KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

A Skilled and Ethical Society

JUNIOR SCHOOL CURRICULUM DESIGN

MATHEMATICS

GRADE 7

First published 2022

Revised 2024

ISBN: 978-9914-43-932-8

Published and printed by the Kenya Institute of Curriculum Development

FOREWORD

The Government of Kenya is committed to ensuring that policy objectives for Education, Training, and Research meet the aspirations of the Constitution of Kenya 2010, the Kenya Vision 2030, the 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, Primary and Junior School levels.

The implementation of the Competency Based Curriculum involves monitoring and evaluation to determine its success. After the five-year implementation cycle, a summative evaluation of the primary education cycle was undertaken to establish the achievement of learning outcomes as envisaged in the Basic Education Curriculum Framework. The Government of Kenya constituted a Presidential Working Party on Education Reforms (PWPER) in 2022 to address salient issues affecting the education sector. PWPER made far-reaching recommendations for basic education that necessitated curriculum review. The recommendations of the PWPER, monitoring reports, summative evaluation of the primary education cycle and feedback from curriculum implementers and other stakeholders led to rationalisation and review of the basic education curriculum.

The reviewed Grade 7 curriculum designs build on competencies attained by learners at the end Grade 6. Further, they provide opportunities for learners to continue exploring and nurturing their potential as they prepare to transit to Senior School.

The curriculum designs present the National Goals of Education, essence statements, general and specific expected learning outcomes for the subjects as well as strands and sub-strands. The designs also outline suggested learning experiences, suggested key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values, and the 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) nationally implemented the Competency Based Curriculum (CBC) in 2019. Grade 7 is the first grade of Junior School in the reformed education structure.

The reviewed Grade 7 curriculum furthers implementation of the CBC from Grade 6 at the primary 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 School education level. This is very critical in the realisation of the Vision and Mission of the ongoing curriculum reforms as enshrined in the Sessional Paper No. I of 2019: *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 of 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. They also offer several suggested learning resources and a variety of assessment techniques. It is expected that the design will guide teachers to effectively facilitate learners to attain the expected learning outcomes for Grade 7 and prepare them for a smooth transition to Grade 8. Furthermore, it is my hope that teachers will use the designs to make learning interesting, exciting, and enjoyable.

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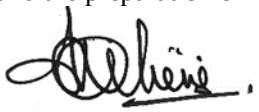
ACKNOWLEDGEMENT

The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2019) mandates the Institute to develop and review (*SNE adapt*) 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) 2017. The curriculum responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, the Kenya Vision 2030, the East African Community Protocol, the International Bureau of Education Guidelines and the United Nations Sustainable Development Goals (SDGs).

KICD receives its funding from the Government of Kenya to facilitate the achievement of its 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 revised Grade 7 curriculum designs were developed with the support of the World Bank through the Kenya Primary Education Equity in Learning Programme (KPEELP); a project coordinated by MoE. Therefore, the Institute is very grateful to the Government of Kenya, through the MoE and the development partners for the policy, resource, and logistical support. Specifically, special thanks goes to the Cabinet Secretary-MoE and the Principal Secretary - State Department of Basic Education.

We also wish to acknowledge the KICD curriculum developers and other staff, all teachers and 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) during the process of developing these designs. Finally, we are very grateful to the Chairperson of the KICD Council and other members of the Council for the very consistent guidance throughout the process.

We assure all teachers, parents and other stakeholders that this curriculum design will effectively guide the implementation of the CBC in Grade 7 and the preparation of learners for transition to Grade 8.



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NATIONAL GOALS OF EDUCATION

Education in Kenya should:

1. **Foster nationalism and 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 to make a positive contribution to the life of the nation.

2. **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 following the wake of rapid modernisation. Education should assist our youth in adapting 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 up a modern and independent economy which needs 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.

3. **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.

4. **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.

5. **Promote social equity and responsibility.**
   Education should promote social equality and foster a sense of social responsibility within an education system that 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.

6. **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 to build a stable and modern society.

7. **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.

8. **Promote positive attitudes towards good health and environmental protection.**
   Education should inculcate in young people the value of good health 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.

LESSON ALLOCATION

S/No	Learning Area	Number of Lessons Per Week
1.	English	5
2.	Kiswahili / Kenya Sign Language	4
3.	Mathematics	5
4.	Religious Education	4
5.	Social Studies	4
6.	Integrated Science	5
7.	Pre-Technical Studies	4
8.	Agriculture	4
9.	Creative Arts and Sports	5
	Pastoral /Religious Instructional Program	1*
Total		**40 + 1***

LEARNING OUTCOMES FOR JUNIOR SCHOOL

By the end of Junior 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 permeated by Mathematics. From counting, adding, subtracting, multiplying, or dividing quantities and substances 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. We live in a world of space, shape and structures. It is impossible to imagine a world without Mathematics. It is applied in the economic activities, scientific endevours, social interactions, religious practices, and the political sphere. It is therefore imperative that children begin learning Mathematics from an early age.

In Junior Secondary, Mathematics builds on the competencies acquired by the learner from primary school. It strengthens these competencies, providing a foundation in mathematical skills for Science, Technology, Engineering, and Mathematics (STEM) and other pathways at Senior School. Mathematics also equips the learner with the necessary skills and competencies to apply their knowledge to solve real-life problems. This aligns with Vision 2030 and Sessional Paper Number 1 of 2019, which emphasises STEM areas.

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.

SUMMARY OF STRANDS AND SUB-STRANDS

STRANDS	SUB-STRANDS	Suggested Number of Lessons
1.0 Numbers	1.1 Whole Numbers	20
	1.2 Factors	7
	1.3 Fractions	9
	1.4 Decimals	6
	1.5 Squares and Square Roots	5
2.0 Algebra	2.1 Algebraic Expressions	5
	2.2 Linear Equations	6
	2.3 Linear Inequalities	8
3.0 Measurements	3.1 Pythagorean Relationship	4
	3.2 Length	6
	3.3 Area	8
	3.4 Volume and Capacity	8
	3.5 Time, Distance, and Speed	8
	3.6 Temperature	6
	3.7 Money	14
4.0 Geometry	4.1 Angles	8
	4.2 Geometrical Constructions	12
Data Handling and Probability	5.1 Data Handling	10
Total Number of Lessons		**150**
Note: The suggested number of lessons per sub-strand may be less or more depending on the context.		

STRAND 1.0: NUMBERS

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.1 Whole Numbers** (20 lessons) • *Place value and total value* • *reading and writing numbers in symbols and words* • *rounding off numbers* • *classifying natural numbers* • *operations of whole numbers* • *number sequences*	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 f) apply operations of whole numbers in real-life	The learner is guided to: ● identify and write place value and total value of digits using place value apparatus ● read and write numbers in symbols on number cards or charts ● read and write numbers in words on number cards or charts and practise writing dummy cheques for different sums of money ● work in teams to prepare and use place value charts to round off numbers ● play a number game, make number cards, sort and classify numbers according to those that are even, odd, or prime ● work out or perform 2, 3, or more combined operations in the correct order using digital	1. Why do we write numbers in words and/or symbols? 2. Where do we write numbers in words or symbols?

		situations g) identify number sequences in different situations h) create number sequence for playing number games i) appreciate the use of whole numbers in real-life situations.	devices ● identify the number patterns to work out number sequences ● play games of creating number puzzles that involve number sequences using IT devices or other materials.	

Core Competencies to be developed:

- Communication and Collaboration: speaking, listening and team-work as the learner works together with others to prepare and use place value charts to round off numbers.
- Critical thinking and Problem-solving: interpretation and inference as the learner works together with others to identify number patterns.
- Creativity and Imagination: making observations as the learner plays games of creating number puzzles that involve number sequences.

Values:

- Respect: as the learner works in teams and plays number games.
- Unity: as the learner works towards achieving set goals of making number puzzles.
- Peace: as the learner shares different roles in playing games.

Pertinent and Contemporary Issues (PCIs):

- Financial Literacy: as the learner practices writing dummy cheques for different sums of money.
- Self-esteem: as the learner creates number puzzles that involve number sequences.

Link to other Learning Areas:

Languages: language skills are enhanced as the learner writes numbers in words.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.2 Factors** (7 lessons) • *divisibility of numbers* • *composite numbers* • *Greatest Common Divisor (GCD) and the Least Common Multiples (LCM)*	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	The learner is guided to: ● determine divisibility of numbers using regrouping and divisibility rule worksheets ● write factors of composite numbers by factorisation, factor tree, factor rainbow in charts, colour charts or cards using locally available materials ● use factors to determine the LCM and the GCD using number cards or charts ● use IT to access factors of numbers including songs/poems or games on divisibility tests ● work out application questions and solve problems relating to the GCD and the LCM in real-life situations.	1. Where do we use factors in day-to-day activities? 2. How do we use factors in day-to day activities? 3. How do we apply the GCD and the LCM in day-to-day activities?

		situations e) reflect on the use of factors in real-life situations.	● determine the GCD and LCM of numbers using IT to perform exercises on factors such as matching activities or games.	
Core Competencies to be developed: ● Creativity and Imagination: as the learner works to create songs and poems on divisibility tests. ● Critical thinking and Problem-solving: as the learner applies the GCD and the LCM in solving real-life problems.				
Values: ● Unity: as the learner sings together or solves puzzles on factors. ● Respect for self and others: as the learner works to write factors of composite numbers using a factor tree.				
Pertinent and Contemporary Issues (PCIs): Self-awareness: as the learner works in teams to create songs and poems on divisibility tests**.**				
Link to other learning areas: Agriculture: as the learner applies LCM or GCD as they plan for the smallest or largest containers for measuring different substances.				

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.3 Fractions** (9 lessons) • *Comparing fractions* • *Operations on fractions* • *Reciprocals* • *Number sequences for fractions*	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 h) identify number sequences involving fractions in different situations i) create number sequences	The learner is guided to: ● discuss and arrange fractions in increasing and decreasing order using different strategies ● arrange fractions in ascending or descending order using fraction cards ● add and subtract fractions in cut-outs, cards, charts, and concrete objects ● multiply and divide fractions in cut-outs, cards, charts, and models ● use flip cards to discuss reciprocals ● play games of creating number puzzles that involve fractions number sequences using IT devices or other materials ● create a fraction sequence game that can be used for play and learning	1. How do we use fractions in daily activities? 2. Where do we use fractions in daily activities?

		involving fractions for playing number games j) recognise the use of fractions in real-life situations.	● use IT devices to work out operations of fractions.	
Core Competencies to be developed: ● Creativity and Imagination: as the learner creates puzzles involving fractions. ● Critical thinking and Problem-solving: as the learner applies fractions using cut-outs, cards, charts, and models from local resources.				
Values: ● Social Justice: as the learner shares cards and charts fairly to multiply and divide fractions. ● Responsibility: as the learner performs multiplication and division of fractions using play or IT resources.				
Pertinent and Contemporary Issues (PCIs): ● Citizenship: as the learner carries out the division of fractions, which implies sharing of resources. ● Social Cohesion: as the learner shares items at home and outside school using fractions.				
Link to other Learning Areas: Agriculture: as the learner gives fractional portions of animal feeds or in food production.				

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.4 Decimals** (6 lessons) • *Place value and total value* • *Multiplication and division of decimals*	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) recognise the use of decimals in real-life situations.	The learner is guided to: ● discuss, state, and use the place value and the total value of decimals using place value apparatus and worksheets ● multiply and divide decimals using cut-outs, cards, charts, and models ● use calculators and other IT devices to work out operations of decimals. ● play games involving multiplication and division of decimals.	1. Where are decimals applicable in real-life? 2. How do you use decimals in daily activities?

Core Competencies to be developed:

- Critical thinking and Problem-solving: as the learner identifies and uses the place value and the total value of decimals using place value apparatus and worksheets.
- Digital Literacy: as the learner uses IT devices to learn more about decimals.

Values

- Unity: as the learner works together to multiply and divide decimals using cut-outs, cards, charts, and models.
- Responsibility: as the learner performs multiplication and division of decimals and takes care of cards, charts, and models.

Pertinent and Contemporary Issues (PCIs)

Safety: is enhanced as the learner makes paper cut-outs or other materials and models.

Link to other Learning Areas

Learner relates quantities expressed in decimal forms in measurement as learnt from different concepts in **Integrated Science.**

Sub-strand: Squares and Square Roots

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.5 Squares and Square Roots** (5 lessons) • *squares of whole numbers, fractions and decimals* • *square roots of whole numbers, fractions and decimals*	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) appreciate the use of squares and square roots in real-life situations.	The learner is guided to: • work out squares of numbers using: o grids and charts o long multiplication method o using calculators • work out square roots of numbers using: o factors method o division method o calculators • use IT devices to play games involving squares and square roots.	1. Where do we apply squares and square roots in daily activities? 2. How do we apply squares and square roots in daily activities?

Core Competencies to be developed:

- Critical thinking and Problem-solving: reflection as the learner uses grid squares and charts to find squares and square roots of numbers.
- Digital Literacy: interacting with technologies as the learner uses IT devices to work out squares and square roots of numbers.

Values

- Respect: as the learner appreciates each other's contribution in using grids and charts
- Unity: as the learner shares and works out the factors of numbers to get the square roots of numbers.

Pertinent and Contemporary Issues (PCIs)

Environmental Education: as the learner considers the shapes of different objects in the school compound especially the ones that are squares.

Link to other Learning Areas:

Pre-Technical Studies: in areas such as carpentry and technical drawing contribute to squares and roots of numbers.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to use place value and total value of digits up to hundreds of millions and decimals.	The learner uses place value and total value of digits up to hundreds of millions and decimals correctly and systematically.	The learner uses place value and total value of digits up to hundreds of millions and decimals correctly.	The learner uses place value or total value of digits up to hundreds of millions or decimals correctly.	The learner uses place value or total value of digits up to millions.
Ability to read and write numbers in symbols up to hundreds of millions and in words up to millions.	The learner reads and writes numbers in symbols up to hundreds of millions and in words up to millions correctly and proficiently.	The learner reads and writes numbers in symbols up to hundreds of millions and in words up to millions correctly.	The learner reads or writes numbers in symbols up to hundreds of millions or in words up to millions correctly.	The learner reads or writes numbers in symbols up to millions or in words up to hundreds.
Ability to classify natural numbers as even, odd, and prime.	The learner classifies natural numbers as even, odd, and prime systematically and accurately.	The learner classifies natural numbers as even, odd, and prime accurately.	The learner classifies natural numbers as even or odd or prime accurately.	The learner classifies natural numbers as even or odd.
Ability to apply all of the basic operations of whole numbers up to hundreds of millions (addition, subtraction, multiplication, and	The learner applies all of the basic operations of whole numbers up to hundreds of millions accurately and proficiently.	The learner applies all of the operations of whole numbers up to hundreds of millions accurately.	The learner applies any 3 of the basic operations of whole numbers up to hundreds of millions partially accurately.	The learner applies any 2 of the basic operations of whole numbers up to millions.

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
division).				
Ability to identify and create number sequences.	The learner identifies and creates number sequences correctly and consistently.	The learner identifies and creates number sequences correctly.	The learner identifies or creates number sequences correctly.	The learner identifies number sequences correctly.
Ability to test the divisibility of numbers by 2, 3, 4, 5, 6, 8, 9, 10 and 11.	The learner tests the divisibility of numbers by 2, 3, 4, 5, 6, 8, 9, 10, and 11 accurately and systematically.	The learner tests the divisibility of numbers by 2, 3, 4, 5, 6, 8, 9, 10, and 11 accurately.	The learner tests the divisibility of most numbers by any 5 of 2, 3, 4, 5, 6, 8, 9, 10, or 11 accurately.	The learner tests the divisibility of a few numbers by any 4 of 2, 3, 4, 5, 6, 8, 9, 10, or 11.
Ability to express composite numbers as a product of prime factors.	The learner expresses composite numbers as a product of prime factors correctly and writes the answer in power form.	The learner expresses composite numbers as a product of prime factors correctly.	The learner expresses most of the composite numbers as a product of prime factors correctly.	The learner expresses a few of the composite numbers as a product of the prime factors.
Ability to work out and apply the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method.	The learner works out and applies the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method correctly and systematically.	The learner works out and applies the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method correctly.	The learner works out or applies the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method correctly.	The learner works out or applies the Greatest Common Divisor (GCD) or the Least Common Multiples (LCM) of numbers by factor method.

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to add, subtract, and multiply fractions.	The learner adds, subtracts, and multiplies fractions correctly and systematically.	The learner adds, subtracts, and multiplies fractions correctly.	The learner adds, subtracts, or multiplies fractions correctly.	The learner adds or subtracts fractions.
Ability to determine the reciprocals of fractions and divide fractions.	The learner determines the reciprocals of fractions and divides fractions correctly and systematically.	The learner determines the reciprocals of fractions and divides fractions correctly.	The learner determines the reciprocals of fractions or divides fractions correctly.	The learner determines the reciprocals of fractions.
Ability to multiply and divide decimals by a whole number and by a decimal.	The learner multiplies and divides decimals by a whole number and by a decimal correctly and systematically.	The learner multiplies and divides decimals by a whole number and by a decimal correctly.	The learner multiplies or divides decimals by a whole number or by a decimal correctly.	The learner multiplies or divides decimals by a whole number.
Ability to determine the squares and square roots of whole numbers, fractions, and decimals.	The learner determines the squares and square roots of whole numbers, fractions, and decimals correctly and systematically.	The learner determines the squares and square roots of whole numbers, fractions, and decimals correctly.	The learner determines the squares or square roots of whole numbers, fractions, or decimals correctly.	The learner determines the squares and square roots of whole numbers.

STRAND 2.0: ALGEBRA
Sub-Strand: Algebraic Expressions

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Algebra	**2.1 Algebraic Expressions** (5 lessons) • *simple algebraic statements* • *simplify algebraic expressions*	By the end of the sub-strands 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) appreciate the use of algebraic expressions in real-life.	The learner is guided to: • discuss and classify objects in their immediate environment according to given attributes such as similarities or differences • discuss how to form algebraic expressions from the classified objects • read and interpret algebraic statements to form algebraic expressions • discuss how to simplify algebraic expressions from the classified objects • use IT to work out exercises and activities in algebra or drag-and-drop activities to group similar objects.	How do we use algebraic expressions in daily activities?

Core Competencies to be developed:

- Communication and Collaboration: speaking, listening, and teamwork as the learner discusses on the formation of algebraic expressions.
- Critical thinking and Problem-solving: interpretation and inference as the learner factorises algebraic expressions.

Values:

- Unity: as the learner classifies or groups similar objects during the discussions.
- Respect: as the learner appreciates each other's contribution while discussing and forming algebraic expressions.

Pertinent and Contemporary Issues (PCIs):

- Environmental Education: as the learner classifies objects from the environment.
- Friendship formation: as the learner discusses on formation of algebraic expressions.

Link to other Learning Areas

Languages: enhances learner's interpreting skills for statements to form algebraic expressions.

Sub-strand: Linear Equations

Strand	**Sub-Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested Key Inquiry Question(s)**
2.0 Algebra	2.2 **Linear Equations** (6 lessons) *Forming and solving linear equations*	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) reflect on the use of linear equations in real-life situations.	The learner is guided to: ● role play activities involving equations with one unknown for example weighing using beam balance. Also, dramatise shopping activities. ● discuss how to form and solve linear equations generated from role play activities ● use IT devices or other resources to form and solve linear equations.	1. How do we use linear equations in real-life? 2. Why do we use linear equations in real-life?

Core Competencies to be developed: ● Communication and Collaboration: speaking, listening and teamwork as the learner role plays activities involving equations in one unknown. ● Self-efficacy: self-awareness skills as the learner carries out weighing using beam balance and role play different activities. ● Learning to learn: organising own learning as the learner applies linear equations in real-life.
Values ● Integrity as the learner shares resources as per the given equation (conditions). ● Responsibility: as the learner uses a given letter in the equation to represent an item.
Pertinent and Contemporary Issues (PCIs): Self-esteem as the learner participates in role-play activities like weighing and shopping that will lead to equations in one unknown.
Link to other Learning Areas Pre-Technical Studies: as the learner uses IT devices in forming and solving equations.

Sub-Strand: Linear Inequalities

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Algebra	**2.3 Linear Inequalities** (8 lessons**)** • *inequality symbols* • *simple and compound linear inequalities in one unknown* • *number lines*	By the end of the sub-strand the learner should be able to: a) apply inequality symbols to inequality statements in learning situations b) form simple linear inequalities in one unknown in different situations c) illustrate simple inequalities on a number line d) form compound inequality statements in one unknown in different situations e) illustrate compound inequalities in one unknown on a number line f) appreciate the use of linear inequalities in real-life.	The learner is guided to: ● use inequality cards to complete simple inequality statements using symbols ● use inequality cards/objects to form simple linear inequalities with one unknown ● draw and represent simple inequality statements on a number line ● use inequality cards to complete compound inequality statements. Have examples that may involve gender such as the number of boys and girls in class ● draw and represent compound inequality statements on a number line ● use IT devices in graphing tools to present solutions to inequalities.	1. How do we use linear inequalities in real-life? 2. Why do we use linear inequalities in real-life?

Core Competencies to be developed ● Communication and Collaboration: as the learner discusses how to form linear inequalities. ● Creativity and Imagination: as the learner draws and represents inequality statements on a number line.
Values Integrity: as the learner observes and adheres to the conditions of the given inequalities.
Pertinent and Contemporary Issues (PCIs) Gender Equality: gender representation for inclusivity, for example, number of boys and girls in a class or school.
Link to other Learning Areas Language: enhances learner's skills to form linear inequalities from different situations in statement form.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to form and simplify algebraic expressions.	The learner forms and simplifies algebraic expressions correctly and proficiently.	The learner forms and simplifies algebraic expressions correctly.	The learner forms or simplifies algebraic expressions correctly.	The learner forms algebraic expressions.
Ability to form, solve, and apply linear equations in one unknown.	The learner forms, solves, and applies linear equations in one unknown accurately and systematically.	The learner forms, solves, and applies linear equations in one unknown accurately.	The learner forms, solves, or applies linear equations in one unknown accurately.	The learner forms linear equations in one unknown accurately.
Ability to apply inequality symbols to inequality statements, form simple and compound linear inequalities in one unknown and illustrate inequalities on a number line.	The learner applies inequality symbols to inequality statements, forms simple and compound linear inequalities in one unknown, and illustrates inequalities on a number line correctly and systematically.	The learner applies inequality symbols to inequality statements, forms simple and compound linear inequalities in one unknown, and illustrates inequalities on a number line correctly.	The learner applies inequality symbols to inequality statements, forms simple or compound linear inequalities in one unknown, or illustrates inequality on a number line correctly.	The learner applies inequality symbols to inequality statements, and forms simple or compound linear inequalities in one unknown partially correctly.

STRAND 3.0: MEASUREMENTS

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.1 Pythagorean Relationship** (4 lessons) *Relationship of the sides of a right-angled triangle*	By the end of the sub-strand, the learner should be able to: a) recognise the sides of a right-angled triangle in different situations b) identify Pythagorean relationships in different situations c) apply Pythagorean relationship to real-life situations d) promote the use of Pythagoras Theorem in real-life situations.	The learner is guided to: ● draw and represent practical cases of right-angled triangles 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. ● do 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 ● work out exercises related to the Pythagorean relationship ● create Pythagorean relationship puzzles ● use IT devices and other resources to explore the use of Pythagorean relationships in daily life.	How do we use Pythagorean relationships in real-life situations?

Core Competencies to be developed ● Critical thinking and Problem-solving: as the learner identifies Pythagorean relationships in different situations such as a leaning ladder or staircase. ● Creativity and Imagination: as the learner creates Pythagorean relationship puzzles. ● Learning to Learn: as the learner applies Pythagorean relationships in real-life situations.
Values ● Unity: as the learner carries out various activities together, such as creating Pythagorean relationship puzzles. ● Respect: as the learner appreciates each other's opinions when identifying and applying Pythagorean relationships in real-life situations.
Pertinent and Contemporary Issues (PCIs) ● Peer Education: as the learner works with peers to establish the Pythagorean relationship. ● Safety as the learner takes care when using the ladder to do various activities related to the Pythagorean relationship.
Link to other learning areas: Pre-Technical Studies: technical drawing, building construction or surveying enhances the concept of Pythagorean relationship.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.2 Length** (6 lessons) • *Conversions in length* • *Operations in length* • *Perimeter of plane figures* • *circumference of circles*	By the end of the sub-strand, the learner should be able to: a) convert units of length from one form to another involving cm, dm, m, Dm, Hm in learning situations b) perform operations involving units of length in different situations c) work out the perimeter of plane figures in different situations d) work out the circumference of circles in different situations e) promote the use of length in real-life situations.	The learner is guided to: ● generate conversion tables involving cm, dm, m, Dm, Hm ● carry out different operations involving length ● watch videos on correct procedures for measuring length and working out perimeter ● use appropriate measuring tools to measure the length of various objects. ● measure and work out perimeter of different plane figures including combined shapes. ● measure the circumference and diameter of different circular objects and establish the relationship between circumference and	1. Why do we use different units of measuring length? 2. How do we measure the perimeter of different objects?

			diameter which is Pi. ● use Pi to practise working out the circumference of circles and can use IT devices for calculations.	

Core Competencies to be developed:

- Communication and Collaboration: as the learner works with peers when measuring the lengths of various objects and also as they discuss the relationship between circumference and diameter.
- Self-efficacy: as the learner practices different operations using length.
- Critical thinking and Problem-solving: as the learner relates circumference to diameter.

Values

- Integrity: as the learner carries out the activities and gives the correct measurement.
- Unity: as the learner works together in measuring the lengths of various objects.

Pertinent and Contemporary Issues (PCIs)

- Social Cohesion: as the learner works with peers in measuring the lengths of various objects.
- Safety: as the learner handles different instruments for measuring length.
- Global Citizenship: as the learner appreciates units of measurement especially the SI units of length.

Link to other Learning Areas:

Integrated Science: as the learner uses units of measuring length as used in Science.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.3 Area** **(**8 lessons) • *square metre (m^2), acres, and hectares as units of measuring area* • *area of rectangle, parallelogram, rhombus, and trapezium* • *area of circles and borders*	By the end of the sub-strand, the learner should be able to: a) identify the relationship between square metre (m^2) and hectares as units of measuring area b) work out the area of a 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) recognize the use of area in real-life situations.	The learner is guided to: ● generate conversion tables involving square metres and hectares as units of measuring area ● use cut-outs to find the area of plane figures ● watch videos on how to cut-out a circle into small sectors to demonstrate how to derive the formula for the area of a circle ● cut out a circle into small sectors and rearrange it to form a rectangle to derive the formula for the area of a circle ● practise cutting out the plane figures of combined shapes into different shapes to work out the area.	1. What are plane figures? 2. How do we work out the areas of plane figures?

Core Competencies to be developed: ● Critical thinking and Problem-solving: as the learner cuts out the circle into small sectors, joining them to create a rectangle and generate a formula for getting the area of a circle. ● Creativity and Imagination: as the learner combines different shapes to make patterns. ● Self-efficacy: as the learner demonstrates 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 the learner works out exact areas of different shapes. ● Unity: as the learner works in a team and shares tasks in measuring the area.
PCIs ● Safety: as the learner carefully handles different instruments/tools to make cut-outs of different materials. ● Environmental Education: as the learner uses locally available materials in measuring the area of different surfaces.
Link to other Learning Areas: ● Creative Arts & Sports: as the learner combines different shapes to make patterns. ● Integrated Science: as the learner relates area to friction and pressure on a surface.

Sub-Strand: Volume and Capacity

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.4 Volume and Capacity** **(**8 lessons) • *metre cube (m^3) as a unit of volume* • *conversions in volume* • *the volume of cubes, cuboids, and cylinder* • *capacity of containers*	By the end of the sub-strand, the learner should be able to: a) identify metre cube (m^3) as a unit of volume in measurements b) convert metre cube (m^3) into centimeter cube (cm^3) and vice versa in different situations c) work out the volume of cubes, cuboids, and cylinders 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) promote the use of volume and capacity in real-life situations.	The learner is guided to: ● make a cube of sides 1 metre using locally available materials ● discuss and work out the conversions of cm cube (cm^3) to m cube (m^3) and vice versa ● collect labeled containers of different volume and capacity from the environment ● generate conversion tables of volume and capacity ● create models of cubes, cuboids, and cylinders which they will use to work out volume ● watch videos on volume and capacity	1. Where do we use volume and capacity in daily activities? 2. Why do we measure volume?

Core Competencies to be developed: ● Critical thinking and Problem-solving: as the learner creates a conversion table of units of volume. ● Creativity and Imagination: as the learner creates models of cubes and cuboids.
Values ● Responsibility: as the learner works with peers and share different tasks in making models. ● Peace: as the learner discusses and makes models for different volumes and capacities.
Pertinent and Contemporary Issues (PCIs) ● Environmental Education: as the learner uses big and small containers of different volumes from locally available resources. ● Safety: as the learner carefully makes models of cubes and cuboids.
Link to other learning areas: ● Pre-Technical Studies: as the learner creates models of cubes and cuboids. ● Integrated Science: as the learner works out the volume of different substances.

Sub-Strand: Time, Distance, and Speed

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.5 Time, Distance, and Speed** (8 lessons) • *Conversions in time* • *Conversions in units of distance* • *Speed*	By the end of the sub-strand, the learner should be able to: a) identify units of measuring time in real-life situations b) convert units of time from one form to another in learning situations c) convert units of measuring distance in learning situations d) identify speed as distance covered per unit time in different situations e) work out speed in km/h and m/s in real-life situations f) convert units of speed from kilometers per hour (Km/h) to meters per second (m/s) and vice versa in real-life	The learner is guided to: ● use analog or digital clock to tell time in hours, minutes, and seconds and discuss the units of time ● create a conversion table on units of time ● discuss and estimate distances between two or more points and convert distances in Km to meters and vice versa ● engage in activities that involve distance and time such as track events to relate time, distance, and speed ● discuss how long they take to travel from home to school, discuss the aspects of distance, and time taken to get to school ● practise calculating speed in	1. Why do we relate distance, time and speed? 2. What is the importance of speed in daily activities?

		situations g) reflect on the use of time, distance, and speed in real-life situations	km/h or m/s, ● read and interpret a road sign on speed , ● identify and discuss the importance of speed limiters to ensure road safety, ● play digital games involving racing or watch marathons.	
Core Competencies to be developed: ● Critical thinking and Problem-solving: as the learner creates conversion tables relate and determine distance, time, and speed. ● Self-efficacy: as the learner observes punctuality in attending to different activities.				
Values ● Patriotism: as the learner observes road safety rules including speed limits for crossing the roads. ● Integrity**:** as the learner observes punctuality and work out correct distances.				
Pertinent and Contemporary Issues (PCIs) Disaster Risk Reduction (DRR) and Safety: as the learner observes safety in roads and machines in relation to speed.				
Link to other Learning Areas: Integrated Science: as the learner observes time as they carry out different experiments or activities.				

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.6 Temperature** (6 lessons) • *temperature conditions* • *units of measuring temperature* • *conversions in temperature* • *temperature in degrees Celsius and* Kelvin	By the end of the sub-strand, the learner should be able to: a) describe the temperature conditions of the immediate environment as either warm, hot or cold b) compare temperature using hotter, warmer, colder and same as in different situations c) identify units of measuring temperature as degrees Celsius and Kelvin in different situations d) convert units of measuring temperature from degree Celsius to Kelvin and vice-versa e) work out temperature in degrees Celsius and Kelvin in real-life situations f) use IT devices or other	The learner is guided to: ● move to the field, observe the temperature in the environment, and discuss the temperature conditions as either warm, hot or cold ● discuss and test the temperature of different substances using arbitrary methods like touching, cold, warm, or hot water (exercise caution when dealing with hot substances) ● identify and use tools for measuring temperature, for example, thermometers that are in degrees Celsius. ● work out conversions of temperature from degrees Celsius to Kelvin and vice versa	1. How does temperature affect our everyday lives? 2. How do we measure temperature?

		resources to read temperature conditions of different places g) recognise temperature changes in the environment.	● practise using IT devices or other resources to determine the temperature of different places in degrees Celsius and Kelvin.	
Core Competencies to be developed ● Communication and Collaboration: as the learner works with peers and uses tools for measuring temperature. ● Digital Literacy: interacting with technology as the learner determines the temperature of different places using digital devices.				
Values ● Responsibility: as the learner handles tools of measuring temperature. ● Integrity: as the learner gives correct measurements of temperature.				
Pertinent and Contemporary Issues (PCIs) ● Self-awareness: as the learner takes their body temperatures that is an indicator of health status. ● Safety: as the learner works together with others and exercises caution when dealing with hot substances.				
Link to other Learning Areas: ● Integrated Science**:** as the learner considers their body temperatures to establish their health status and dress appropriately. ● Social studies: as the learner considers different climatic temperature changes.				

Sub-Strand: Money

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.7 Money** (12 lessons) • *profit and loss* • *discount* • *commission* • *bills* • *postal charges* • *mobile money services*	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 g) work out postal charges in real-life situations h) identify mobile money services for different	The learner is guided to: ● role play shopping and selling activities involving profit, loss, discount and commission ● work out profit and loss involving different activities and settings ● work out the percentage profit/loss from the role play activities ● work out discount and percentage discount from model shopping activities ● work out commission and percentage commission from the role play activities ● identify different types of bills and read the components of bills ● prepare bills for different items and expenses	1. Why do we use money in daily activities? 2. What considerations would we make when buying or selling? 3. What is involved in mobile money transactions?

		transactions i) work out mobile money transactions in real-life situations j) use IT devices or other resources to learn more about money transactions k) recognise the use of money in day-to-day activities.	● visit a post office to gather information on postal services and charges ● work out postal charges of different services ● discuss and identify mobile money services ● work out mobile money transactions, for example, in sending or receiving money, credit, and savings ● generate bills, pay for goods and services, and other online transactions using IT devices.	
Core Competencies to be developed: ● Critical thinking and Problem-solving: as the learner works out discounts, commissions, and mobile money as well as postal charges and bills. ● Communication and Collaboration: as the learner role plays on negotiating for discounts and commissions. ● Citizenship: as the learner works out discounts, commissions, and mobile money in Kenyan currency. ● Self-efficacy: as the learner role plays on negotiating for discounts and commissions.				

Values: ● Patriotism: as the learner role plays and works out paying bills in Kenyan currency. ● Integrity: as the learner pays bills and appreciates the use of money.
Pertinent and Contemporary Issues (PCIs): ● Financial Literacy: as the learner works out any discounts, commissions, and mobile money as well as postal charges and bills. ● Decision-making: as the learner uses money to pay bills and postal charges.
Link to other Learning Areas: ● Pre-Technical Studies: as the learner works out bills, discounts, commissions and postal charges. ● Languages: as the learner gathers information on postal services and charges.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to identify and apply the Pythagorean relationship.	The learner identifies and applies the Pythagorean relationship correctly and proficiently.	The learner identifies and applies the Pythagorean relationship correctly.	The learner identifies or applies the Pythagorean relationship correctly.	The learner identifies the Pythagorean relationship partially correctly.
Ability to convert units of length and performs operations involving length.	The learner converts units of length and performs operations involving length accurately and systematically.	Converts units of length and performs operations involving length accurately.	Converts units of length or performs operations involving length accurately.	Converts units of length accurately.
Ability to work out the perimeter of plane figures, circumference of circles and area of rectangles, parallelograms, rhombus, trapezium, and circles.	The learner works out the perimeter of plane figures, circumference of circles and area of rectangles, parallelograms, rhombus, trapezium, and circles accurately and systematically.	The learner works out the perimeter of plane figures, circumference of circles and area of rectangles, parallelograms, rhombus, trapezium and circles accurately.	The learner works out the perimeter of plane figures or circumference of circles and area of any 3 of rectangles, parallelograms, rhombus, trapezium or circles accurately.	The learner works out the perimeter of plane figures or circumference of circles and area of any 2 of rectangles, parallelograms, rhombus, trapezium or circles accurately.
Ability to work out the volume of cubes, cuboids,	The learner works out the volume of cubes, cuboids, and cylinders	The learner works out the volume of cubes, cuboids, and	The learner works out the volume of any 2 of; cubes, cuboids, or cylinders	The learner works out the volume of any 1 of; cubes, or cuboids

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
and cylinders.	accurately and systematically.	cylinders accurately.	accurately.	accurately.
Ability to identify the relationship between cm^3, m^3 and litres, relate volume to capacity, and work out the capacity of containers.	The learner identifies the relationship between cm^3, m^3 and litres, relates volume to capacity, and works out the capacity of containers accurately and proficiently.	The learner identifies the relationship between cm^3, m^3 and litres, relates volume to capacity, and works out the capacity of containers accurately.	The learner identifies the relationship between cm^3, m^3 or litres, or relates volume to capacity or works out the capacity of containers accurately.	The learner identifies the relationship in any 2 of; cm^3, m^3 or litres accurately.
Ability to work out speed in km/h and m/s.	The learner works out speed in Km/h and m/s accurately and systematically.	The learner works out speed in Km/h and m/s accurately.	The learner works out speed in Km/h or m/s accurately.	The learner works out speed in Km/h partially accurately.
Ability to identify and convert units of measuring temperature from degrees Celsius to Kelvin and vice-versa.	The learner identifies and converts units of measuring temperature from degrees Celsius to Kelvin and vice-versa accurately and systematically.	The learner identifies and converts units of measuring temperature from degrees Celsius to Kelvin and vice-versa accurately.	The learner identifies or converts units of measuring temperature from degrees Celsius to Kelvin or vice-versa accurately.	The learner identifies units of measuring temperature as degrees Celsius and Kelvin accurately.

Ability to work out temperature in degrees Celsius and Kelvin.	The learner works out temperature in degree Celsius and Kelvin accurately and proficiently.	The learner works out temperature in degree Celsius and Kelvin accurately.	The learner works out temperature in degree Celsius or Kelvin accurately.	The learner works out temperature in degree Celsius partially accurately.
Ability to work out profit, loss, discount, and commission.	The learner works out profit, loss, discount, and commission correctly and proficiently.	The learner works out profit, loss, discount, and commission correctly.	The learner works out any 3 of; profit, loss, discount, or commission correctly.	The learner works out any 2 of; profit, loss, discount, or commission correctly.
Ability to calculate percentage profit, loss, discount and commission.	The learner calculates percentage profit, loss, discount and commission accurately and systematically.	The learner calculates percentage profit, loss, discount and commission accurately.	The learner calculates any 3 of; percentage profit, loss, discount or commission accurately.	The learner calculates any 2 of; percentage profit, loss, discount or commission accurately.
Ability to interpret and prepare bills.	The learner interprets and prepares bills correctly and logically.	The learner interprets and prepares bills correctly.	The learner interprets or prepares bills correctly.	The learner interprets bills partially correctly.
Ability to identify and work out postal charges and mobile money services.	The learner identifies and works out postal charges and mobile money services accurately and systematically.	The learner identifies and works out postal charges and mobile money services accurately.	The learner identifies or works out postal charges or mobile money services accurately.	The learner identifies or works out postal charges or mobile money services partially accurately.

STRAND 4.0: GEOMETRY
Sub-Strand: Angles

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Geometry	**4.1 Angles** (8 lessons) • *angles on a straight line and at a point* • *angles on a transversal and parallelogram* • *angle properties of polygons*	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 situations e) identify angle properties of polygons up to hexagons in different situations f) relate interior angles, exterior angles, and the number of sides of a polygon up to hexagons in different situations	The learner is guided to: ● discuss positions of objects in the immediate environment in relation to angles ● draw straight lines with different angles, measure, and relate them. ● draw different angles at a point, measure, relate, and work out angles at point ● draw transversals, measure and relate angles in a transversal ● draw parallelograms, measure and relate various angles in a parallelogram ● use cut-outs or drawings of different polygons up to hexagon, measure the interior angles, and relate to	1. What are angles? 2. Where do we use angles in real-life situations?

		g) solve angles and sides of polygons up to hexagons in learning situations, h) reflect on the use of angles in objects within the environment.	the number of right angles ● use cut-outs or drawings of different polygons up to hexagon, measure interior and exterior angles and relate to the number of sides ● work out angles and sides in different polygons up to hexagon ● draw angles at a point and in parallelograms using IT devices or other resources.	
Core Competencies to be developed: ● Communication and Collaboration: as the learner discusses the positions of objects in the immediate environment in relation to angles. ● Critical thinking and Problem-solving: as the learner draws, measures, and relates angles.				
Values ● Responsibility: as the learner explores positions of objects in the immediate environment in relation to angles. ● Unity: as the learner works with peers to use cut-outs or drawings of different polygons up to hexagons.				
Pertinent and Contemporary Issues (PCIs) Safety: as the learner works carefully use cut-outs or drawings of different polygons up to hexagon.				
Link to other learning areas Pre-Technical Studies**:** as the learner uses cut-outs or drawings of different polygons up to hexagons, or drawings.				

Sub-Strand: Geometrical Constructions

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Geometry	**4.2 Geometrical Constructions** (12 lessons) • *bisecting angles* • *constructing 90^0, 45^0 60^0, 30^0* • *constructing different triangles and* circles	By the end of the sub-strand, the learner should be able to: a) measure different angles in learning situations b) bisect angles using a ruler and a pair of compasses only in learning situations c) construct 90^0, 45^0 60^0, 30^0 and other angles that are multiples of 7.5^0 using a ruler and a pair of compasses only in learning situations d) construct different triangles using a ruler and a pair of compasses only in different situations e) construct circles using a ruler and a pair of compasses only in different situations f) recognise use of geometric constructions of different shapes in objects.	The learner is guided to: ● draw and measure different angles ● draw and bisect different angles ● construct 90^0, 45^0 60^0, 30^0 including 120^0, 105^0 and practise drawing angles that are multiples of 7.5^0 using a pair of compasses and rulers ● construct triangles using a pair of compasses and rulers ● construct circles using a pair of compasses and rulers ● use IT devices on graphics to draw angles and circles, watch videos of bisecting angles and constructing angles and circles.	1. Where do we use geometric constructions in real-life situations? 2. Why do we use geometric constructions?

Core Competencies to be developed: ● Creativity and Imagination: as the learner constructs angles, triangles, and circles. ● Digital Literacy: as the learner uses IT tools to learn more about the construction of angles, triangles and circles.
Values ● Responsibility: as the learner uses geometrical instruments for the construction of angles and circles. ● Unity: as the learner works together with others to draw and measure different angles.
Pertinent and Contemporary Issues (PCIs) Safety: as the learner uses geometrical instruments such as a pair of compasses and dividers.
Link to other Learning Areas Creative Arts and Sports: as the learner constructs angles, triangles, and circles which can be used to make geometrical patterns.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to relate and solve angles on a straight line, at a point, and on a transversal.	The learner relates and solves angles on a straight line, at a point, and on a transversal accurately and systematically.	The learner relates and solves angles on a straight line, at a point, and on a transversal accurately.	The learner relates or solves angles on a straight line, at a point, or on a transversal accurately.	The learner relates angles on a straight line, at a point, or on a transversal accurately.
Ability to identify angle properties of polygons up to hexagons.	The learner identifies angle properties of polygons up to hexagons accurately and gives explanations.	The learner identifies angle properties of polygons up to hexagons accurately.	The learner identifies angle properties of polygons up to pentagon accurately.	The learner identifies angle properties of quadrilaterals accurately.
Ability to solve angles and sides of polygons up to hexagons.	The learner solves angles and sides of polygons up to hexagons accurately and systematically.	The learner solves angles and sides of polygons up to hexagons accurately.	The learner solves angles or sides of polygons up to pentagon accurately.	The learner solves angles or sides of quadrilaterals accurately.

Ability to measure, bisect, and construct 90^0, 60^0, 45^0 30^0 and other angles that are multiples of 7.5^0 using a ruler and a pair of compasses only.	The learner measures, bisects, and constructs 90^0, 60^0, 45^0, 30^0 and other angles that are multiples of 7.5^0 using a ruler and a pair of compasses accurately and systematically.	The learner measures, bisects, and constructs 90^0, 60^0, 45^0, 30^0 and other angles that are multiples of 7.5^0 using a ruler and a pair of compasses accurately.	The learner measures, bisects, or constructs 90^0, 60^0, 45^0, 30^0 using a ruler and a pair of compasses accurately.	The learner measures, bisects, or constructs 90^0, 60^0, 45^0 using a ruler and a pair of compasses accurately.
Ability to construct different triangles and circles using a ruler and a pair of compasses only.	The learner constructs different triangles and circles using a ruler and a pair of compasses accurately and systematically.	The learner constructs different triangles and circles using a ruler and a pair of compasses accurately.	The learner constructs different triangles or circles using a ruler and a pair of compasses accurately.	The learner constructs different triangles or circles using a ruler and a pair of compasses partially accurately.

STRAND 5.0: DATA HANDLING AND PROBABILITY
Sub-Strand: Data Handling

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
5.0 Data Handling and Probability	**5.1 Data Handling (**10 lessons) • *Collecting data* • *frequency distribution table* • *drawing pictographs, bar graphs, line graphs, and pie charts* • *interpreting graphs, charts, and travel graphs*	By the end of the sub-strand, the learner should be able to: a) state the meaning of data in a 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 i) interpret pie charts of data	The learner is guided to: ● discuss, collect, and organise data from immediate environment ● tally and represent the data in frequency tables ● discuss and come up with a suitable scale to represent data in graphs ● discuss and use a suitable scale to draw pictographs from data ● discuss and use a suitable scale to draw bar graphs from data ● discuss and interpret bar graphs of data ● discuss and represent data on pie charts ● discuss and interpret pie charts of data	1. Why do we collect data? 2. How do we represent data? 3. How do we interpret data?

		from real-life situations j) draw a line graph of data from different situations. k) interpret travel graphs from real-life situations l) promote the use of data in real-life situations.	● use a suitable scale to represent and interpret data from line graphs ● discuss and interpret travel graphs from real-life situations ● draw pie charts and pictographs, and read data from bar graphs using IT devices or watch videos relating to data.	

Core Competencies to be developed:

- Creativity and Imagination: as the learner represents data in the form of pie charts and pictograms.
- Critical thinking and Problem-solving: as the learner interprets data from bar graphs, pictograms, and pie charts.

Values

- Responsibility: as the learner collects and presents data in pictograms that may involve different resources.
- Peace: as the learner works with peers to collect and represent data in graphs.

Pertinent and Contemporary Issues (PCIs)

Decision-making: as the learner presents data that can be used to make informed decisions.

Link to other learning areas

- Creative Arts and Sports: as the learner draws pictographs and pie charts.
- Social Studies: as the learner presents data in pie charts and pictographs that may involve populations.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to collect data and draw a frequency distribution table of data.	The learner collects data and draws a frequency distribution table of data accurately and systematically.	The learner collects data and draws a frequency distribution table of data accurately.	The learner collects data or draws a frequency distribution table of data accurately.	The learner collects data or draws a frequency distribution table of data partially accurately.
Ability to determine a suitable scale for graphs and draw Pictographs and Bar Graphs of data.	The learner determines a suitable scale for graphs and draws Pictographs and Bar Graphs of data accurately and systematically.	The learner determines a suitable scale for graphs and draws Pictographs and Bar Graphs of data accurately.	The learner determines a suitable scale for graphs or draws Pictographs or Bar Graphs of data accurately.	The learner determines a suitable scale for graphs or draws Pictographs of data accurately.
Ability to interpret data from pictographs and Bar Graphs.	The learner interprets data from pictographs and Bar Graphs concisely.	The learner interprets data from pictographs and Bar Graphs correctly.	The learner interprets data from pictographs or Bar Graphs correctly.	The learner interprets data from pictographs correctly.
Ability to draw and interpret Pie Charts of data.	The learner draws and interprets Pie Charts of data precisely.	The learner draws and interprets Pie Charts of data accurately.	The learner draws or interprets Pie Charts of data accurately.	The learner draws Pie Charts of data partially accurately.
Ability to draw line graphs and interpret travel graphs.	The learner draws line graph and Interprets travel graphs accurately and systematically.	The learner draws line graph and Interprets travel graphs accurately.	The learner draws line graph or Interprets travel graphs accurately.	The learner draws line graph or Interprets travel graphs partially accurately.

APPENDIX 1: GUIDELINES FOR INTEGRATING COMMUNITY SERVICE LEARNING (CSL) PROJECT

Introduction

Community Service Learning (CSL) is an experiential learning strategy that integrates classroom learning and community service, enabling learners to reflect on, experience, and learn from the community. The CSL activity is hosted as a strand within Social Studies. The Social Studies teacher will be responsible for coordinating teachers from other learning areas to carry out the integrated CSL class activity. Learners will be expected to apply knowledge, skills, attitudes and values from the different Learning Areas to carry out the integrated CSL class activity. Learners will undertake one common integrated class CSL activity following a 6-step milestone approach that is:

Milestone	**Description**
Milestone 1	**Problem Identification** Learners study their community to understand the challenges faced and their effects on community members.
Milestone 2	**Designing a solution** Learners create an intervention to address the challenge identified.
Milestone 3	**Planning for the Project** Learners share roles, create a list of activities to be undertaken, mobilise resources needed to create their intervention, and set timelines for execution
Milestone 4	**Implementation** The learners execute the project and keep evidence of work done.

Milestone 5	Showcasing /Exhibition and Report Writing Exhibitions involve showcasing learners' project items to the community and reflecting on the feedback Learners write a report detailing their project activities and learnings from feedback
Milestone 6	**Reflection** Learners review all project work to learn from the challenges faced. They link project work with academic concepts, noting how the concepts enabled them to do their project as well as how the project helped to deepen the learning of the academic concepts.

Assessment of CSL integrated Activity

Assessment for the integrated CSL activity will be conducted formatively. The assessment will consider both the process and the end product. This entails assessing each of the milestone stages of the integrated CSL class activity. It will focus on three components namely: skills from various learning areas applied in carrying out the activity, core competencies developed, and values nurtured.

APPENDIX 2: LIST OF ASSESSMENT METHODS, LEARNING RESOURCES, AND NON-FORMAL ACTIVITIES

Strand	Sub-strand	Suggested Assessment Methods	Resources Suggested Learning	Suggested Non-Formal Activities
Numbers	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	

Algebra	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 the 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	
Measurement	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 the volume of liquids using containers of different sizes from smallest to biggest. Relate this to the packaging of goods such as water, milk, and other things in the marketplace and how this affects consumer awareness and protection.
	Mass	Class written tests Class activities	Teaspoons, 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, Stopwatches	

	Temperature	Class activities Out-of-school/home assignments or activities	Thermometer, weather charts	Record weather changes for some 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	
Geometry	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,	
Data handling and probability	Data handling	Class activities Class written tests	Data from different sources	Undertake project that may involve data collection and presentation

APPENDIX 3: USE OF ICT DEVICES

The following ICT devices may be used in the teaching/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 CD's,
11. Scanners,
12. Internet and Others.