**: the ability to work effectively with others.

(ix**)** **Responsibility**: the ability to act independently and make decisions; morally accountable for one's action; capable of rational conduct.

(x) **Environmental Awareness**: being conscious of one's physical and socio-economic surroundings.

(xi) **Respect for the Rule of Law**: obeying the rules and regulations of the land.

The teacher should ensure that learners cultivate the above attitudes and skills as basis for living in the nation as effective citizens.

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 national 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 one another both personally and professionally.

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, it aims to make learners become morally upright with the attitude of doing the right thing even when no one is watching, be true to themselves and be willing to live the values of honesty and compassion. Equally important, the ethos or culture of the work place, including integrity and perseverance, must underpin the learning processes to allow learners to apply skills and competencies in the world of work.

The action verbs provided under the various profile dimensions should help you to structure your teaching to achieve desired learning outcomes. Select from the action verbs provided for your teaching, for evaluation exercises and for test construction. Check the weights of the profile dimensions to ensure that you have given the required emphasis to each of the dimensions 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 to 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 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, 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 ten periods a week, each period consisting of thirty minutes, is allocated to the teaching of Mathematics at the Lower Primary level. It is recommended that the teaching periods be divided as follows:
2 periods per day (two 30-minute periods)

PEDAGOGICAL APPROACHES

These include the approaches, methods, strategies and appropriate relevant teaching and learning resources for ensuring that every learner benefits from the teaching and learning process. The curriculum emphasises the:

1. creation of learning-centred classrooms through the use of creative approaches to ensure learner empowerment and independent learning;
2. positioning of inclusion and equity at the centre of quality teaching and learning;
3. use of differentiation and scaffolding as teaching and learning strategies for ensuring that no learner is left behind;
4. use of Information Communications Technology (ICT) as a pedagogical tool;
5. identification of subject specific instructional expectations needed for making learning in the subject relevant to learners;
6. integration of assessment as learning, for learning and of learning into the teaching and learning processes and as an accountability strategy; and
7. questioning techniques that promote deep learning.

LEARNING-CENTRED PEDAGOGY

The learner is at the centre of learning. At the heart of the national curriculum for change and sustainable development is the 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 KG1 to KG2 and B1 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 through the inspiration of the teacher. The learners, then, become actively engaged in looking for answers, working in groups to solve problems. They also research for information, analyse and evaluate information. The aim of the learning-centred classroom is to enable learners take ownership of their learning. It provides the opportunity for deep and profound learning to take place.

The teacher as a facilitator needs to create a learning environment that:

1. makes learners feel safe and accepted;
2. helps learners to interact with varied sources of information in a variety of ways;
3. helps learners to identify a problem suitable for investigation through project work;
4. connects the problem with the context of the learners' world so that it presents realistic opportunities for learning;
5. organises the subject matter around the problem, not the subject;
6. gives learners responsibility for defining their learning experience and planning to solve the problem;
7. encourages learners to collaborate in learning; and
8. expects all learners to 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 teachers providing the answers and their opinions in a learning-centred classroom.

INCLUSION

Inclusion is ensuring 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 and accessibility to quality education is met. The Curriculum suggests a variety of approaches that address learners' diversity and their special needs in the learning process. When these approaches are effectively used in lessons, they will contribute to the full development of the learning potential of every learner. Learners have individual needs, learning experiences and different levels of motivation for learning. Planning, delivery and reflection on daily learning experiences should take these differences into consideration. The curriculum therefore promotes:

1. learning that is linked to the learner's background and to their prior experiences, interests, potential and capacities.

2. 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
3. the active involvement of the learners in the selection and organisation of learning experiences, making them aware of their importance and also enabling them to assess their own learning outcomes.

DIFFERENTIATION AND SCAFFOLDING

Differentiation is a process by which differences (learning styles, interest and readiness to learn) between learners are accommodated so that all learners in a group have the best possible chance of learning. Differentiation could be by content, tasks, questions, outcome, groupings and support. Differentiation as a way of ensuring each learner benefits adequately from the delivery of the curriculum can be achieved in the classroom through i) task ii) support from the Guidance and Counselling Unit and iii) learning outcomes.

Differentiation by task involves teachers setting different tasks for learners of different abilities. 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.

Differentiation by support involves the teacher giving the needed support and referring weak learners to the Guidance and Counselling Unit for academic support.

Differentiation by outcome involves the teacher allowing learners to respond at different levels. Weaker learners are allowed more time for complicated tasks.

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 task, experience 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 and engaging them to discuss the excerpt to improve comprehension. The teacher goes ahead to guide 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 are:

1. give learners a simplified version of a lesson, assignment, or reading, and then gradually increases the complexity, difficulty, or sophistication over time;
2. describe or illustrate a concept, problem, or process in multiple ways to ensure understanding;
3. give learners an exemplar or model of an assignment they will be asked to complete;
4. give learners a vocabulary lesson before they read a difficult text;
5. describe the purpose of a learning activity clearly and the learning goals they are expected to achieve; and
6. describe explicitly how the new lesson builds on the knowledge and skills learners were taught in a previous lesson.

INFORMATION AND COMMUNICATION TECHNOLOGY

Information and Communication Technology (ICT) has been integrated into the Mathematics curriculum as part of the core of education, alongside reading, writing and numeracy. Thus, the curriculum is designed to use ICT as a teaching and learning tool to enhance deep and independent learning. For instance, the teacher, in certain instances, is directed to use multimedia to support the teaching and learning process.

ICT has the potential to innovate, accelerate, enrich and deepen skills. It also motivates and engages learners to relate school experiences to work practices. It provides opportunities for learners to fit into the world of work. Some of the expected outcomes that this curriculum aims to achieve are:

1. improved teaching and learning processes;
2. improved consistency and quality of teaching and learning;
3. increased opportunities for more learner-centered pedagogical approaches;
4. improved inclusive education practices;
5. improved collaboration, creativity, higher order thinking skills; and
6. enhanced flexibility and differentiated approach of delivery

The use of ICT as a teaching and learning tool is to provide learners an access to large quantities of information online and offline. It also provides the framework for analysing data to investigate patterns and relationships in statistical data]. Once learners have made their findings, ICT can help them organise, edit and print the information in many different ways.

Learners need to be exposed to various ICT tools around them including calculators, radios, cameras, phones, television sets and computers and related software like Microsoft Office packages - Word, PowerPoint and Excel as teaching and learning tools. The exposure that learners are given at the primary school level to use ICT in exploiting 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 competence level of learners.

ORGANISATION AND STRUCTURE OF THE CURRICULUM

The curriculum is organised under key headings and annotations.

ANNOTATION

A unique annotation is used to label the class, strands, sub-strands, content standards and learning indicators in the curriculum for the purpose of easy referencing. The annotation is defined in Figure 1:

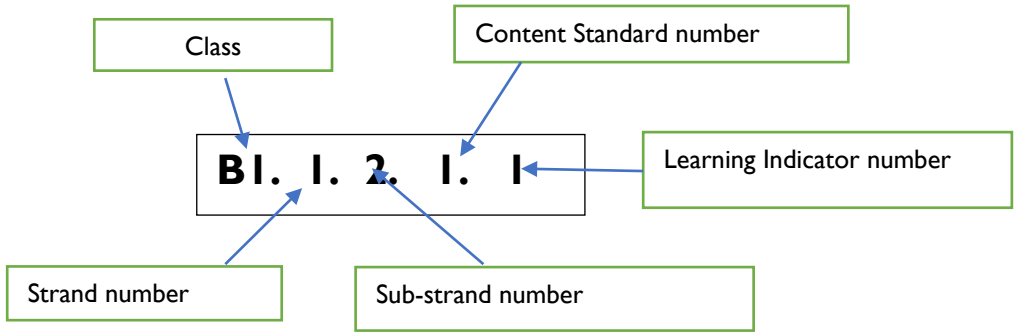


Figure 1: Curriculum Reference Numbers

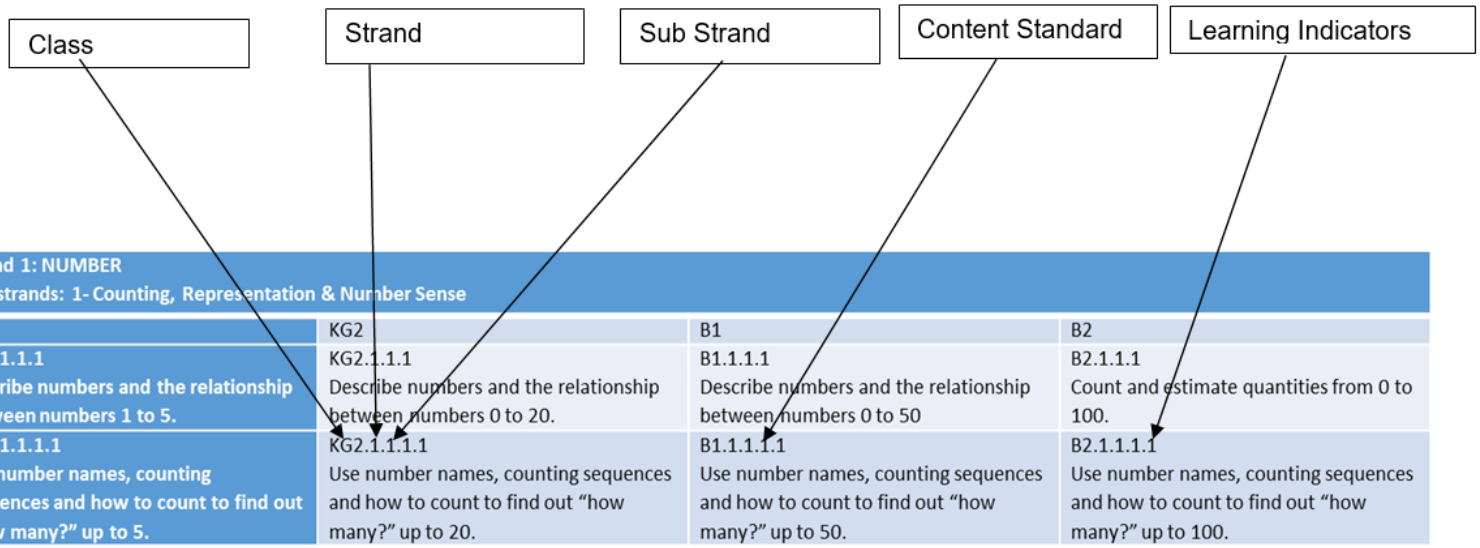
Strands are the broad areas/sections of the Mathematics content to be studied.

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 refers to 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: NUMBER Sub-strands: 1- Counting, Representation & Number Sense			
KG1	KG2	B1	B2
KG1.1.1.1 Describe numbers and the relationship between numbers 1 to 5.	KG2.1.1.1 Describe numbers and the relationship between numbers 0 to 20.	B1.1.1.1 Describe numbers and the relationship between numbers 0 to 50	B2.1.1.1 Count and estimate quantities from 0 to 100.
KG1.1.1.1.1 Use number names, counting sequences and how to count to find out "how many?" up to 5.	KG2.1.1.1.1 Use number names, counting sequences and how to count to find out "how many?" up to 20.	B1.1.1.1.1 Use number names, counting sequences and how to count to find out "how many?" up to 50.	B2.1.1.1.1 Use number names, counting sequences and how to count to find out "how many?" up to 100.

ORGANIZATION OF THE STANDARDS (B1 – B3)

The content standards in this document are organized by grade level. Within each grade level, the contents are grouped first by strands. Each strand is further subdivided into sub-strands of related indicators.

- **Indicators** are learning outcomes that define what learners should know and be able to do.
- **Content Standards** are groups of related indicators. Note that indicators from different standards may sometimes be closely related, because mathematics is a connected subject.
- **Sub-strands** are larger groups of related indicators (or mathematics topics to be studied). Indicators from different sub-strands may sometimes be closely related.
- **Strands** are the main branches of the mathematics content to be studied.

The Standards are organised at the B1 – B3 phase under four strands:

1. Number
2. Algebra
3. Geometry and Measurement
4. Data

Table 1 shows the strands and sub-strands of the B1 – B3 curriculum and Table 2 shows the scope of the sub-strands.

Table 1 Strands and sub-strands of the B1 – B3 curriculum

STRANDS	SUB-STRANDS		
	B1	**B2**	**B3**
Number (Counting, Representation and Cardinality) Operations and Fractions	Numbers: (Counting, Representation and Cardinality)	Numbers: (Counting, Representation and Cardinality)	Numbers: (Counting, Representation, and Cardinality)
	Numbers: (Operations)	Numbers: (Operations)	Numbers: (Operations)
	Fractions Representation and Relationship	Fractions Representation and Relationship	Fractions Representation and Relationship
Algebra	Patterns and Relationships	Patterns and Relationships	Patterns and Relationships
Geometry and Measurement	Lines and Shapes	Lines and Shapes	Lines and Shapes
	Position and Transformation	Position and Transformation	Position and Transformation
	Measurements	Measurements	Measurements
Data	Data (Collection, Presentation, Analysis and Interpretation)	Data (Collection, Presentation, Analysis and Interpretation)	Data (Collection, Presentation, Analysis and Interpretation)

Table 2 Scope of the sub-strands of the B1 – B3 curriculum

STRANDS	SUB-STRANDS	B1	B2	B3
Number	Whole Numbers: Counting and Representation	√	√	√
	Whole Numbers Operations	√	√	√
	Fractions Representation and Relationship	√	√	√
Algebra	Patterns and Relationships	√	√	√
Geometry and Measurement	Lines and Shapes	√	√	√
	Position and Transformation	√	√	√
	Measurements	√	√	√
Data	Data (Collection, Presentation, Analysis and Interpretation)	√	√	√

BASIC I

BASIC 1

Strand 1: NUMBER

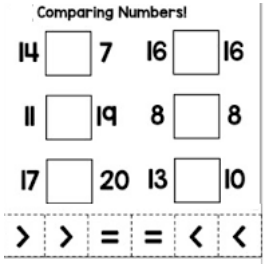
Sub-Strand 1: Number: Counting, Representation, Cardinality & Ordinality

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.1.1 **Describe numbers and the relationship between numbers 0 to 100**	**B1.1.1.1.1 Use number names, counting sequences and how to count to find out "how many?"** E.g. 1. Count by 1s (forwards and backwards) between two given numbers between 0 and 100; or by 2s and 10s; Identify and correct errors or omissions in counting or skip counting sequences E.g. 2. Count to answer "how many?" questions about as many as 100 objects arranged in a line, a grid or a circle; Show that the count of a group of up to 100 objects does not change regardless of the order in which the objects are counted or the arrangement of the objects E.g. 3. Estimate the number of objects in a small group (up to 100) and describe the estimation strategy used; Select an appropriate estimate among all those given for a group of up to 100 objects and justify the choice E.g. 4. Represent the number of objects in a group with a written numeral 0 to 100. Use ordinal numbers to describe the position of objects up to 10th place	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership; Attention to Precision; Cultural Identity

<table>
<tr><th>CONTENT STANDARDS</th><th>INDICATORS AND EXEMPLARS</th><th>SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES</th></tr>
<tr>
<td>B1.1.1.1

Describe numbers and the relationship between numbers 0 to 100. CONT'D</td>
<td>
B1.1.1.1.2 Identify numbers in different positions around a given number (0 – 100)
E.g. 1. Display a number chart with numbers multiples of say 4 between 0 and 100 and have learners identify numbers in different positions around a given number. Put learners in convenient groups and give each group a number grid and have them identify numbers in different positions around a chosen number.
<table>
<tr><td>4</td><td>8</td><td>1</td></tr>
<tr><td>16</td><td>18</td><td>11</td></tr>
<tr><td>28</td><td>44</td><td>69</td></tr>
<tr><td>67</td><td>76</td><td>96</td></tr>
</table>
B1.1.1.1.3 Use number names and non-standard units for measuring (lengths and volumes) to count to find out "how long or how much?"…up to 100
E.g. 1. Have learners use their feet, hand-span and referent materials to find how long a table, window and door frames are etc., by counting the number of times their feet, hand-span and referent materials are able to do this
E.g. 2. Have learners use empty containers such as bottles, cups etc. to determine the capacity of other bigger containers by counting to find how much (the number of times) the bottles, cups etc. are able to do this
</td>
<td>Learners develop:

Problem Solving skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision</td>
</tr>
</table>

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.1.1 **Describe numbers and the relationship between numbers 0 to 100. CONT'D**	**B1.1.1.1.4 Use comparative language to describe the relationship between quantities/numbers up to 100 using place value and the number line** E.g. 1. Use 1-to-1 correspondence or matching to solve problems that involve comparing 2 sets having between 1 to 100 objects and explain how he/she solved the problem (finding which set has more or less, which groups have the same as) E.g. 2. Use the terms "more than", "less than" or "the same as" when comparing two groups having between1 to 100 objects E.g. 3. Put groups between 1 to 50 objects in increasing or decreasing order and justify his/her answer or explain what he/she did to find the answer E.g. 4. Identify numbers and groups of objects that are that are 1 more or less than a number (for numbers 1 to 100 E.g. 5 Use the number line to compare and order whole numbers from 0 to 100	Learners develop: Problem Solving skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision
	B1.1.1.1.5 Represent the comparison of two number up to 100 using the symbols ">, < or =" E.g. 1. Use the terms "more than", "less than" or "the same as" when comparing two numbers between1 to 50. E.g. 2. Use the symbols "**>**", "**<** " or "**=**" when comparing two numbers between1 to 50 	

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.1.1 **Describe numbers and the relationship between numbers 0 to 100** **CONT'D**	**B1.1.1.1.6 Describe the relationship between quantities/numbers up to 100** E.g. 1. Use one-to-one correspondence, matching or counting to identify whether the number of objects in one group of up to 20 objects is greater than, less than or equal to the number of objects in another; describe the relationship between the two groups or numerals using the terms greater than, less than, or equal to E.g. 2. Build a group that has more than, less than, or the same number as a given set E.g. 3. Demonstrate an understanding of the relative size of numbers up to 100 by: – Order groups of 1 to 20 objects and then a small set of numerals between 1 and 20, and justifying the arrangement – Describe the relative size of numbers up to 100 *(i.e., say whether one number is a lot or a little bigger or smaller than another, or 5 more than another number);* – Place given numerals between 0 and 50 on a number line that has 0, 5 10 and 20 indicated as benchmarks – Act out and solving problems (pictures and words) that involve comparing quantities *(i.e., Johnson has 3 mangoes, Adwoa has 7. what can you say?)*	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

Sub-Strand 2: Number Operations (Addition, Subtraction, Multiplication and Division)

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.2.1 **Develop a conceptual understanding of addition and subtraction**	**B1.1.2.1.1 Demonstrate understanding of addition as joining and finding how many altogether and subtraction as separating and finding how many left; numbers 0 to 20** E.g. 1. Acting out a given story problem presented orally. For instance, – Sena has 8 bottle caps. She takes 5 more bottle caps from Kofi. How many bottle caps does Sena now have? – Kojo has 15 pencils. He gave 7 to Ato. How many pencils are left? • Indicating if the scenario in a story problem represents an addition or a subtraction and justifying the answer E.g. 2. Creating a story problem for subtraction or addition or for a given number sentence (+ and – within 20) - Daniel's family have 6 electric bulbs in the house. Two of the bulbs are not working. How many bulbs can Daniel's family use?	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative learning; Personal Development and Leadership Attention to Precision; Cultural Identity
B1.1.2.2 **Demonstrate an understanding of the concept of equality**	**B1.1.2.2.1 Use objects and pictorial models to solve word problems involving joining, separating and comparing sets within 20 and unknowns as any one of terms in problems such as 9 +7 = [], 13 +[] =19 and 14-[]=3.** E.g. 1. Explaining that = means *"the same as'* – Identifying if two quantities or groups of objects are equal or not and justifying answers – Using the symbol = to record equal relationships (e.g., 3 = ☐ ☐ ☐☐*or*☐☐ ☐ ☐ + ☐ ☐ = ☐ ☐ ☐ ☐ ☐) – Representing a pictorial or concrete equality in symbolic form (e.g., represent ☐ ☐ ☐ + ☐ ☐ = ☐ ☐ ☐ ☐ ☐ as 3 + 2 = 5) E.g. 2. Use a symbol (____) to represent the unknown in an addition or subtraction statement.	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative learning; Attention to Precision

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.2.2 **Demonstrate an understanding of the concept of equality. CONT'D**	B1.1.2.2.2 Use relationship between addition and subtraction to demonstrate understanding of equality for numbers within 20 E.g. 1. Demonstrate an understanding of the relationship between addition and subtraction by: transforming a subtraction as an equivalent addition and vice versa (For example, subtracting eight from 10 (10 – 8) is the same as identifying the number that must be added to 8 to make 10) 10 − 8 = What? Means 8 + What? = 10 B1.1.2.2.3 Generate and solve word problem situations when given a number sentence involving addition and subtraction of numbers within 20 E.g. Write addition and subtraction problems, learners in their groups discuss and generate word problems to match the number sentences	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

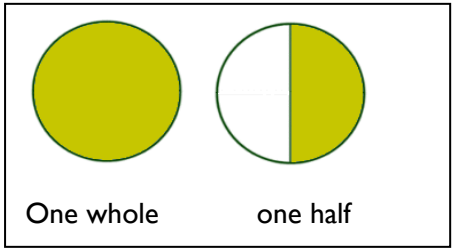
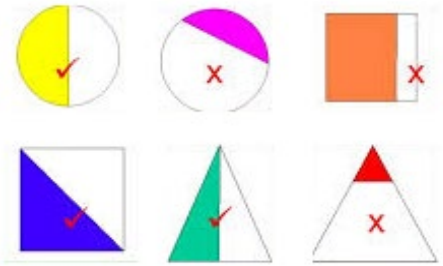
CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.2.3 **Demonstrate fluency with addition and subtraction-relationships**	**B1.1.2.3.1 Use strategies for solving basic addition facts (and related subtraction fact) to10.** *(Note: The focus is on developing strategies to find answers, not memorising number facts. That comes in P2 and P3)* E.g. 1. Naming the number that is 1 more, 2 more, 1 less, or 2 less than a number given by the teacher or another pupil (for numbers up to 20 only) E.g. 2. Naming the double of a number to 10 E.g. 3. Identifying 10 more or less than a number between 0 and 20, and eventually between 0 and 100 E.g. 4. Identifying combinations to 5 or 10 (i.e., given a number, quickly identify how many more must be added to get 5 or 10)	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

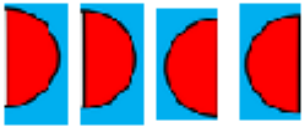
CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.2.4 **Apply strategies for adding and subtracting to 20**	**B1.1.2.4.1 Use counting on, counting down and missing addend strategies for adding and subtracting within 20** E.g. 1. Relating counting to addition (*i.e.,* recognizing that adding 2 is the same as *counting on* 2*)* E.g. 2. Counting on (*i.e., for 5 + 3, start at 5 and count on 3 places… 6, 7, 8. The answer is 8.)* E.g. 3. "Making 10s" *(i.e., if 7 + 2 + 3, do 7 + 3 = 10 first then add 2. The answer is 12. Or if given 7 + 2 + 3, change the order of the addends to 7 + 3 + 2 to produce combinations that add to 10; Or if given 2 + 6 + 4, add the two last addends first to produce 2 + 6 + 4 = 2 + 10 = 12 Or if given 8 + 3, change question to 8 + 2 + 1 = 10 + 1 = 11)* E.g. 4. "Making doubles" *(i.e., if 5 + 4, do 4 + 4 = 8 then add 1. The answer is 9. Or if given 6 + 7, change question to 6 + 6, which give 12 then add 1. The answer is 13).* Relating subtraction to counting down (i.e., Recognizing that subtracting 3 is the same as counting down 3) *(i.e., for 15 - 3, start at 15 and count on 3 places… 14, 13, 12. The answer is 12.)* E.g. 5. Relating subtraction to *comparison or finding the difference* (Recognizing that subtracting 5 from 8 is the same as ' 5 is how many less than 8; or '8 is how many more than 5; E.g. 6. "Using addition to subtract" or re-writing as addition sentence and finding the missing addend *(i.e., if given 7 - __ = 5, change the question to the addition 5 + ___ = 7. The answer is 2, so 7 - 2 = 5.* 7 – *What?* = 5 means 5 + *What?* = 7	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.2.4 **Apply strategies for adding and subtracting to 20** **CONT'D**	*Or if given 8 - 6 = ___ change question to 6 +__ = 8. The answer is 2, so 8 - 6 = 2). That is,* 8 − 6 = What? (___) means 6 + *What?* (___) = 8	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

B1.1.2.4 **Apply strategies for adding and subtracting to 20** **CONT'D**	**B1.1.2.4.2 Solve one-step word problems involving addition and subtraction within 20 using a variety of strategies** E.g. 1. Use a variety of strategies (objects, drawings, mental strategies, counting on, doubles etc.) to solve addition word problems to 20 involving adding to, putting together – and with unknowns in all positions. – Ama has 10 mangoes and receives 3 more mangoes. How many mangoes does she have altogether? E.g. 2. Use a variety of strategies (objects, drawings, mental strategies, counting down, etc.) to solve subtraction word problems to 20 involving taking from, taking apart and comparing – and with unknowns in all positions. – Kojo has 15 pencils. He gave 7 to Ato. How many pencils are left? – Kafui had 5 pencils. Kwame had 3 pencils. How many more pencils did Kafui have than Kwame?	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

Sub-Strand 3: Fractions

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.3.1 **Develop an understanding of halves using concrete and pictorial representations [Exclude notation here]**	**B1.1.3.1.1 Understand the fraction one-half as the quantity obtained by taking 1 part when a whole is partitioned into two equal parts** E.g. 1. Use concrete objects to explain the fraction half as the quantity obtained by taking 1 part when a whole object is partitioned into two equal parts E.g. 2. Use pictorial representations to explain the fraction half as the quantity obtained by taking 1 part when a whole object is partitioned into two equal parts  E.g. 3. Use pictorial representations to help learners sort fractions into those that are halves and those that are not halves 	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.3.1. **Develop an understanding of halves using concrete and pictorial representations [Exclude notation here].** **CONT'D**	**B1.1.3.1.2 Count in halves using concrete and pictorial representations of halves** E.g. 1. Show several halves of concrete objects (like half oranges, half piece of stick, half piece of card, etc. and have them count them in halves (using the language one-half, two-halves, three-halves, etc.)  E.g. 2. Show learners several pictorial representations of halves and have them count (using the language one-half, two-halves, three-halves, etc.) 	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

Sub-Strand 4: Money

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.1.4.1 **Identify coins, their values and the relationships among them in order to recognize the need for monetary transactions**	**B1.1.4.1.1 Recognise Ghanaian coins by name, including one pesewa, five pesewas, ten pesewas, twenty pesewas, fifty pesewas and one cedi by value and describe the relationship among them** E.g. 1. Display the various coins currently being used for transaction in Ghana and initiate discussion on the need for monetary transaction. Learners touch feel and say the features of each coin   E.g. 2. Introduce the one pesewa, five pesewas, ten pesewas, twenty pesewas, fifty pesewa and guide learners learn to identify and recognize the money by name and value E.g. 3. State the relationship between 2p and 10p; 5p and 10p; 2p and 20p; 1p and ¢1, 10p and ¢1	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision; Cultural Identity and Global Citizenship

Strand 2: Algebra
Sub-Strand1: Patterns and Relationship

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.2.1.1 **Recognize, create, extend and describe non-numerical and simple numerical patterns.**	**B1.2.1.1.1 Demonstrate an understanding of repeating patterns with 2 to 4 repeating elements** E.g. 1. Identifying, duplicating, extending or creating a simple – number patterns (1, 2, 3, 4, 1, 2, 3, 4… ___) with 2 to 4 repeating elements, – shape patterns (e.g. ☐ ☐ ★ ☐ ☐ ★ ☐ ☐ ...) with 2 to 4 repeating elements, – sound (clap, clap, snap, snap, clap, clap, snap, snap…) with 2 to 4 repeating elements, or – action patterns (stand up, sit down, clap, stand up, sit down, clap…) with 2 to 4 repeating elements. – E.g. 2. Identifying and describing errors or missing elements in number, shape, sound or action patterns with 2 to 4 repeating elements (e.g., – ☐☐☐☐☐☐☐☐☐☐ – 2 4 6 2 ___ 6) E.g. 3. Representing a repeating sound or number pattern as shape pattern or vice versa (e.g., represent 1, 2, 1, 2 as clap, snap, clap, snap or as ★ ☐ ★ ☐) E.g. 4. Identifying and describing patterns in and outside the classroom (in a song, in a fabric, etc.) For instance, use patterns in Kente as examples of repeating patterns.	Learners develop : Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision; Cultural Identity and Global Citizenship

Strand 3: GEOMETRY AND MEASUREMENT
Sub-Strand 1: 2D and 3D Shapes

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.3.1.1 **Analyse attributes of two-dimensional shapes and three-dimensional objects to develop general concept about their properties**	**B1.3.1.1.1 Distinguish between attributes that define a two-dimensional figure or three-dimensional figure and attributes that do not define the shape** Display 2D cut out shapes and 3D objects and have learners: E.g. 1. Identify 2D shapes (triangles, squares, rectangles, circles) on the surfaces of 3D objects (cubes, cylinders, spheres, rectangular prisms) in the classroom or beyond; Identify what features define a shape or an object (e.g. triangles are closed and have three sides) and other features (colour, orientation or size) E.g. 2. Sort a given set of 2D shapes and 3D objects using a given single feature or criteria (size, shape, etc.) and explain the sorting rule, feature or criteria used to sort them; Describe the difference between two given pre-sorted sets of familiar 3D objects or 2D shapes and the feature or criteria used to sort them E.g. 3. Identify 3D objects in the environment that have parts similar to a given 2D shape (e.g., find the parts of a can or bucket that are similar to a circle) E.g. 4. Create a composite 2D shape from 2D shapes (i.e., build a new shape using triangle, circles, rectangles, or squares, or build a rectangle using squares or a square using triangles etc.) and describe it. (Make several of the logic block set below with card or plywood and paint them) 	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision; Cultural Identity and Global Citizenship

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.3.1.1 **Analyse attributes of two-dimensional shapes and three-dimensional objects to develop general concept about their properties.** **CONT'D**	**B1.3.1.1.2 Identify three-dimensional shapes, including spheres ones, cylinders, rectangular prisms (including cubes), and triangular prisms and describe their attributes using formal geometric language** E.g. 1. Sort a given set of 3D shapes using a given single feature or criteria (size, shape, etc.) and explain the sorting rule, feature or criteria used to sort them E.g. 2. Describe the difference between two given pre-sorted sets of familiar 3D shapes and the feature **B1.3.1.1.3 Identify two-dimensional shapes, including circles, triangles, rectangles and squares as special rectangles, rhombuses and hexagons and describe their attributes using formal geometric language** E.g. 1. Sort a given set of 2D shapes using a given single feature or criteria (size, shape, etc.) and explain the sorting rule, feature or criteria used to sort them E.g. 2. Describe the difference between two given pre-sorted sets of familiar 2D shapes and the feature	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

Sub-Strand 2: Position /Transformation

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.3.2.1 **Describe the position of objects in space**	**B1.3.2.1. 1 Tell the position of objects relative other objects in space using words such above, below, to the right etc.** E.g. 1. Learners tell their sitting position relative to other children in the classroom. For example, Yaw is on the third line (row), three places from Ama and to the left of Kwesi	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision; Cultural Identity and Global Citizenship

Sub-strand 3: Measurement – Length, Mass and Capacity

CONTENT STANDARS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.3.3.1 **Demonstrate an understanding of Measurement**	**B1.3.3.1.1 Develop an understanding of measuring as a process of comparing pairs of items using words such as smaller, longer, thinner, heavier, bigger etc.** E.g.1. Learners bring together pairs of objects on the same flat surface to compare to find out which is taller	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision; Cultural Identity

Strand 4: Data
Sub-Strand 1: Data Collection, Organisation, Interpretation, Presentation and Analysis

CONTENT STANDARDS	INDICATORS AND EXEMPLARS	SUBJECT SPECIFIC PRACTICES AND CORE COMPETENCIES
B1.4.1.1 **Organise, represent and interpret data**	**B1.4.1.1.1 Organise and represent (using pictures/objects) data with up to three categories.** E.g. 1. Have a picture of learners in front of the class and ask the learners to use two different pictures/objects to represent the number of males and females. Repeat with pictures of animals E.g. 2. Using a one-to-one correspondence to solve simple problems (i.e. how many altogether, how many more or less) problems requiring interpretation of the concrete representation of pictures as in E.g. 1 above **B1.4.1.1.2 Organise a given set of data into three categories, find the total number of data points and determine how many are in each category and compare the number in any two category** E.g. 1. Learners use tally charts with data relevant to their daily lives (e.g. favourite drinks, eye colour , pets etc) to analyze and compare data in a picture graph **E.g. 2.** Learners construct pictures graphs in groups as well as individually based on data given them	Learners develop: Problem Solving Skills; Critical Thinking; Justification of Ideas; Collaborative Learning; Personal Development and Leadership Attention to Precision

BASIC 2