REPUBLIC OF KENYA
MINISTRY OF EDUCATION

JUNIOR SCHOOL CURRICULUM DESIGN

GRADE 8

MATHEMATICS
FOR LEARNERS WITH HEARING IMPAIRMENTS

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

First Published in 2023

All rights reserved. No part of this book may be reproduced, stored in a retrieval system or transcribed, in any form or by any means, electronic, mechanical, photocopy, recording or otherwise, without the prior written permission of the publisher.

ISBN:

Published and printed by 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, 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 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, feedback from curriculum implementers and other stakeholders led to rationalisation and review of the basic education curriculum.

The reviewed Grade seven curriculum designs for learners with hearing impairment build on competencies attained by learners at Primary school level. Emphasis at this grade is the development of skills for exploration and making informed decision on pathways based on careers.

The curriculum designs present 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, key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values, 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.

HON. EZEKIEL OMBAKI MACHOGU, CBS
CABINET SECRETARY,
MINISTRY OF EDUCATION

PREFACE

The Ministry of Education (MoE) nationally implemented Competency Based Curriculum (CBC) in 2019. Grade seven is the first grade of Junior school while Grade 9 is the final grade of the level in the reformed education structure.

The reviewed Grade seven curriculum furthers implementation of the CBC from Primary Education level. The curriculum provides opportunities for learners to focus in a field of their choice to form a foundation for further education and training and/or gain employable skills. 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 seven curriculum designs for learners with hearing impairment 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. They 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 seven and prepare them for smooth transition to Grade eight. Furthermore, it is my hope that teachers will use the adapted designs to make learning interesting, exciting and enjoyable.

DR. BELIO KIPSANG', CBS
PRINCIPAL SECRETARY
STATE DEPARTMENT FOR BASIC EDUCATION
MINISTRY OF EDUCATION

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, that responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, the Kenya Vision 2030, East African Community Protocol, International Bureau of Education Guidelines and the United Nations Sustainable Development Goals (SDGs).

KICD receives its funding from the Government of Kenya to facilitate 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 revised Grade seven curriculum designs for learners with hearing impairment were developed and adapted 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 for the support of the Government of Kenya, through the MoE and the development partners for policy, resource and logistical support. Specifically, special thanks to the Cabinet Secretary-MoE and the Principal Secretary – State Department of Basic Education,

I 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 and adaptation of the Grade seven curriculum designs for learners with hearing impairment. In relation to this, I 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 and adapting these designs. Finally, I am very grateful to the KICD Council Chairperson and other members of the Council for very consistent guidance in the process.

I assure all teachers, parents and other stakeholders that this curriculum design will effectively guide the implementation of the CBC at Grade seven and preparation of learners with hearing impairment for transition to Grade eight.

PROF. CHARLES O. ONG'ONDO, PhD, MBS
DIRECTOR/CHIEF EXECUTIVE OFFICER
KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

TABLE OF CONTENTS

LESSON ALLOCATION FOR JUNIOR SCHOOL

S/ No.	Learning Area	No. of Lesson
1	English for Learners with Hearing Impairment	5
2	Kiswahili for Learners with Hearing Impairment /Kenyan Sign Language	4
3	Mathematics for Learners with Hearing Impairment	5
4	Religious Education	4
5	Integrated Science for Learners with Hearing Impairment	5
6	Agriculture & Nutrition for Learners with Hearing Impairment	4
7	Social Studies for Learners with Hearing Impairment	4
8	Creative Arts and Sports for Learners with Hearing Impairment	5
9	Pre- technical Studies for Learners with Hearing Impairment	4
10.	Pastoral/ Religious Instruction Programme	1
	Total	**41**

NATIONAL GOALS OF EDUCATION

Education in Kenya should:

i) 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 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 following in the wake of rapid modernization. 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 up 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 recognizes 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.

LEVEL LEARNING OUTCOMES

By 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, 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 coexistence.
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 whereby we count, add, subtract, multiply or divide quantities and substances, deal with space, shape, and structures throughout our daily interactions. Mathematics involves understanding numbers and the numerical operations used to develop strategies for cognitive mathematical problem solving skills, estimation, and computational fluency. It is impossible to think of a world without Mathematics. It is applied in economic, scientific, social, religious, and political worlds. It is therefore imperative that deaf 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. This curriculum is therefore designed to capture specific adaptations to support deaf learners to understand Mathematics and also prepare 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 emphasises STEM areas. Further, this design has been adapted to ensure that learners who are Deaf and those with Hard of Hearing learn effectively. The adaptations include suggestions for provision of sign interpretation on aspects that require use of sound, use of digital devices with assistive technology, use of visual aids such as charts, maps and diagrams, use of hands-on activities, guided demonstrations, purposeful pairing and use of adapted learning resources. The design has also incorporated alternative learning outcomes and activities to enhance the acquisition of sign language vocabulary to learners with Hearing Impairments.

GENERAL LEARNING OUTCOMES

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 SUBSTRANDS

Strand	Sub Strand	Suggested Number of Lessons
1. **NUMBERS**	1.1 Integers	6
	1.2 Fractions	6
	1.3 Decimals	8
	1.4 Squares and square roots	6
	1.5 Rates, ratios, proportions, and percentages	14
2. **ALGEBRA**	2.1 Algebraic Expressions	6
	2.2 Linear Equations	7
3. **MEASUREMENT**	3.1 Circles	5
	3.2 Area	10
	3.3 Money	9
4. **GEOMETRY**	4.1 Geometric constructions	12
	4.2 Coordinates and graphs	14
	4.3 Scale drawing	14
	4.4 Common solids	16
5. **DATA HANDLING AND PROBABILITY**	5.1 Data presentation and interpretation	10
	5.2 Probability	**7**
		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 Questions
1.0 NUMBERS	**1.1 Integers** (6 lessons)	By the end of the sub-strand, the learner should be able to**;** a) sign terms related to integers and its operations, b) represent integers on a number line in different situations, c) carry out operations of addition and subtraction of integers on the number line in real life situations, d) reflect on use of integers in real-life situations.	● In the purposive groups, learners are guided to observe signed videos, teachers' illustration charts and demonstrations on operations of integers on the number line. ● In the purposive groups, learners are guided to sign terms related to integers and its operations. ● In purposive groups, learners are guided to carry out activities involving positive and negative numbers and zero. For example, climbing stairs (positive), going downstairs (negative). Others may include standing at a point (the zero point) and count the number of steps moved either forward or backward. ● In purposive groups, learners are guided to draw, sign and represent integers on number lines on learning materials. ● In the purposive group, learners are guided to perform operations, including	1. How do we use integers in real-life situations? 2. How do we carry out operations of integers? 3. How are integer operations applicable in real life?

			combined operations of integers on a number line. ● In purposive groups, learners are guided to fingerspell, sign and play creative games that involve number lines, for example jumping steps. ● In groups, learners use digital devices or print resources to learn more on operations of integers on number lines.	

Core Competencies to be developed

- Creativity and Imagination: Uses creativity in work context; as learners play creative games that involve number lines, for example jumping steps.
- Digital literacy: Playing digital games; as learners use IT devices to learn and play games on integers.

Values

- Respect: As learners work in groups play games that involve integers.
- Unity: As the learner works together in creating games on integers.

Pertinent and Contemporary Issues (PCIs):

- Socio-Economic and Environmental Issues; Environmental education: As learners use available resources and spaces to jump steps.

Links to other learning areas:

- Integrated Science: As learners work out operations that involve integers.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Question(s)
1.0 NUMBERS	**1.2 Fractions** (6 lessons)	By the end of the sub-strand, the learner should be able to**:** a) sign vocabularies related to fraction, b) carry out combined operations on fractions in different situations, c) Work out operations on fractions in real life situations, d) promote use of fractions in real life situations.	● In the purposive groups, learners are guided to watch captioned video or observe teacher demonstration on how to sign vocabularies related to fractions such as numerator, denominator, (proper, improper, and mixed fractions). ● In groups, learners are guided to practise signing vocabularies related to fraction. ● In purposive groups, learners are guided to identify and practise signing mathematical operations such as +, -, x, ÷, (), of, $\frac{\square}{\square}$ and = in a given mathematical problem. ● In pairs learners are guided to draw and represent integers on a number lines on flash cards or manila papers to be kept on their portfolios or displayed in the classroom. ● In groups, learners are seated in a way that support use of sign language and are guided to perform operations,	How do we use fractions in real-life situations?

			including combined operations of integers on a number line. ● In purposive groups that support use of signs, learners are guided to discuss and carry out operations on fractions from activities such as shopping and other real-life cases. ● In purposive groups, learners are guided to play games of operations on fractions using digital devices or other resources.	
Core Competencies to be developed: ● Communication and Collaboration: Observing and signing; as learners follow instructions on operations of fractions from activities such as shopping and other real-life cases. ● Digital Literacy: Playing digital games; as learners use IT to play games of operations on fractions using IT devices.				
Values: ● Responsibility: As learners play games of operations on fractions using IT devices or other resources. ● Respect: As learners work together to work out operations on fractions from shopping activities.				
Pertinent and Contemporary Issues (PCIs): ● Life Skills and Human Sexuality: Self-esteem; as learners play games of operations on fractions using IT devices or other resources.				
Links to other learning areas: ● Learner is able to relate the concept of fractions to estimates of harvests, seeds or fertiliser required for sowing or application in Agriculture and Nutrition.				
Assessment resources ● Multiplication tables, Calculators, Portfolio, manilla, flashcards, digital devices				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
1.0 NUMBERS	**1.3 Decimals** (8 lessons)	By the end of the Sub Strand, the learner should be able to**;** a) sign words related to conversion of fractions to decimals in different situations, b) identify recurring decimals in different situations, c) convert recurring decimals into fractions in different situations, d) round off a decimal number to a required number of decimal places in different situations, e) express numbers to a required significant figure in real-life situations,	● In groups, learners are guided to identify, fingerspell and sign converting of fractions to decimals. ● In purposive groups, learners are guided to watch a signed video, teacher demonstration or illustration charts on conversion of fractions to decimals, recurring decimals and rounding off of decimals, then discuss and classify non- recurring and recurring decimals. Indicate the recurring digits. ● In purposive groups, learners are guided to discuss and practise converting recurring decimals to fractions in different situations. ● In groups, learners are guided to discuss and round	1. How do we work out operations on decimals? 2. How do we use decimals in real-life situations?

		f) express numbers in standard form in different situations, g) carry out combined operations on decimals in different situations, h) apply decimals to real-life situations, i) promote use of decimals in real-life situations.	off decimal numbers to a required number of decimal places. Ensure seating arrangement allows room to access signed information. ● In purposive groups, learners are guided to write and sign decimal and whole numbers to give significant figures. ● In groups, learners are guided to write numbers in standard form in learning materials such as cards or charts. ● In groups, learners are guided to work out combined operations on decimals in the correct order. ● In purposive groups, learners are guided to discuss and apply decimals to real-life cases. ● In groups, learners are guided to play games of operations on decimals using	

			digital devices or other locally available materials.	

Core Competencies to be developed:

- Digital literacy: Playing digital games; Learners develop the skills of interacting with computers as they play games of operations on decimals using digital devices.
- Critical thinking and problem solving: Explores different possible solutions to a problem; Explore other ways of solving a problem as learners practise converting recurring decimals to fractions.

Values:

- Responsibility: As learners discuss and classify non-recurring and recurring decimals.
- Respect: As learners work in groups to discuss and classify non-recurring and recurring decimals.
- Unity: As learners discuss the application of decimals in real life situation.

Pertinent and Contemporary Issues (PCIs):

- Life skills and Human Sexuality: Self-esteem; As learners work out combined operations on decimals in the correct order.

Links to other learning area:

- The learner is able to relate the concept of measurement to expressing different quantities of measurement in decimals in Integrated Science.

Assessment resources

- Multiplication tables, Calculators, Portfolio, manilla, flashcards, digital devices

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
1.0 NUMBERS	**1.4 Squares and Square Roots (6 lessons)**	By the end of the Sub Strand, the learner should be able to; a) sign and work out the square and square root of numbers, b) work out the squares of numbers from tables in different situations, c) work out the square roots of numbers from tables in different situations, d) work out squares and square roots of numbers using a calculator in different situations, e) enjoy using squares and square roots in real-life situations.	● In groups, learners are guided to watch a signed video clip or captioned video on how to read squares and square roots from the table. ● In the purposive groups, learners are guided to sign-read, and write the squares of numbers from tables. ● In groups, learners are guided to sign-read and work out the square roots of numbers from tables in different situations. ● In groups, learners are guided to practise working out squares and square roots using a calculator. ● In groups, learners are guided to use digital devices to play square and square root games.	1. Why do we use squares and square roots of numbers in real-life situations? 2. How do we apply squares and square roots in real-life situations?

			● In groups, learners are guided to create games that involve squares and square roots of numbers.	

Core Competencies to be developed;

- Communication and collaboration: Observing and signing; as learners work in groups to read, sign, and write the square roots of numbers from tables
- Imagination and creativity: Imagines different situations; as learners read, sign, and write the square roots of numbers from tables

Values

- Respect: As learners appreciate each other's contribution in creating games that involve squares and square roots of numbers.
- Unity: as learners work in teams to play games involving squares and square roots of numbers.

Pertinent and Contemporary Issues (PCIs):

- Socio-Economic and Environmental Issues: Cyberbullying prevention; As the learner uses IT devices or other materials to play games on squares and square root games.

Links to other learning areas:

- Learner applies knowledge of squares and square roots in designing items to make in Pre-Technical Studies.

Suggested Learning Resources

- Equivalent fraction board, circular and rectangular cut-outs, counters

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
1.0 NUMBERS	1.5 **Rates, Ratio, Proportions and Percentages** (14 lessons)	By the end of the Sub Strand, the learner should be able to; a) sign vocabularies related to ratios, rates, proportions, and percentages for learning, b) identify rates in different situations, c) work out rates in real-life situations, d) express fractions as ratios in real-life situations, e) compare two or more ratios in different situations, f) divide quantities in given ratios in real-life situations, g) work out ratios in different situations, h) work out increase and decrease of quantities using ratios in real-life situations,	● In groups, learners are guided to observe captioned video or teacher board or chart illustrations on rates, ratios, proportions, and percentages. ● In groups, learners are guided to identify, fingerspell and sign the terms related to rates in different situations. ● In groups, learners are guided to work out rates in real life. ● In purposive groups, learners are guided to express fractions as ratios in real life. ● In purposive groups, learners are guided to use cut-outs portions from whole objects or diagrams to compare two or more fractions and ratios in different situations. ● In groups, learners are guided to discuss and share or divide quantities of concrete objects in different ratios.	1. How do we use rates in real life situations? 2. How do we use ratios in daily activities?

		i) work out percentage change of given quantities in real-life situations, j) identify direct and indirect proportions in real-life situations, k) work out direct and indirect proportions in real-life situations, l) promote use of ratios and proportions in real life.	● In pairs, learners are guided to work out the increase and decrease of quantities using ratios in real-life situations. ● In groups, learners are guided to discuss and determine percentage increase and decrease of different quantities. ● In purposive groups, learners are guided to use digital devices or other materials to identify and work out direct and indirect proportions in real-life situations. ● In purposive groups, learners are guided to role play shopping activities or use diagrams to show and determine direct relationships and proportions. ● In groups, learners are guided to use hourglass or any other device to show and determine indirect relationships.	
Core Competencies to be developed: ● Critical thinking and problem solving: Evaluation and decision making; as learners carry out different activities such as calling using different service providers to determine calling rates.				

● Creativity and Imagination: Imagines different situations**;** as the learner uses hourglass to show indirect relationships.
Values ● Respect: As learners shares out different quantities in given ratios. ● Integrity: As learners shares quantities in different proportions or percentages.
Pertinent and Contemporary Issues (PCIs): ● Citizenship: Social cohesion; as learners role play time taken to call at a specified time and also charges from different telecom service providers. ● Life Skills and Human Sexuality: Negotiation; as learners use ratios to divide quantities such as money on different items to buy as part of consumer awareness.
Links to other learning areas ● Pre-technical studies: As learners calculate rates of calling from service providers as part of consumer protection. ● Pre-Technical Studies: As learners work out ratios or proportions of different building materials.
Suggested Learning Resources: ● Digital devices, textbooks, paper cut-out, hourglass

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to sign terms related to numbers.	Sign terms related to numbers with clear and distinct handshapes, movements, and facial expressions.	Sign terms related to numbers with generally clear handshapes and movements and facial expression	Sign terms related to numbers with unclear handshapes or movements, making it difficult to understand.	Sign terms related to numbers with very unclear handshapes and movements, making them impossible to understand algebraic expression
Ability to carry out operations of addition and subtraction of integers on the number line in real life situations.	Carries out operations of addition and subtraction of integers on the number line in real life situations showcasing a clear understanding of the concepts.	Carries out operations of addition and subtraction of integers on the number line in real life situations.	Carries out operations of addition and subtraction of integers on the number line in real life situations with minor errors.	Carries out operations of addition and subtraction of integers on the number line in real life situations with frequent errors.

Ability to carry out combined operations on fractions in different situations.	Carries out combined operations on fractions in different situations demonstrating a clear understanding of the concept.	Carries out combined operations on fractions in different situations.	Carries out combined operations on fractions in different situations but demonstrates partial understanding of the correct order of operation.	Carries out combined operations on fractions in different situations but demonstrates little to no understanding of the correct order of operation.
Ability to carry out combined operations on decimals in different situations	Carries out combined operations on decimals in different situations demonstrating a clear understanding of the order of operation.	Carries out combined operations on decimals in different situations.	Carries out combined operations on decimals in different situations demonstrating partial understanding of the correct order of operation.	Carries out combined operations on decimals in different situations demonstrating little to no understanding of the correct order of operation.
Ability to work out squares and square roots of numbers from tables and use a calculator in different situations.	Works out squares and square roots of numbers from tables and use a calculator in different situations and relate them.	Works out squares and square roots of numbers from tables and uses a calculator in different situations.	Works out squares and square roots of numbers from tables and uses a calculator in different situations with occasional errors.	Works out squares and square roots of numbers from tables and uses a calculator in different situations with little to no accuracy.

Ability to work out Rates, Ratio, Proportions and Percentages in different situations.	Works out Rates, Ratio, Proportions and Percentages in different situations showing in depth understanding of the concept.	Works out Rates, Ratio, Proportions and Percentages in different situations.	Works out Rates, Ratio, Proportions and Percentages in different situations with incomplete solutions.	Works out Rates, Ratio, Proportions and Percentages in different situations with incorrect solutions.

STRAND 2.0: ALGEBRA

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
2.0 ALGEBRA	**2.1 Algebraic Expressions** (6 Lessons)	By the end of the Sub Strand, the learner should be able to; a) sign terms related to algebraic expression, b) factorise algebraic expressions in different situations, c) simplify algebraic fractions in different situations, d) evaluate algebraic expressions by substituting numerical values in different situations, e) enjoy using algebraic expressions in real-life situations.	● In groups, learners are guided to identify, fingerspell and sign terms related to algebraic expression such as like terms, unlike terms, expression, factor, and factorization of algebraic expression. ● In purposive groups, learners are guided to watch captioned video or teacher chart illustrations on simplification of algebraic expression then discuss and simplify sample the algebraic fractions. ● In purposive groups, learners are guided to factorise algebraic expressions in different situations. ● In purposive groups, learners are guided to simplify algebraic fractions in different situations using drag and drop activities of	1. How do we factorise algebraic expressions? 2. How do we simplify algebraic expressions?

			grouping similar terms to simplify algebraic expressions. ● In pairs, learners are guided to evaluate algebraic expressions by substituting numerical values in different situations. ● In groups, learners are guided to play digital games on algebraic expressions.	

Core Competencies to be developed:

- Self-efficacy: Keeps trying when something goes wrong; as learners substitute the given numerical values to work out a given algebraic expression.
- Creativity and imagination: Generates ideas when given a clear brief; as learners form expression from a given statement.

Values

- Responsibility: As learners discuss and substitute values in algebraic expressions in groups with each doing their portioned part.

Pertinent and Contemporary Issues (PCIs):

Socio-Economic and Environmental Issues: Pollution, Environment & technology; As learners use varied resources for like and unlike terms in algebra.

Links to other learning areas:

Learners are able to relate the concept of using symbols to the use of symbols to represent quantities for substances in Integrated Science.

Suggested Learning Resources:

Digital devices, charts, coursebook

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
2.0 ALGEBRA	2.2 **Linear Equations** (7 Lessons)	By the end of the sub strand, the learner should be able to; a) sign the term linear equation in solving linear equations, b) form linear equations in two unknowns in real-life situations, c) solve linear equations in two unknowns by substitution method in real life situations, d) solve linear equations in two unknowns by elimination method in real-life situations, e) apply linear equations in two unknowns in real-life situations,	• In groups learners are guided to identify, fingerspell and sign terms related to linear equations such as unknown or variables, linear and equation. • In groups learners are guided to watch a captioned video or teacher chart illustrations on formation and solving of linear equations and simultaneous equations using elimination and substitution methods then discuss and form simple linear equations in two unknowns in real-life situations. • In purposive groups, learners are guided to discuss and use substitution methods to solve simultaneous equations in two unknowns. • In groups, learners are guided to discuss and use elimination methods to solve simultaneous equations in two unknowns. • In purposive groups, learners are guided to practise forming and solving	1. How do we solve linear equations in two unknowns? 2. Why do we use linear equations in real-life situations?

		f) recognise the use of linear equations in real life.	simultaneous equations in two unknowns in real-life situations using any method. ● In groups, learners are guided to watch videos and play games on linear equations in two unknowns using digital devices or other materials.	
Core Competencies to be developed; ● Communication and collaboration: Observing, signing, writing, and contributing to group discussion; as learners discuss and use substitution methods to find the solutions of simultaneous equations in two unknowns. ● Digital literacy: Operating a digital device; as learners watch videos on linear equations in two unknowns from a digital device.				
Values: ● Unity: As learners practise forming and solving simultaneous equations in two unknowns of real-life cases in groups.				
Pertinent and Contemporary Issues (PCIs): ● Citizenship; as learners role play shopping activities on two different items in the shop to form linear equations in two unknowns.				
Links to other learning areas: ● Learners are able to relate the skill of equations to discuss and use substitution methods to find the solutions of simultaneous equations in English.				
Suggested Learning Resources: ● Chart, digital devices, coursebook				

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to sign terms related to algebraic expression.	Sign terms related to algebraic expression with clear and distinct handshapes, movements, and facial expressions.	Sign terms related to algebraic with generally clear handshapes and movements, facial expressions.	Sign terms related to algebraic expression with unclear handshapes or movements, making it difficult to understand.	Sign terms related to algebraic with very unclear handshapes and movements, making them impossible to understand algebraic expression
Ability to evaluate algebraic expressions by substituting numerical values in different situations.	Evaluates algebraic expressions comprehensively by substituting numerical values in different situations.	Evaluates algebraic expressions by substituting numerical values in different situations.	Evaluates algebraic expressions partially by substituting numerical values in different situations.	Evaluates algebraic expressions with errors by substituting numerical values in different situations.

Ability to solve linear equations in two unknowns by substitution and elimination methods in real life situations.	Solves linear equations effectively in two unknowns by substitution and elimination methods in real life situations.	Solves linear equations in two unknowns by substitution and elimination methods in real life situations.	Solves linear equations in two unknowns by either substitution or elimination methods in real life situations.	Solves linear equations partly in two unknowns by either substitution or elimination methods in real life situations.

STRAND 3.0: MEASUREMENTS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
3.0 MEASUREMENTS	**3.1 Circles** (5 lessons)	By the end of the Sub Strand, the learner should be able to; a) sign vocabularies related to the circle, b) work out the circumference of a circle in real-life situations, c) work out the length of an arc of a circle in different situations, d) calculate the perimeter of a sector of a circle in different situations, e) promote use of circles in real-life situations.	● In purposive groups, learners are guided to sign vocabularies related to measurement such as circle, circumference, arc length of a circle, sector, and semi-circle. ● In purposive groups, learners are guided to watch a captioned video, teacher illustration charts on working out circumference, length of arc, and perimeter of circles then discuss and find the circumference of sample circular objects in the environment. ● In purposive groups, learners are guided to use cut-outs to relate arc lengths of a circumference then work out arc length of a circle, starting	1. How do we determine the circumference of a circle? 2. How do we use sectors of a circle in real-life situations?

			with semicircle, then quarter of a circle. ● In purposive groups, learners are guided to draw circles with varied radii and work out the circumference, and arc lengths of the circles. ● In purposive groups, learners are guided to use cut-outs of sectors of circles from locally available materials to work out the perimeter of the sectors. ● In groups, learners are guided to use digital devices or other resources to explore the use of sectors of circles in daily life.	
Core Competencies to be developed: ● Communication and collaboration: Punctual, reliable, supports others and contributes to group decision making; as learners discuss and find the circumference of different circular objects in the environment in groups.				
Values: ● Unity: As learners work in groups to calculate the circumference of a circle ● Responsibility: As the learner makes any objects with the sector that can be used in real-life situations.				
Pertinent and Contemporary Issues (PCIs): ● Socio-Economic and Environmental Issues: Biodiversity and pollution; As learners use locally available materials to cut out sectors responsibly.				

Links to other learning areas: The learner is able to relate the skill of using paper cut-out to find circumference to calculating the circumference of different circular objects in the environment in Pre-Technical Studies.
Learning resources ● Cut-outs of sectors, papers, ruler

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
3.0 **MEASUREMENTS**	**3.2 Area** (10 lessons)	By the end of the Sub Strand, the learner should be able to; a) sign vocabularies related to area for learning, b) calculate the area of circle in different situations, c) work out the area of a sector of a circle in different situations, d) work out the surface area of cubes and cuboids in real-life situations, e) work out the surface area of a cylinder in real-life situations, f) determine the surface area of a triangular	● In group, learners are guided to identify, fingerspell and sign terms related to area and formulas of specific shapes such as circles, sector, angle subtended, square, rectangle, cube, cuboid, and cylinder. ● In groups, learners are guided to observe a signed or captioned video clip or teacher illustration charts on calculation of area of various shapes. ● In the purposive groups, learners are guided to discuss and work out area of various circles and semicircles. ● In purposive groups, learners are guided to cut-out sectors from circles using locally available materials and work out areas of the sectors using the angle and radii. ● In groups, learners are guided to use models to find the surface area of cubes and cuboids using appropriate formulas.	How do we use area in real-life situations?

		prism in different situations, g) work out the area of irregular shapes using square grids in real-life situations, h) appreciate use of length in real-life situations.	● In groups, learners are guided to use models to find the surface area of cylinders. ● In groups, learners are guided to use models to find the surface area of triangular prisms in different situations. ● In groups, learners are guided to draw irregular shapes on square grids to determine or estimate their areas. In groups, learners are guided to watch videos on models of cubes, cuboids, cylinders, and prisms and how to find the surface area. Also make or improvise models or containers from locally available materials. ● In groups learners are guided to watch or play games on calculation of areas of different shapes using digital devices.	
Core Competencies to be developed: ● Critical thinking and problem solving: Uses creativity in work context; as learners use cut-outs of sectors of circles from locally available materials and find the area. ● Learning to learn: Knows what doing well looks like; as learners use models to find the surface area of cubes, cuboids and cylinders and derive the formulas for each.				
Values: ● Responsibility: Through excellence as learners use models to find the surface area of triangular prisms.				
Pertinent and Contemporary Issues (PCIs)				

● Socio-Economic and Environmental Issues: Safety; As learners handle different instruments to make cut-outs of sectors from locally available materials and find the area where they relate the angle of the sector to the area of the circle. ● Socio-Economic and Environmental Issues: Environment & technology**;** As learners use locally available materials to draw irregular shapes, for example their palm of hands, feet, leaves etc. and trace on square grid to estimate the area.
Links to other learning areas: The learner is able to relate the concept of tracing to drawing irregular shapes, for example their palm of hands, feet, leaves in Creative Arts.
Suggested learning resources: ● Digital devices, s, paper cut-outs

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
3.0 MEASUREMENTS	**3.3 Money** (9 lessons)	By the end of the Sub Strand, the learner should be able to; a) sign vocabularies related to money with regards to interest and depreciation, b) identify interest and principal in real-life situations, c) calculate simple interest in real-life situations, d) calculate compound interest per annum step by step up to three years in real-life situations, e) work out appreciation and depreciation per annum step by step up to three years in different situations,	● In groups, learners are guided to Identify and sign vocabularies related to money such as interest, simple and compound interest, interest rate, depreciation, annually, quarterly, semi-annually, hire purchase, instalment, and amount. ● In purposive groups, learners are guided to watch a captioned video, teacher illustrations, visit or invite resource persons from different financial institutions in the neighbourhoods of the school or home to help them identify interest, principal, and gather information about simple and compound interests offered on deposits (principal). ● In purposive groups, learners are guided to discuss and work out simple interest.	1. How do we pay for goods on hire purchase? 2. Why do we calculate interest in real life situations?

		f) work out hire purchase in real-life situations, g) spend money responsibly on needs and leisure.	• In purposive groups, learners are guided to discuss and work out compound interest. • In purposive groups, learners are guided to identify and discuss objects or goods that appreciate and depreciate in value to inform decision making on goods that are worth investing in or buying. • In groups, learners are guided to determine appreciation and depreciation using a step by step method. • In groups, learners are guided to visit or carry out online research on hire purchase shops to observe instalment calculation on items sold and present their findings to be attached to their portfolio. • In purposive groups, learners are guided to work out sample questions on hire purchase. • In groups, learners are guided to use digital devices to access online shopping platforms and identify terms of sale.	

Core Competencies to be developed:

- Communication and collaboration: Generates ideas when given clear briefs: as learners gather information about simple and compound interests offered on deposits (principal) as a group.
- Critical thinking and problem solving: Active listening and communication skills; as learners determines appreciation and depreciation using step by step methods and discusses what goods are worth investing in or buying.

Values:

- Responsibility: As learners make responsible choices on shopping goods that they appreciate.
- Respect: As learners appreciate each other's opinion.

Pertinent and Contemporary Issues (PCIs):

- Citizenship Education: Good Governance; as learners use money (Kenya shillings) to buy goods.

Links to other learning areas:

Learners are able to relate the concept of hire purchase to calculation of interest, appreciation, and depreciation in Pre-Technical Studies.

Suggested learning resources:

- Digital devices, course books

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to sign terms related to measurement.	Signs terms related to measurement with clear and distinct handshapes, movements, and facial expressions.	Signs terms related to measurement, clear handshapes and movements and facial expression.	Signs terms related to measurement with unclear handshapes or movements, making it difficult to understand.	Signs terms related to measurement with very unclear handshapes and movements, making them impossible to understand algebraic expression
Ability to work out the circumference, length of an arc and the perimeter of a sector of a circle in real-life situations.	Works out the circumference, length of an arc and the perimeter of a sector of a circle with precision in real-life situations.	Works out the circumference, length of an arc and the perimeter of a sector of a circle in real-life situations.	Works out the circumference, length of an arc and the perimeter of a sector of a circle with occasional gaps in real-life situations.	Works out the circumference, length of an arc and the perimeter of a sector of a circle with frequent errors in real-life situations.
Ability to determine surface area of regular and	Determines surface area of regular and irregular shapes in	Determines surface area of regular and irregular	Determines surface area of regular and irregular shapes in real life	Determines surface area of regular and irregular shapes in real life

irregular shapes in real life situations.	real life situations utilising different approaches.	shapes in real life situations.	situations with inaccuracies in solutions.	situations with incomplete solutions.
Ability to calculate simple interest, compound interest, appreciation, and depreciation in different situations.	Calculates simple interest, compound interest, appreciation and depreciation in different situations and shows their interrelationship.	Calculates simple interest, compound interest, appreciation, and depreciation in different situations.	Calculates simple interest, compound interest, appreciation, and depreciation with minimal struggles in different situations.	Calculates simple interest, compound interest, appreciation, and depreciation with struggles in different situations.

STRAND 4.0: GEOMETRY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
4.0 GEOMETRY	**4.1 Geometrical Construction** (12 lessons)	By the end of the Sub Strand, the learner should be able to; a) sign words related to construction of lines in different situations, b) construct parallel and perpendicular lines in different situations, c) divide a line proportionally in different situations, d) identify and sign angle properties of polygons in different situations, e) construct regular polygons up to a hexagon in different situations, f) construct irregular polygons up to a	● In groups, learners are guided to identify, Fingerspell and sign terms and tools related to geometry such as perpendicular line, parallel lines, angle, bisect, perpendicular bisector, angle bisector, ruler, pair of compasses, protractor, set square and dividers. ● In groups, learners are guided to watch teacher illustrations, charts, or captioned video on dividing a line proportionally, for example, using a set square and a ruler only or a pair of compasses then practise the same using sample exercise. ● In purposive groups, learners are guided to discuss and sign angle properties of polygons and relate the number of right angles to the	1. How do we construct polygons? 2. Why do we use polygons in real-life situations?

		hexagon in different situations, g) construct circles passing through the vertices of a triangle in different situations, h) construct circles touching the sides of the triangle in different situations, i) appreciate geometric patterns in objects and substances in real life.	number of sides. They can determine the angles in a given polygon. ● In purposive groups, learners are guided to construct regular polygons using a pair of compasses, rulers, and protractors. ● In purposive groups, learners are guided to construct irregular polygons using a pair of compasses, rulers, protractors. ● In purposive groups, learners are guided to practise constructing circles passing through vertices of given triangles and circumscribed circles. ● In purposive groups, learners are guided to practise constructing circles touching sides of given triangles. inscribed circles. ● In groups, learners are guided to watch videos on how to construct polygons, using different construction software.	

			● In groups, learners are guided to use digital devices to create patterns using circles touching sides of triangles or polygons.	
Core Competencies to be developed: ● Communication and collaboration: signing and contributing to group decision making; as the learners discuss angle properties of polygons and relate the number of right angles to the number of sides. ● Digital literacy: Operating digital devices: as the learner uses IT or other devices to create patterns using circles touching sides of triangles or polygons.				
Values: ● Responsibility and respect: As learners discuss angle properties of polygons and relate the number of right angles to the number of sides.				
Pertinent and Contemporary Issues (PCIs): ● Education for Sustainable Development: As learners use IT or other resources to create patterns using circles touching sides of triangles or polygons.				
Links to other learning areas: The learner is able to relate the concept of pattern to constructing buildings of different shapes in Pre-Technical Studies**.**				
Suggested learning resources: ● Protractors, a pair of compasses, digital devices, ruler, paper cut-outs				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
4.0 GEOMETRY	**4.2 Coo AND GRAPHS** (14 lessons)	By the end of the Sub Strand, the learner should be able to; a) sign words related to coordinates and graphs, b) draw a labelled Cartesian plane on different learning materials, c) identify points on the Cartesian plane in different situations, d) plot points on the Cartesian plane in different situations, e) generate table of values for a linear equation in different situations, f) determine an appropriate scale for	● In groups, learners are guided to sign and fingerspell words related to coordinates and graphs for example coordinates, origin, Cartesian plane. ● In purposive groups, learners are guided to draw and sign and appropriately label the axes on the Cartesian plane. ● In purposive groups, learners are guided to practise locating and plotting points on the Cartesian plane appropriately. ● In purposive groups, learners are guided to discuss, sign- read coordinates of points on the Cartesian plane. They write the coordinates in terms of (x, y) (horizontal value, vertical value. ● In purposive groups, learners are guided to fingerspell, sign and discuss how to choose and use appropriate scale for a given data.	1. How do we plot coordinates on the Cartesian plane? 2. Why do we use linear graphs in real life?

		a linear equation on the Cartesian plane in different situations, g) draw a linear graph from table of values on Cartesian plane in different situations, h) solve simultaneous linear equations graphically in different situations, i) apply simultaneous equations in real-life situations, j) reflect on the use of graphs in real life.	● In purposive groups, learners are guided to discuss and make an appropriate table of values for a given linear equation and draw the linear graphs. ● In purposive groups, learners are guided to generate the values in a table of the simultaneous linear equations and draw the graphs, reading the point of intersection as solution for the equations. ● In purposive groups, learners are guided to discuss and form simultaneous equations from statements and solve using graphs. ● In purposive groups, learners are guided to use digital graphing tools to create linear graphs or use other materials to practise drawing linear graphs.	
Core Competencies to be developed: ● Communication and collaboration: Signing and contributing to group decision making; as the learner discusses and sign-read coordinates of points on the Cartesian plane. ● Digital literacy: Operating digital devices; as learners use IT graphing tools to create linear graphs.				

Values: ● Respect: As the learner: discuss and make an appropriate table of values for a given linear equation and draw the linear graphs.
Pertinent and Contemporary Issues (PCIs) ● Citizenship Education: As the learner practises locating and plotting points on the Cartesian plane appropriately.
Links to other learning areas: ● The learner is able to relate the skill of using coordinates to finding directions using a compass in Social Studies.
Suggested learning Resources: ● Graph book, graph paper, digital compass,

S**trand**	**Sub Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested key Inquiry Questions**
4.0 GEOMETRY	**4.3 SCALE DRAWING** **(**14 lessons**)**	By the end of the Sub Strand, the learner should be able to; a) sign terms related to scale drawing in different situations, b) represent length to a given scale in different situations, c) convert actual length to scale length in real-life situations, d) convert scale length to actual length in real-life situations, e) interpret linear scales in statement form in different situations, f) write linear scales in statement form in different situations, g) interpret linear scales in ratio form in different situations, h) write linear scales in ratio form in different situations,	● In groups, learners are guided to Identify different types of scales from a given map. ● In groups, learners are guided to sign vocabularies scale, linear, ratio, statement scale, actual length, interpret and conversion. ● In purposive groups, learners are guided to measure and represent length of different objects from immediate environment in his/her workbook. ● In purposive groups, learners are guided to discuss and practise converting scale from one form to another. ● In purposive groups, learners are guided to sign- read, discuss, and interpret given linear scales in statement form. ● In purposive groups, learners are guided to discuss, write and fingerspell given linear scales in statement form.	1. How do we determine scales in real life? 2. Why do we use scale drawing in real-life situations?

		i) convert linear scale from statement form to ratio form and ratio form to statement form in different situations j) make scale drawings in different situations, k) apply scale drawing in real-life situations, l) appreciate the use of scale drawing in maps.	● In purposive groups, learners are guided to sign- read, discuss, and interpret given linear scales in ratio form. ● In purposive groups, learners are guided to discuss and carry out conversions of scales from one form to another. ● In purposive groups, learners are guided to make scale drawings on different learning materials using appropriate scale. ● In groups, learners are guided to use digital devices to display the maps and use the zoom functions to demonstrate scale. ● In groups, learners are guided to Use maps to demonstrate scale.	

Core Competencies to be developed

- Communication and collaboration: Writing clearly and supporting others in group work; as the learner in groups write clearly given linear scales in statement form.
- Critical thinking and problem solving: Active listening and communication; as the learner discusses and writes given linear scales in statement form.
- Digital literacy: operating digital devices; as the learner uses ICT devices to display the maps and use the zoom functions to demonstrate scale.

Values: ● Responsibility: As learners take good care of the maps given to them for learning. ● Unity: As learners work in groups. ● Love: As learners respect each other's opinion in groups.
Pertinent and Contemporary Issues (PCIs): ● Socio-Economic and Environmental Issues: Environment & technology; As learners measure and represent the length of different objects from the immediate environment in their workbooks.
Links to other learning areas: ● Pre-Technical Studies: As learners read and make scale drawings. ● Social studies: The learner is able to relate the skill of using scale drawing to estimate the area of a place in Social Studies.
Suggested resources ● Unit angles, protractors, pair of compasses, rulers, straight edges

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
4.0 GEOMETRY	**4.4 COMMON SOLIDS (**16 lessons**)**	By the end of the Sub Strand, the learner should be able to; a) sign words related to common solids in the environment, b) sketch nets of cubes, cuboids, cylinders, pyramids, and cones in different situations, c) work out the surface area of the solids from nets of solids in different situations, d) determine the distance between two points on the surface of a solid in different situations, e) make models of hollow and compact solids for skills development, f) promote the use of common solids in real-life situations.	● In groups, learners are guided to identify, fingerspell and sign words for common solids such as cubes, cuboids, cylinders, pyramids, and cones from the immediate environment. ● In groups, learners are guided to discuss, open, and sketch the nets of hollow solids. ● In purposive groups, learners are guided to work out the surface area of solids from nets. ● In purposive groups, learners are guided to discuss and practise measuring the distance between any two points on the surface of the solids. ● In purposive groups, learners are guided to make models of hollow and compact solids using locally available materials. Hollow solids (containers) may be of cubes, cuboids, cylinders, pyramids, or cones. Compact solids (e.g.	1. How do we use common solids in real life? 2. How do you determine the surface area of solids? 3. How do you determine the volume of common solids?

			bricks) may be of cubes, cuboids, or cylinders. ● In groups, learners are guided to use digital devices to watch videos on common solids, nets and draw the solids and nets. ● In purposive groups, learners are guided to use other resources such as print or carton boxes to trace or draw nets of solids.	
Core Competencies to be developed; ● Communication and collaboration: Signing, observing, and contributing to group decision making; as the learner discusses and works in groups to collect solids from the environment. ● Creativity and imagination: Making connections**;** as learners make the models of different solids/open and sketch the net of a cube.				
Values ● Responsibility: As the learner work in groups to collect solids and make models.				
Pertinent and Contemporary Issues (PCIs): ● Life Skills and Human Sexuality: Self-esteem; as the learners open nets of solids and make models.				
Links to other learning areas: ● Pre-Technical Studies: As the learner sketch nets of different solids while practising in technical drawing ● The is able to relate the concept of surface area to modelling various solids using clay in Creative Arts**.**				
Suggested Learning resources: ● Containers, compact solid objects, water, soil, clay, waste newspapers				

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to sign terms related to geometry.	Sign terms related to geometry with clear and distinct handshapes, movements, and facial expressions.	Sign terms related to geometry with generally clear handshapes and movements and facial expression	Sign terms related to geometry with unclear handshapes or movements, making it difficult to understand.	Sign terms related to geometry with very unclear handshapes and movements, making them impossible to understand algebraic expression
Ability to construct regular and irregular polygons up to hexagon in different situations.	Constructs regular and irregular polygons up to hexagon in different situations effectively utilising appropriate tools and techniques.	Constructs regular and irregular polygons up to hexagon in different situations.	Constructs regular and irregular polygons up to hexagon in different situations but occasionally struggles to use appropriate tools and techniques.	Constructs regular and irregular polygons up to hexagon in different situations but frequently struggles to use appropriate tools and techniques.

Ability to construct Escribed Circle and Inscribed Circle in different situations.	Constructs Escribed Circle and Inscribed Circle in different situations effectively utilising appropriate tools and techniques.	Constructs Escribed Circle and Inscribed Circle in different situations.	Constructs Escribed Circle and Inscribed Circle in different situations but occasionally struggle to use appropriate tools and techniques.	Constructs Escribed Circle and Inscribed Circle in different situations but frequently struggle to use appropriate tools and techniques.
Ability to interpret regular and irregular polygons up to hexagon in different situations.	Interprets regular and irregular polygons up to hexagon systematically in different situations.	Interprets regular and irregular polygons up to hexagon in different situations.	Interprets regular and irregular polygons up to hexagon with minimal errors in different situations.	Interprets regular and irregular polygons up to hexagon with frequent errors in different situations.
Ability to interpret Escribed Circle and Inscribed Circle in different situations.	Interprets Escribed Circle and Inscribed Circle systematically in different situations.	Interprets Escribed Circle and Inscribed Circle in different situations.	Interprets Escribed Circle and Inscribed Circle with minimal errors in different situations**.**	Interprets Escribed Circle and Inscribed Circle with frequent errors in different situations.

Ability to plot out points on a Cartesian plane	Plots out points on a Cartesian plane with precision.	Plots out points on a Cartesian plane.	Plots out points on a Cartesian plane with minor deviations.	Plots out points on a Cartesian plane with major deviations.
Ability to interpret linear scales in statement form in different situation	Interprets linear scales in statement form precisely in different situations.	Interprets linear scales in statement form in different situations.	Interprets linear scales in statement form with minor errors in different situations.	Interprets linear scales in statement form with significant errors in different situations.
Ability to work out the surface area of the solids from nets of solids in different situations.	Works out the surface area of the solids from nets of solids in different situations utilising different methods	Works out the surface area of the solids from nets of solids in different situations.	Works out the surface area of the solids from nets of solids in different situations with inaccuracies in solutions	Works out the surface area of the solids from nets of solids in different situations with incomplete solutions.

STRAND 5.0: DATA HANDLING AND PROBABILITY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested key Inquiry Questions
5.0 **DATA HANDLING AND PROBABILITY**	**5.1 DATA PRESENTATION AND INTERPRETATION (10 lessons)**	By the end of the Sub Strand, the learner should be able to; a) sign terms related to data presentation and interpretation for learning, b) draw bar graphs of data from real-life situations, c) interpret bar graphs of data from real-life situations, d) draw line graphs of given data from real-life situations, e) interpret line graphs of data from real-life situations, f) identify the mode of a set of discrete data	● In groups, learners are guided to observe a photograph with bar graphs and line graphs. ● In groups, learners are guided to Sign and fingerspell terms graph, bar graph, line graph, data, mean, median and mode. ● In purposive groups, learners are guided to collect data from the immediate environment or experiences, for example size of shoes, height or test scores and class members. ● In purposive groups, learners are guided to use a suitable scale to draw and represent the data in bar graphs. ● In groups, learners are guided to discuss and interpret bar graphs.	1. Why is data presentation important? 2. How do we determine the mean of data?

		from real-life situations, g) calculate the mean of a set of discrete data from real-life situations, h) determine the median of a set of discrete data from real-life situations, i) use device or other materials to determine the mean, mode and median of discrete data in different situations, j) promote use of data representation and interpretation in real-life situations.	● In groups, they are guided to discuss and represent data in line graphs. ● In purposive groups, are guided to discuss and interpret line graphs. ● In groups, learners are guided to identify the mode from a given set of discrete data. ● In purposive groups, learners are guided to discuss and work out the average from different sets of discrete data and relate it to the mean. ● In groups, learners are guided to carry out different activities that involve getting the median position. For example, where possible learners use the hand to identify the middle finger in reference to the position. ● In groups, learners are guided to arrange given data in ascending order and identify the middle value which is the median.	

			● In groups, learners are guided to use IT to create bar graphs and line graphs to represent the data, calculate the mean, the mode and the median. ● In groups, learners are guided to use other resources to draw bar and line graphs.	

Core Competencies to be developed;

- Communication and collaboration: Writing, observing, and signing; as learners discuss and represent data in line graphs in groups.
- Critical thinking and problem solving imagines different situations and generates ideas; as the learner discuss and interpret Bar graphs
- Self-efficacy: Keep trying when something goes wrong; as the learner collects data from their own experiences, for example size of shoes, height or test scores and draws line and bar graphs from the data.

Values:

- Love: As the learner carries out different activities that involve getting the median position in groups harmoniously. For example, where possible learners use the hand to identify the middle finger in reference to the position.
- Respect: As the learner discusses and represents data in line graphs in groups.

Pertinent and Contemporary Issues (PCIs):

- Socio-Economic and Environmental Issues: Environmental education; as learners collect data from the immediate environment or experiences, for example size of shoes, height, or test scores.

Links to other learning areas:

The learner is able to relate the skill of presenting data using graphs to representing data using charts and graphs in Social Studies.

Suggested resources ● Data from different sources

Strand	**Sub Strand**	**Specific Learning Outcome**	**Suggested Learning Experiences**	**Suggested key Inquiry Questions**
5.0 DATA HANDLING AND PROBABILITY	**5.2 PROBABILITY (**7 lessons**)**	By the end of the Sub Strand, the learner should be able to; a) sign words related to probability, b) identify events involving chance in real-life situations, c) perform chance experiments in different situations, d) write the experimental probability outcomes in different situations, e) express the probability outcomes in fractions in different situations, f) express the probability outcomes in decimals or percentages in different situations,	● In groups, learners are guided to fingerspell, signs used in probability for probability space, possible outcomes. ● In groups, learners are guided to Identify and discuss daily events that are likely or unlikely to happen or will not happen. ● In purposive groups, learners are guided to discuss, sign, and carry out different chance experiments like flipping the coin, tossing the dice, or drawing coloured balls from a bag, one ball at a time. ● In purposive groups, learners are guided to record the probability of the chance outcomes in fractions, decimals, and percentages.	1. How do we consider chances that an event is likely to happen? 2. Why is probability important in real-life situations?

		g) use digital devices and other materials to play games involving probability, h) recognise events that happen by chance in real-life situations.	● In groups, learners are guided to use digital or other resources to play games involving probability.	

Core Competencies to be developed:

- Communication and collaboration: Writing, observing, and signing; as the learner discusses daily events that are likely/unlikely to happen/will not happen.
- Self-efficacy: Can tell when others feel positive or negative; as the learner discusses and carries out different chance experiments like flipping the coin and avoiding harmful practices of gambling.

Values:

- Responsibility: As the learner uses digital devices or other resources such as coins, balls in the study of probability.

Pertinent and Contemporary Issues (PCIs)

- Socio-Economic and Environmental Issues: Education for Sustainable development (ESD); As the learner discusses daily events that are likely/unlikely to happen/will not happen that may relate to the environment.

Links to other learning areas:

The learner is able to relate the concept of probability to discussion of daily events that are likely/unlikely to happen/will not happen that may involve the weather in Social Studies.

Suggested resources

- Data from different sources

Suggested Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to sign terms related to data handling and probability.	Sign terms related to data handling and probability with clear and distinct handshapes, movements, and facial expressions.	Sign terms related to data handling and probability with generally clear handshapes and movements and facial expression	Sign terms related to data handling and probability with unclear handshapes or movements, making it difficult to understand.	Sign terms related to data handling and probability with very unclear handshapes and movements, making them impossible to understand.
Ability to interpret bar graphs and line graphs of data from real-life situations.	Interprets bar graphs and line graphs of data from real-life situations showcasing attention to all the features.	Interprets bar graphs and line graphs of data from real-life situations.	Interprets bar graphs and line graphs of data partly from real-life situations.	Interprets bar graphs and line graphs of data partly even with prompts from real-life situations.
Ability to express the probability outcomes in fractions, decimals,	Expresses the probability outcomes in fractions, decimals or percentages in different	Expresses the probability outcomes in fractions, decimals,	Expresses the probability outcomes in fractions, decimals, or percentages in different situations with	Expresses the probability outcomes in fractions, decimals, or percentages in

or percentages in different situations.	situations and relates them.	or percentages in different situations.	minor errors in specific cases.	different situations with struggles.

COMMUNITY SERVICE LEARNING PROJECT

Introduction

In Grade 8, focus is on learners making preparations to undertake a CSL activity of their own choice. They will be required to identify a community problem through research, plan and come up with solutions to solve the problem. The preparations will be carried out in groups. Learners will build on CSL knowledge, skills and attitudes acquired from Life Skills Education as well as other subjects.

CSL Skills to be covered:

a) **Leadership**: Learners develop leadership skills as they undertake various roles during preparation.
b) **Financial Literacy and Entrepreneurship Skills:** Learners will gain skills on wise spending, saving, and investing for sustained economic growth. They could consider ways of generating income as they undertake the CSL project through innovative ways. Moreover, they could identify business ideas and opportunities as well as resources to meet the needs of the community.
c) **Research:** Learners will be expected to identify a problem or pertinent issue in the community and indicate how the problem will be solved. They will also acquire skills on how to report their findings.
d) **Communication:** Learners indicate reporting mechanisms to be used during the actual project e.g., how they intend to communicate with members of the community, either online or offline.
e) **Citizenship:** As learners engage in the CSL activities for this Grade, they will be vested with the rights, privileges, and duties of a citizen, hence giving them a sense of belonging and attachment to the nation. They will also be empowered to engage and assume active roles in shaping a more peaceful, tolerant, and inclusive society.
f) **Life Skills Education:** Learners will be equipped with life skills, including decision making, assertiveness, effective communication, problem solving and stress management. This will enable them to manage interpersonal relationships, develop leadership skills as well as discover and grow their talents.
g) **Community Development:** Learners will be empowered with skills necessary to effect relevant change, including building stronger and more resilient communities.

Suggested Pertinent and Contemporary Issues (PCIs)	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested key Inquiry Questions**
● Environmental degradation ● Lifestyle diseases ● Communicable and non-communicable diseases ● Poverty ● Violence in community ● Food security issues ● Conflicts in the community **Note:** The suggested PCIs are only examples. Teachers should allow learners to identify PCIs as per their context and reality.	By the end of the CSL project, the learner should be able to: a) identify a problem in the community through research b) plan to solve the identified problem in the community, c) design solutions to the identified problem, d) appreciate the need to belong to a community.	The learner is guided to: ● brainstorm on pertinent and contemporary issues (PCIs) in their community that need attention in groups. ● choose a PCI that needs immediate attention and explain why in groups. ● carry out research using digital devices/print media/interactions with members of the community/resource persons in identifying a community problem to address in groups. ● discuss possible solutions to the identified issue in groups. ● propose the most appropriate solution to the problem in groups. ● discuss ways and instruments they can use to collect data on the problem (questionnaires, interviews, observation schedule, etc). ● develop instruments for data collection. ● identify resources needed for the CSL project (human, technical, financial)	1. How does one determine community needs? 2. Why is it necessary to make adequate preparations before embarking on a project?

		● discuss when the project will begin and end. ● prepare a programme/timetable of the entire project execution. ● Assign roles to be carried out by all group members. ● reflect on how the project preparation enhanced learning.	

Key Component of CSL developed

a) Identification of a problem in the community through research.
b) planning to solve the identified problem.
c) designing solutions to the identified problem.

Core competencies to be developed

- **Communication and collaboration**: Learners will make the preparations in groups and conduct discussions on best ways of carrying out the project.
- **Self-efficacy:** Learners develop the skills of self-awareness and leadership as they undertake the CSL project.
- **Creativity and imagination**: Learners will come up with creative ways of solving the identified community problem.
- **Critical thinking and problem solving:** Learners will demonstrate autonomy in identifying a community need, exploring plausible solutions, and making necessary preparations to address the problem.
- **Digital literacy**: Learners can use technology as they research on a community problem that they can address.
- **Learning to learn:** Learners gain new knowledge and skills as they identify a community problem to be addressed and make preparations to carry out the project.
- **Citizenship: T**his is enhanced as learners choose a PCI that needs immediate attention in the community.

Pertinent and Contemporary Issues (PCIs)

- **Social cohesion:** As learners discuss possible solutions to the identified issue.
- **Critical thinking:** As learners discuss possible solutions to the identified issue.

Values

- **Integrity:** As learners carry out research using digital devices and print media as they identify a community problem to address.
- **Respect:** As learners brainstorm on pertinent and contemporary issues in their community that need attention.

Assessment Rubric

Indicator \ Level	Exceeds Expectation	Meets Expectation	Approaches Expectation	Below Expectation
Ability to identify a problem in the community through research.	Correctly and precisely identifies a problem in the community through research.	Correctly identifies a problem in the community through research.	Partially identifies a problem in the community through research.	Has challenges identifying a problem in the community through research even with assistance.
Ability to plan to solve the identified problem.	Accurately and systematically plans to solve the identified problem.	Accurately plans to solve the identified problem.	Plans to solve the identified problem leaves out some details.	With assistance plans to solve the identified problem but leaves out many details.
Ability to design solutions to the identified problem.	Correctly and elaborately designs solutions to the identified problem.	Correctly designs solutions to the identified problem.	Partly designs solutions to the identified problem.	Has challenges designing solutions to the identified problem even with prompting.

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

Strand	Sub Strand	Suggested Assessment Methods	Suggested Learning Resources	Suggested Non-Formal Activities
Numbers	Integers	● Class activities ● Class written tests ● Home or extended assignments or activities ● Projects	Number line games on charts, number cards, steps,	Prepare or improvise number line games on charts
	Fractions	● Class activities ● Class written tests ● Home or extended assignments or activities	Multiplication tables	
	Decimals	● Class activities ● Class written tests ● Home or extended assignments or activities	Multiplication tables	
	Squares and square roots	● Class activities ● Class written tests ● Home or extended assignments or activities	Equivalent fraction board, circular and rectangular cut-outs, counters	

	Rates, ratios, proportions, and percentages	● Class activities ● Class written tests ● Home or extended assignments or activities	Place value charts, Number cards	
Algebra	Algebraic Expressions	● Class activities ● Class written tests ● Home or extended assignments or activities ● Project	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 to organise and arrange personal items at school and home.
	Linear Equations	● Class activities ● Class written tests ● Out of class assignments	Information from different sources	
Measurement	Circles	● Class activities ● Class written tests ● Out of class assignments	Cut-outs of sectors, papers, ruler	

	Area	● Class written tests ● Out of class assignments or activities	Square cut-outs, squares, 1m squares	
	Money	● Class activities ● Home or extended assignments or activities ● project	Price lists for commodities, model shop, electronic money	Research, identify and discuss different products/goods that appreciate or depreciate. This can be done through online or other forms of searches. Create a table of products and the two prices: one for cash payment, the other for hire purchase payment. This is to inform purchasing decisions that will protect consumers from products that highly lose value with time.
Geometry	Geometric constructions	● Class activities ● Class written tests ● Out of class assignments or activities	Unit angles, Protractors, pair of compasses, rulers, straight edges	
	Coordinates and graphs	● Class activities ● Class written tests ● Out of class assignments or activities	rulers, plotting/graph paper	

	Scale drawing	● Class activities ● Class written tests ● Home or extended assignments or activities	Unit angles, protractors, pair of compasses, rulers, straight edges	
	Common solids	● Class activities ● Class written tests ● Home or extended assignments or activities ● project	Containers, compact solid objects, water, soil, clay, waste news/papers	Make models of hollow and compact solids using locally available materials. Hollow solids (containers) may be of cubes, cuboids, cylinders, pyramids, or cones and can be improvised from existing resources. Compact solids (e.g. sample bricks) may be of cubes, cuboids, or cylinders.
Data handling and probability	Data handling	● Class activities ● Class written tests ● Home or extended assignments or activities	Data from different sources	
	Probability	● Class activities ● Class written tests ● Home or extended assignments or activities	Data from different sources	

APPENDIX 2: USE OF ICT TOOLS

The following ICT tools may be used in learning and teaching of Mathematics at this level:

1. Learner digital devices (**LDD**)
2. Teacher digital devices (**TDD**)
3. Mobile phones
4. Digital clocks
5. Television sets
6. Videos
7. Cameras
8. Projectors
9. Radios
10. DVD players
11. CDs
12. Scanners
13. Internet
14. Other resources.