



REPUBLIC OF KENYA  
MINISTRY OF EDUCATION

## **JUNIOR SECONDARY SCHOOL CURRICULUM DESIGN**

# **MATHEMATICS**

## **GRADE 7**



**KENYA INSTITUTE OF CURRICULUM DEVELOPMENT**

First Published in 2022

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## **FOREWORD**

The Government of Kenya is committed to ensuring that policy objectives for Education, Training and Research meet the aspirations of the Kenya Constitution 2010, the Kenya Vision 2030, National Curriculum Policy 2019, the United Nations Sustainable Development Goals (SDGs) and the Regional and Global conventions to which Kenya is a signatory. Towards achieving the mission of Basic Education, the Ministry of Education (MoE) has successfully and progressively rolled out the implementation of the Competency Based Curriculum (CBC) at Pre-Primary and Primary School levels. The roll out of Junior Secondary School (Grade 7-9) will subsequently follow as from 2023-2025.

The curriculum designs at this level build on competencies attained by learners at the end of the Primary School cycle. Further, they provide opportunities for learners to continue exploring and nurturing their potentials as they prepare to transit to Senior Secondary School.

The curriculum designs present National Goals of Education, essence statements, general and specific expected learning outcomes for the learning areas (subjects) as well as strands and sub strands. The designs also outline suggested learning experiences, key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values, Community Service Learning (CSL) activities and assessment rubric.

It is my hope that all Government agencies and other stakeholders in Education will use the designs to plan for effective and efficient implementation of the CBC.

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## **PREFACE**

The Ministry of Education (MoE) is implementing the second phase of the curriculum reforms with the national roll out of the Competency Based Curriculum (CBC) having been implemented in 2019. Grade 7 is the first level of the Junior Secondary School (JSS) in the new education structure.

Grade 7 curriculum furthers implementation of the CBC to the JSS education level. The main feature of this level is a broad curriculum for the learner to explore talents, interests and abilities before selection of pathways and tracks at the Senior Secondary education level. This is very critical in the realisation of the Vision and Mission of the on-going curriculum reforms as enshrined in the Sessional Paper No. I of 2019 whose title is: *Towards Realizing Quality, Relevant and Inclusive Education and Training for Sustainable Development* in Kenya. The Sessional Paper explains the shift from a Content - Focused Curriculum to a focus on **Nurturing every Learner’s potential**.

Therefore, the Grade 7 curriculum designs are intended to enhance the learners’ development in the CBC core competencies, namely: Communication and Collaboration, Critical Thinking and Problem Solving, Creativity and Imagination, Citizenship, Digital Literacy, Learning to Learn and Self-efficacy.

The curriculum designs provide suggestions for interactive and differentiated learning experiences linked to the various sub strands and the other aspects of the CBC. The curriculum designs also offer several suggested learning resources and a variety of assessment techniques. It is expected that the designs will guide teachers to effectively facilitate learners to attain the expected learning outcomes for Grade 7 and prepare them for smooth transition to the next Grade. Furthermore, it is my hope that teachers will use the designs to make learning interesting, exciting and enjoyable.

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## **ACKNOWLEDGEMENT**

The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2019) mandates the Institute to develop curricula and curriculum support materials for basic and tertiary education and training. The curriculum development process for any level of education involves thorough research, international benchmarking and robust stakeholder engagement. Through a systematic and consultative process, the KICD conceptualised the Competency Based Curriculum (CBC) as captured in the *Basic Education Curriculum Framework* (BECF), that responds to the demands of the 21<sup>st</sup> Century and the aspirations captured in the Kenya Constitution 2010, the Kenya Vision 2030, East African Community Protocol and the United Nations Sustainable Development Goals (SDGs).

KICD receives its funding from the Government of Kenya to enable the successful achievement of the stipulated mandate and implementation of the Government and Sector (Ministry of Education (MoE) plans. The Institute also receives support from development partners targeting specific programmes. The Grade 7 curriculum designs have been developed with the support of the World Bank through the Kenya Secondary Education Quality Improvement Program (SEQIP) commissioned by the MoE. Therefore, the Institute is very grateful for the support of the Government of Kenya, through the MoE and the development partners for the policy, resource and logistical support. Specifically, special thanks to the Cabinet Secretary – MoE and the Principal Secretary – State Department of Early Learning and Basic Education.

We also wish to acknowledge the KICD curriculum developers and other staff, all teachers, educators who took part as panelists; the Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders for their roles in the development of the Grade 7 curriculum designs. In relation to this, we acknowledge the support of the –Chief Executive Officers of the Teachers Service Commission (TSC) and the Kenya National Examinations Council (KNEC) for their support in the process of developing these designs.

Finally, we are very grateful to the KICD Council Chairperson Prof. Elishiba Kimani and other members of the Council for very consistent guidance in the process. We assure all teachers, parents and other stakeholders that these curriculum designs will effectively guide the implementation of the CBC at Grade 7 and preparation of learners for Grade 8.

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## LESSON ALLOCATION

	<b>Subject</b>	<b>Number of Lessons Per Week (40 minutes per lesson)</b>
1.	English	5
2.	Kiswahili/KSL	4
3.	Mathematics	5
4.	Integrated Science	4
5.	Health Education	2
6.	Pre-Technical Studies	4
7.	Social Studies	3
8.	Religious Education	3
9.	Business Studies	3
10.	Agriculture	3
11.	Life Skills Education	1
12.	Physical Education and Sports	2
13.	Optional Subject	3
14.	Optional Subject	3
	<b>Total</b>	<b>45</b>



## NATIONAL GOALS OF EDUCATION

Education in Kenya should:

**i) Foster nationalism, patriotism and promote national unity.**

Kenya's people belong to different communities, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help young people acquire this sense of nationhood by removing conflicts and promoting positive attitudes of mutual respect which enable them to live together in harmony and foster patriotism in order to make a positive contribution to the life of the nation.

**ii) Promote the social, economic, technological and industrial needs for national development.**

Education should prepare the youth of the country to play an effective and productive role in the life of the nation.

**a) Social Needs**

Education in Kenya must prepare children for changes in attitudes and relationships which are necessary for the smooth progress of a rapidly developing modern economy. There is bound to be a silent social revolution in the wake of rapid modernisation. Education should assist our youth to adapt to this change.

**b) Economic Needs**

Education in Kenya should produce citizens with the skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building a modern and independent economy which is in need of an adequate and relevant domestic workforce.

**c) Technological and Industrial Needs**

Education in Kenya should provide learners with the necessary skills and attitudes for industrial development. Kenya recognises the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system is deliberately focused on the knowledge, skills and attitudes that will prepare our young people for these changing global trends.

**iii) Promote individual development and self-fulfilment.**

Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential interests and abilities. A vital aspect of individual development is the building of character.





- iv) Promote sound moral and religious values.**  
Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.
- v) Promote social equality and responsibility.**  
Education should promote social equality and foster a sense of social responsibility within an education system which provides equal educational opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service irrespective of gender, ability or geographical environment.
- vi) Promote respect for and development of Kenya's rich and varied cultures.**  
Education should instil in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. Children should be able to blend the best of traditional values with the changing requirements that must follow rapid development in order to build a stable and modern society.
- vii) Promote international consciousness and foster positive attitudes towards other nations.**  
Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.
- viii. Promote positive attitudes towards good health and environmental protection.**  
Education should inculcate in young people the value of good health in order for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.



## **LEARNING OUTCOMES FOR MIDDLE SCHOOL**

By end of Middle School, the learner should be able to:

1. Apply literacy, numeracy and logical thinking skills for appropriate self-expression.
2. Communicate effectively, verbally and non-verbally, in diverse contexts.
3. Demonstrate social skills, and spiritual and moral values for peaceful co-existence.
4. Explore, manipulate, manage and conserve the environment effectively for learning and sustainable development.
5. Practise relevant hygiene, sanitation and nutrition skills to promote health.
6. Demonstrate ethical behaviour and exhibit good citizenship as a civic responsibility.
7. Appreciate the country's rich and diverse cultural heritage for harmonious co-existence.
8. Manage pertinent and contemporary issues in society effectively.
9. Apply digital literacy skills for communication and learning.

## **ESSENCE STATEMENT**

We live in a world of Mathematics whereby we count, add, subtract, multiply or divide quantities and substances, and use space, shapes, and structures throughout our daily interactions. Mathematics involves understanding numbers and the numerical operations used to develop strategies for mental mathematical problem-solving skills, estimation and computational fluency. It is impossible to think of a world without Mathematics. It is applied in economic activities, scientific, social, religious and political worlds. It is therefore imperative that children are taught Mathematics from early years.

In Junior Secondary, Mathematics builds on the competencies acquired by the learner from Primary School. It enhances the learner's competencies in mathematical skills as a foundation for Science, Technology, Engineering and Mathematics (STEM) and other pathways at Senior School. Mathematics also prepares the learner to have sufficient skills and competencies for application in solving problems in real life situations. This is in line with Vision 2030 and Sessional Paper number 1 of 2019, which emphasizes STEM.



## **SUBJECT GENERAL LEARNING OUTCOMES**

By the end of the Junior Secondary School, the learner should be able to:

- 1) Demonstrate mastery of number concepts by working out problems in day-to-day life.
- 2) Represent and apply algebraic expressions in different ways.
- 3) Apply measurement skills to find solutions to problems in a variety of contexts.
- 4) Use money and carry out financial transactions in real life situations.
- 5) Generate geometrical shapes and describe spatial relationships in different contexts.
- 6) Collect and organise data to inform and solve problems in real life situations.
- 7) Develop logical thinking, reasoning, communication and application skills through a mathematical approach to problem solving
- 8) Apply mathematical ideas and concepts to other learning areas or subjects and in real life contexts.
- 9) Develop confidence and interest in mathematics for further training and enjoyment.



**STRAND 1.0: NUMBERS**  
**Sub-Strand: Whole Numbers**

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Numbers	1.1 Whole Numbers  (20 lessons)	By the end of the sub-strand the learner should be able to: a) use place value and total value of digits up to hundreds of millions in real life b) read and write numbers in symbols up to hundreds of millions in real life situations c) read and write numbers in words up to millions for fluency d) round off numbers up to the nearest hundreds of millions in real life situations e) classify natural numbers as even, odd and prime in different situations	The learner is guided to: <ul style="list-style-type: none"> <li>• identify and write place value and total value of digits using place value apparatus</li> <li>• read and write numbers in symbols on number cards or charts</li> <li>• read and write numbers in words on number cards or charts and practise writing dummy cheques for different sums of money</li> <li>• prepare and use place value charts to round off numbers</li> <li>• play a number game, make number cards, sort and classify numbers according to those that are even, odd or prime</li> </ul>	<ol style="list-style-type: none"> <li>1. Why do we write numbers in words and/or symbols?</li> <li>2. Where do we write numbers in words or symbols?</li> <li>3. Why do we round off numbers in real life situations?</li> </ol>



		f) apply operations of whole numbers in real life situations g) identify number sequence in different situations h) create number sequence for playing number games i) use IT devices for learning more on whole numbers and for enjoyment j) appreciate use of whole numbers in real life situations.	<ul style="list-style-type: none"> <li>● work out or perform 2, 3 or more combined operations in the correct order using digital devices</li> <li>● identify the number patterns to work out number sequences</li> <li>● play games of creating number puzzles that involve number sequences using IT devices or other materials.</li> </ul>	
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**Core Competencies to be developed:**

- **Communication and collaboration:** Speaking, listening and team work as learners work in pairs or groups to prepare and use place value charts to round off numbers.
- **Critical thinking and problem solving:** Interpretation and inference as learners work together to identify number patterns.
- **Creativity and imagination:** Making observations as learners play games of creating number puzzles that involve number sequences.

**Values:**

- **Respect** as learners work in pairs/groups and play number games.
- **Unity** as learners work towards achieving set goals of making number puzzles.
- **Peace** as learners work in groups and share different roles in playing games.



**Pertinent and Contemporary Issues (PCIs):**

- **Financial literacy** as learners practise writing dummy cheques for different sums of money.
- **Self-esteem:** as learners create number puzzles that involve number sequences.

**Link to other subjects**

- **Business Studies:** writing numbers in words and in symbols as the learners practise writing dummy cheques at home.
- **Computer Studies:** as learners use digital devices to play number games.
- **Languages:** writing numbers in words.

**Assessment Rubric**

<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to use place value and total value of digits up to hundreds of millions	Uses place value and total value of digits up to hundreds of millions, correctly and systematically	Uses place value and total value of digits up to hundreds of millions correctly	Uses place value or total value of some digits up to hundreds of millions correctly	Uses place value or total value of digits up to hundreds of millions with difficulties
Ability to read and write numbers in symbols up to hundreds of millions	Reads and writes numbers in symbols up to hundreds of millions correctly and confidently helps others	Reads and writes numbers in symbols up to hundreds of millions correctly	Reads or writes some numbers in symbols up to hundreds of millions correctly	Reads or writes numbers in symbols up to hundreds of millions with difficulties



Ability to read and write numbers in words up to millions	Reads and writes numbers in words up to millions correctly and confidently helps others	Reads and writes numbers in words up to millions correctly	Reads or writes some numbers in words up to millions correctly	Reads and writes numbers in words up to millions with difficulties
Ability to round off numbers up to the nearest hundreds of millions	Rounds off numbers up to the nearest hundreds of millions accurately and systematically	Rounds off numbers up to the nearest hundreds of millions accurately	Rounds off some numbers up to the nearest hundreds of millions accurately	Rounds off some numbers up to the nearest hundreds of millions with difficulties
Ability to classify natural numbers as even, odd and prime	Classifies natural numbers as even, odd and prime systematically and accurately	Classifies natural numbers as even, odd and prime accurately	Classifies some natural numbers as even or odd or prime accurately	Classifies some natural numbers as even, odd and prime with difficulties
Ability to apply operations of whole numbers	Applies operations of whole numbers accurately and helps others	Applies operations of whole numbers accurately	Applies operations of some whole numbers accurately	Applies operations of some whole numbers with difficulties
Ability to identify number sequence	Identifies number sequence correctly and determines missing numbers	Identifies number sequence correctly	Identifies some number sequences correctly	Identifies some number sequences with difficulties
Ability to create number sequence	Creates number sequence correctly and systematically	Creates number sequence correctly	Creates some number sequences correctly	Attempts to create some number sequences with difficulties



**Sub-Strand: Factors**

<b>Strand</b>	<b>Sub-Strand</b>	<b>Specific Learning Outcomes</b>	<b>Suggested Learning Experiences</b>	<b>Key Inquiry Questions</b>
<b>1.0 Numbers</b>	<b>1.2 Factors (7 lessons)</b>	By the end of the sub-strand, the learner should be able to: a) test divisibility of numbers by 2, 3, 4, 5, 6, 8, 9,10 and 11 in different situations b) express composite numbers as a product of prime factors in different situations c) work out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method in different situations d) apply the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) in real life situations	The learner is guided to: <ul style="list-style-type: none"><li>● determine divisibility of numbers using regrouping and divisibility rule work sheets</li><li>● write factors of composite numbers by factorization, factor tree, factor rainbow in charts, colour charts or cards using locally available materials</li><li>● use factors to determine the LCM and the GCD using number cards or charts</li><li>● use IT to access factors of numbers including songs/poems or games on divisibility tests</li><li>● work out application questions and solve problems relating to the</li></ul>	<ol style="list-style-type: none"><li>1. Where do we use factors in day-to-day activities?</li><li>2. How do we use factors in day-to-day activities?</li><li>3. How do we apply the GCD and the LCM in day-to-day activities?</li></ol>





		<p>e) use IT devices for learning more on factors and for enjoyment</p> <p>f) reflect on use of factors in real life situations.</p>	<p>GCD and the LCM in real life situations.</p> <ul style="list-style-type: none"> <li>determine the GCD and LCM of numbers using IT to perform exercises on factors such as matching activities or games.</li> </ul>	
<p><b>Core Competencies to be developed:</b></p> <ul style="list-style-type: none"> <li><b>Creativity and imagination:</b> Making connections as learners work in groups to create songs and poems on divisibility tests.</li> <li><b>Critical thinking and problem solving:</b> Interpretation and inference as learners apply the GCD and the LCM in solving real life problems.</li> </ul>				
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li><b>Unity</b> as learners sing together or solve puzzles on factors.</li> <li><b>Respect for self and others</b> as learners work in groups to write factors of composite numbers using factor tree.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li><b>Self-awareness</b> as learners work in groups to create songs and poems on divisibility tests.</li> <li><b>Education for Sustainable Development (ESD)</b> as learners use locally available materials for making number cards and charts</li> </ul>				
<p><b>Link to other subjects</b></p> <ul style="list-style-type: none"> <li><b>Music</b> as learners work in groups to create songs and poems on divisibility tests.</li> <li><b>Home Science</b> as learners apply LCM or GCD as they plan for smallest or largest containers for measuring different substances.</li> </ul>				



<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to test divisibility of numbers by 2, 3, 4, 5, 6, 8, 9,10 and 11	Tests divisibility of numbers by 2, 3, 4, 5, 6, 8, 9,10 and 11 accurately and systematically	Tests divisibility of numbers by 2, 3, 4, 5, 6, 8, 9,10 and 11 accurately	Tests divisibility of some numbers by 2, 3, 4, 5, 6, 8, 9,10 and 11 accurately	Tests divisibility of some numbers by 2, 3, 4, 5, 6, 8, 9,10 and 11 with difficulties
Ability to express composite numbers as a product of prime factors	Expresses composite numbers as a product of prime factors correctly and writes the answer in power form	Expresses composite numbers as a product of prime factors correctly	Expresses some composite numbers as a product of prime factors correctly	Expresses some composite numbers as a product of prime factors with difficulties
Ability to work out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method	Work out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method correctly and systematically	Works out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method correctly	Works out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of some numbers by factor method correctly	Works out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of some numbers by factor method with difficulties
Ability to apply the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) in real life situations	Applies the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) correctly, using examples, in real life situations	Applies the Greatest Common Divisor (GCD) and the LCM correctly in real life situations	Applies either the Greatest Common Divisor (GCD) or the LCM correctly in real life situations	Applies either the Greatest Common Divisor (GCD) or the LCM in real life situations with difficulties



## Sub-Strand: Fractions

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Numbers</b>	<b>1.3 Fractions</b> (9 lessons)	By the end of the sub-strand, the learner should be able to: a) compare fractions in different situations b) add fractions in different situations c) subtract fractions in different situations d) multiply fractions by a whole number, fraction and a mixed number in real life situations e) identify the reciprocals of fractions in different situations f) divide fractions by a whole number, fraction and a mixed fraction in real life situations g) divide a whole number by fractions in different situations	The learner is guided to: <ul style="list-style-type: none"> <li>• discuss and arrange fractions in increasing and decreasing order using different strategies</li> <li>• arrange fractions in ascending or descending order using fraction cards</li> <li>• add and subtract fractions in cut-outs, cards, charts and concrete objects</li> <li>• multiply and divide fractions in cut-outs, cards, charts and models</li> <li>• use flip cards to discuss reciprocals</li> <li>• play games of creating number puzzles that involve fractions</li> <li>• number sequences using</li> </ul>	<ol style="list-style-type: none"> <li>1. How do we use fractions in daily activities?</li> <li>2. Where do we use fractions in daily activities?</li> </ol>



		<p>h) identify number sequence involving fractions in different situations</p> <p>i) create number sequence involving fractions for playing number games</p> <p>j) use IT devices for learning more on fractions and for enjoyment</p> <p>k) recognise use of fractions in real life situations.</p>	<p>IT devices or other materials</p> <ul style="list-style-type: none"> <li>• create a fraction sequence game that can be used for play and learning</li> <li>• use IT devices to work out operations of fractions.</li> </ul>	
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**Core Competencies to be developed:**

- **Creativity and imagination:** Observed as learners create puzzles involving fractions.
- **Critical thinking and problem solving:** Evaluation and decision making as learners apply fractions using cut-outs, cards, charts and models from local resources.

**Values**

- **Social justice:** as learners share things fairly
- **Responsibility:** as learners perform multiplication and division of fractions when sharing or allocating resources.

**Pertinent and Contemporary Issues (PCIs)**

- **Citizenship** as learners carry out division of fractions, which implies sharing
- **Social cohesion** as learners share items at home and outside school using fractions

**Link to other subjects**

- **Music** as learners use fractions in types of musical notes like semi-quavers (1/16), quavers.
- **Agriculture** as learners give portions of animal feeds.



<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to compare fractions	Compares fractions, using various methods, correctly	Compares fractions correctly	Compares some fractions correctly	Compares fractions with difficulties
Ability to add fractions	Adds fractions correctly, using various methods	Adds fractions correctly	Adds some fractions correctly	Adds fractions with difficulties
Ability to subtract fractions	Subtracts fractions precisely	Subtracts fractions correctly	Subtracts some fractions correctly	Subtracts fractions with difficulties
Ability to multiply fractions by a whole number, fraction and a mixed number	Multiplies fractions by a whole number, a fraction and a mixed number using various methods	Multiplies fractions by a whole number, fraction and a mixed number correctly	Multiplies fractions by a whole number or a fraction or a mixed number correctly	Multiplies fractions by a whole number, a fraction and a mixed number with difficulties
Ability to find reciprocals of fractions	Finds reciprocals of fractions systematically	Finds reciprocals of fractions correctly	Finds reciprocals of some fractions correctly	Finds reciprocals of fractions with difficulties



Ability to divide fractions by a whole number, fraction and a mixed number	Divides fractions by a whole number, fraction and a mixed number correctly using various methods	Divides fractions by a whole number, fraction and a mixed number correctly	Divides fractions by a whole number, fraction or a mixed number correctly	Divides fractions by a whole number, a fraction or a mixed number with difficulties
Ability to divide a whole number by fractions	Divides a whole number by fractions correctly, using various methods	Divides a whole number by fractions correctly	Divides a whole number by some fractions	Divides a whole number by fractions with difficulties
Ability to identify number sequence involving fractions	Identifies number sequence involving fractions correctly and states missing numbers	Identifies number sequence involving fractions correctly	Identifies parts of number sequence involving fractions correctly	Identifies number sequence involving fractions with difficulties
Ability to create number sequence involving fractions	Creates number sequence involving fractions correctly and systematically	Creates number sequence involving fractions Correctly	Creates parts of the number sequence involving fractions correctly	Creates number sequence involving fractions with difficulties



## Sub-Strand: Decimals

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Numbers	1.4 Decimals (6 lessons)	By the end of the sub-strand, the learner should be able to: a) identify the place value and the total value of digits in decimals in real life b) multiply decimals by a whole number and by a decimal in real life situations c) divide decimals by a whole number and by a decimal in real life situations d) use IT devices for learning more on decimals and for enjoyment e) recognise use of decimals in real life situations.	The learner is guided to: <ul style="list-style-type: none"> <li>• discuss, state and use the place value and the total = value of decimals using place value apparatus and worksheets</li> <li>• multiply and divide decimals using cut-outs, cards, charts and models</li> <li>• use calculators and other IT devices to work out operations of decimals.</li> <li>• play games involving multiplication and division of decimals.</li> </ul>	<ol style="list-style-type: none"> <li>1. Where are decimals applicable in real life?</li> <li>2. How do you use decimals in daily activities?</li> </ol>
<p><b>Core Competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• <b>Critical thinking and problem solving:</b> Open-mindedness and creativity as learners identify and use the place value and the total value of decimals using place value apparatus and worksheets.</li> <li>• <b>Digital literacy:</b> Interacting with technology; as learners use IT gadgets to learn more on decimals.</li> </ul>				



<b>Values</b>				
<ul style="list-style-type: none"> <li>• <b>Unity</b> as learners work in groups to multiply and divide decimals using cut-outs, cards, charts and models.</li> <li>• <b>Responsibility</b> as learners perform multiplication and division of decimals.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs)</b>				
<ul style="list-style-type: none"> <li>• <b>Safety</b> as learners make paper cut-outs or other materials and models.</li> </ul>				
<b>Link to other subjects</b>				
<ul style="list-style-type: none"> <li>• <b>Integrated Science</b> - quantities expressed in decimal forms in measurement</li> <li>• <b>Home Science</b> as learners measure mass of ingredients for cooking in decimals.</li> </ul>				
<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to identify place value and total value of decimals	Identifies place value and total value of decimals correctly and helps others	Identifies place value and total value of decimals correctly	Identifies place value or total value of decimals correctly	Identifies place value or total value of decimals with difficulties
Ability to multiply decimals by a whole number and by a decimal	Multiplies decimals by a whole number and by a decimal correctly using various methods	Multiplies decimals by a whole number and by a decimal correctly	Multiplies decimals by a whole number or a decimal correctly	Multiplies decimals by a whole number or by a decimal with difficulties
Ability to divide decimals by a whole number and by a decimal	Divides decimals by a whole number and by a decimal correctly and systematically	Divides decimals by a whole number and by a decimal correctly	Divides decimals by a whole number or a decimal correctly	Divides decimals by a whole number or by a decimal with difficulties





### Sub-Strand: Squares and Square Roots

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
1.0 Numbers	1.5 Squares and Square Roots (5 lessons)	By the end of the sub-strand, the learner should be able to: a) determine the squares of whole numbers, fractions and decimals by multiplication in different situations b) determine the square roots of whole numbers, fractions and decimals of perfect squares in different situations c) use IT devices for learning more on squares and square roots and for enjoyment d) appreciate use of squares and square roots in real life situations.	The learner is guided to: <ul style="list-style-type: none"> <li>● work out squares of numbers using: <ul style="list-style-type: none"> <li>✓ grids and charts</li> <li>✓ long multiplication method</li> <li>✓ using calculators</li> </ul> </li> <li>● work out square roots of number using: <ul style="list-style-type: none"> <li>✓ factors method</li> <li>✓ division method</li> <li>✓ calculators</li> </ul> </li> <li>● use IT devices to play games involving squares and square roots</li> </ul>	1. Where do we apply squares and square roots in daily activities? 2. How do we apply squares and square roots in daily activities?
<p><b>Core Competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Critical thinking and problem solving:</b> Reflection as learners use grid squares and charts to find squares and square roots.</li> <li>● <b>Digital literacy:</b> Interacting with technologies as learners use IT devices to work out squares and square roots of numbers.</li> </ul>				



**Values**

- **Respect** as learners appreciate each other’s contribution in groups in using grids and charts
- **Unity** as learners work in groups and work out the factors of numbers to get the square roots.

**Pertinent and Contemporary Issues (PCIs)**

**Environmental education** as learners consider shapes of different objects in the school compound especially the ones that are squares.

**Link to other subjects**

- **Pre-Technical Studies:** in areas such as carpentry and technical drawing.
- **Agriculture** as learners determine the number of seedlings that would fit in a square portion of land.

**Assessment Rubric**

<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to determine the squares of whole numbers, fractions and decimals by multiplication	Determines the squares of whole numbers, fractions and decimals by multiplication correctly, using different methods	Determines the squares of whole numbers, fractions and decimals by multiplication correctly	Determines the squares of some whole numbers or fractions and decimals by multiplication correctly	Determines the squares of whole numbers, fractions and decimals by multiplication with difficulties
Ability to determine the square roots of whole numbers, fractions and decimals of perfect squares	Determines the square roots of whole numbers, fractions and decimals of perfect squares correctly using different methods	Determines the square roots of whole numbers, fractions and decimals of perfect squares correctly	Determines the square roots of some whole numbers or fractions and decimals of perfect squares	Determines the square roots of whole numbers, fractions and decimals of perfect squares with difficulties



## STRAND 2.0: ALGEBRA

### Sub-Strand: Algebraic Expressions

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Algebra	2.1 Algebraic Expressions (5 lessons)	By the end of the sub-strand the learner should be able to: a) form algebraic expressions from real life situations b) form algebraic expressions from simple algebraic statements in real life situations c) simplify algebraic expressions in real life situations d) use IT devices for more learning on algebraic expressions and for enjoyment, e) appreciate use of algebraic expressions in real life.	The learner is guided to: <ul style="list-style-type: none"><li>• discuss and classify objects in their immediate environment according to given attributes such as similarities or differences</li><li>• discuss how to form algebraic expressions from the classified objects</li><li>• read and interpret algebraic statements to form algebraic expressions</li><li>• discuss how to simplify algebraic expressions from the classified objects</li><li>• use IT to work out exercises and activities in algebra or drag and drop activities to group similar objects</li></ul>	How do we use algebraic expressions in daily activities?



<b>Core Competencies to be developed:</b>				
<ul style="list-style-type: none"> <li>• <b>Communication and collaboration:</b> Speaking, listening and team work; as learners discuss, in groups, formation of algebraic expressions.</li> <li>• <b>Critical thinking and problem solving:</b> Interpretation and inference; as learners factorize algebraic expressions</li> </ul>				
<b>Values</b>				
<ul style="list-style-type: none"> <li>• <b>Unity</b> as learners classify/group similar objects in groups.</li> </ul> <p><b>Respect</b> as learners appreciate each other’s contribution while discussing and forming algebraic expressions.</p>				
<ul style="list-style-type: none"> <li>• <b>Pertinent and Contemporary Issues (PCIs)</b></li> <li>• <b>Environmental education</b> as learners classify objects from the environment.</li> <li>• <b>Friendship formation</b> as learners work and discuss, in groups, formation of algebraic expressions.</li> </ul>				
<b>Link to other subjects</b>				
<ul style="list-style-type: none"> <li>• <b>Languages</b> as learners interpret statements to form algebraic expressions.</li> </ul>				
<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to form algebraic expressions	Forms algebraic expressions correctly and systematically	Forms algebraic expressions correctly	Forms algebraic expressions partially	Forms algebraic expressions with difficulties
Ability to form algebraic expressions from simple algebraic statements	Forms algebraic expressions from simple algebraic statements correctly and systematically	Forms algebraic expressions from simple algebraic statements correctly	Forms some algebraic expressions from simple algebraic statements correctly	Forms algebraic expressions from simple algebraic statements with difficulties
Ability to simplify algebraic expressions	Simplifies algebraic expressions correctly and systematically	Simplifies algebraic expressions correctly	Simplifies some algebraic expressions correctly	Simplifies algebraic expressions with difficulties



## Sub-Strand: Linear Equations

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>2.0 Algebra</b>	<b>2.2 Linear Equations</b> (6 lessons)	By the end of the sub-strand, the learner should be able to: a) form linear equations in one unknown in different situations b) solve linear equations in one unknown in different situations c) apply linear equations in one unknown to real life situations d) use IT devices for more learning on linear equations and for enjoyment e) reflect on use of linear equations in real life situations.	The learner is guided to: <ul style="list-style-type: none"> <li>● role-play activities involving equations with one unknown, for example weighing using beam balance and shopping activities</li> <li>● discuss how to form and solve linear equations generated from role-play activities</li> <li>● use IT to form and solve linear equations.</li> </ul>	<ol style="list-style-type: none"> <li>1. How do we use linear equations in real life?</li> <li>2. Why do we use linear equations in real life?</li> </ol>
<p><b>Core Competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Communication and collaboration:</b> Speaking, listening and team work as learners role-play activities involving equations in one unknown.</li> <li>● <b>Self-efficacy:</b> Self-awareness skills as learners carry out weighing using beam balance and role play.</li> <li>● <b>Learning to learn:</b> Organising own learning as learners apply linear equations in real life.</li> </ul>				
<p><b>Values</b></p> <ul style="list-style-type: none"> <li>● <b>Integrity</b> as learners share resources as per the given equation (conditions).</li> <li>● <b>Responsibility:</b> as learners use a given letter in the equation to represent an item.</li> </ul>				



**Pertinent and Contemporary Issues (PCIs)**

- **Social cohesion** as learners work in groups to role play in shopping activities.

**Self-esteem** as learners participate in role-play activities like weighing and shopping that will lead to equations in one unknown.

**Link to other subjects**

- **Computer Studies** as learners use IT devices in forming and solving equations.

**Assessment Rubric**

<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to form linear equations in one unknown	Forms linear equations in one unknown correctly and systematically	Forms linear equations in one unknown correctly	Forms some linear equations in one unknown correctly	Forms linear equations in one unknown with difficulties
Ability to solve linear equations in one unknown	Solves linear equations in one unknown correctly and systematically	Solves linear equations in one unknown correctly	Solves some linear equations in one unknown correctly	Solves linear equations in one unknown with difficulties
Ability to apply linear equations in one unknown	Applies linear equations in one unknown correctly and systematically	Applies linear equations in one unknown correctly	Applies some linear equations in one unknown correctly	Applies linear equations in one unknown with difficulties



## Sub-Strand: Linear Inequalities

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Algebra	2.3 Linear Inequalities (8 lessons)	<p>By the end of the sub-strand the learner should be able to:</p> <ol style="list-style-type: none"><li>apply inequality symbols to inequality statements in learning situations</li><li>form simple linear inequalities in one unknown in different situations</li><li>illustrate simple inequalities on a number line</li><li>form compound inequality statements in one unknown in different situations</li><li>illustrate compound inequalities in one unknown on a number line</li><li>use IT devices for more learning on linear inequalities and for enjoyment</li><li>appreciate use of linear inequalities in real life.</li></ol>	<p>The learner is guided to:</p> <ul style="list-style-type: none"><li>use inequality cards to complete simple inequality statements</li><li>use inequality cards/objects to form simple linear inequalities with one unknown</li><li>draw and represent simple inequality statements on a number line</li><li>use inequality cards to complete compound inequality statements</li><li>draw and represent compound inequality statements on a number line</li><li>use IT graphing tools to present solutions to inequalities.</li></ul>	<ol style="list-style-type: none"><li>How do we use linear inequalities in real life?</li><li>Why do we use linear inequalities in real life?</li></ol>



**Core Competencies to be developed:**

- **Communication and collaboration:** Speaking and listening as learners discuss how to form the linear inequalities.
- **Creativity and imagination:** Open-mindedness and creativity as learners draw and represent inequality statements on a number line.

**Values**

- **Social justice** as learners apply linear inequalities,
- **Integrity** as learners observe the conditions of the given inequalities.

**Pertinent and Contemporary Issues (PCIs)**

- **Health education:** observing the correct dosage in drugs / limits on drug consumption.
- **Gender equality:** gender representation for inclusivity.

**Link to other subjects**

- **Language** as learners form linear inequalities from different situation.
- **Pre-Technical Studies** in measuring quantities.





<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to apply inequality symbols to inequality statements	Applies inequality symbols to inequality statements accurately and comprehensively	Applies inequality symbols to inequality statements accurately	Applies inequality symbols to some inequality statements accurately	Applies inequality symbols to inequality statements with difficulties
Ability to form simple linear inequality in one unknown	Forms simple linear inequality in one unknown correctly and systematically	Forms simple linear inequality in one unknown correctly	Forms some simple linear inequalities in one unknown correctly	Forms simple linear inequality in one unknown with difficulties
Ability to illustrate simple linear inequality on a number line	Illustrates simple linear inequality on a number line correctly and comprehensively	Illustrates simple linear inequality on a number line correctly	Illustrates some simple linear inequalities on a number line correctly	Illustrates simple linear inequality on a number line with difficulties
Ability to form compound inequality statements in one unknown	Forms compound linear inequality in one unknown correctly and systematically	Forms compound inequality statements in one unknown correctly	Forms some compound inequality statements in one unknown partially	Forms compound inequality statements in one unknown with difficulties
Ability to illustrate compound linear inequality on a number line	Illustrates compound linear inequality on a number line correctly and comprehensively	Illustrates compound linear inequality on a number line correctly	Illustrates some compound linear inequalities on a number line correctly	Illustrates compound linear inequality on a number line with difficulties



**STRAND 3.0: MEASUREMENTS**  
**Sub-Strand: Pythagorean Relationship**

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.1 Pythagorean Relationship (4 lessons)	By the end of the sub-strand, the learner should be able to: <ol style="list-style-type: none"> <li>a) recognise the sides of a right-angled triangle in different situations</li> <li>b) identify Pythagorean relationship in different situations</li> <li>c) apply Pythagorean relationship to real life situations</li> <li>d) use IT devices for more learning on Pythagoras Theorem and for enjoyment</li> <li>e) promote use of Pythagoras Theorem in real life situations.</li> </ol>	The learner is guided to: <ul style="list-style-type: none"> <li>• draw and represent practical cases of right-angled triangle of an object leaning on a wall at different positions and recognise the sides as the hypotenuse, the height and the base. For example, a ladder leaning on a wall.</li> <li>• carry out a variety of activities for example, counting squares on different sides of a 3, 4, 5 right angled-triangle, establish the Pythagorean relationship and practise using other right angled-triangles</li> </ul>	How do we use Pythagorean relationship in real life situations?



			<ul style="list-style-type: none"> <li>• work out exercises related to Pythagorean relationship</li> <li>• create Pythagorean relationship puzzles</li> <li>• use IT devices to explore the use of Pythagorean relationship in daily life.</li> </ul>	
<p><b>Core Competencies to be developed</b></p> <ul style="list-style-type: none"> <li>• <b>Critical thinking and problem solving:</b> Interpretation and inference as learners identify Pythagorean relationship in different situations.</li> <li>• <b>Creativity and imagination:</b> Open-mindedness and creativity as learners create Pythagorean relationship puzzles.</li> <li>• <b>Learning to learn:</b> Sharing learnt knowledge as learners apply Pythagorean relationship in real life situations.</li> </ul>				
<p><b>Values</b></p> <ul style="list-style-type: none"> <li>• <b>Unity</b> as learners carry out various activities together, such as creating Pythagorean relationship puzzles.</li> <li>• <b>Respect</b> as learners appreciate each other’s opinions when identifying and applying Pythagorean relationship in real life situations.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs)</b></p> <ul style="list-style-type: none"> <li>• <b>Peer education</b> as learners work in groups to establish the Pythagorean relationship.</li> <li>• <b>Safety</b> as learners take care when using the ladder to carry out various activities on Pythagorean relationship.</li> </ul>				
<p><b>Link to other subjects</b></p> <ul style="list-style-type: none"> <li>• <b>Pre-Technical Studies:</b> technical drawing, building construction, surveying.</li> </ul>				



<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to recognise the sides of a right-angled triangle	Recognises the sides of a right-angled triangle correctly and cites practical cases	Recognises the sides of a right-angled triangle correctly	Recognises some of the sides of a right-angled triangle correctly	Recognises the sides of a right-angled triangle with difficulties
Ability to identify Pythagorean relationship	Identifies Pythagorean relationship correctly and consistently	Identifies Pythagorean relationship correctly	Identifies some Pythagorean relationships correctly	Identifies Pythagorean relationship with difficulties
Ability to apply Pythagorean relationship	Applies Pythagorean relationship to various situations correctly and systematically	Applies Pythagorean relationship to various situations correctly	Applies Pythagorean relationship to some situations correctly	Applies Pythagorean relationship with difficulties



## Sub-Strand: Length

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
3.0 Measurements	3.2 Length (6 lessons)	<p>By the end of the sub-strand, the learner should be able to:</p> <ul style="list-style-type: none"> <li>a) convert units of length from one form to another involving cm, dm, m, Dm, Hm in learning situations</li> <li>b) perform operations involving units of length in different situations</li> <li>c) work out the perimeter of plane figures in different situations</li> <li>d) work out the circumference of circles in different situations</li> <li>e) use IT devices for more learning on length and for enjoyment</li> </ul>	<p>The learner is guided to:</p> <ul style="list-style-type: none"> <li>● generate conversion tables involving cm, dm, m, Dm, Hm</li> <li>● practise different operations involving length</li> <li>● watch videos on correct procedures of measuring length and working out perimeter</li> <li>● use appropriate measuring tools to measure the length of various objects.</li> <li>● measure and work out perimeter of different plane figures including combined shapes.</li> <li>● measure the circumference and diameter of different circular objects and establish the relationship between</li> </ul>	<ol style="list-style-type: none"> <li>1. Why do we use different units of measuring length?</li> <li>2. How do we measure the perimeter of different objects?</li> </ol>



		f) promote use of length in real life situations.	circumference and diameter, which is Pi. ● use Pi to practise working out circumference of circles and IT devices for calculations.	
<p><b>Core Competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Communication and collaboration:</b> Speaking, listening and team work; as learners work in pairs/groups when measuring lengths of various objects and also as they discuss the relationship between circumference and diameter.</li> <li>● <b>Self-efficacy:</b> Personal skills as the learners practise different operations using length.</li> </ul> <p><b>Critical thinking and problem solving:</b> interpretation and inference as learners relate circumference to diameter.</p>				
<p><b>Values</b></p> <ul style="list-style-type: none"> <li>● <b>Integrity</b> as learners carry out the activities and give the correct measurement.</li> <li>● <b>Unity</b> as learners work in groups measuring lengths of various objects.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs)</b></p> <ul style="list-style-type: none"> <li>● <b>Social cohesion</b> as learners work in pairs and groups in measuring lengths of various objects.</li> <li>● <b>Safety</b> as learners handle different instruments of measuring length.</li> <li>● <b>Global citizenship</b> as they appreciate units of measurements especially the SI units of length.</li> </ul>				
<p><b>Link to other subjects</b></p> <ul style="list-style-type: none"> <li>● <b>Integrated Science:</b> units of measuring length</li> <li>● <b>Pre-Technical Studies:</b> Tailoring, constructions, engineering.</li> </ul>				



<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to convert units of length from one form to another involving cm, dm, m, Dm, Hm	Converts units of length from one form to another involving cm, dm, m, Dm, Hm correctly and systematically	Converts units of length from one form to another involving cm, dm, m, Dm, Hm correctly	Converts units of length from one form to another involving cm, dm, m, Dm, Hm partially	Converts units of length to other forms involving cm, dm, m, Dm, Hm with difficulties
Ability to perform operations involving units of length	Performs operations involving units of length and in appropriate units correctly and systematically	Performs operations involving units of length correctly	Performs operations involving units of length partially	Performs operations involving units of length with difficulties
Ability to work out the perimeter of plane figures	Works out the perimeter of plane figures accurately and systematically	Works out the perimeter of plane figures accurately	Works out the perimeter of plane figures partially	Works out the perimeter of plane figures with difficulties
Ability to work out the circumference of circles	Works out the circumference of circles correctly and systematically	Works out the circumference of circles correctly	Works out the circumference of circles partially	Works out the circumference of circles with difficulties



**Sub-Strand: Area**

<b>Strand</b>	<b>Sub-Strand</b>	<b>Specific Learning Outcomes</b>	<b>Suggested Learning Experiences</b>	<b>Key Inquiry Questions</b>
<b>3.0 Measurements</b>	<b>3.3 Area</b> (8 lessons)	By the end of the sub-strand, the learner should be able to: a) identify square metre ( $m^2$ ), acres and hectares as units of measuring area b) work out the area of rectangle, parallelogram, rhombus and trapezium in different situations c) work out the area of circles in different situations d) calculate the area of borders and combined shapes in real life situations e) use IT devices for more learning on area and for enjoyment f) recognise use of area in real life situations.	The learner is guided to: <ul style="list-style-type: none"><li>● generate conversion tables involving acres and hectares as units of measuring area</li><li>● use cut-outs to find the area of the plane figures</li><li>● watch videos on how to cut out a circle to small sectors to demonstrate how to derive the formula for the area of a circle</li><li>● cut out a circle into small sectors and rearrange to form a rectangle to derive the formula for the area of a circle</li><li>● practise cutting out the plane figures of combined shapes into different shapes to work out the area.</li></ul>	<ol style="list-style-type: none"><li>1. What are plane figures?</li><li>2. How do we work out the areas of plane figures?</li></ol>





**Core Competencies to be developed:**

- **Critical thinking and problem solving:** Reflection as learners cut out the circle into small sectors, joining them to create a rectangle and generate the formula of getting the area of a circle.
- **Creativity and imaginations:** Open-mindedness and creativity as learners combine different shapes to make patterns.
- **Self-efficacy:** Personal skills as learners demonstrate how to derive the formula for the area of a circle.

**Values**

- **Responsibility** as the learner cuts out the small sectors of the circle and joins them up to form a rectangle.
- **Integrity** as learners work out exact areas of different shapes.
- **Unity** as learners work in groups and share tasks in measuring the area.

**PCIs**

- **Safety;** as learners handle different instruments/tools to make cut-outs of different materials.
- **Environmental education;** as learners use locally available materials in measuring the area.

**Link to other subjects**

- **Pre-Technical Studies** - correct area of different shapes in surveying.
- **Creative Arts** - as learners combine different shapes to make patterns.
- **Integrated Science** - relating area to friction and pressure.



<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to identify square metre ( $m^2$ ), acres and hectares as units of measuring area	Identifies square metre ( $m^2$ ), acres and hectares as units of measuring area accurately and systematically	Identifies square metre ( $m^2$ ), acres and hectares as units of measuring area accurately	Identifies square metre ( $m^2$ ), acres or hectares as units of measuring area	Identifies square metre ( $m^2$ ), acres and hectares as units of measuring area with difficulties
Ability to work out the area of rectangles, parallelogram, rhombus and trapezium	Works out the area of rectangles, parallelogram, rhombus or trapezium accurately and systematically	Works out the area of rectangles, parallelogram, rhombus and trapezium accurately	Works out the area of rectangles or parallelogram or rhombus or trapezium	Works out the area of rectangles, parallelogram, rhombus and trapezium with difficulties
Ability to work out the area of circles	Works out the area of circles accurately and systematically	Works out the area of circles accurately	Works out the area of circles partially	Works out the area of circles with difficulties
Ability to calculate the area of borders and combined shapes	Calculates the area of borders and combined shapes accurately and systematically	Calculates the area of borders and combined shapes accurately	Calculates the area of borders and combined shapes partially	Calculates the area of borders and combined shapes with difficulties



### Sub-Strand: Volume and Capacity

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.4 Volume and Capacity (8 lessons)	By the end of the sub-strand, the learner should be able to: a) identify cubic metre ( $m^3$ ) as a unit of volume in measurements b) convert cubic metre ( $m^3$ ) into cubic centimetre ( $cm^3$ ) and vice versa in different situations c) work out the volume of cubes, cuboids and cylinder in different situations d) identify the relationship between $cm^3$ , $m^3$ and litres in real life situations e) relate volume to capacity in real life situations f) work out the capacity of containers in real life situations g) use IT devices for more learning on volume and capacity and for enjoyment h) promote use of volume and capacity in real life situations.	The learner is guided to: <ul style="list-style-type: none"> <li>• make a cube of sides 1 metre using locally available materials</li> <li>• discuss and work out the conversions of cubic centimetre (<math>cm^3</math>) and cubic metre (<math>m^3</math>)</li> <li>• collect labelled containers of different volume and capacity from the environment</li> <li>• generate conversion tables of volume and capacity</li> <li>• create models of cubes, cuboids, and cylinders which they will use to work out volume</li> <li>• watch videos on volume and capacity</li> </ul>	<ol style="list-style-type: none"> <li>1. Where do we use volume and capacity in daily activities?</li> <li>2. Why do we measure volume?</li> </ol>



<p><b>Core Competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Critical thinking and problem solving:</b> Interpretation and inference as learners create a conversion table of units of volume.</li> <li>● <b>Creativity and Imagination:</b> Open-mindedness and creativity as learners create models of cubes and cuboids.</li> </ul>				
<p><b>Values</b></p> <ul style="list-style-type: none"> <li>● <b>Responsibility</b> as learners work in groups and share different tasks in making models.</li> <li>● <b>Peace</b> as learners discuss to make the models for different volumes and capacities.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs)</b></p> <ul style="list-style-type: none"> <li>● <b>Environmental education</b> as learners use big and small containers of different volume from locally available resources.</li> <li>● <b>Safety</b> as learners make models of cubes and cuboids.</li> <li>● <b>Education for Sustainable Development:</b> water conservation using containers of different capacities.</li> </ul>				
<p><b>Link to other subjects</b></p> <ul style="list-style-type: none"> <li>● <b>Creative Arts</b> as learners create models of cubes and cuboids.</li> <li>● <b>Pre-Technical Studies</b> as learners create models of cubes and cuboids.</li> <li>● <b>Integrated Science</b> as learners work out volume of different substances.</li> </ul>				
<p><b>Assessment Rubric</b></p>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to identify cubic metre (m <sup>3</sup> ) as a unit of volume	Identifies cubic metre (m <sup>3</sup> ) as a unit of volume accurately and consistently	Identifies cubic metre (m <sup>3</sup> ) as a unit of volume accurately	Identifies cubic metre (m <sup>3</sup> ) as a unit of volume accurately with help	Identifies cubic metre (m <sup>3</sup> ) as a unit of volume with difficulties



Ability to convert cubic metre ( $m^3$ ) into cubic centimetre ( $cm^3$ ) and vice versa	Converts cubic metre ( $m^3$ ) into cubic centimetre ( $cm^3$ ) and vice versa accurately and systematically	Converts cubic metre ( $m^3$ ) into cubic centimetre ( $cm^3$ ) and vice versa accurately	Converts cubic metre ( $m^3$ ) into cubic centimetre or converts cubic metre into cubic metre ( $m^3$ )	Converts cubic metre ( $m^3$ ) into cubic centimetre and vice versa with difficulties
Ability to work out the volume of cubes, cuboids and cylinders	Works out the volume of cubes, cuboids and cylinders correctly and systematically	Works out the volume of cubes, cuboids and cylinders correctly	Works out the volume of cubes or cuboids or cylinders	Works out the volume of cubes, cuboids and cylinders with difficulties
Ability to identify the relationship between $cm^3$ , $m^3$ and litres	Identifies the relationship between $cm^3$ , $m^3$ and litres accurately and consistently	Identifies the relationship between $cm^3$ , $m^3$ and litres accurately	Identifies the relationship between $cm^3$ , $m^3$ and litres partially	Identifies the relationship between $cm^3$ , $m^3$ and litres with difficulties
Ability to convert units of capacity from one form to another	Converts units of capacity from one form to another correctly and systematically	Converts units of capacity from one form to another correctly	Converts units of capacity from one form to another partially	Converts units of capacity from one form to another with difficulties
Ability to relate volume to capacity	Relates volume to capacity accurately and consistently	Relates volume to capacity accurately	Relates volume to capacity partially	Relates volume to capacity with difficulties
Ability to work out the capacity of containers	Works out the capacity of containers correctly and systematically	Works out the capacity of containers correctly	Work out the capacity of some containers	Works out the capacity of containers with difficulties



### Sub-Strand: Time, Distance and Speed

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	<b>3.5 Time, Distance and Speed</b>  (8 lessons)	By the end of the sub-strand, the learner should be able to: <ol style="list-style-type: none"> <li>identify units of measuring time in real life situations</li> <li>convert units of time from one form to another in learning situations</li> <li>convert units of measuring distance in learning situations</li> <li>identify speed as distance covered per unit time in different situations</li> <li>work out speed in kilometres per hour (km/h) and metres per second (m/s) in real life situations</li> <li>convert units of speed from Km/h to m/s and</li> </ol>	The learner is guided to: <ul style="list-style-type: none"> <li>use analog or digital clock to tell time in hours, minutes and seconds and discuss the units of time</li> <li>create conversion table on units of time</li> <li>discuss and estimate distances between two or more points and convert from km to m and vice versa</li> <li>engage in activities that involve distance and time such as track events to relate time, distance and speed</li> <li>discuss how long they take to travel from home to school, discuss the aspects of</li> </ul>	<ol style="list-style-type: none"> <li>Why do we relate distance, time and speed?</li> <li>What is the importance of speed in daily activities?</li> </ol>



		vice versa in real life situations g) use IT devices to learn more on time, distance and speed for planning h) reflect on use of time, distance and speed in real life situations	distance, and time taken to get to school <ul style="list-style-type: none"> <li>• practise calculating speeds in km/h or m/s</li> <li>• play digital games involving racing or watch marathon</li> </ul>	
<b>Core Competencies to be developed:</b> <ul style="list-style-type: none"> <li>• <b>Critical thinking and problem solving-</b> interpretation and inference as learners create conversion tables relate and determine distance, time and speed.</li> <li>• <b>Self-efficacy</b> - Personality skills as learners observe punctuality in attending to different activities.</li> </ul>				
<b>Values</b> <ul style="list-style-type: none"> <li>• <b>Patriotism</b> as learners observe road safety rules, including speed limits.</li> <li>• <b>Integrity</b> as learners observe punctuality and work out correct distances.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs)</b> <ul style="list-style-type: none"> <li>• <b>Disaster risk reduction (DRR) and safety</b> as learners observe safety in road and machines in relation to speed.</li> </ul>				
<b>Link to other subjects</b> <ul style="list-style-type: none"> <li>• <b>Integrated Science</b> as learners observe time as they carry out different experiments.</li> <li>• <b>PHE</b> as learners participate in athletics.</li> </ul>				



<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to identify units of measuring time	Identifies units of measuring time correctly and consistently	Identifies units of measuring time correctly	Identifies some units of measuring time	Identifies units of measuring time with difficulties
Ability to convert units of time from one form to another	Converts units of time from one form to another correctly and systematically	Converts units of time from one form to another correctly	Converts some units of time from one form to another	Converts units of time from one form to another with difficulties
Ability to convert units of measuring distance	Converts units of measuring distance correctly and systematically	Converts units of measuring distance correctly	Converts units of measuring distance partially	Converts units of measuring distance with difficulties
Ability to identify speed as distance covered per unit time	Identifies speed as distance covered per unit time correctly and consistently	Identifies speed as distance covered per unit time correctly	Identifies speed as distance covered per unit time partially	Identifies speed as distance covered per unit time with difficulties
Ability to work out speed in km/h and m/s	Works out speed in km/h and m/s accurately and systematically	Works out speed in km/h and m/s accurately	Works out speed in km/h or m/s accurately with help	Works out speed in km/h and m/s with difficulties
Ability to convert units of speed from km/h to m/s and vice versa	Converts units of speed from km/h to m/s and vice versa correctly and systematically	Converts units of speed from km/h to m/s and vice versa correctly	Converts units of speed from km/h to m/s or m/s to km/h	Converts units of speed from km/h to m/s and vice versa with difficulties





## Sub-Strand: Temperature

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.6 Temperature (6 lessons)	<p>By the end of the sub-strand, the learner should be able to:</p> <ul style="list-style-type: none"> <li>a) describe the temperature conditions of the immediate environment as either warm, hot or cold</li> <li>b) compare temperature using hotter, warmer, colder and same as in different situations</li> <li>c) identify units of measuring temperature as degree Celsius and Kelvin in different situations</li> <li>d) convert units of measuring temperature from degree Celsius to Kelvin and vice-versa</li> </ul>	<p>The learner is guided to:</p> <ul style="list-style-type: none"> <li>● move to the field, observe the temperature in the environment and discuss the temperature conditions as either warm, hot or cold</li> <li>● discuss and test temperature of different substances using arbitrary methods like touching, for example cold, warm or hot water (exercise caution when dealing with hot substances)</li> <li>● identify and use tools of measuring temperature, for example, thermometers that are in degrees Celsius.</li> </ul>	<ol style="list-style-type: none"> <li>1. How does temperature affect our everyday lives?</li> <li>2. How do we measure temperature?</li> </ol>



		<ul style="list-style-type: none"> <li>e) work out temperature in degree Celsius and Kelvin in real life situations</li> <li>f) use IT devices or other resources to learn about temperature conditions of different places</li> <li>g) recognise temperature changes in the environment.</li> </ul>	<ul style="list-style-type: none"> <li>● work out conversions of temperature from degrees Celsius to Kelvin and vice versa</li> <li>● practise using IT devices or other resources to determine the temperature of different places in degree Celsius and Kelvin.</li> </ul>	
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**Core Competencies to be developed**

- **Communication and collaboration:** Team work as learners work in groups and use tools of measuring temperature.
- **Digital literacy:** Interacting with technology as learners determine temperature of different places using digital devices.

**Values**

- **Responsibility** as learners carefully handle tools of measuring temperature.
- **Integrity** as learners give correct measurements of temperature.

**Pertinent and Contemporary Issues (PCIs)**

- **Self-awareness** as learners take their body temperatures.
- **Safety** as learners work in groups and exercise caution when dealing with hot substances.

**Link to other subjects**

- **Health Education** as learners consider their body temperatures to establish their health status and dressing appropriately.
- **Social Studies** as learners consider climatic temperature changes.



<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to describe the temperature conditions of the immediate environment as either warm, hot or cold	Describes the temperature conditions of the immediate environment as either warm, hot or cold correctly and comprehensively	Describes the temperature conditions of the immediate environment as either warm, hot or cold correctly	Describes the temperature conditions of the immediate environment as either warm, hot or cold partially	Describes the temperature conditions of the immediate environment as either warm, hot or cold with difficulties
Ability to compare temperature using hotter, warmer, colder and same as	Compares temperature using hotter, warmer, colder and same as accurately and comprehensively	Compares temperature using hotter, warmer, colder and same as accurately	Compares temperature using hotter, warmer, colder and same as partially	Compares temperature using hotter, warmer, colder and same as with difficulties
Ability to identify units of measuring temperature as degrees Celsius and Kelvin	Identifies units of measuring temperature as degree Celsius correctly and Kelvin precisely	Identifies units of measuring temperature as degree Celsius and Kelvin correctly	Identifies units of measuring temperature as degree Celsius or as Kelvin	Identifies units of measuring temperature as degree Celsius and as Kelvin with difficulties
Ability to convert units of measuring temperature from degree Celsius to Kelvin and vice-versa	Converts units of measuring temperature from degree Celsius to Kelvin and vice-versa correctly and systematically	Converts units of measuring temperature from degree Celsius to Kelvin and vice-versa correctly	Converts units of measuring temperature from either degree Celsius to Kelvin or Kelvin to Celsius	Converts units of measuring temperature from degree Celsius to Kelvin and vice-versa with difficulties
Ability to work out temperature in degrees Celsius and Kelvin	Works out temperature in degree Celsius and Kelvin accurately and systematically	Works out temperature in degree Celsius and Kelvin accurately	Works out temperature in degree Celsius or Kelvin	Works out temperature in degree Celsius and Kelvin with difficulties



### Sub-Strand: Money

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.7 Money (12 lessons)	By the end of the sub-strand, the learner should be able to: a) work out profit and loss in real life situations b) calculate the percentage profit and loss in different situations c) calculate discount and percentage discount of different goods and services d) calculate commission and percentage commission in real life situations e) interpret bills at home f) prepare bills in real life situations	The learner is guided to: <ul style="list-style-type: none"> <li>● role-play shopping and selling activities involving profit, loss, discount and commission</li> <li>● work out profit and loss involving different activities and settings</li> <li>● work out percentage profit/loss from the role-play activities</li> <li>● work out discount and percentage discount from model shopping activities</li> <li>● work out commission and percentage commission from the role-play activities</li> <li>● identify different types of bills and read the components of bills</li> <li>● prepare bills of different items and expenses</li> </ul>	<ol style="list-style-type: none"> <li>1. Why do we use money in daily activities?</li> <li>2. What considerations would we make when buying or selling?</li> <li>3. What is involved in mobile money transactions?</li> </ol>



		<p>g) work out postal charges in real life situations</p> <p>h) identify mobile money services for different transactions</p> <p>i) work out mobile money transactions in real life situations</p> <p>j) use IT devices to learn more about money for expenditure and investment,</p> <p>k) recognise use of money in day-to-day activities.</p>	<ul style="list-style-type: none"> <li>● visit post office to gather information on postal services and charges</li> <li>● work out postal charges in different situations</li> <li>● discuss and identify mobile money services</li> <li>● work out mobile money transactions, for example, in sending or receiving money, credit and savings</li> <li>● generate bills, pay for goods and services, and other online transactions using IT devices</li> </ul>	
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**Core Competencies to be developed:**

- **Critical thinking and problem solving:** Evaluation and decision making as learners work out discounts, commissions and mobile money as well as postal charges and bills.
- **Communication and collaboration:** Speaking and listening as learners role-play negotiating for discounts and commissions.
- **Citizenship** Active social skills as learners work out discounts, commissions and mobile money in Kenyan currency.
- **Self-efficacy** - Negotiation skills as learners role-play negotiating for discounts and commissions.

<b>Values</b>				
<ul style="list-style-type: none"> <li>• <b>Patriotism</b> as learners work out and pay bills in Kenyan currency.</li> <li>• <b>Integrity</b> as learners pay bills and appreciate use of money</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs)</b>				
<ul style="list-style-type: none"> <li>• <b>Financial literacy</b> as learners work out any discounts, commissions and mobile money as well as postal charges and bills.</li> <li>• <b>Decision making</b> as learners use money in paying bills and postal charges.</li> </ul>				
<b>Link to other subjects</b>				
<ul style="list-style-type: none"> <li>• <b>Business Studies</b> as learners work out bills, discounts, commissions and postal charges.</li> <li>• <b>Life Skills Education</b> as learners apply negotiation skills in discounts and commissions.</li> <li>• <b>Languages</b> as learners gather information on postal services and charges.</li> </ul>				
<b>Assessment Rubric</b>				
<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to work out profit and loss	Works out profit and loss correctly and systematically	Works out profit and loss correctly	Works out profit or loss with some help	Works out profit and loss with difficulties
Ability to calculate percentage profit and loss	Calculates percentage profit and loss correctly and systematically	Calculates percentage profit and loss correctly	Calculates percentage profit or loss partially	Calculates percentage profit and loss with difficulties

Ability to calculate discount and percentage discount	Calculates discount and percentage discount correctly and systematically	Calculates discount and percentage discount correctly	Calculates discount and percentage discount partially	Calculates discount and percentage discount with difficulties
Ability to calculate commission and percentage commission	Calculates commission and percentage commission correctly and systematically	Calculates commission and percentage commission correctly	Calculates commission and percentage commission partially	Calculates commission and percentage commission with difficulties
Ability to interpret bills	Interprets bills accurately and comprehensively	Interprets bills accurately	Interprets some bills accurately	Interprets bills with difficulties
Ability to prepare bills	Prepares bills accurately and systematically	Prepares bills accurately	Prepares some bills accurately	Prepares bills with difficulties
Ability to work out postal charges	Works out postal charges correctly and systematically	Works out postal charges correctly	Works out some postal charges correctly	Works out postal charges with difficulties
Ability to identify mobile money services	Identifies mobile money services correctly and comprehensively	Identifies mobile money services correctly	Identifies some mobile money services	Identifies mobile money services with difficulties
Ability to work out mobile money transactions	Works out mobile money transactions accurately and systematically	Works out mobile money transactions accurately	Works out some mobile money transactions accurately	Works out mobile money transactions with difficulties



## STRAND 4.0: GEOMETRY

### Sub-Strand: Angles

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Geometry	4.1 Angles (10 lessons)	By the end of the sub-strand, the learner should be able to: a) relate different types of angles on a straight line in real life situations b) solve angles at a point in learning situations c) relate angles on a transversal in different situations d) solve angles in a parallelogram in different situation e) identify angle properties of polygons up to hexagon in different situations f) relate interior angles, exterior angles and the number of sides of a	The learner is guided to: <ul style="list-style-type: none"><li>• discuss positions of objects in the immediate environment in relation to angles</li><li>• draw straight lines with different angles, measure and relate them.</li><li>• draw different angles at a point, measure, relate and work out angles at point</li><li>• draw transversals, measure and relate angles</li><li>• draw parallelograms, measure and relate various angles</li><li>• use cut-outs or drawings of different polygons up to hexagon, measure the interior angles and relate to the number of right angles</li><li>• use cut-outs or drawings of different polygons up to</li></ul>	<ol style="list-style-type: none"><li>1. What are angles?</li><li>2. Where do we use angles in real life situations?</li></ol>





		<p>polygon up to hexagon in different situations</p> <p>g) solve angles and sides of polygons up to hexagon in learning situations</p> <p>h) use IT devices to learn more about angles and for leisure,</p> <p>i) admire use of angles in objects</p>	<p>hexagon, measure interior and exterior angles and relate to the number of sides</p> <ul style="list-style-type: none"> <li>• work out angles and sides in different polygons up to hexagon</li> <li>• draw angles at a point and in parallelograms using IT devices.</li> </ul>	
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**Core Competencies to be developed:**

- **Communication and collaboration:** Team work as learners discuss, in groups, positions of objects in the immediate environment in relation to angles.
- **Critical thinking and problem solving:** Interpretation and inference as learners draw, measure and relate angles.
- **Digital literacy:** Interacting with technology as learners learn use digital devices to learn more on algebraic inequalities and play digital games.

**Values**

- **Responsibility** as learners explore positions of objects in the immediate environment in relation to angles.
- **Unity** as learners work in groups to use cut-outs or drawings of different polygons up to hexagon.



**Pertinent and Contemporary Issues (PCIs)**

- **Safety** as learners work in groups to use cut-outs or drawings of different polygons up to hexagon. .

**Link to other subjects**

- **Pre-Technical Studies** as learners use cut-outs or drawings of different polygons up to hexagon.

**Assessment Rubric**

<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to relate different types of angles on a straight line	Relates different types of angles on a straight line correctly and comprehensively	Relates different types of angles on a straight line correctly	Relates some of the different types of angles on a straight line correctly	Relates different types of angles on a straight line with difficulties
Ability to solve angles at a point	Solves angles at a point correctly and systematically	Solves angles at a point accurately	Solves some angles at a point correctly	Solves angles at a point with difficulties
Ability to relate angles on a transversal	Relate angles on a transversal correctly and comprehensively	Relates angles on a transversal correctly	Relates some angles on a transversal correctly	Relates angles on a transversal with difficulties
Ability to solve angles on a parallelogram	Solves angles on a parallelogram correctly and systematically	Solves angles on a parallelogram correctly	Solves some angles on a parallelogram correctly	Solves angles on a parallelogram with difficulties



Ability to identify angle properties of polygons up to hexagon	Identifies angle properties of polygons up to hexagon correctly and comprehensively	Identifies angle properties of polygons up to hexagon correctly	Identifies some angle properties of polygons up to hexagon correctly	Identifies angle properties of polygons up to hexagon with difficulties
Ability to relate interior angles, exterior angles and the number of sides of a polygon up to hexagon	Relates interior angles, exterior angles and the number of sides of a polygon up to hexagon correctly and comprehensively	Relates interior angles, exterior angles and the number of sides of a polygon up to hexagon correctly	Relates some interior angles, exterior angles and the number of sides of a polygon up to hexagon correctly	Relates interior angles, exterior angles and the number of sides of a polygon up to hexagon with difficulties
Ability to solve angles and sides of polygons up to hexagon	Solves angles and sides of polygons up to hexagon accurately and systematically	Solves angles and sides of polygons up to hexagon accurately	Solves some angles and sides of polygons up to hexagon correctly	Solves angles and sides of polygons up to hexagon with difficulties



### Sub-Strand: Geometrical Constructions

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Geometry	4.2 Geometrical Constructions (12 lessons)	<p>By the end of the sub-strand, the learner should be able to:</p> <ul style="list-style-type: none"> <li>a) measure different angles in learning situations</li> <li>b) bisect angles using a ruler and a pair of compasses only in learning situations</li> <li>c) construct <math>90^{\circ}</math>, <math>45^{\circ}</math>, <math>60^{\circ}</math>, <math>30^{\circ}</math> and other angles that are multiples of <math>7.5^{\circ}</math> using a ruler and a pair of compasses only in learning situations</li> <li>d) construct different triangles using a ruler and a pair of compasses only in different situations</li> <li>e) construct circles using a ruler and a pair of compasses only in different situations</li> </ul>	<p>The learner is guided to:</p> <ul style="list-style-type: none"> <li>● draw and measure different angles</li> <li>● draw and bisect different angles</li> <li>● construct <math>90^{\circ}</math>, <math>45^{\circ}</math>, <math>60^{\circ}</math>, <math>30^{\circ}</math> including <math>120^{\circ}</math>, <math>105^{\circ}</math> and practice with angles that are multiples of <math>7.5^{\circ}</math> using a pair of compasses and rulers</li> <li>● construct triangles using a pair of compasses and rulers</li> <li>● construct circles using a pair of compasses and rulers</li> <li>● use IT devices on graphics to draw angles and circles, watch videos of</li> </ul>	<ol style="list-style-type: none"> <li>1. Where do we use geometric constructions in real life situations?</li> <li>2. Why do we use geometric constructions?</li> </ol>



		f) use IT devices to learn about geometric constructions for skills development g) recognise use of geometric constructions of different shapes in objects	bisecting angles and constructing angles and circles.	
<b>Core Competencies to be developed:</b> <ul style="list-style-type: none"> <li>• <b>Creativity and imagination:</b> Making observations as learners construct angles, triangles and circles.</li> <li>• <b>Digital literacy:</b> as learners use digital devices to learn more about construction of angles, triangles and circles</li> </ul>				
<b>Values</b> <ul style="list-style-type: none"> <li>• <b>Responsibility</b> as learners use geometrical instruments for construction of angles and circles.</li> <li>• <b>Unity</b> as learners work in groups to draw and measure different angles.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs)</b> <ul style="list-style-type: none"> <li>• <b>Safety</b> as learners use geometrical instruments such as a pair of compasses and dividers.</li> </ul>				
<b>Link to other subjects</b> <ul style="list-style-type: none"> <li>• <b>Creative Arts</b> as learners construct angles, triangles and circles which they can use to make geometrical patterns.</li> </ul>				



<b>Assessment Rubric</b>				
Ability to measure different angles	Measures different angles accurately and systematically	Measures different angles accurately	Measures some of the different angles accurately	Measures different angles with difficulties
Ability to bisect angles using a ruler and a pair of compasses only	Bisects angles using a ruler and a pair of compasses accurately and systematically	Bisects angles using a ruler and pair of compasses accurately	Bisects some angles using a ruler and a pair of compasses accurately	Bisects angles using a ruler and a pair of compasses with difficulties
Ability to construct $90^{\circ}$ , $60^{\circ}$ , $45^{\circ}$ $30^{\circ}$ and other angles that are multiples of $7.5^{\circ}$ using a ruler and a pair of compasses only	Constructs $90^{\circ}$ , $60^{\circ}$ , $45^{\circ}$ , $30^{\circ}$ and other angles that are multiples of $7.5^{\circ}$ using a ruler and a pair of compasses accurately and systematically	Constructs $90^{\circ}$ , $60^{\circ}$ , $45^{\circ}$ , $30^{\circ}$ and other angles that are multiples of $7.5^{\circ}$ using a ruler and a pair of compasses accurately	Constructs $90^{\circ}$ , $60^{\circ}$ , $45^{\circ}$ , $30^{\circ}$ and other angles that are multiples of $7.5^{\circ}$ using a ruler and a pair of compasses correctly with some help	Constructs $90^{\circ}$ , $60^{\circ}$ , $45^{\circ}$ , $30^{\circ}$ and other angles that are multiples of $7.5^{\circ}$ using a ruler and a pair of compasses with difficulties
Ability to construct different triangles using a ruler and a pair of compasses only	Constructs different triangles using a ruler and a pair of compasses accurately and systematically	Constructs different triangles using a ruler and a pair of compasses accurately	Constructs some of the different triangles using a ruler and a pair of compasses accurately	Constructs different triangles using a ruler and a pair of compasses with difficulties
Ability to construct circles using a ruler and a pair of compasses only	Constructs circles using a ruler and a pair of compasses only accurately and systematically	Constructs circles using a ruler and a pair of compasses only accurately	Constructs some circles using a ruler and a pair of compasses only less accurately	Constructs circles using a ruler and a pair of compasses only with difficulties



## STRAND 5.0: DATA HANDLING AND PROBABILITY

### Sub-Strand: Data handling

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>5.0 Data Handling and Probability</b>	<b>5.1 Data Handling</b> (10 lessons)	By the end of the sub-strand, the learner should be able to: a) state the meaning of data in learning situation b) collect data from different situations c) draw frequency distribution table of data from different sources d) determine a suitable scale for graphs of data from different situations e) draw pictographs of data from real life situations f) draw bar graphs of data from different sources g) interpret bar graphs of data from real life situations h) draw pie charts of data from real life situations	The learner is guided to: <ul style="list-style-type: none"><li>● discuss, collect and organise data from the immediate environment</li><li>● tally and represent the data in a frequency table</li><li>● discuss and come up with a suitable scale to represent data in graphs</li><li>● discuss and use a suitable scale to draw pictographs from data</li><li>● discuss and use a suitable scale to draw bar graphs from data</li><li>● discuss and interpret bar graphs of data</li><li>● discuss and represent data on pie charts</li></ul>	<ol style="list-style-type: none"><li>1. Why do we collect data?</li><li>2. How do we represent data?</li><li>3. How do we interpret data?</li></ol>



		<ul style="list-style-type: none"> <li>i) interpret pie charts of data from real life situations</li> <li>j) draw a line graph of data from different situations</li> <li>k) interpret travel graphs from real life situations</li> <li>l) use IT or other resources to represent data</li> <li>m) promote use of data in real life situations.</li> </ul>	<ul style="list-style-type: none"> <li>● discuss and interpret pie charts of data</li> <li>● use a suitable scale to represent data on line graphs</li> <li>● discuss and interpret travel graphs from real life situations</li> <li>● draw pie charts, pictographs and read data from bar graphs using IT devices or watch videos relating to data.</li> </ul>	
<p><b>Core Competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>● <b>Creativity and imagination:</b> Making observations as learners present data in the form of pie charts and pictograms.</li> <li>● <b>Critical thinking and problem solving:</b> Interpretation and inference as learners interpret data from bar graphs, pictograms and pie charts.</li> </ul>				
<p><b>Values</b></p> <ul style="list-style-type: none"> <li>● <b>Responsibility</b> as learners collect and present data in pictograms that may involve different resources.</li> <li>● <b>Peace</b> as learners work in groups to collect and present data.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs)</b></p> <ul style="list-style-type: none"> <li>● <b>Decision making</b> as learners present data that can be used to make informed decisions.</li> </ul>				





**Link to other subjects**

- **Creative Arts** as learners draw pictographs and pie charts.
- **Social Studies** as learners present data in pie charts and pictographs that may involve populations.

**Assessment Rubric**

<b>Indicators</b>	<b>Exceeds Expectations</b>	<b>Meets Expectations</b>	<b>Approaches Expectations</b>	<b>Below Expectations</b>
Ability to state the meaning of data	States the meaning of data correctly and comprehensively	States the meaning of data correctly	States the meaning of data correctly with some help	Has difficulties stating the meaning of data
Ability to collect data	Collects data accurately and systematically	Collects data accurately	Collects some data accurately	Collects data with difficulties
Ability to draw frequency distribution table of data	Draws frequency distribution table of data accurately and systematically	Draws frequency distribution table of data accurately	Draws frequency distribution table of data accurately with some help	Draws frequency distribution table of data with difficulties
Ability to determine suitable scale for graphs	Determines suitable scale for graphs correctly and precisely	Determines suitable scale for graphs correctly	Determines suitable scale for some graphs correctly	Determines suitable scale for graphs with difficulties
Ability to draw Pictographs of data	Draws pictographs of data correctly and systematically	Draws pictographs of data correctly	Draws some pictographs of data correctly	Draws pictographs of data with difficulties



Ability to draw bar graphs of data	Draws bar graphs of data correctly and systematically	Draws bar graphs of data correctly	Draws some bar graphs of data correctly	Draws bar graphs of data with difficulties
Ability to interpret bar graphs of data	Interprets bar graphs of data correctly and precisely	Interprets bar graphs of data correctly	Interprets some bar graphs of data correctly	Has difficulties interpreting bar graphs of data
Ability to draw pie charts of data	Draws pie charts of data correctly and systematically	Draws pie charts of data correctly	Draws some pie charts of data correctly	Draws pie charts of data with difficulties
Ability to interpret pie charts of data	Interprets pie charts of data correctly and comprehensively	Interprets pie charts of data correctly	Interprets some pie charts of data correctly	Has difficulties interpreting pie charts of data
Ability to draw a line graph	Draws a line graph correctly and systematically	Draws a line graph correctly	Draws a line graph correctly with some help	Draws a line graph with difficulties
Ability to interpret travel graphs	Interprets travel graphs correctly and comprehensively	Interprets travel graphs correctly	Interprets some travel graphs correctly	Has difficulties interpreting travel graphs



## **GUIDELINES ON COMMUNITY SERVICE LEARNING CLASS ACTIVITY**

Community Service Learning (CSL) is an experiential learning strategy that integrates classroom learning and community service to enable learners reflect, experience and learn from the community. CSL is expected to benefit the learner, the school and the local community. Knowledge and skills on how to carry out a CSL project have been covered under Life Skills Education (LSE).

All learners in Grade 7 will be expected to participate in only one CSL class activity. The activity will give learners an opportunity to practise the CSL project skills covered under LSE. This activity will be undertaken in groups for purposes of learning. Learners will be expected to apply knowledge and skills on steps of the CSL project to carry out an activity of their choice as per the guidelines provided in the template. The learning approach will take the form of a whole school approach, where the entire school community will be engaged in the learning process. Teachers will guide learners to execute a simple school-based integrated CSL class activity. This activity can be done in 4 to 6 weeks outside the classroom time.

### **CSL Skills to be covered:**

- i) Research :** Learners will develop research skills as they investigate PCIs to address the activity, ways and tools to use in collecting the data, manner in which they will analyse information and present their findings.
- ii) Communication:** Learners will develop effective communication skills as they engage with peers and school community members. These will include listening actively, asking questions, presentation skills using varied modes etc.
- iii) Citizenship:** Learners will be able to explore opportunities for engagement as members of the school community and providing a service for the common good.
- iv) Leadership:** Learners develop leadership skills as they take up various roles within the CSL activity.



- v) **Financial Literacy Skills:** Learners consider how they can undertake the project as well as sourcing and utilising resources effectively and efficiently.
- vi) **Entrepreneurship:** Learners consider ways of generating income through innovation for the CSL class activity.

Suggested PCIs	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<p>The learners will be guided to consider the various PCIs provided in the various subjects in Grade 7 and choose one suitable to their context and reality</p>	<p>By the end of the CSL class activity, the learner should be able to:</p> <ol style="list-style-type: none"> <li>a) identify a problem in the school community through research,</li> <li>b) plan to solve the identified problem in the community,</li> <li>c) design solutions to the identified problem,</li> <li>d) implement solutions to the identified problem,</li> <li>e) share the findings with relevant actors,</li> <li>f) reflect on own learning and relevance of the project,</li> <li>g) appreciate the need to belong to a community</li> </ol>	<p>The learner is guided to:</p> <ul style="list-style-type: none"> <li>● brainstorm on /pertinent and contemporary issues in their school that need attention</li> <li>● choose a PCI that needs immediate attention and explain why</li> <li>● discuss possible solutions to the identified issue</li> <li>● propose the most appropriate solution to the problem</li> <li>● discuss ways and tools they can use to collect information on a problem (questionnaires, interviews, observation)</li> <li>● develop tools for collecting the information/data</li> <li>● identify resources they need for the activity</li> </ul>	<ol style="list-style-type: none"> <li>1. How does one determine community needs?</li> <li>2. Why is it necessary to be part of a community?</li> <li>3. What can one do to demonstrate a sense of belonging</li> </ol>



		<ul style="list-style-type: none"> <li>● collect the information/data using various means</li> <li>● develop various reporting documents on their findings</li> <li>● use the developed tools to report on their findings</li> <li>● implement the project</li> <li>● collect feedback from peers and school community regarding the CSL activity</li> <li>● share the report on activity through various media to peers and school community</li> <li>● discuss the strengths and weaknesses of the implemented project and lessons learnt</li> <li>● reflect on how the project enhanced own learning while at the same time facilitating service on an issue in the school community</li> </ul>	
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<b>Assessment Rubric</b>				
<b>Indicator</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
The ability to identify and analyse a pertinent issue in society to be addressed	Learner critically defines and elaborately discusses a pertinent issue to be addressed.	Learner defines and discusses a pertinent issue to be addressed.	Learner defines and discusses a pertinent issue to be addressed with minimal support.	Learner requires support to critically examine and select the appropriate issue.
The ability to plan to solve the identified problem	Learner correctly and systematically establishes resources needed, develops plans, assigns responsibilities, and generates data on the CSL project.	Learner correctly establishes resources needed, develops plans, assigns responsibilities, and generates data on the CSL project.	Learner sometimes establishes resources needed, develops plans, assigns responsibilities, and generates data on the CSL project.	Learner has difficulty establishing resources needed, developing plans, assigning responsibilities and generating data on the CSL project.
The ability to design solutions to the identified problem and implement them	Learner constantly applies the knowledge and skills gained in subjects to address the identified issue.	Learner applies the knowledge and skills gained in subjects to address the identified issue.	Learner applies the knowledge and skills gained in subjects to address the identified issue with some support.	Learner requires a lot of prompting to apply the knowledge and skills gained in subjects to address the identified issue.



Ability to share findings with relevant actors	Learner comprehensively and confidently shares findings of the issue addressed in the activity.	Learner confidently shares findings of the issue addressed in the activity.	Learner shares some of the findings of the issue addressed in the activity.	Learner briefly shares findings of the issue addressed in the activity, lacks necessary details.
The ability to reflect on own learning and relevance of the activity	Learner distinctively and clearly outlines the benefits of the CSL activity on the target community and own learning.	Learner clearly outlines the benefits of the CSL activity on the target community and own learning.	Learner outlines the benefits of the CSL activity on the target community and own learning, a few unclear.	Learner struggles to outline the benefits of the CSL activity on the target community and own learning.



**APPENDIX 1: LIST OF ASSESSMENT METHODS, LEARNING RESOURCES AND NON-FORMAL ACTIVITIES**

<b>Strand</b>	<b>Sub-Strand</b>	<b>Suggested Assessment Methods</b>	<b>Resources Suggested Learning</b>	<b>Suggested Non-Formal Activities</b>
<b>Numbers</b>	Whole Numbers	Class activities Class written tests Out of school/home assignments or activities	Place value apparatus, number charts, number cards, multiplication table	Prepare or improvise number charts and different place value apparatus.
	Factors	Class activities Class written tests Out of school/home assignments	Multiplication tables	
	Fractions	Class activities Class written tests Out of school/home assignments	Multiplication tables	
	Decimals	Class activities Class written tests Out of school/home assignments	Equivalent fraction board, circular and rectangular cut-outs, counters	
	Squares and square roots	Class written tests Class activities	Place value charts, number cards	





<b>Algebra</b>	Algebraic Expressions	Class activities Class written tests Out of school/home assignments or activities	Information from different sources	Carry out activities involving classifying objects in their immediate environment according to given attributes such as similarities or differences. This can be done at home. Take photos and share with class or school. Use the concept of classification of objects or things at school and home to be orderly.
	Linear Equations	Class activities Class written tests Out of school/home assignments or activities	Information from different sources	
	Inequalities	Class written tests Class activities	Information from different sources	
<b>Measurement</b>	Pythagorean Relationship	Class activities Class written tests Out of school/home assignments	Ladder, stairs, square cut-outs, 1cm squares, 1m squares	
	Length	Class written tests Class activities	Metre Rule, 1metre ticks, tape measure	



	Area	Class written tests Out of school/home assignments or activities	Square cut-outs, 1cm squares, 1m squares	
	Volume and Capacity	Class written tests Class activities Out of school/home assignments or activities	Cubes, cuboids, cylinders, pyramids, Spheres, cut-outs of rectangles, circles, and triangles of different sizes	Measure volume of liquids using containers of different sizes from smallest to biggest. Relate this to packaging of goods such as water, milk and other things in the market place and how this affects consumer awareness and protection.
	Mass	Class written tests Class activities	Tea spoons, soil or sand, manual/electronic weighing machine, beam balance,	Make an improvised weighing machine/beam balance that can be used in markets to weigh 1 or 1/2kgs
	Time, distance and speed	Class written tests Out of school/home assignments or activities	Analogue and digital clocks, digital watches, stop watches	



	Temperature	Class activities Out of school/home assignments or activities	Thermometer, weather charts	Record weather changes for a period of time, for example a month/term, and discuss how this affects the way one dresses.
	Money	Class written tests Class activities Out of school/home assignments or activities	Price list, classroom shop, electronic money tariffs charts	
<b>Geometry</b>	Angles	Class activities Class written tests Out of school/home assignments or activities	Unit angles, protractors, rulers, straight edges	
	Geometric constructions	Class activities Class written tests	Pair of compasses, rulers	
<b>Data handling and probability</b>	Data handling	Class activities Class written tests	Data from different sources	Undertake a project that may involve data collection and presentation



## APPENDIX 2: USE OF ICT DEVICES

The following ICT devices may be used in the teaching and learning of mathematics at this level:

1. Learner digital devices (LDD),
2. Teacher digital devices (TDD),
3. Mobile phones,
4. Digital clocks (use of other clocks is also encouraged)
5. Television sets,
6. Videos,
7. Cameras,
8. Projectors,
9. Radios,
10. DVD players and CDs,
11. Scanners,
12. Internet and others.

