



REPUBLIC OF KENYA
MINISTRY OF EDUCATION

JUNIOR SECONDARY SCHOOL CURRICULUM DESIGN

MATHEMATICS FOR LEARNERS
WITH PHYSICAL IMPAIRMENT

GRADE 7



KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

First Published in 2022

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: 978-9914-43-686-0

Published and printed by Kenya Institute of Curriculum Development

FOREWORD

Curriculum is a tool which a country employs to empower its citizens. The Kenya Institute of Curriculum Development in meeting its core mandate '*to develop curriculum and curriculum support materials*' has spearheaded curriculum reforms in the education sector. The reforms are based on rigorous research, monitoring and evaluation activities conducted on the 8-4-4 system of education to inform the Competency-Based Curriculum through a phase-in phase-out model. The reforms were informed by the Summative Evaluation Survey (2009), Needs Assessment Study (2016) and the Task Force Report on Re-alignment of Education Sector (2012), 21st century learning and approaches, the East Africa Protocol on harmonisation of education, among many others.

The curriculum reforms aim at meeting the needs of the Kenyan society by aligning the curriculum to the Constitution of Kenya 2010, the Kenya Vision 2030 and the East African Protocol, among other policy requirements as documented by the Sessional Paper No. 1 of 2019 on 'Reforming Education and Training in Kenya for Sustainable Development'. The reforms adopted the Competency-Based Curriculum (CBC) to achieve development of requisite knowledge, skills, values and attitudes that will drive the country's future generations as documented by the Basic Education Curriculum Framework (BECF). Towards achieving the mission of the Basic Education, the Ministry of Education has successfully and progressively rolled out curriculum implementation for Early Years Education and Foundation level, Grades 4, 5 and Intermediate Level. The roll out for Grade 6, Junior Secondary (Grade 7-9), and Prevocational Level will subsequently follow.

It is my hope that the curriculum designs for learners with physical Impairment in Grade 7 will guide the teachers, among other educational stakeholders, for progressive achievement of the curriculum vision which seeks to have engaged, empowered and ethical citizens.

PROF. GEORGE A. O. MAGOHA, EGH
CABINET SECRETARY,
MINISTRY OF EDUCATION

PREFACE

The Government of Kenya embarked on the national implementation of the Competency Based Curriculum in January, 2019 for Early Years Education (Pre-Primary 1 and 2, and Lower Primary Grade 1, 2 and 3) and Foundation Level. The implementation progressed to Upper Primary (Grade 4, 5 and 6) and Intermediate Level based on the reorganization of the Basic Education structure. Grade 7 curriculum furthers implementation of the Competency-Based Curriculum to Junior Secondary education level. This level marks the zenith of Middle School education whose main feature is to offer a broad opportunity for the learner with Physical Impairment to explore talents, interests and abilities before selection of pathways and tracks in Senior Secondary education level. This is similar to the Pre-vocational and Vocational Level.

The Grade 7 curriculum designs for learners with Physical Impairment in the respective learning areas will enable the development of 21st Century competencies. Ultimately, this will lead to the realization of the vision and mission of the Competency-Based Curriculum as documented in the Basic Education Curriculum Framework (KICD, 2017).

It is my hope that all Government agencies among other stakeholders in education will use the designs to guide effective and efficient implementation of the learning activities as well as provide relevant feedback on various aspects of the curriculum. Successful implementation of the Grade 7 curriculum for learners with Physical Impairment will be a significant milestone towards realization of the curriculum mission ‘Nurturing Every Learner’s Potential’.

JULIUS O. JWAN, PhD, CBS
PRINCIPAL SECRETARY
STATE DEPARTMENT FOR EARLY LEARNING AND BASIC EDUCATION
MINISTRY OF EDUCATION

ACKNOWLEDGEMENTS

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

The Kenya Institute of Curriculum Development has developed and adapted the Grade 7 curriculum designs for learners with Physical Impairment taking cognisance of the tenets of the CBC, key among them being the need to ensure that learners with Physical Impairment are provided with learning experiences that call for higher order thinking, thereby ensuring they become engaged, empowered and ethical citizens as articulated in the BECF Vision. The Grade 7 designs for learners with Physical Impairment also provide opportunities for learners to develop the core competencies as well as engage in Community Service Learning. The designs present Suggested Assessment Rubric linked to sub strands in the individual subjects. Teachers are encouraged to use varied assessment tools when assessing learners.

KICD obtains its funding from the Government of Kenya to enable the achievement of its mandate and implementation of the Government and Sector (Ministry of Education (MoE) plans. The Institute also receives support from development partners targeting specific programmes. The Grade 7 curriculum designs have been developed and adapted with the support of the World Bank through the Kenya Secondary Education Quality Improvement Program (SEQIP) commissioned by the MoE. The Institute is grateful for the support accorded to the process by the Government of Kenya, through the MoE and the development partners for the policy, resource, and logistical support.

I acknowledge the KICD curriculum developers and other staff, teachers and all the educators who participated, as panelists, in the development and adaption of the designs. I also appreciate the contribution of the Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders for their various roles in the development and adaptation of the Grade 7 curriculum designs for learners with Physical Impairment.

My special thanks to the Cabinet Secretary, Ministry of Education; the Principal Secretary State Department of Early Learning and Basic Education; the Secretary, Teachers' Service Commission (TSC) and the Chief Executive Officer, Kenya National Examinations Council (KNEC) for their support in the process. Finally, I am grateful to the KICD Governing Council for their consistent guidance during the development and adaptation of the curriculum designs. The Institute assures all curriculum implementers, parents, and other stakeholders that the designs will ensure effective implementation of the CBC at Grade 7.

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

TABLE OF CONTENTS

FOREWORD	i
PREFACE	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
TIME ALLOCATION	v
NATIONAL GOALS OF EDUCATION	vi
LEARNING OUTCOMES FOR MIDDLE SCHOOL	viii
ESSENCE STATEMENT	viii
SUBJECT GENERAL LEARNING OUTCOMES.....	viii
STRAND 1.0: NUMBERS	1
STRAND 2.0: ALGEBRA.....	21
STRAND 3.0: MEASUREMENTS.....	30
STRAND 4.0: GEOMETRY	58
STRAND 5.0: DATA HANDLING AND PROBABILITY	66
COMMUNITY SERVICE LEARNING ACTIVITIES	71

TIME ALLOCATION

No	Subject	Number of Lessons Per Week (40 minutes per lesson)
1.	English	5
2.	Kiswahili/KSL	4
3.	Mathematics	5
4.	Integrated Science	4
5.	Health Education	2
6.	Pre-Technical Studies	4
7.	Social Studies	3
8.	Religious Education (CRE/IRE/HRE)	3
9.	Business Studies	3
10.	Agriculture	3
11.	Life Skills Education	1
12.	Physical Education and Sports	2
13.	Optional Subject including Braille skills and Sign Language	3
14.	Optional Subject	3
	Total	45

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-fulfillment

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 instill in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. Children should be able to blend the best of traditional Values: with the changing requirements that must follow rapid development in order to build a stable and modern society.
- vii) **Promote international consciousness and foster positive attitudes towards other nations.**
Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.
- viii) **Promote positive attitudes towards good health and environmental protection.**
Education should inculcate in young people the value of good health in order for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.

LEARNING OUTCOMES FOR MIDDLE SCHOOL

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

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

ESSENCE STATEMENT

We live in a world of Mathematics whereby we count, add, subtract, multiply or divide quantities and substances 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 think of a world without Mathematics. It is applied in the economic activities, scientific, social, religious and political worlds. It is therefore imperative that children are taught Mathematics from early years.

In Junior Secondary, Mathematics builds on the competencies acquired by the learner with Physical Impairment from primary school. It enhances the learner's competencies in mathematical skills as a foundation for Science, Technology, Engineering and Mathematics (STEM) and other pathways at Senior School. Mathematics also prepares the learner to have sufficient skills and competencies for application in solving problems in real life situations. This is in line with vision 2030 and sessional paper number 1 of 2019 which emphasizes on 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 organize data to inform and solve problems in real life situations.
- 7) Develop logical thinking, reasoning, communication and application skills through a mathematical approach to problem solving.
- 8) Apply mathematical ideas and concepts to other learning areas or subjects and in real life contexts.
- 9) Develop confidence and interest in mathematics for further training and enjoyment.

STRAND 1.0: NUMBERS

Sub Strand: Whole Numbers

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Numbers	1.1 Whole Numbers (20 lessons)	<p>By the end of the sub strand the learner should be able to:</p> <ul style="list-style-type: none"> a) <i>apply</i> 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 situations 	<p>Learners are guided:</p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to identify and write place value and total value of digits using place value apparatus. <i>Learners with speech difficulties could identify using residual speech as they are lip-read by peers/ Learner Support Assistant/ Teacher or point on the theme based multipurpose communication board/ write/ type/ stamp using appropriate Assistive Technology. Learners with manipulation difficulties (fine motor) could use any alternative functional part of the body or assistive technology to write or type on adapted digital devices with appropriate accessibility features and software to give own responses. Learners with severe manipulation difficulties could also mount/ stamp/ carry out tasks orally as they are audio-visually recorded and the clip stored as evidence of task performance in their e-portfolio. Those with spinal curvatures such as scoliosis should be appropriately positioned on positioning devices. Lower place value charts as well as tables for learners with short stature. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision (see resources section for details/ specifications on assistive devices) Apply these adaptations in all the subsequent tasks which</i> 	<ol style="list-style-type: none"> 1. Why do we write numbers in words and/or symbols? 2. Where do we write numbers in words or symbols? 3. Why do we round off numbers in real life situations?

		<p>g) identify number sequence in different situations</p> <p>h) create number sequence for playing number games</p> <p>i) use IT devices for learning more on whole numbers and for enjoyment</p> <p>j) appreciate use of whole numbers in real life situations.</p>	<p><i>involve working in pairs or groups, manipulation, identification of numbers, speech and use of ICT devices under this Sub Strand. However, other adaptations have also been made on specific tasks</i></p> <ul style="list-style-type: none"> • <i>individually, in purposive pairs or groups to read and write numbers in symbols on number cards or charts The cards used should be large and made of heavy gauge material for enhanced manipulation by learners with fine motor difficulties such as those with tremors</i> • <i>individually, in purposive pairs or groups to read and write numbers in words on number cards or charts and practice writing dummy cheques for different sums of money Apply the adaptations in bullet 1 and 2 above on speech and manipulation (fine motor) herein</i> • <i>individually, in purposive pairs or groups to prepare and use place value charts to round off numbers Learners with manipulation difficulties could use any alternative functional part of the body and or appropriate assistive technology such as head/ mouth pointers/ universal cuffs/ tweezers with grips to arrange or align number cards in the appropriate place value</i> • <i>in purposive pairs or groups to play a number game, make number cards, sort and classify numbers according to those that are even, odd or prime Learners with mobility difficulties could use appropriate mobility devices to move within the classroom. Ensure the tables or surfaces where the cards are to be arranged are free from dust to prevent asthmatic attacks. Those with brittle bone disease</i> 	
--	--	---	---	--

			<p><i>should perform lighter tasks to avoid fractures as they play number games Apply these adaptations in all the subsequent activities which involve movement, playing games and manipulation under this sub strand</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to work out or perform 2, 3 or more combined operations in the correct order using digital devices Apply the adaptation on use of digital devices in bullet 1 above herein • individually, in purposive pairs or groups to identify the number patterns to work out number sequences Apply the adaptation for speech in bullet 1 above herein • in purposive pairs or groups to play games of creating number puzzles that involve number sequences using IT devices or other materials <p>Apply the adaptation for learners with tremors and short stature in bullet 1 above herein. <i>Learners with contractures could also use any alternative functional part of the body/ assistive technology to operate adapted computers with specialized accessibility features and software (see resources section for details on assistive devices). Those who type using lower extremities could use footboards for tablets/ keyboards Apply safety precaution for learners with difficulties in vision herein.</i></p>	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Communication and collaboration as learners work in pairs or groups to prepare and use place value charts to round off numbers. • Critical thinking and problem solving as learners work together to identify number patterns. • Creativity and Imagination as learners play games of creating number puzzles that involve number sequences. 				

<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Financial literacy is enhanced as learners practice writing dummy cheques for different sums of money. • Self-esteem is developed as learners create number puzzles that involve number sequences. 	<ul style="list-style-type: none"> • Values: • Respect is nurtured as learners work in pairs/ groups and play number games. • Unity is promoted as learners work towards achieving set goals of making number puzzles. • Peace is promoted as learners work in groups and share different roles in playing games.
<p>Links to other subjects:</p> <ul style="list-style-type: none"> • Business studies as learners write numbers in words and in symbols and as they practice writing dummy cheques at home. • Computer Science as learners use digital devices to play number games. • Languages as learners write numbers in words. 	
<p>Suggested Non-Formal Activities to Support Learning:</p> <ul style="list-style-type: none"> • Learners to prepare or improvise number charts and different place value apparatus during their free time. 	<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> • Oral Questions • Observation • Written exercises • Audio visual recording
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> • Place value charts on numbers and number cards <i>with legible letters and bright colour contrast</i>, number lines on numbers, learner digital devices (LDD), teacher digital devices(TDD), cameras, projectors, radios, DVD players and CD's, internet connectivity, <i>padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on numbers, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc drive</i> • Other Related Service Providers: <i>Physiotherapist, Occupation Therapist, Speech Therapist, Learners Support Assistant,</i> 	

Suggested Assessment Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Applying place value and total value of digits up to hundreds of millions in real life.	Analyzes place value and total value of digits up to hundreds of millions in real life.	Applies place value and total value of digits up to hundreds of millions in real life.	Applies place value and total value of digits up to tens of millions in real life.	Applies place value or total value of digits up to tens of millions in real life with Prompts.
Reading and writing numbers in symbols up to hundreds of millions.	Reads and writes numbers in symbols up to hundreds of millions and beyond.	Reads and writes numbers in symbols up to hundreds of millions.	Reads and writes numbers in symbols up to tens of millions.	Reads or writes numbers in symbols up to tens of millions with Prompts.
Reading and writing numbers in words up to millions.	Reads and writes numbers in words up to millions and beyond.	Reads and writes numbers in words up to millions.	Reads and writes numbers in words up to hundreds of thousands.	Reads or writes numbers in words up to hundreds of thousands with Prompts.
Rounding off numbers up to the nearest hundreds of millions.	Rounds off numbers up to the nearest hundreds of millions and beyond.	Rounds off numbers up to the nearest hundreds of millions.	Rounds off numbers up to the nearest tens of millions.	Rounds off numbers up to the nearest tens of millions with Prompts.
Classifying natural numbers as even, odd and prime.	Compares natural numbers as even, odd and prime.	Classifies natural numbers as even, odd and prime.	Identifies natural numbers as even, odd and prime.	Identifies natural numbers as even/ odd or prime with Prompts.
Applying operations of whole numbers in real life situations.	Analyses operations of whole numbers in real life situations.	Applies operations of whole numbers in real life situations.	Distinguishes operations of whole numbers in real life situations.	Identifies operations of whole numbers in real life situations with Prompts.
Identifying number sequence in different situations.	Completes number sequence in different situations by determining missing numbers.	Identifies number sequence in different situations.	Identifies the rule in number sequence in different situations.	Identifies the rule in number sequence with continuous guidance.
Creating number sequence.	Analyses number sequence.	Creates number sequence.	Interprets number sequence.	Identifies number sequence with guidance.

Sub Strand: Factors

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Numbers	1.2 Factors (7 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ul style="list-style-type: none"> a) test divisibility of numbers by 2, 3, 4, 5, 6, 8, 9,10 and 11 in different situations b) express composite numbers as a product of prime factors in different situations c) work out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method in different situations d) apply the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) in real life situations e) use IT devices for learning more on factors and for enjoyment f) reflect on use of factors in real life situations. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to determine divisibility of numbers using regrouping and divisibility rule work sheets <i>Learners with speech difficulties could use residual speech as they are lip-read by peers/ Learner Support Assistant or use Alternative and Augmentative modes of Communication-AAC (sign, write or use communication boards or digital devices with appropriate software such as text-to-speech) to express own opinion Apply this adaptation in all the subsequent activities which involve use of speech under this Sub Strand</i> ● individually, in purposive pairs or groups to write factors of composite numbers by factorization, factor tree, factor rainbow in charts, colour charts or cards using locally available materials <i>Learners with difficulties in manipulation could use any alternative functional part of the body/ appropriate assistive technology such as adapted pens/ pencils with grips to write. They could also use typing aid to type on adapted digital devices with appropriate accessibility features and software to give own responses or mount/ stamp or carry out tasks orally as they are audio-visually recorded and the recorded clip stored as evidence for task performance in their e-portfolio (See resources section for more details on resources). Apply these adaptations in all the subsequent tasks which involve writing, manipulation (fine motor) as well as use of adapted ICT devices under this Sub Strand</i> 	<ol style="list-style-type: none"> 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?

			<ul style="list-style-type: none"> ● individually, in purposive pairs or groups to use factors to determine the LCM and the GCD using number cards or charts <i>Learners with manipulation difficulties could use any alternative functional part of the body/ appropriate assistive technology such as tweezers with grips to arrange or align number cards Lower place value and multiplication charts as well as tables for learners with short stature</i> ● individually, in purposive pairs or groups to use IT or varied print media such as journals or textbooks to access factors of numbers including songs/ poems or games on divisibility tests <i>Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. Learners on positioning devices should be preferentially and appropriately positioned to avoid acquisition of secondary conditions such as contractures</i> ● individually, in purposive pairs or groups to work out application questions and solve problems relating to the GCD and the LCM in real life situations <i>Apply the adaptations in bullet one above herein</i> ● individually, in purposive pairs or groups to determine the GCD and LCM of numbers using IT <i>Apply the adaptations in bullet one above on use of adapted digital devices herein.</i> ● individually, in purposive pairs or groups to perform exercises on factors such as matching activities or games. <i>Learners with manipulation difficulties could match by writing/ mounting/ pointing or mentioning orally. Adjust worktops and tables appropriately</i> 	
--	--	--	--	--

<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> ● Creativity and imagination: as learners work in groups to create songs and poems on divisibility tests. ● Critical thinking and problem solving: as learners apply the GCD and the LCM in solving real life problems. 	
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Self-awareness is developed as learners work in groups to create songs and poems on divisibility tests. ● Environmental education is enhanced as learners use locally available materials for making number cards and charts. 	<p>Values:</p> <ul style="list-style-type: none"> ● Unity is promoted as learners sing together or solve puzzles on factors. ● Respect for self and others is observed as learners work in groups to write factors of composite numbers using factor tree.
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Music as learners work in groups to create songs and poems on divisibility tests. ● Home Science as learners apply LCM or GCD in planning for smallest or largest containers to measure different substances. 	
<p>Suggested Non-Formal Activities to Support Learning:</p> <ul style="list-style-type: none"> ● Learners share out play materials such as marbles during games time. They could also share textbooks in the library or even play a gaming activity that involves divisibility test, GCD and LCM. 	<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> ● Written exercises ● oral questions ● observation ● Audio-visual recording
<p>Suggested learning Resources:</p> <ul style="list-style-type: none"> ● Place value chart and number cards <i>with legible letters and bright colour contrast</i>, Number lines, meter-rules <i>with grips</i>, adhesives such as cello tape, pen or pencil holders, tweezers <i>with grips</i> Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players and CD's, Internet connectivity, <i>Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on factors, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc</i> ● Other Related Service Providers: Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person 	

Suggested Assessment Rubric:				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Testing divisibility of numbers by 2, 3, 4, 5, 6, 8, 9, 10 and 11.	Applies divisibility of numbers by 2, 3, 4, 5, 6, 8, 9, 10 and 11.	Tests divisibility of numbers by 2, 3, 4, 5, 6, 8, 9, 10 and 11.	Tests divisibility of numbers by any seven of the following (2, 3, 4, 5, 6, 8, 9, 10 and 11).	Tests divisibility of numbers by up to three of the following (2, 3, 4, 5, 6, 8, 9, 10 and 11) with prompts.
Expressing composite numbers as a product of prime factors.	Expresses composite numbers as a product of prime factors and writes the answer in power form.	Expresses composite numbers as a product of prime factors.	Describes composite numbers as a product of prime factors.	Identifies composite numbers as a product of prime factors with prompts.
Working out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method.	Analyzes the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method.	Works out the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) of numbers by factor method.	Calculates the Greatest Common Divisor (GCD) or the Least Common Multiples (LCM) of numbers by factor method.	Identifies the Greatest Common Divisor (GCD) or the Least Common Multiples (LCM) of numbers with prompts.
Applying the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) in real life situations.	Analyzes the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) in real life situations.	Applies the Greatest Common Divisor (GCD) and the Least Common Multiples (LCM) in real life situations.	Applies either the Greatest Common Divisor (GCD) or the Least Common Multiples (LCM) in real life situations.	Identifies application of the Greatest Common Divisor (GCD) or the Least Common Multiples (LCM) in real life situations with guidance.

Sub Strand: Fractions

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Numbers	1.3 Fractions (9 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ul style="list-style-type: none"> 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 sequence involving fractions in different situations i) create number sequence involving fractions for playing number games j) use IT devices for learning more on fractions and for enjoyment k) recognise use of fractions in real life situations. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> • in purposive pairs or groups to discuss and arrange fractions in increasing and decreasing order using different strategies <i>Learners with difficulties in speech could use residual speech as they are lip-read by peers or Learner Support Assistant or use Alternative and Augmentative modes of Communication-AAC (sign, write or use communication boards or digital devices with appropriate software such as text-to-speech) to express own opinion Apply these adaptations in all the subsequent activities which involve use of speech and manipulation (fine motor-handling cards) under this Sub Strand</i> • individually, in purposive pairs or groups to arrange fractions in ascending or descending order using fraction cards <i>Apply the adaptation in the above bullet on handling cards herein</i> • individually, in purposive pairs or groups to add and subtract fractions in cut outs, cards, charts and concrete objects <i>Learners with manipulation difficulties (fine motor-writing/ handling cards) could use any alternative functional part of the body/ assistive technology to write/ type/ stamp/mount or carry out tasks orally as they are audio-visually recorded and the recorded clip stored as evidence of task performance in their e-portfolio. (See resources section for more details on assistive devices)</i> 	<ol style="list-style-type: none"> 1. How do we use fractions in daily activities? 2. Where do we use fractions in daily activities?

			<p><i>Apply these adaptations in all the subsequent activities which involve writing or use of IT devices</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to multiply and divide fractions in cut outs, cards, charts and models <i>Apply the adaptations in bullet above on handling fraction cards and writing herein</i> • in purposive pairs or groups to use flip cards to discuss reciprocals <i>Those with fine motor difficulties or missing limbs could use any alternative functional part of the body and or appropriate assistive technology such as head/ mouth pointers/universal cuffs to manipulate the flip cards and arrange or align fraction cards</i> <i>Apply the adaptation for speech in bullet 1 above herein</i> • in purposive pairs or groups to play games of creating number puzzles that involve fractions number sequences using IT devices or other materials <i>Apply the adaptations for learners with manipulation difficulties and those with short stature in bullet 1 above herein. Those who type using lower extremities could use footboards for tablets/ keyboards</i> <i>Also apply safety precaution for learners with difficulties in vision herein</i> • individually, in purposive pairs or groups to create a fraction sequence game that can be used for play and learning <i>Apply the adaptation for speech in bullet 1 above herein</i> • individually, in purposive pairs or groups to use IT devices to work out operations of fractions. <i>Refer to the above adaptations on ICT.</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Creativity and imagination as learners create puzzles involving fractions. • Critical thinking and problem solving as learners apply fractions using cut outs, cards, charts and models from local resources. 				

<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Social cohesion is achieved as learners carry out division of fractions which implies sharing and as they share items at home and outside school using fractions. 	<p>Values:</p> <ul style="list-style-type: none"> ● Social justice is promoted as learners share things fairly. ● Responsibility is nurtured as learners perform multiplication and division of fractions when sharing or allocating resources.
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Music as learners use fractions in types of musical notes like semi- quavers (1/16), quavers. ● Agriculture as learners give fractional portions of animal feeds. 	
<p>Suggested Non-Formal Activities to Support Learning:</p> <ul style="list-style-type: none"> ● Learners to participate in gaming activities that involve division during their free time and during mathematics club meetings. 	<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> ● Oral questions ● Observation ● Audio-visual recording ● written tests
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> ● <i>Multiplication table, Place value chart and number cards with legible letters and bright colour contrast, adhesives such as cello tape, pen or pencil holders, tweezers with grips Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players and CD's, Internet connectivity, Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on fractions, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc drive</i> ● Other related Service Providers: Physiotherapist, Occupational Therapist, Speech Therapist, Learner Support Assistant, Resource Person 	

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Comparing fractions.	Analyzes fractions using various methods.	Compares fractions.	Solves fractions.	Identifies fractions with prompts.
Adding fractions.	Adds all types of fractions and converts the sums into decimals.	Adds fractions.	Adds proper fractions with different denominator.	Adds fractions with common denominators.
Subtracting fractions.	Subtracts all types of fractions and converts the differences into decimals.	Subtracts fractions.	Subtracts proper fractions with different denominators.	Subtracts fractions with common denominators.
Multiplying fractions by a whole number, fraction and a mixed number.	Multiplies fractions of whole number, a fraction and a mixed number and converts the products into decimals.	Multiplies fractions by a whole number, fraction and a mixed number.	Multiplies proper fractions with different denominators by a whole number or a fraction or a mixed number.	Multiplies fractions with common denominators by either whole number or fraction or mixed number.
Finding reciprocals of fractions.	Finds reciprocals of fractions and converts the results into decimals.	Finds reciprocals of fractions.	Finds reciprocals of proper fractions with different denominators.	Finds the reciprocals of fractions with common denominators with prompts.
Dividing fractions by a whole number, fraction and a mixed number.	Divides fractions by a whole number, fraction and a mixed numbers and further converts the quotients into decimals.	Divides fractions by a whole number, fraction and a mixed number.	Divides proper fractions with different denominators by a whole number, fraction or a mixed number.	Divides fractions with common denominators by a whole number or a fraction with guidance.
Dividing a whole number by fractions.	Divides a whole number by fractions and creates number sequence.	Divides a whole number by fractions.	Converts a whole number into fraction and finds the reciprocal of the divisor.	Identifies the reciprocal of the divisor with prompts.
Identifying number sequence involving fractions.	Completes number sequence involving fractions.	Identifies number sequence involving fractions.	Arranges fractions in both ascending and descending order.	Arranges simple fractions in either ascending or descending order with prompts.
Creating number Sequence involving fractions.	Examines number sequence involving fractions.	Creates number sequence involving fractions.	Recognizes number sequence involving fractions.	Identifies number sequence involving fractions with prompts.

Sub Strand: Decimals

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Numbers	1.4 Decimals (6 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ul style="list-style-type: none"> a) identify the place value and the total value of digits in decimals in real life b) multiply decimals by a whole number and by a decimal in real life situations c) divide decimals by a whole number and by a decimal in real life situations d) use IT devices for learning more on decimals and for enjoyment e) recognise use of decimals in real life situations. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> • in purposive pairs or groups to discuss, state and use the place value and total value of decimals using place value apparatus and worksheets <i>Learners with manipulation difficulties (fine motor-writing/ operating devices) could use any alternative functional part of the body and or appropriate assistive technology such as head/mouth pointers/universal cuffs to write/ type/ manipulate place value apparatus. Learners with speech difficulties could use residual speech as they are lip-read by peers or teacher or Learner Support Assistant or use Alternative and Augmentative modes of Communication-AAC (sign, write or use communication boards or digital devices with appropriate software such as text-to-speech) to express own opinion. Apply preferential seating for learners such as those with short stature/ difficulties in vision/ mild hearing loss to have an enhanced visual and auditory input</i> Apply these adaptations in all the subsequent activities which involve use of speech, group task/ class presentations and writing under this Sub Strand • individually, in purposive pairs or groups to multiply and divide decimals using cut outs, cards, charts and models <i>Apply the adaptations in the above bullet for manipulation (writing/typing/ handling cut-outs) herein</i> <i>Learners with severe</i> 	<ul style="list-style-type: none"> 1. Where are decimals applicable in real life? 2. How do you use decimals in daily activities?

			<p><i>manipulation difficulties could carry out tasks orally as they are audio-visually recorded and the recorded clip stored as evidence of task performance in their e-portfolio Apply these adaptations in all the subsequent activities which involve writing or use of IT devices</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to use calculators and other IT devices to work out operations of decimals <i>Besides using other functional part of the body, learners with manipulation difficulties could also type on adapted digital devices using typing aid. Those who type/ write with their lower extremities could use footboards. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. Learners with postural defects/ short stature should be preferentially seated/ appropriately positioned to avoid acquisition of secondary conditions such as contractures</i> <i>Apply the above adaptations on use of adapted digital devices herein</i> • in purposive pairs or groups to play games involving multiplication and division of decimals <i>Learners with mobility difficulties could use appropriate mobility devices to move within the classroom. Ensure the tables or surfaces where the learners will play with cards on decimals are free from dust to prevent triggering asthmatic attacks. Learners with conditions such as brittle bone disease/ cardiac complications/ muscular</i> 	
--	--	--	--	--

			<i>dystrophy could perform lighter ability level tasks as they play number games.</i>	
Core Competencies to be developed: <ul style="list-style-type: none"> • Critical thinking and problem solving as learners identify and use the place value and the total value of decimals using place value apparatus and worksheets. • Digital literacy as learners use IT gadgets to learn more on decimals. 				
Pertinent and Contemporary Issues (PCIs): Safety is observed as learners make paper cut outs or other materials and models.			Values: <ul style="list-style-type: none"> • Unity is promoted as learners work in groups to multiply and divide decimals using cut outs, cards, charts and models. • Responsibility is developed as learners perform multiplication and division of decimals. 	
Links to other subjects: <ul style="list-style-type: none"> • Integrated Science as learners express quantities of substances in decimal forms. • Home science as learners measure mass of ingredients for cooking in decimals. 				
Suggested Non-Formal Activities to Support Learning: <ul style="list-style-type: none"> • Learners to measure and record the dimensions of the play field in decimals during play. 			Suggested Modes of Assessment: <ul style="list-style-type: none"> • Written exercises • Oral questions • Observation • Audio-visual recording 	
Suggested Learning Resources: <ul style="list-style-type: none"> • Place value chart, number card, operation sign card <i>with legible letters and bright colour contrast</i>, Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players and CD's, Internet connectivity, <i>Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on decimals, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc drive</i> • Other Related Service Providers: Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person 				

Assessment Rubric				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Identifying place value and total value of decimals.	Applies place value and total value of decimals.	Identifies place value and total value of decimals.	Identifies place value or total value of decimals.	Mentions place value or total value of decimals with prompts.
Multiplying decimals by a whole number and by a decimal.	Multiplies decimals by a whole number and by a decimal using relevant illustrations.	Multiplies decimals by a whole number and by a decimal.	Multiplies decimals by a whole number or a decimal.	Multiplies decimals by a whole number with guidance.
Dividing decimals by a whole number and by a decimal.	Divides decimals by a whole number and by a decimal using relevant illustrations.	Divides decimals by a whole number and by a decimal.	Divides decimals by a whole number or a decimal.	Divides decimals by a whole number with cues.

Sub Strand: Squares and Square Roots

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
1.0 Numbers	1.5 Squares and Square Roots (5 lessons)	By the end of the sub strand, the learner should be able to: a) determine the squares of whole numbers, fractions and decimals by multiplication in different situations b) determine the square roots of whole numbers, fractions and decimals of perfect squares in different situations	Learners are guided: <ul style="list-style-type: none"> individually, in purposive pairs or groups to work out squares of numbers using: <ul style="list-style-type: none"> grids and charts long multiplication method using calculators <i>Learners with speech difficulties could use residual speech as they are lip read by peers/ learner support assistant/ teacher or point on theme based multipurpose board/ write/ use speech synthesizer software or type to contribute in the discussion. Learners with manipulation difficulties (fine motor-writing) could use any alternative functional part of the body or appropriate assistive technology to write or type on adapted computers with appropriate accessibility</i>	<ol style="list-style-type: none"> Where do we apply squares and square roots in daily activities? How do we apply squares and square roots in daily activities?

		<p>c) use IT devices for learning more on squares and square roots and for enjoyment</p> <p>d) appreciate use of squares and square roots in real life situations.</p>	<p><i>features and software. They could also mount their responses or respond orally as they are audio-visually recorded and the clip saved in their e-portfolio as evidence of task performance. Those who write or type using lower extremities could be provided with footboards and heavy gauge papers/ books. Learners with postural defects could require preferential seating/ positioning. Adjust the glare on computer screens appropriately for learners with difficulties in vision</i></p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to work out square roots of number using: <ul style="list-style-type: none"> - factors method - division method - calculators <p><i>Apply the adaptations in bullet 1 above apply herein</i></p> <ul style="list-style-type: none"> ● in purposive pairs or groups to use IT devices <i>or other resources</i> to play games involving squares and square roots. <i>Apply the adaptation for learners for learners with manipulation difficulties (fine motor) and short stature in bullet 1 above herein.</i> Learners with manipulation difficulties (both fine and gross) could use any alternative functional part of the body or assistive technology to operate adapted computers with specialized accessibility features and software (See resources section for specifications on assistive technology). <i>Apply safety precaution for learners with difficulties in vision herein.</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> ● Critical thinking and problem solving as learners use grid squares and charts to find squares and square roots. ● Digital literacy as learners use IT devices to work out squares and square roots of numbers. 				

<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Environmental education is enhanced as learners consider shapes of different objects in the school compound especially the ones that are squares. 	<p>Values:</p> <ul style="list-style-type: none"> ● Respect is nurtured as learners appreciate each other's contribution in groups in using grids and charts. ● Unity is promoted as learners work in groups and work out the factors of numbers to get the square roots.
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Pre-Technical Studies as learners take part in carpentry and technical drawing. ● Agriculture as learners determine the number of seedlings that would fit in a square portion of land. 	
<p>Suggested Non-Formal Activities to Support Learning:</p> <ul style="list-style-type: none"> ● Learners could count tiles within the school in their classrooms/ hall or arrange cups at the school dining hall. 	<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> ● Written exercises ● Oral questions ● Observation ● Audio-visual recording
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> ● Place value apparatus, multiplication table, number charts <i>and cards with legible letters and bright colour contrast</i>, Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players and CD's, Internet connectivity, <i>Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on squares and square roots, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc drive</i> ● Other Related Service Providers: Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person 	

Suggested Assessment Rubric:				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Determining the squares of whole numbers, fractions and decimals by multiplication.	Solves the squares of whole numbers, fractions and decimals by multiplication and relevant illustrations.	Determines the squares of whole numbers, fractions and decimals by multiplication.	Determines the squares of whole numbers, fractions or decimals by multiplication.	Identifies the squares of whole numbers or fractions or decimals by multiplication with prompts.
Determining the square roots of whole numbers, fractions and decimals of perfect squares.	Evaluates the square roots of whole numbers, fractions and decimals of perfect squares.	Determines the square roots of whole numbers, fractions and decimals of perfect squares.	Determines the square roots of whole numbers and fractions or decimals of perfect squares.	Identifies the square roots of whole numbers or fractions with prompts.

STRAND 2.0: ALGEBRA

Sub Strand: Algebraic Expressions

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Algebra	2.1 Algebraic Expressions (5 lessons)	<p>By the end of the sub strands the learner should be able to:</p> <ul style="list-style-type: none"> a) form algebraic expressions from real life situations b) form algebraic expressions from simple algebraic statements in real life situations c) simplify algebraic expressions in real life situations d) use IT devices for more learning on algebraic expressions and for enjoyment e) appreciate use of algebraic expressions in real life. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> • in purposive pairs or groups to discuss and classify objects in their immediate environment according to given attributes such as similarities or differences <p><i>Learners with speech difficulties could use residual speech as they are lip read by peers/ learner support assistant/ teacher or point on theme based multipurpose board/ write/ use speech synthesizer software or type to contribute in the discussion. Learners with manipulation difficulties (fine motor) could use any alternative functional part of the body/ assistive technology such as adapted pens to write or use adapted computer with appropriate accessibility features and software to type/ mount their responses. They could also respond orally as they are audio-visually recorded and the clip saved in their e-portfolio as evidence of task performance. Those who write/ type using lower extremities should be provided with footboards. Learners with postural defects/ short stature/ difficulty in vision/ mild hearing loss could require preferential seating/ appropriate positioning devices and lowered table heights for enhanced manipulation of the objects. Adjust the glare on computer screens appropriately for learners with difficulties in vision and those with epilepsy (see specifications on assistive devices in the resources section) Apply these adaptations in all the subsequent tasks which involve speech, writing/ typing/ use of digital devices under this sub strand</i></p>	How do we use algebraic expressions in daily activities?

			<ul style="list-style-type: none"> • in purposive pairs or groups to discuss how to form algebraic expressions from the classified objects <i>Apply the adaptations for speech and manipulation difficulties in bullet 1 above herein and in the subsequent bullets 3, 4 and 5 below</i> • individually, in purposive pairs or groups to read and interpret algebraic statements to form algebraic expressions • in purposive pairs or groups to discuss how to simplify algebraic expressions from the classified objects • individually, in purposive pairs or groups to use IT to work out exercises and activities in algebra or drag and drop activities to group similar objects <i>Apply safety precaution for learners with difficulties in vision herein</i> <p><i>The adaptations made in this sub strand also apply in the subsequent experiences under this strand where speech, writing and use of digital devices are involved. However, besides some other adaptations have also been made on some specific learning experiences. Modify all facilitation of learning vis-à-vis the needs of individual learner.</i></p>	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Communication and collaboration as learners discuss in groups on formation of algebraic expressions. • Critical thinking and problem solving as learners factorize algebraic expressions. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Environmental education is enhanced as learners classify objects from the environment. • Friendship formation is nurtured as learners work and discuss in groups on formation of algebraic expressions. 			<p>Values:</p> <ul style="list-style-type: none"> • Unity is promoted as learners classify/ group similar objects in groups. • Respect is developed as learners appreciate each other’s contribution while discussing and forming algebraic expressions. 	
<p>Link to other Subjects:</p> <ul style="list-style-type: none"> • Languages as learners interpret statements to form algebraic expressions. 				
<p>Non formal Activities to support Learning:</p> <ul style="list-style-type: none"> • Learners to carry out activities involving classifying objects in their immediate environment according to given attributes 			<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> • Oral questions • Observation 	

<p>such as similarities or differences. This can be done within the school environment. Learners to take photos as they perform the activity and share with class or school.</p> <ul style="list-style-type: none"> Learners may also apply the concept of classification of objects or things to enhance orderliness within the school environment. 	<ul style="list-style-type: none"> Audio-visual recording Class written tests
---	---

Suggested Learning Resources:

- Information from different sources *such as charts with legible letters and bright colour contrast*, Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players, DVDs and CD's, Internet connectivity, *data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc drive, padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on algebraic expression, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination)*
- Related Service Providers:** *Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person*

Suggested Assessment Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Forming algebraic expressions.	Solves algebraic expressions abstractly and from real life situations.	Forms algebraic expressions.	Interprets algebraic expressions.	Recognizes algebraic expressions with prompts.
Forming algebraic expressions from simple algebraic statements.	Solves algebraic expressions from given simple algebraic statements and own made statements.	Forms algebraic expressions from simple algebraic statements.	Describes algebraic expressions made from simple algebraic statements.	Identifies algebraic expressions made from simple algebraic statements with prompts.
Simplifying algebraic expressions.	Applies algebraic expressions.	Simplifies algebraic expressions.	States steps for simplifying algebraic expressions.	Identifies simplified algebraic expressions with guidance.

Sub Strand: Linear Equations

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Algebra	2.2 Linear Equations (6 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ul style="list-style-type: none"> a) form linear equations in one unknown in different situations b) solve linear equations in one unknown in different situations c) apply linear equations in one unknown to real life situations d) use IT devices for more learning on linear equations and for enjoyment e) reflect on use of linear equations in real life situations. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> ● in purposive pairs or groups to role play activities involving equations with one unknown for example weighing using beam balance and shopping activities <i>Learners with mobility difficulties could use mobility devices with necessary physical assistance. Apply the adaptations for speech in Sub strand 2.1 bullet 1 herein for learners with speech difficulties. Apply preferential seating for learners with short stature and those with difficulties in vision. Learners such as those with hypotonic muscles or those with brittle bone disease should be given tasks according to individual functioning ability. The height of the beam balances should be appropriate for each learner (See the resources section hereunder for more details on assistive devices)</i> ● in purposive pairs or groups to discuss how to form and solve linear equations generated from role play activities <i>Apply the adaptations in sub strand 2.1 bullet 1 on speech difficulties herein</i> ● in purposive pairs or groups to make class presentations on forming and solving linear equations <i>Apply the adaptations in sub strand 2.1 bullet 1 on speech, manipulation difficulties, preferential seating and bullet 5 on use of ICT devices herein and in the bullet hereunder</i> ● individually, in purposive pairs or groups to use IT to form and solve linear equations. 	<ol style="list-style-type: none"> 1. How do we use linear equations in real life? 2. Why do we use linear equations in real life?

<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Communication and collaboration as learners role play activities involving equations in one unknown. • Self-efficacy as learners carry out weighing using beam balance and as they role play. • Learning to learn as learners apply linear equations in real life. 	
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Social cohesion is enhanced as learners work in groups to role play in shopping activities. • Self-esteem is enhanced as learners participate in role play activities like weighing and shopping that will lead to equations in one unknown. 	<p>Values:</p> <ul style="list-style-type: none"> • Integrity is promoted as learners share resources as per the given equation (conditions). • Responsibility is nurtured as learners use a given letter in the equation to represent an item.
<p>Links to other subjects:</p> <p>Computer Science as learners use IT devices in forming and solving equations.</p>	
<p>Non formal Activities to support Learning:</p> <ul style="list-style-type: none"> • Learners to carry out activities involving classifying objects in their immediate environment according to given attributes such as similarities or differences during their free time. Learners may take photos as they carry out the tasks and share with class or school. This can be done within the school environment. 	<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> • Oral questions • Observation • <i>Audio-visual recording</i> • Class written tests
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> • Information from different sources <i>such as charts with legible letters and bright colour contrast, Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players, DVDs and CD's, Internet connectivity, data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc drive, padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards linear equations, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination)</i> • Related Service Providers: <i>Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person</i> 	

Suggested Assessment Rubric:				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Forming linear equations in one unknown.	Solves linear equations in one unknown.	Forms linear equations in one unknown.	Interprets linear equations in one unknown.	Recognizes linear equations in one unknown with prompts.
Solving linear equations in one unknown.	Solves linear equations in two unknowns.	Solves linear equations in one unknown.	Describes linear equations in one unknown.	Identifies linear equations in one unknown with guidance.
Applying linear equations in one unknown.	Applies linear equations in two unknowns.	Applies linear equations in one unknown.	Interprets linear equations in one unknown.	Identifies linear equations in one unknown with prompts.

Sub Strand: Linear Inequalities

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Algebra	2.3 Linear Inequalities (8 lessons)	<p>By the end of the sub strand the learner should be able to:</p> <ul style="list-style-type: none"> 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 	<p>Learners are guided:</p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to use inequality cards to complete simple inequality statements. <i>Learners with difficulties in vision and those with short stature should be preferentially seated. Learners with manipulation difficulties (fine motor) in grip could use any alternative functional part of the body or assistive technology such as adapted tweezers to grip to arrange the cards. Learners with postural difficulties should use cut-out tables while those who use their lower limbs should use footboards or any appropriate flat surface when manipulating the cards</i> • individually, in purposive pairs or groups to use inequality cards/objects to form simple linear inequalities with one unknown Apply the above adaptations herein and in bullet 4 hereunder • individually, in purposive pairs or groups to draw and represent simple inequality statements on a number line 	<ol style="list-style-type: none"> 1. How do we use linear inequalities in real life? 2. Why do we use linear inequalities in real life?

		<p>f) use IT devices for more learning on linear inequalities and for enjoyment</p> <p>g) appreciate use of linear inequalities in real life.</p>	<p><i>Learners with manipulation difficulties (fine motor) could use any alternative functional part of the body or appropriate assistive technology such as adapted tools to draw. They could also use adapted digital devices with specialized accessibility features and software in drawing. Learners with severe manipulation difficulties could describe the procedure for drawing as an authorized person does the actual task under their instruction</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to use inequality cards to complete compound inequality statements <i>Apply the adaptations in bullet two above herein</i> • individually, in purposive pairs or groups to draw and represent compound inequality statements on a number line <i>Apply the adaptations in bullet three above herein</i> • individually, in purposive pairs or groups to use IT graphing tools to present solutions to inequalities. <i>Apply the adaptations in sub strand 2.1 bullet 5 on use of ICT devices herein.</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Communication and collaboration as learners discuss on how to form the linear inequalities. • Creativity and Imagination as learners draw and represent inequality statements on a number line. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Health education is enhanced as learners observe the correct dosage in drugs/ limits on drug consumption. • Gender equality is observed as learners observe gender representation for inclusivity during group activities. 		<p>Values:</p> <ul style="list-style-type: none"> • Social justice is promoted as learners apply linear inequalities. • Integrity is observed as learners observe the conditions of the given inequalities. 		
<p>Links to other subjects:</p> <ul style="list-style-type: none"> • Language as learners form linear inequalities from different situation. • Pre-Technical studies as learners participate in measuring quantities. 				
<p>Suggested Non-formal Activities to Support Learning:</p>			<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> • <i>Oral questions</i> 	

<ul style="list-style-type: none"> Learners participate in gaming activities that involve forming linear inequalities from varied situations within the school environment. 	<ul style="list-style-type: none"> Observation Audio-visual recording Class written tests
--	--

Suggested Learning Resources:

- Information from different sources such as *charts with legible letters and bright colour contrast*, Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players, DVDs and CD's, Internet connectivity, *data storage devices such as Digital Versatile Discs (DVDs)/ pen drive mass storage device/ external hard disc drive, padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards linear inequalities, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination),*
- Related Service Providers:** *Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person*

Suggested Assessment Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Applying inequality symbols to inequality statements in learning situations.	Applies inequality symbols to inequality statements and further solves them.	Applies inequality symbols to inequality statements.	Interprets inequality symbols in inequality statements.	Identifies inequality symbols in inequality statements with prompts.
Forming simple linear inequalities in one unknown in different situations.	Solves simple linear inequality in one unknown.	Forms simple linear inequality in one unknown.	Describes simple linear inequality in one unknown.	Identifies simple linear inequality in one unknown with guidance.
Illustrating simple linear inequality on a number line.	Examines simple linear inequality on a number line.	Illustrates simple linear inequality on a number line.	Interprets simple linear inequality on a number line.	Recognizes simple linear inequality on a number line with continuous prompts.
Forming compound inequality statements in one unknown.	Forms compound linear inequality in one unknown and solves.	Forms compound inequality statements in one unknown.	Describes compound inequality statements in one unknown.	Identifies compound inequality statements in one unknown with guidance.

Illustrating compound linear inequality on a number line.	Illustrates compound linear inequality on a number line and in varied contexts with clear explanations.	Illustrates compound linear inequality on a number line.	Describes compound linear inequality.	Recalls compound linear inequality with prompts.
---	---	--	---------------------------------------	--

STRAND 3.0: MEASUREMENTS

Sub Strand: Pythagorean Relationship

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.1 Pythagorean Relationship (4 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ol style="list-style-type: none"> recognize the sides of a right-angled triangle in different situations identify Pythagorean relationship in different situations apply Pythagorean relationship to real life situations use IT devices for more learning on Pythagoras Theorem and for enjoyment promote use of Pythagoras Theorem in real life situations. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> individually, in purposive pairs or groups to draw and represent practical cases of the right-angled triangle of an object leaning on a wall at different positions and recognize the sides as the hypotenuse, the height and the base. For example, a ladder leaning on a wall <i>Learners with speech difficulties could identify using residual speech as they are lip-read by peers/ Learner Support Assistant/ Teacher or point/ write/ type using appropriate Assistive Technology. Learners with manipulation difficulties (fine motor) could use any alternative functional part of the body/ assistive technology such as adapted pens to draw on a heavy gauge paper. Those with spinal curvatures could require positioning devices. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. Safety precaution should be observed for learners with brittle bone disease to prevent fractures as they carry out the activities (See the resources section for more details on assistive devices) Apply these adaptations in all the subsequent activities which involve identification,</i> 	<p>How do we use Pythagorean relationship in real life situations?</p>

			<p><i>speech, manipulation (writing/ drawing/ handling cards) and use of ICT devices under this Sub Strand</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to do a variety of activities for example, counting squares on different sides of a 3, 4, 5 right angled-triangle to establish the Pythagorean relationship and practice using other right angled-triangles, objects or cut outs • individually, in purposive pairs or groups to work out exercises related to Pythagorean relationship • individually, in purposive pairs or groups to create Pythagorean relationship puzzles • individually, in purposive pairs or groups to use IT devices to explore the use of Pythagorean relationship in daily life. <i>Those with manipulation difficulties could use ICT devices such as computers with special accessibility features.</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Critical thinking and problem solving as learners interpret, infer and identify Pythagorean relationship in different situations. • Creativity and imagination as learners create Pythagorean relationship puzzles. • Learning to learn as learners apply Pythagorean relationship in real life situations. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Peer education is enhanced as learners work in groups to establish the Pythagorean relationship. • Safety is observed as learners take care when using the ladder to do various activities on Pythagorean relationship. 			<p>Values:</p> <ul style="list-style-type: none"> • Unity is promoted as learners carry out various activities together, such as creating Pythagorean relationship puzzles. • Respect is nurtured as learners appreciate each other's opinions when identifying and applying Pythagorean relationship in real life situations. 	
<p>Links to other subjects:</p> <p>Pre-Technical Studies as learners use Pythagorean relationship in technical drawing, building construction, surveying.</p>				

<p>Suggested Non-Formal Activities to support leaning:</p> <ul style="list-style-type: none"> • Learners to place objects leaning on a wall at different positions and recognize the sides during their free time. 	<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> • <i>Oral questions</i> • <i>Observation</i> • <i>Audio-visual recording</i> • <i>Class written tests</i>
--	---

Suggested learning Resources:

- Ladder, stairs, Square cutouts, 1cm squares, 1m squares, *padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on Pythagorean Theorem, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded keyboards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick, adapted tweezers with grips, larger cards made of heavy-gauge paper and large prints with brighter colour contrast, cut-out tables, footboards, appropriate flat surface, universal cuffs with pencils, large rulers with grips*

Related Service Providers: *Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person*

Suggested Assessment Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Recognizing the sides of a right-angled triangle.	Describes with illustrations the sides of a right-angled triangle.	Recognizes the sides of a right-angled triangle.	Recognizes any two sides of a right-angled triangle.	Recognizes any side of a right-angled triangle with prompts.
Identifying Pythagorean relationship.	Applies Pythagorean relationship.	Identifies Pythagorean relationship.	Recognizes Pythagorean relationship.	Identifies the sides of a right-angled triangle.
Applying Pythagorean relationship.	Analyses Pythagorean relationship to various situations with illustrations.	Applies Pythagorean relationship.	Describes Pythagorean relationship.	Identifies Pythagorean relationship with prompts.

Sub Strand: Length

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
3.0 Measurements	3.2 Length (6 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ul style="list-style-type: none"> 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) use IT devices for more learning on length and for enjoyment f) promote use of length in real life situations. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to generate conversion tables involving cm, dm, m, Dm, Hm <i>Learners with speech difficulties could use residual speech as they are lip read by a peer/ learner support assistant/ teacher or point on theme based multipurpose board/ write/ use speech synthesizer software or type to contribute to the discussion. Learners with manipulation difficulties (fine motor) could use any alternative functional part of the body or assistive technology such as adapted pens to write or adapted computer with appropriate accessibility features and software to type/ mount responses or respond orally as they are audio-visually recorded and the clip saved in his/ her e-portfolio as evidence for task performance (See specifications of assistive technology in the resources section)</i> These adaptations apply in all the subsequent activities which involve writing as well as use of adapted ICT devices under this Sub Strand ● individually, in purposive pairs or groups to practice different operations involving length Apply the above adaptations herein ● individually, in purposive pairs or groups to watch videos on correct procedures of measuring length and working out perimeter <i>and then make class presentation Learners with short stature, those with difficulties in vision and those with mild</i> 	<ol style="list-style-type: none"> 1. Why do we use different units of measuring length? 2. How do we measure the perimeter of different objects?

			<p><i>hearing difficulties should be preferentially seated for enhanced visual and auditory input. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. Those with spinal curvatures may require positioning devices such as special seats. Lower table heights for those with short stature</i></p> <ul style="list-style-type: none"> ● <i>individually, in purposive pairs or groups to use appropriate measuring tools to measure the length of various objects <i>Learners with manipulation difficulties could use any alternative functional part of the body/ assistive technology to perform the task. In severe cases, they could carry out tasks orally as they are audio-visually recorded and the recorded clip stored as evidence of task performance in their e-portfolio. Apply the adaptations in bullet one on speech difficulties herein</i></i> ● <i>individually, in purposive pairs or groups to measure and work out the perimeter of different plane figures including combined shapes Apply the adaptations in bullet 1 and 4 above herein and in bullets 6 and 7 below</i> ● <i>individually, in purposive pairs or groups to measure the circumference and diameter of different circular objects and establish the relationship between circumference and diameter which is Pi <i>Those who write using lower extremities should be provided with footboards and heavy gauge paper/ books. Strap/ splint learners</i></i> 	
--	--	--	--	--

			<p><i>with floppiness and those with tremors accordingly on positioning devices</i></p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to use Pi to practice working out the circumference of circles and can use IT devices for calculations. <i>Learners with manipulation difficulties could use any other functional part of the body/ appropriate assistive technology to operate the digital devices with necessary physical assistance. Those who type with their lower extremities could use footboards. Adjust the glare on computer screens appropriately for learners with difficulties in vision and those with epilepsy.</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> ● Communication and collaboration as learners work in pairs/groups when measuring lengths of various objects and also as they discuss the relationship between circumference and diameter. ● Self-efficacy as the learners make class presentations on correct procedures of measuring length and working out perimeter. ● Critical thinking and problem solving as learners relate circumference to diameter. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Safety is observed as learners handle different instruments of measuring length. ● Social cohesion is promoted as learners work in pairs and groups in measuring lengths of various objects. ● Global citizenship is developed as they appreciate units of measurements especially the SI units of length. 			<p>Values:</p> <ul style="list-style-type: none"> ● Integrity is promoted as learners carry out the activities and give the correct measurement. ● Unity is promoted as learners work in groups measuring lengths of various objects. 	
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Integrated Science as learners use units of measuring length. ● Pre-technical Studies as learners <i>use units of measuring length</i> in tailoring, constructions, engineering 				
<p>Non formal activities to support learning:</p> <ul style="list-style-type: none"> ● Learners to measure the length of the field or dimensions of the classroom during their free time. 			<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> ● <i>Observation</i> ● <i>Audio-visual recording</i> 	

- Class written tests

Suggested Learning Resources:

- Metre Rule *with grip*, 1metre ticks, Tape measure *with loops*, padded pens/ pencils *with enhanced grip*, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on length, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick, adapted tweezers with grips, larger cards made of heavy-gauge paper and large prints with brighter colour contrast, cut-out tables, footboards, appropriate flat surface, universal cuffs with pencils, large rulers with grips

Other Related Service Providers: Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person

Suggested Assessment Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Converting units of length from one form to another involving cm, dm, m, Dm, Hm.	Converts units of length from one form to another involving cm, dm, m, Dm, Hm and vice versa.	Converts units of length from one form to another involving cm, dm, m, Dm, Hm.	Converts up to three units of length from one form to another involving cm, dm, m, Dm, Hm.	Converts up to two units of length to other forms involving cm, dm, m, Dm, Hm with cues.
Performing operations involving units of length.	Performs combined operations involving units of length and in appropriate units.	Performs operations involving units of length.	Outlines operations involving units of length.	Identifies operations involving units of length with prompts.
Working out the perimeter of plane figures.	Works out the perimeter of plane figures with illustrations.	Works out the perimeter of plane figures.	Describes the perimeter of plane figures.	Identifies the sides of plane figures with cues.
Working out the circumference of circles.	Works out the circumference of circles with illustrations.	Works out the circumference of circles.	Describes the circumference of circles.	Identifies the circumference/ diameter/ radius of circles with prompts.

Sub Strand: Area

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.3 Area (8 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ul style="list-style-type: none"> a) identify square metre (m²), acres and hectares as units of measuring area b) work out the area of rectangle, parallelogram, rhombus and trapezium in different situations c) work out the area of circles in different situations d) calculate the area of borders and combined shapes in real life situations e) use IT devices for more learning on area and for enjoyment f) recognise use of area in real life situations. 	<p>Learners are guided:</p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to generate conversion tables involving acres and hectares as units of measuring area <i>Learners with manipulation difficulties (fine motor) could use any alternative functional part of the body/ assistive technology to write. They could also use adapted computer with appropriate accessibility features and software to type. In severe cases, they could respond orally as they are audio-visually recorded and the clip saved in their e-portfolio as evidence of task performance. Those who write using lower extremities should be provided with footboards and heavy gauge paper. Learners with floppiness and those with tremors should be strapped/ splinted on positioning devices. Lower table heights for those with short stature. Adjust the glare on computer screens appropriately for learners with difficulties in vision and those with epilepsy. (See specifications for assistive devices in resources section) These adaptations apply in all the subsequent learning experiences which involve writing, drawing, arranging shapes or shape cards, mounting, practical work, measurement, tracing, cutting and use of ICT devices under this sub-strand</i> ● individually, in purposive pairs or groups to use cut outs to find the area of the plane figures Apply the adaptations in the above experience on speech and manipulation herein ● individually, in purposive pairs or groups to watch videos on how to cut out a circle to small sectors to demonstrate how to derive the formula for the area of a circle <i>and do a peer review. Seat learner with short stature, those with difficulties in vision</i> 	<ol style="list-style-type: none"> 1. What are plane figures? 2. How do we work out the areas of plane figures?

			<p><i>and those with mild hearing loss preferentially to have an enhanced visual and auditory input respectively. Adjust the glare on computer screens appropriately for learners with difficulties in vision and those with epilepsy Apply the adaptation in bullet one above herein for manipulation difficulties</i></p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to cut out a circle into small sectors and rearrange to form a rectangle to derive the formula for the area of a circle <i>Observe safety precautions for learners with haemophilia and brittle bone disease to prevent accidental cuts or fractures respectively as they use cutting tools Apply the adaptation in bullet 1 above on manipulation, positioning, safety and speech difficulties herein</i> ● individually, in purposive pairs or groups to practice cutting out the plane figures of combined shapes into different shapes to work out the area <i>Apply adaptations in bullets 1 and 4 above on manipulation and speech difficulties herein</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> ● Critical thinking and problem solving as learners cut out the circle into small sectors, joining them to create a rectangle and generate formula of getting the area of a circle. ● Creativity and imaginations as learners creatively combine different shapes to make patterns. ● Self-efficacy as learners demonstrate how to derive the formula for the area of a circle. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Safety is observed as learners handle different instruments/tools to make cut outs of different materials. ● Environmental education is enhanced as learners use locally available materials in measuring the area. 			<p>Values:</p> <ul style="list-style-type: none"> ● Responsibility is nurtured as the learners cut out the small sectors of the circle and join them up to form a rectangle. ● Integrity is promoted as learners work out exact areas of different shapes. ● Unity is promoted as learners work in groups and share tasks in measuring the area. 	

<p>Links to other Subjects:</p> <ul style="list-style-type: none"> ● Pre-technical Studies as learners correct area of different shapes through surveying. ● Creative Arts as learners combine different shapes to make patterns. ● Integrated Science as learners relate area to friction and pressure. 				
<p>Suggested Non-formal Activities to Support Learning:</p> <ul style="list-style-type: none"> ● Learners measure and mark the play areas during games time. 		<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> ● Observation ● Class written tests ● Audio-visual recording 		
<p>Suggested Learning Resources</p> <ul style="list-style-type: none"> ● Square cut outs <i>made of heavy gauge material</i>, 1cm squares, 1m squares, <i>padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on area, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick, adapted tweezers with grips, larger cards made of heavy-gauge paper and large prints with brighter colour contrast, cut-out tables, footboards, appropriate flat surface, universal cuffs with pencils, large rulers with grips</i> ● Related Service Providers: <i>Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person</i> 				
<p>Suggested Assessment Rubric</p>				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Identifying square metre (m ²), ares and hectares as units of measuring area.	Applies square metre (m ²), ares and hectares as units of measuring area.	Identifies square metre (m ²), ares and hectares as units of measuring area.	Identifies any two units of measuring area.	Identifies square metre (m ²)/ ares/ hectares as units of measuring area.
Working out the area of rectangles, parallelogram, rhombus and trapezium.	Works out the area of combined shapes of rectangles, parallelogram, rhombus or trapezium.	Works out the area of rectangles, parallelogram, rhombus and trapezium.	Works out the area of any three shapes (rectangles, parallelogram, rhombus or trapezium).	Works out the area of any one of the following shapes (rectangles, parallelogram, rhombus and trapezium).

Working out the area of circles.	Works out the area of circles and borders.	Works out the area of circles.	States the formula for working out the area of circles.	Identifies the Pi and the radius.
Calculating the area of borders and combined shapes.	Calculates the area of borders and combined shapes with relevant illustrations.	Calculates the area of borders and combined shapes.	Calculates the area of borders.	Calculates the area of borders with prompts.

Sub Strand: Volume and Capacity

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.4 Volume and Capacity (8 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <p>a) identify metre cube (m^3) as a unit of volume in measurements</p> <p>b) convert cubic metre (m^3) into cubic centimetre (cm^3) and vice versa in different situations</p> <p>c) work out the volume of cubes, cuboids and cylinder in different situations</p> <p>d) identify the relationship between cm^3, m^3 and litres in real life situations</p> <p>e) relate volume to capacity in real life situations</p> <p>f) work out the capacity of containers in real life situations</p>	<p>Learners are guided:</p> <ul style="list-style-type: none"> individually, in purposive pairs or groups to make a cube of sides 1 metre using locally available material <i>Learners with manipulation difficulties to use any alternative functional part of the body and or appropriate assistive technology to identify or make a 1 metre cube. Learners on positioning devices should be preferentially and appropriately positioned to avoid secondary conditions such as contractures. Learners with speech difficulties could use residual speech as they are lip-read by peers or teacher or Learner Support Assistant or Alternative and Augmentative modes of Communication-AAC (sign, write or use communication boards or digital devices with appropriate software such as text-to-speech) to express own opinion. Learners with Emotional and Behavioural Difficulties should be preferentially seated in close proximity for application of behaviour modification strategies</i> 	<ol style="list-style-type: none"> Where do we use volume and capacity in daily activities? Why do we measure volume?

		<p>g) use IT devices for more learning on volume and capacity and for enjoyment</p> <p>h) promote use of volume and capacity in real life situations.</p>	<ul style="list-style-type: none"> • in purposive pairs or groups to discuss and work out the conversions of cm cube[cm³]and m cube [m³] <i>Learners with speech difficulties could identify using residual speech as they are lip-read by peers/ Learner Support Assistant/ Teacher or point on the theme based multipurpose communication board / write type/ stamp using appropriate Assistive Technology in writing answers Apply adaptations for manipulation difficulties (fine motor-writing) in sub strand 3.3 bullet 1 herein</i> • individually, in purposive pairs or groups to collect labeled containers of different volume and capacity from the environment <i>Learners with manipulation difficulties could use any alternative functional part of the body/ appropriate assistive technology such as head/ mouth pointers to collect labelled containers of different volume and capacity from the environment. Learners with mobility difficulties could use mobility devices such as wheelchairs with physical assistance from peers or learner support assistant or teacher. Observe safety precautions for learners with brittle bones, those with epilepsy and those with allergic conditions by keeping them off rugged terrains, places with water bodies and pungent fumes respectively</i> • individually, in purposive pairs or groups to generate conversion tables of volume and capacity Apply the adaptation of speech in bullet one above or use adapted digital devices such as computers with expanded keyboards, key guards, sticky keys and or head-operated optical mouse or be physically assisted by peers or teacher aide or teacher under their 	
--	--	---	--	--

			<p><i>instructions. Learners should be sensitized on possible risk factors to avoid as they collect the containers</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to create models of cubes, cuboids, and cylinders which they will use to work out volume <p><i>Apply the adaptations in bullet 1 above on manipulation difficulties (using cutting tools/ creating cubes) and speech difficulties herein</i></p> <ul style="list-style-type: none"> • in purposive pairs or groups to watch videos on volume and capacity and conduct peer review in class. <i>Learners with short stature, those with difficulties in vision and those with mild hearing difficulties should be preferentially seated for enhanced visual and auditory input. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. Those with spinal curvatures may require positioning devices such as special seats. Lower table heights for those with short stature.</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Critical thinking and problem solving as learners create a conversion table of units of volume. • Creativity and Imagination as learners create models of cubes and cuboids. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Environmental education is enhanced as learners use containers of different sizes and volumes that they collected from local environment to measure volume and capacity. • Water conservation is observed as learners use containers of different capacities to store water. • Safety is observed as learners make models of cubes and cuboids. 			<p>Values:</p> <ul style="list-style-type: none"> • Responsibility is nurtured as learners work in groups and share different tasks in making models. • Peace is promoted as learners discuss to make the models for different volumes and capacities. 	

Links to other Subjects:				
<ul style="list-style-type: none"> • Creative Arts as learners create models of cubes and cuboids. • Pre-technical Studies as learners create models of cubes and cuboids. • Integrated Science as learners work out volumes of different substances. 				
Non Formal Activities to Support Learning:			Suggested Modes of Assessment:	
<ul style="list-style-type: none"> • Learners measure volume of liquids using containers of different sizes from smallest to biggest. • Learners relate packaging of goods such as water, milk and other things in the market place and how this affects consumer awareness and protection. 			<ul style="list-style-type: none"> • <i>Observation</i> • Class written tests • <i>Audio-visual recording.</i> 	
Suggested Learning resources:				
<ul style="list-style-type: none"> • Cubes, Cuboids, Cylinders, Pyramids, Spheres, Cut outs of rectangles, Circles, Triangles of different sizes (<i>all must be those that are made of heavy gauge materials and easy to manipulate</i>), <i>padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication boards on volume and capacity, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick, adapted tweezers with grips, larger cards made of heavy-gauge paper and large prints with brighter colour contrast, cut-out tables, footboards, appropriate flat surface, universal cuffs with pencils, large rulers with grips</i> • Related Service Providers: <i>Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person</i> 				
Suggested Assessment Rubric				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Identifying metre cube (m ³) as a unit of volume.	Explains metre cube (m ³) as a unit of volume.	Identifies metre cube (m ³) as a unit of volume.	Recalls metre cube (m ³) as a unit of volume.	Recalls metre cube (m ³) as a unit of volume with prompts.
Converting metre cube (m ³) into centimetre cube (cm ³) and vice versa.	Converts metre cube (m ³) into centimetre cube (cm ³) and vice versa with appropriate illustrations.	Converts metre cube (m ³) into centimetre cube and vice versa.	Converts metre cube (m ³) into centimetre cubic or centimetre cube into metre cube (m ³).	Converts metre cube (m ³) into centimetre cube with prompts.

Working out the volume of cubes, cuboids and cylinders.	Works out the volume of cubes, cuboids and cylinders with relevant illustrations.	Works out the volume of cubes, cuboids and cylinders.	Works out the volume of cubes/ cuboids or cylinders.	Works out the volume of any of the following; (cubes, cuboids, cylinders) with prompts.
Identifying the relationship between cm^3 , m^3 and litres.	Explains the relationship between cm^3 , m^3 and litres.	Identifies the relationship between cm^3 , m^3 and litres.	Identifies the relationship between cm^3 and m^3 or m^3 and litres.	Identifies the relationship between cm^3 and m^3 with prompts.
Converting units of capacity from one form to another.	Converts units of capacity from one form to another and vice versa.	Converts units of capacity from one form to another.	Converts up to three basic units of capacity.	Lists units of capacity.
Relating volume to capacity.	Relates volume to capacity with relevant illustrations.	Relates volume to capacity.	Describes volume and capacity.	Describes volume or capacity with prompts.
Working out the capacity of containers.	Works out the capacity of containers with relevant illustrations.	Works out the capacity of containers.	Describes the capacity of containers.	Describes the capacity of containers with prompts.

Sub Strand: Time, Distance and Speed

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.5 Time, Distance and Speed (8 lessons)	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	Learners are guided: <ul style="list-style-type: none"> individually, in purposive pairs or groups to use analog or digital clock to tell time in hours, minutes and seconds and discuss the units of time <i>Learners with speech difficulties could use residual speech as they are lip read by peers/ learner support assistant/ teacher or point on theme based multipurpose board/ write/ use speech synthesizer software or type to contribute in the discussion. Those with manipulation difficulties could use any alternative functional part of the body to operate the clock or be physically assisted under their instructions. Learners with</i> 	<ol style="list-style-type: none"> Why do we relate distance, time and speed? How is the concept of speed important in our day today life?

		<p>c) convert units of measuring distance in learning situations</p> <p>d) identify speed as distance covered per unit time in different situations</p> <p>e) work out speed in km/h and m/s in real life situations</p> <p>f) convert units of speed from kilometers per hour (Km/h) to meters per second (m/s) and vice versa in real life situations</p> <p>g) use IT devices to learn more on time, distance and speed for planning</p> <p>h) reflect on use of time, distance and speed in real life situations.</p>	<p><i>spinal curvatures such as those with scoliosis could require positioning devices. Lower charts on units of measuring time and wall clocks for learners with short stature. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision</i></p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to create conversion table on units of time <i>Learners with manipulation difficulties could use any alternative functional part of the body/ appropriate assistive technology such as adapted pens/pencils to write, head/ mouth pointers to arrange or align cards with units of time or type on digital devices with appropriate accessibility features. Apply the adaptation on use of ICT and speech difficulties in bullet 1 above herein</i> ● in purposive pairs or groups to discuss and estimate distances between two or more points and convert from Km to meters and vice versa <i>Apply the adaptations for manipulation, speech and postural difficulties in bullet 1 above herein</i> ● individually, in purposive pairs or groups to engage in activities that involve distance and time such as track events to relate time, distance and speed <i>Learners with manipulation difficulties could use any alternative functional part of the body/ appropriate assistive technology such as head/ mouth pointers to measure distance and time using adapted tools. Learners with mobility difficulties could use mobility devices with physical assistance from peers or learner support assistant or teacher. Observe safety precautions for learners with brittle bones, those with epilepsy and those with allergic</i> 	
--	--	---	---	--

			<p><i>conditions by keeping them off rugged terrains, cold and pungent fumes respectively</i></p> <ul style="list-style-type: none"> ● <i>in purposive pairs or groups to discuss how long they take to travel from home to school-discuss the aspects of distance, and time taken to get to school Apply adaptations in bullet 1 above herein for speech, positioning and writing difficulties</i> ● <i>individually, in purposive pairs or groups to practice calculating speeds in km/h or m/s Learners with manipulation difficulties (fine motor- writing) could use any alternative functional part of the body or assistive technology to write or adapted computer with appropriate accessibility features and software to type/ mount responses or respond orally as they are audio-visually recorded and the clip saved in their e-portfolio as evidence of task performance. Those who write using lower extremities should be provided with footboards and heavy gauge paper/ books. Learners with floppiness and those with tremors could be appropriately strapped/ splinted on positioning devices such as special seats. Lower table heights for learners with short stature</i> ● <i>in purposive pairs or groups to play digital games involving racing or watch marathon and perform peer review. Learners with manipulation difficulties (fine motor-handling ICT devices) could use any alternative functional part of the body/ assistive technology such as typing aid to operate the adapted digital devices. Adjust the glare on computer screens appropriately for learners with difficulties in vision and those with epilepsy. Apply the adaptations for speech, positioning and preferential seating in bullets 1 and 4 herein.</i> 	
--	--	--	---	--

<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> ● Critical thinking and problem solving: as learners create conversion tables to relate and determine distance, time and speed. ● Self-efficacy as learners observe punctuality in attending to different activities. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Safety is observed as learners observe safety in road and machines in relation to speed. 		<p>Values:</p> <ul style="list-style-type: none"> ● Patriotism is promoted as learners observe road safety rules including speed limits. ● Integrity is promoted as learners observe punctuality and work out correct distances. 		
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Integrated Science as learners observe time in carrying out different experiments. ● Physical Education and Sports as learners <i>time themselves while they</i> participate in athletics. 				
<p>Non formal Activities to support Learning:</p> <ul style="list-style-type: none"> ● Learners could participate in gaming activities that involve time and distance. ● They could calculate speed of peers as they participate in athletic activities. 		<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> ● <i>Peer Assessment</i> ● <i>Oral Questions</i> ● <i>Audio-visual recording</i> ● Class written tests 		
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> ● Analogue and Digital clocks, Digital watches, Stop watches, (<i>all with handles/ grips</i>), Internet connectivity, <i>Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication board on time, distance and speed, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications/ software (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick cut-out tables, footboards, mobility devices (wheelchair, scooter board, crutches, Walking frames, walkers)</i> ● Related Service Providers: <i>Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person</i> 				
<p>Suggested Assessment Rubric:</p>				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Identifying units of measuring time.	Explains units of measuring time.	Identifies units of measuring time.	Recognizes units of measuring time.	Identifies units of measuring time with prompts.

Converting units of time from one form to another.	Converts units of time from one form to another and vice versa.	Converts units of time from one form to another.	Converts any four units of time (seconds, minutes, hours, days, weeks, months, years) from one form to another.	Converts up to three units from one form to another (seconds, minutes, hours, days, weeks, months, years).
Converting units of measuring distance.	Converts units of measuring distance vice versa.	Converts units of measuring distance.	Converts outlines units of measuring distance.	Converts up to three measuring distance.
Identifying speed as distance covered per unit time.	Analyzes speed as distance covered per unit time.	Identifies speed as distance covered per unit time.	Identifies distance and time.	Identifies distance or time.
Working out speed in km/h and m/s.	Works out speed in Km/h and m/s and vice versa.	Works out speed in Km/h and m/s.	Works out speed in Km/h or m/s.	Works out speed in Km/h or m/s with prompts.
Converting units of speed from kilometers per hour (Km/h) to meters per second (m/s) and vice versa.	Converts units of speed from kilometers per hour (Km/h) to meters per second (m/s) and vice versa with illustrations.	Converts units of speed from kilometers per hour (Km/h) to meters per second (m/s) and vice versa.	Converts units of speed from kilometers per hour (Km/h) to meters per second (m/s) or meters per second (m/s) to kilometers per hour (Km/h).	Works out speed in Km/h and m/s.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.6 Temperature (6 lessons)	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	Learners are guided: <ul style="list-style-type: none"> individually, in purposive pairs or groups to move to the field, observe the temperature in the environment and discuss the temperature conditions as either warm, hot or cold <i>and then make a class presentation</i> Learners with mobility difficulties could use appropriate mobility devices to move in the field. Learners with brittle bones, those with epilepsy and those with allergic conditions such as asthma should be kept off rugged terrains as well as possible triggers such as dust/cold or heights respectively. Learners with speech difficulties could 	<ol style="list-style-type: none"> How does temperature affect our everyday lives? How do we measure temperature?

		<p>c) identify units of measuring temperature as degree Celsius and Kelvin in different situations</p> <p>d) convert units of measuring temperature from degree Celsius to Kelvin and vice-versa</p> <p>e) work out temperature in degree Celsius and Kelvin in real life situations</p> <p>f) use IT devices or other resources to learn about temperature conditions of different places</p> <p>g) recognize temperature changes in the environment.</p>	<p><i>observe and discuss the temperature using residual speech as they are lip-read by peers/ Learner Support Assistant/Teacher or write/ type to express own views. Learners with contractures of the extremities and those with postural difficulties could require appropriate positioning devices. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. (See the resources section for details and specifications of Assistive Technology)</i></p> <ul style="list-style-type: none"> ● <i>in purposive pairs or groups to discuss and test temperature of different substances using arbitrary methods like touching, for example cold, warm or hot water (exercise caution when dealing with hot substances Apply the adaptations in the above bullet on speech, manipulation (both fine and gross) herein. Learners with numbness of the muscles should observe effects of heat rather than touching hot substances to prevent burns. Learners with asthma and those with epilepsy should avoid touching cold water to prevent attacks</i> ● <i>individually, in purposive pairs or groups to identify and use tools of measuring temperature, for example, thermometers that are in degrees Celsius Refer to the above adaptations on speech. Learners with manipulation difficulties (fine and gross motor-using tools) could use any alternative functional part of the body or appropriate assistive technology to handle the tools and record their findings. Those with severe difficulties in manipulation difficulties could respond orally as they are audio-visually recorded and the clip</i> 	
--	--	--	--	--

			<p><i>saved in their e-portfolio as evidence of task performance (See specifications on Assistive devices in resources section)</i></p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to work out conversions of temperature from degrees Celsius to Kelvin and vice versa <i>Apply the adaptations on manipulation (fine motor-writing) in bullet 3 above herein</i> ● individually, in purposive pairs or groups to practice using IT devices or other resources to determine temperature of different places in degree Celsius and Kelvin. <i>Learners with manipulation difficulties (fine motor-handling ICT devices) could use any alternative functional part of the body/ assistive technology such as typing aid to operate the adapted digital devices or be physically assisted under their instructions. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision.</i> 	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> ● Communication and collaboration as learners work in groups and use tools of measuring temperature. ● Digital literacy as learners determine temperature of different places using digital devices. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Self-awareness is enhanced as learners take their body temperatures. ● Safety is observed as learners work in groups and exercise caution when dealing with hot substances. 			<p>Values:</p> <ul style="list-style-type: none"> ● Responsibility is developed as learners carefully handle tools of measuring temperature. ● Integrity is nurtured as learners give correct measurements of temperature. 	
<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Health Education as learners consider their body temperatures to establish their health status and dressing appropriately. ● Social studies as learners consider climatic temperature changes. 				

<p>Non Formal Activities to support Learning:</p> <ul style="list-style-type: none"> Record weather changes for a period of time, for example a month/term and discuss how this affects the way one dresses. 	<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> Observation Audio-visual recording Class activities
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> Thermometer, weather charts, Internet connectivity, <i>Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication board on temperature, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications/ software (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick cut-out tables, footboards</i> Related Service Providers: <i>Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person</i> 	

Suggested Assessment Rubric:				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Describing the temperature conditions of the immediate environment as either warm, hot or cold.	Analyzes the temperature conditions of the immediate environment as either warm, hot or cold.	Describes the temperature conditions of the immediate environment as either warm, hot or cold.	States the temperature conditions of the immediate environment as either warm, hot or cold.	Identifies the temperature conditions of the immediate environment with prompts.
Comparing temperature using hotter, warmer, colder and same as.	Analyzes temperature using hotter, warmer, colder and same as.	Compares temperature using hotter, warmer, colder and same as.	Compares temperature using hotter, warmer and colder.	Compares temperature using hotter, warmer or colder with prompts.
Identifying units of measuring temperature as degree Celsius and Kelvin.	Explains units of measuring temperature as degree Celsius and Kelvin.	Identifies units of measuring temperature as degree Celsius and Kelvin.	Identifies units of measuring temperature as degree Celsius or as Kelvin.	Identifies units of measuring temperature as degree Celsius or as Kelvin with prompts.

Converting units of measuring temperature from degree Celsius to Kelvin and vice-versa.	Examines the conversion units of measuring temperature from degree Celsius to Kelvin and vice-versa.	Converts units of measuring temperature from degree Celsius to Kelvin and vice-versa.	Converts units of measuring temperature from either degree Celsius to Kelvin or Kelvin to degree Celsius.	Converts units of measuring temperature from degree Celsius to Kelvin with prompts.
Working out temperature in degree Celsius and Kelvin.	Works out temperature in degree Celsius and Kelvin and converts the answer to either of the units.	Works out temperature in degree Celsius and Kelvin.	Works out temperature in degree Celsius or Kelvin.	Works out temperature in degree Celsius or Kelvin with prompts.

Sub Strand: Money

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Measurements	3.7 Money (12 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <p>a) work out profit and loss in real life situations</p> <p>b) calculate the percentage profit and loss in different situations</p> <p>c) calculate discount and percentage discount of different goods and services</p> <p>d) calculate commission and percentage commission in real life situations</p> <p>e) interpret bills in real life situations,</p> <p>f) prepare bills in real life situations</p> <p>g) work out postal charges in real life situations,</p>	<p>Learners are guided:</p> <ul style="list-style-type: none"> in purposive pairs or groups to role play shopping and selling activities involving profit, loss, discount and commission <i>Learners with speech difficulties could use residual speech as they are lip read by peers/ learner support assistant/ teacher or point on theme based multipurpose board/ write/ use speech synthesizer software or type to contribute in the discussion. Those with manipulation difficulties could use any alternative functional part of the body and or appropriate assistive technology such as head/ mouth pointers to identify and manipulate shopping items. Lower tables for learners with short stature and observe safety precaution against fractures for learners with brittle bone disease as they role play shopping and selling activities. Learners with difficulties in movement</i> 	<ol style="list-style-type: none"> Why do we use money in daily activities? What considerations would we make when buying or selling? What is involved in mobile money transactions?

		<p>h) identify mobile money services for different transactions</p> <p>i) work out mobile money transactions in real life situations</p> <p>j) use IT devices to learn more about money for expenditure and investment</p> <p>k) recognise use of money in day to day activities.</p>	<p><i>such as those with paraplegia could use mobility devices such as crutches</i> Apply these adaptations in all the subsequent activities which involve working in pairs or groups, speech, positioning and movement under this Sub Strand</p> <ul style="list-style-type: none"> ● individually, in purposive pairs or groups to work out profit and loss involving different activities and settings <i>Learners with manipulation difficulties (fine motor) could use any alternative functional part of the body and or assistive technology such as adapted pens/ pencils with grips to write or use typing aid to type on adapted digital devices with appropriate accessibility features to express own views. Those with severe manipulation difficulties could mount/ stamp or carry out tasks orally as they are audio-visually recorded and the recorded clip stored as evidence of performance of task in their e-portfolio</i> Apply these adaptations in all the subsequent activities which involve writing and use of ICT devices under this Sub Strand ● individually, in purposive pairs or groups to work out percentage profit/ loss from the role play activities Apply the adaptations in bullet 2 above on writing herein and in bullets 4, 5, 7, 9 and 11 below ● individually, in purposive pairs or groups to work out discount and percentage discount from model shopping activities ● individually, in purposive pairs or groups to work out commission and percentage commission from the role play activities 	
--	--	---	--	--

			<ul style="list-style-type: none"> ● individually, in purposive pairs or groups to identify different types of bills and read the components of bills <i>Learners with speech difficulties could identify using residual speech as they are lip-read by peers/ Learner Support Assistant/ Teacher or point on the theme based multipurpose communication board/ write/ type/ stamp using appropriate Assistive Technology</i> ● individually, in purposive pairs or groups to prepare bills of different items and expenses ● individually, in purposive pairs or groups to visit post office to gather information on postal services and charges <i>Those with mobility difficulties could use mobility devices such as wheelchairs or crutches. Safety precaution against possible triggers to asthmatic attacks such as dust as well as heights and cold for those with epilepsy should be observed. Those with brittle bone disease should keep off rugged or slippery terrains to avoid fractures as they visit the post office</i> <i>Apply adaptation for speech in bullet 1 above and manipulation-writing in bullet 2 above herein</i> ● individually, in purposive pairs or groups to work out postal charges in different situations ● in purposive pairs or groups discuss and identify mobile money services <i>Apply the adaptations for speech difficulties in bullet 1 above herein</i> ● individually, in purposive pairs or groups to work out mobile money transactions, for example, in 	
--	--	--	--	--

			<p>sending or receiving money, credit and savings, generating bills, paying for goods and services, and other online transactions using IT devices or other resources. Learners with manipulation difficulties (both fine and gross) such as those with missing limbs could use any alternative functional part of the body/ assistive technology such as typing aid/ head mouse to operate adapted computers (smart phones, tablets, laptops, desktops) with specialized accessibility features and software to carry out the mobile money transactions (See resources section for specifications on assistive technology). Those who type using lower extremities could use footboards for tablets/ keyboards. Learners with severe manipulation difficulties could be physically assisted under their instruction. Apply safety precaution for learners with difficulties in vision herein.</p>	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> ● Critical thinking and problem solving as learners work out discounts, commissions and mobile money as well as postal charges and bills. ● Communication and collaboration as learners’ role play on negotiating for discounts and commissions. ● Citizenship as learners work out discounts, commissions and mobile money in Kenyan currency. ● Self-efficacy as learners role play on negotiating for discounts and commissions. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> ● Financial literacy is developed as learners work out any discounts, commissions and mobile money as well as postal charges and bills. ● Decision making is enhanced as learners use money in paying bills and postal charges. 			<p>Values:</p> <ul style="list-style-type: none"> ● Patriotism is promoted as learners work out and pay bills in Kenyan currency. ● Integrity is promoted as learners pay bills and appreciate use of money. 	

<p>Links to other subjects:</p> <ul style="list-style-type: none"> ● Business studies as learners work out bills, discounts, commissions and postal charges. ● Life skills as learners apply negotiation skills in discounts and commissions. ● Languages as learners gather information on postal services and charges. 				
<p>Suggested Non-formal Activities to Support Learning:</p> <ul style="list-style-type: none"> ● Learners to practice budgeting activities during play. 		<p>Suggested modes of Assessment:</p> <ul style="list-style-type: none"> ● <i>Observation</i> ● Class written tests ● <i>Audio-visual recording</i> 		
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> ● Classroom shop <i>with shelves at a height accessible by all learners</i>, electronic money tariffs chart (s), price list and number cards <i>with legible prints and brighter colour contrast</i>, real money (notes and coins), imitation money <i>made of heavy gauge material/ laminated, padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication board on money, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications/ software (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick cut-out tables, footboards</i> ● Related Service Providers: Physiotherapist, Occupational Therapist, Speech Therapist, Learner Support Assistant , Resource Person 				
<p>Suggested Assessment Rubric</p>				
Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Working out profit and loss.	Works out profit and loss and converts into percentages.	Works out profit and loss.	Works out profit or loss.	Identifies profit and loss with prompts.
Calculating percentage profit and loss.	Evaluates percentage profit and loss.	Calculates percentage profit and loss.	Calculate percentage profit or loss.	Describes percentage profit or loss with prompts.
Calculating discount and percentage discount.	Evaluates discount and percentage discount.	Calculates discount and percentage discount.	Calculate discount or percentage discount.	Calculates discount or percentage discount with prompts.

Calculating commission and percentage commission.	Evaluates commission and percentage commission.	Calculates commission and percentage commission.	Calculates commission or percentage commission.	Calculates commission or percentage commission with prompts.
Interpreting bills.	Analyzes bills.	Interprets bills.	Describes bills.	Identifies bills.
Preparing bills.	Evaluates bills.	Prepares bills.	States the entries in a bill.	Identifies the entries in a bill with prompts.
Working out postal charges.	Analyzes postal charges.	Works out postal charges.	Describes postal charges.	Identifies postal charges with prompts.
Identifying mobile money services.	Evaluates mobile money services.	Identifies mobile money services.	Describes mobile money services.	Identifies mobile money services with prompts.
Working out mobile money transactions.	Analyzes mobile money transactions.	Works out mobile money transactions.	Outlines mobile money transactions.	States mobile money transactions with cues.

STRAND 4.0: GEOMETRY

Sub Strand: Angles

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Geometry	4.1 Angles (10 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ul style="list-style-type: none"> a) relate different types of angles on a straight line in real life situations b) solve angles at a point in learning situations c) relate angles on a transversal in different situations d) solve angles in a parallelogram in different situation e) identify angle properties of polygons up to hexagon in different situations f) relate interior angles, exterior angles and the number of sides of a polygon up to hexagon in different situations g) solve angles and sides of polygons up to hexagon in learning situations h) use IT devices to learn more about angles and for leisure 	<p>Learners are guided:</p> <ul style="list-style-type: none"> • in purposive pairs or groups to discuss positions of objects in the immediate environment in relation to angles and present their findings <i>Learners with speech difficulties could use residual speech as they are lip read by peers/ learner support assistant/ teacher or point on theme based multipurpose communication board/ write/ use speech synthesizer software or type to contribute in the discussion. Preferentially seat learners with short stature, those with mild hearing loss, and those with difficulties in vision for enhanced visual and auditory input during class presentations</i> • individually, in purposive pairs or groups to draw straight lines with different angles, measure and relate them <i>Learners with manipulation difficulties (fine motor- in using drawing tools) such as those with amputation/ missing limbs could use any alternative functional part of the body/ appropriate assistive technology to draw straight lines and angles/ mount already drawn lines and angles which they measure using protractors with grips. They could also use adapted digital devices with specialized accessibility features and interactive software. Learners with severe manipulation difficulties could mount strips of paper to form straight lines and angles. They could alternatively describe the procedure for drawing and measuring angles as an authorized person does the actual task. Learners with short stature/ those with difficulties in vision/ those with postural difficulties should be</i> 	<ol style="list-style-type: none"> 1. How do we make angles? 2. Where do we use angles in real life situations?

		<p>i) admire use of angles in objects.</p>	<p><i>preferentially seated and appropriately positioned while those who use lower extremities should draw on footboards</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to draw different angles at a point, measure, relate and work out angles at point <i>Apply the above adaptations herein and in the two successive bullets under this sub strand for learners with manipulation difficulties (handling drawing/ measuring instruments) as well as learners with speech difficulties such as those with slurred speech in relating angles</i> • individually, in purposive pairs or groups to draw transversals, measure and relate angles • individually, in purposive pairs or groups to draw parallelograms, measure and relate various angles • individually, in purposive pairs or groups to use cut outs or drawings of different polygons up to hexagon, measure the interior angles and relate to the number of right angles <i>Apply the adaptation on manipulation in bullet 2 and 3 above (drawing) herein. Learners with manipulation difficulties could handle large cut-outs made of heavy-gauge materials</i> • individually, in purposive pairs or groups to use cut outs or drawings of different polygons up to hexagon, measure interior and exterior angles and relate to the number of sides <i>Apply the adaptation in bullet 2 and 6 above herein for learners with manipulation difficulties (gross and fine motor in handling cut-outs) and speech difficulties in relating angles</i> • individually, in purposive pairs or groups to work out angles and sides in different polygons up to hexagon <i>Apply the adaptations on writing and use of ICT devices in bullet 1 herein for learners with manipulation difficulties (fine motor)</i> • individually, in purposive pairs or groups to draw angles at a point and in parallelograms using IT devices. <i>Learners with</i> 	
--	--	--	--	--

			<p><i>manipulation difficulties (both fine and gross) could use any alternative functional part of the body and assistive technology such as typing aid/ head mouse to operate adapted computers with specialized accessibility features and software. Learners who type using lower extremities could use footboards for tablets/ keyboards.</i></p> <p><i>Apply safety precaution for learners with difficulties in vision herein.</i></p> <p><i>The adaptations made in this sub strand also apply in the successive experiences under this strand where speech, writing, drawing, measurement of angles or lines and use of digital devices are involved. However, besides, some other adaptations have also been made on some specific learning experiences. Modify all facilitation of learning vis-à-vis the needs of individual learner (See resources section for detailed specifications on assistive technology).</i></p>	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Communication and collaboration as learners discuss in groups the positions of objects in the immediate environment in relation to angles. • Critical thinking and problem solving as learners draw, measure and relate angles. • Digital literacy as learners learn to use digital devices to learn more on <i>angles</i> inequalities and play digital games. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Safety is observed as learners work in groups to use cut outs or drawings of different polygons up to hexagon. 			<p>Values:</p> <ul style="list-style-type: none"> • Responsibility is enhanced as learners explore positions of objects in the immediate environment in relation to angles. • Unity is promoted as learners work in groups to use cut outs or drawings of different polygons up to hexagon. 	
<p>Links to other subjects:</p> <ul style="list-style-type: none"> • Pre-technical Studies as learners use cut outs or drawings of different polygons up to hexagon, or drawings in tailoring. 				
<p>Suggested Non-Formal Activities to Support Learning:</p> <ul style="list-style-type: none"> • Learners could identify different polygons in the environment and relate their interior and exterior angles to the number of sides during their free time or Mathematics club’s time. 			<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> • <i>Oral questions</i> • <i>Observation</i> • <i>Audio-visual recording</i> 	

- Class written tests

Suggested Learning Resources:

- Learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players and CD's, Internet connectivity, *Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication board on angles, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications/ software (for text creation, text-to-speech conversion, speech recognition, eye-tracking for operation, calculator), ergonomic and head operated mouse, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick, adapted tweezers with grips, larger cut-outs of polygons made of heavy-gauge paper and large prints with brighter colour contrast, cut-out tables, footboards, appropriate flat surface, universal cuffs with pencils, large rulers with grips*
- **Related Service Providers:** *Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person*

Suggested Assessment Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Relating different types of angles on a straight line.	Relates different types of angles on a straight line, giving relevant illustrations.	Relates different types of angles on a straight line.	Recognizes different types of angles on a straight line.	Identifies angles on a straight line with guidance.
Solving angles at a point	Solves angles at a point with relevant explanations.	Solves angles at a point.	Interprets angles at a point.	Identifies angles at a point with prompts.
Relating angles on a transversal.	Relates angles on a transversal with relevant illustrations.	Relates angles on a transversal.	Recognizes angles on a transversal.	Identifies angles on a transversal with prompts.
Solving angles on a parallelogram.	Solves angles on a parallelogram with relevant illustrations.	Solves angles on a parallelogram.	Describes angles on a parallelogram.	Identifies angles on a parallelogram with prompts.
Identifying angle properties of polygons up to hexagon.	Identifies angle properties of polygons up to heptagon (septagon).	Identifies angle properties of polygons up to hexagon.	Identifies angle properties of polygons up to pentagon.	Identifies angle properties of quadrilaterals with guidance.
Relating interior angles, exterior angles and the	Relates interior angles, exterior angles and the number of sides	Relates interior angles, exterior angles	Relates interior angles or exterior angles and the	Identifies interior angles, exterior angles and the number

number of sides of a polygon up to hexagon.	of a polygon up to heptagon (septagon).	and the number of sides of a polygon up to hexagon.	number of sides of a polygon up to hexagon.	of sides up to hexagon with prompts.
Solving angles and sides of polygons up to hexagon.	Solves angles and sides of polygons up to heptagon (septagon)	Solves angles and sides of polygons up to hexagon	Solves angles of polygons up to hexagon.	Solves angles of polygons up to pentagons with prompts.

Sub Strand: Geometrical Constructions

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Geometry	4.2 Geometrical Constructions (12 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <p>a) measure different angles in learning situations</p> <p>b) bisect angles using a ruler and a pair of compasses only in learning situations</p> <p>c) construct 90°, 45°, 60°, 30° and other angles that are multiples of 7.5° using a ruler and a pair of compasses only in learning situations</p> <p>d) construct different triangles using a ruler and a pair of compasses only in different situations</p> <p>e) construct circles using a ruler and a pair of compasses only in different situations</p>	<p>Learners are guided:</p> <ul style="list-style-type: none"> individually, in purposive pairs or groups to draw and measure different angles <i>The adaptations in sub strand 4.1 bullet 2 on drawing lines and measuring angles apply herein and in bullet 2, 3, 4, and 5 hereunder. Moreover, learners with manipulation difficulties could use the chalkboard drawing instruments on a slate or flat surface. Caution should be taken for learners with tremors and those who may have haemophilia against injury from sharp pointed instruments such as pair of compasses. All the instruments should be adapted to have grips/ handles or larger for enhanced grip. In all tasks that involve precision/ accuracy, such as construction/ measurement, allow a wider margin of error for learners with manipulation difficulties and those with difficulties in posture as they may not carry out the activities with the required precision. Recognize any effort shown by the learner vis-à-vis his/ her individual needs</i> individually, in purposive pairs or groups to draw and bisect different angles 	<ol style="list-style-type: none"> Where do we use geometric constructions in real life situations? Why do we use geometric constructions?

		<p>f) use IT devices to learn about geometric constructions for skills development</p> <p>g) recognise use of geometric constructions of different shapes in objects.</p>	<p><i>Apply the adaptations in sub strand 4.1 bullet 2 herein and in bullets 3, 4 and 5 below</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to construct 90°, 45°, 60°, 30° including 120°, 105° and practice with angles that are multiples of 7.5° using a pair of compasses and rulers • individually, in purposive pairs or groups to construct triangles using a pair of compasses and rulers • individually, in purposive pairs or groups to construct circles using a pair of compasses and rulers • individually, in purposive pairs or groups to use IT devices on graphics to draw angles and circles, watch videos of bisecting angles and constructing angles and circles. <p><i>Apply the adaptations in sub strand 4.1 bullet 9 above herein.</i></p>	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Creativity and imagination as learners make observations and construct angles, triangles and circles. • Digital literacy as learners learn to use digital devices to learn more on construction of angles, triangles and circles 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Safety is observed as learners use geometrical instruments such as a pair of compasses and dividers. 			<p>Values:</p> <ul style="list-style-type: none"> • Responsibility is nurtured as learners use geometrical instruments for construction of angles and circles. • Unity is promoted as learners work in groups to draw and measure different angles. 	
<p>Links to other subjects:</p> <ul style="list-style-type: none"> • Creative arts as learners construct angles, triangles and circles which they can use to make geometrical patterns. 				
<p>Suggested Non-Formal Activities to Support Learning:</p> <ul style="list-style-type: none"> • Learners could participate in marking the athletic track and different ball game courts during games time or sports clubs time. 			<p>Suggested Modes of Assessment:</p> <ul style="list-style-type: none"> • <i>Oral questions</i> • <i>Observation</i> • <i>Class written tests</i> 	

Suggested Learning Resources:

- Unit angles made of heavy gauge material, Protractors , Rulers (the instruments should be larger ones with handles/ grips such chalkboard drawing instruments), Straight edges/ large heavy gauge cut-outs with straight edges, chalkboard drawing instruments with enhanced grip, slate, appropriately prepared flat surface such as floor/ table top, learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players and CD's, Internet connectivity, Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication board on Geometrical constructions, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, universal cuffs, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, drawing tables and pie charts, text-to-speech conversion, speech recognition, eye-tracking for operation), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick, cut-out tables, footboards
- **Related Service Providers:** Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person

Suggested Assessment Rubric

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Measuring different angles.	Measures different angles and also calculates the missing ones in plane figures.	Measures different angles.	Describes different angles.	Identifies different angles with prompts.
Bisecting angles using a ruler and a pair of compasses only.	Bisects angles and sides using a ruler and a pair of compasses only.	Bisects angles using a ruler and pair of compasses only.	Bisects angles using a protractor and a ruler.	Bisects angles using a protractor and a ruler prompts.
Constructing 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.	Constructs 90 ⁰ , 60 ⁰ , 45 ⁰ , 30 ⁰ and other angles that are multiples of 7.5 ⁰ using a ruler, a pair of compasses and other methods.	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 only.	Constructs 90 ⁰ , 60 ⁰ , 45 ⁰ and 30 ⁰ using a ruler and a pair of compasses only.	Constructs any one of the following angles (90 ⁰ , 60 ⁰ , 45 ⁰ , 30 ⁰) protractor and a ruler with prompts.
Constructing different triangles using a ruler	Constructs different triangles using a ruler and a pair of	Constructs different triangles using a ruler and a pair of compasses only.	Constructs a triangle using a ruler and a pair of compasses only.	Constructs a triangle using a protractor and a ruler with prompts.

and a pair of compasses only.	compasses only and states their properties.			
Constructing circles using a ruler and a pair of compasses only.	Constructs circles using a ruler and a pair of compasses only, creating patterns involving circles.	Constructs circles using a ruler and a pair of compasses only.	Describes construction of circles using a ruler and a pair of compasses only.	Uses circular objects to create circles.

STRAND 5.0: DATA HANDLING AND PROBABILITY

Sub strand: Data handling

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
5.0 Data Handling and Probability	5.1 Data Handling (10 lessons)	<p>By the end of the sub strand, the learner should be able to:</p> <ol style="list-style-type: none"> state the meaning of data in learning situation collect data from different situations draw frequency distribution table of data from different sources determine suitable scale for graphs of data from different situations draw pictographs of data from real life situations draw bar graphs of data from different sources interpret bar graphs of data from real life situations draw pie charts of data from real life situations interpret pie charts of data from real life situations draw a line graph of data from different situations interpret travel graphs from real life situations use IT or other resources to represent data 	<p>Learners are guided:</p> <ul style="list-style-type: none"> in purposive pairs or groups to discuss, collect and organize data from immediate environment <p><i>Preferentially seat learners with such as those with short stature/ difficulties in vision/ postural defects for enhanced auditory and visual input. Those who use lower extremities should write/ draw/ organize data on footboards. Learners with speech difficulties could use residual speech/ point on theme based multipurpose board/ write/ use speech synthesizer software/ type to contribute in the discussion. In collecting data, learners with mobility difficulties could use appropriate assistive technology for mobility to navigate the environment, with physical assistance as need may arise. Learners with manipulation difficulties (fine motor in using writing tools) could use any alternative functional part of the body or assistive technology for writing or mount to organize the collected data. They could also use adapted digital devices with specialized accessibility features and interactive software to record data while in the field. Learners with severe manipulation</i></p>	<ol style="list-style-type: none"> Why do we collect data? How do we represent data? How do we interpret data?

		<p>m) promote use of data in real life situations.</p>	<p><i>difficulties could describe the procedure for drawing/ organizing data as an authorized person does the actual task. They could be given already drawn data graphs/ pie charts which they interpret</i></p> <p><i>(The adaptations made in this experience also apply in the subsequent experiences in bullets 2, 3, 4, 5, 6, 7, 8, 9 10 and 11 below where preferential seating/ positioning, speech, manipulation (writing/ drawing materials) and interpretation of data are involved)</i></p> <ul style="list-style-type: none"> • individually, in purposive pairs or groups to tally and represent the data in a frequency tables • in purposive pairs or groups to discuss and come up with suitable scale to represent data in graphs • in purposive pairs or groups to discuss and use a suitable scale to draw pictographs from data • in purposive pairs or groups to discuss and use a suitable scale to draw bar graphs from data • in purposive pairs or groups to discuss and interpret bar graphs of data • in purposive pairs or groups to discuss and represent data on pie charts • in purposive pairs or groups to discuss and interpret pie charts of data • individually, in purposive pairs or groups to use suitable scale to represent data on line graphs 	
--	--	--	--	--

			<ul style="list-style-type: none"> • in purposive pairs or groups to discuss and interpret travel graphs from real life situations • individually, in purposive pairs or groups to draw pie charts, pictographs and read data from bar graphs using IT devices or watch videos relating to data. <p><i>Adjust the light intensity/ glare on the screens of digital devices appropriately to suit learners who may experience difficulties in vision such as those with photophobia as well as those with epilepsy. Safety precaution should be observed for learners with brittle bone disease against slippery and rugged terrains to prevent mishaps such as fractures as they collect data. Learners with allergic conditions such as asthma and those with epileptic seizures should be kept off places with possible triggers such as fumes/dust/ cold or heights/ water bodies respectively.</i></p>	
<p>Core Competencies to be developed:</p> <ul style="list-style-type: none"> • Creativity and imagination as learners make observations and present data in the form of pie charts and pictograms. • Critical thinking and problem solving as learners make inference and interpret data from bar graphs, pictograms and pie charts. 				
<p>Pertinent and Contemporary Issues (PCIs):</p> <ul style="list-style-type: none"> • Decision making is developed as learners present data that can be used to make informed decisions. 			<p>Values:</p> <ul style="list-style-type: none"> • Responsibility is enhanced as learners collect and present data in pictograms that may involve different resources. • Peace is promoted as learners work in purposive groups to collect and present data. 	
<p>Links to other subjects:</p> <ul style="list-style-type: none"> • Creative Arts as learners draw pictographs and pie charts. • Social Studies as learners present data in pie charts and pictographs that may involve populations. 				
<p>Suggested Non-Formal Activities to Support Learning:</p>			<p>Suggested Modes of Assessment:</p>	

<ul style="list-style-type: none"> Learners could participate in marking the athletic track and different ball game courts during games time or sports clubs time. 	<ul style="list-style-type: none"> Oral questions Observation Class written tests Audio-visual recording
---	--

Suggested Learning Resources:

- Unit angles made of heavy gauge material, Protractors , Rulers (*the instruments should be larger ones with handles/ grips*), Straight edges/ large heavy gauge cut-outs with straight edges, chalkboard drawing instruments with enhanced grip, slate, appropriately prepared flat surface such as floor/ table top, learner digital devices (LDD), Teacher digital devices(TDD), Cameras, Projectors, Radios, DVD players and CD's, Internet connectivity, Padded pens/ pencils with enhanced grip, head/ mouth pointers, book holders and page turners, multipurpose stamps, theme-based multipurpose communication board on data handling, heavy-gauge paper/ exercise books, splints, seats with worktops fixed to the side of the less affected arm/ hand, typing aids, adapted computers with larger screens, touch screens, expanded key boards (with key guards, trackballs, larger keys, sticky keys, embedded touch pads), appropriate applications (for text creation, drawing tables and pie charts, text-to-speech conversion, speech recognition, eye-tracking), ergonomic and head operated mouse, footboards, positioning devices (chest/ neck braces, prone wedges/ beds, special seats with straps, tables with adjustable heights and inclination), universal cuffs with stick, cut-out tables, footboards
- Related Service Providers:** Physiotherapist, Occupation Therapist, Learners Support Assistant, Resource Person

Suggested Assessment Rubric:

Criteria	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Stating the meaning of data.	Explains the meaning of data.	States the meaning of data.	Mentions the meaning of data.	Identifies the meaning of data with prompts.
Collecting data.	Collects data using varied methods.	Collects data.	Describes ways of collecting data.	Identifies ways of collecting data with cues.
Drawing frequency distribution table of data.	Draws frequency distribution table of data outlining the various components.	Draws frequency distribution table of data.	Describes frequency distribution table of data.	Identifies components of frequency distribution table of data with prompts.
Determining suitable scale for graphs.	Determines suitable scale for graphs uses it to plot data in graphs.	Determines suitable scale for graphs.	States suitable scale for graphs.	Identifies suitable scale for graphs with prompts.

Drawing Pictographs of data.	Draws Pictographs of data outlining the various components.	Draws Pictographs of data.	Describes Pictographs of data.	Identifies Pictographs of data with prompts.
Drawing Bar Graphs of data.	Draws Bar Graphs of data, outlining the various components.	Draws Bar Graphs of data.	Describes Bar Graphs of data.	Identifies Bar Graphs of data with cues.
Interpreting Bar Graphs of data.	Examines Bar Graphs of data.	Interprets Bar Graphs of data.	Describes Bar Graphs of data.	Identifies Bar Graphs of data with prompts.
Drawing Pie Charts of data.	Draws Pie Charts of data outlining the various sectors.	Draws Pie Charts of data.	Describes Pie Charts of data.	Identifies Pie Charts of data with prompts.
Interpreting Pie Charts of data.	Examines Pie Charts of data.	Interprets Pie Charts of data.	Describes Pie Charts of data.	Identifies Pie Charts of data with prompts.
Drawing a Line Graph.	Draws a Line Graph outlining the various components.	Draws a Line Graph.	Describes a Line Graph.	Identifies a Line Graph with prompts.
Interpreting travel graphs.	Examines travel graphs.	Interprets travel graphs.	Describes travel graphs.	Identifies travel graphs with prompts.

COMMUNITY SERVICE LEARNING ACTIVITIES

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

All learners with physical impairment in Grade 7 will be expected to participate in a CSL class activity. The activity will give learners an opportunity to practise the CSL Project skills covered under LSE. This activity will be undertaken in groups where learners with physical impairment will be purposively grouped to complement each other. Learners will be expected to apply the steps provided to carry out the CSL project.

The activity will take the form of a whole school approach, where the entire school community will be engaged in the learning process. Teachers will guide learners with physical impairment to execute a simple school based CSL class activity. This activity can be done in 4 to 6 weeks outside the classroom time. The duration may be adjusted accordingly to accommodate learners with physical impairment who may require more time to implement the CSL project.

CSL Skills to be covered

- i) **Research:** *Learners will develop research skills as they investigate PCIs to address, ways and tools to use in collecting data, analysing information and presenting their findings.*
- ii) **Communication:** *Learners will develop effective communication skills as they engage with peers and school community members. These will include listening actively, asking questions, and presentation skills using varied modes.*
- iii) **Citizenship:** *Learners will be able to explore opportunities for engagement as members of the school community and provide a service for the common good.*
- iv) **Leadership:** Learners will develop leadership skills as they take up various roles within the CSL activity.
- v) **Financial Literacy Skills:** Learners will consider how to source and utilise resources effectively and efficiently.
- vi) **Entrepreneurship:** Learners will consider ways of generating income through innovation for the CSL class activity.

Suggested PCIs	Specific Learning Outcomes	Suggested Learning Experiences (Customise to the focus of the grade)	Key Inquiry Questions
<p>Learners will be guided to consider the various PCIs provided in the subject in Grade 7 and choose one suitable to their context and reality</p>	<p>By the end of the CSL class activity, the learner should be able to:</p> <ol style="list-style-type: none"> identify a problem in the school community through research; develop a plan to solve the identified problem in the community design solutions to the identified problem implement solution to the identified problem share the findings to relevant actors reflect on own learning and relevance of the project appreciate the need to belong to a community. 	<p>The learners are guided:</p> <ul style="list-style-type: none"> individually, in purposive pairs or groups to brainstorm on pertinent and contemporary issues in the community that need attention and share in class. Learners with speech difficulties could be lip-read by peers, teacher, learner support assistant as they use residual speech or sign, point, write, use multipurpose communication board, speech generating device, eye tracking device or be allowed extra time to express their views. (<i>Apply this adaptation to subsequent learning experiences involving use of speech</i>). in purposive pairs or groups to discuss various PCIs within the school community and identify the one that requires immediate attention giving reasons for their choice. in purposive pairs or groups to discuss possible solutions to the identified issue and propose the most appropriate solution to the problem. in purposive pairs or groups to brainstorm on the resources needed for the activity and source for them. individually, in purposive pairs or groups to discuss different methods and tools of collecting data and determine the ones suitable for the selected project. individually, in purposive pairs or groups to develop appropriate tools (<i>Questionnaires, interview schedule, observation checklist</i>) for collecting data with the guidance of the teacher. Learners with manipulation difficulties could be provided with adapted writing materials such as pen/pencils with grip, weighted pens/pencils or writing claws. They could type on tablet or be assisted by a scribe or learner support assistant to develop their tools. individually, in purposive pairs or groups to collect data and record findings. Learners with mobility difficulties could collect data 	<ol style="list-style-type: none"> How does one determine community needs? Why is it necessary to be part of a community? What can one do to demonstrate a sense of belonging?

		<p>remotely or be supported by peers and learner support assistant during data collection. Apply the adaptation on manipulation above here.</p> <ul style="list-style-type: none"> • in purposive pairs or groups to discuss their findings, develop various reporting documents and use them to report on their findings. <i>Apply adaptation on the use of speech and manipulation in this experience.</i> • individually, in purposive pairs or groups to implement a project to get solutions to the identified problem based on the research report. <i>Apply adaptation on the use of speech, manipulation and mobility in this experience. Ensure the safety of the learners as they manipulate the tools, materials, equipment and as they explore the environment.</i> • individually, in purposive pairs or groups to use feedback from peers and the school community to improve on the implementation of the project. • in purposive pairs or groups to discuss the successes, challenges faced while implementing the project activities and lessons learnt; write a report and share through various media to peers and the school community. <i>Apply adaptation on the use of speech and writing above.</i> Learners with manipulation difficulties could be provided with adapted digital resources with appropriate accessibility features or be supported by peers, learner support assistant or teacher to manipulate the digital resources. Light intensity should be controlled for learners with epilepsy and those with visual impairment. • individually, in purposive pairs or groups to reflect on how the project enhanced learning while at the same time facilitating service to the school by providing solutions to the identified issue(s). 	
--	--	---	--

Suggested Assessment Rubric:

Criteria	Exceeds Expectation	Meets Expectation	Approaches Expectation	Below Expectation
Identifying a pertinent issue in school the community to be addressed.	Gives Justification for the identified pertinent issue in the school community to be addressed.	Identifies a pertinent issue in the school community to be addressed.	States a pertinent issue in the school community to be addressed.	Recalls a pertinent issue discussed in class.
Planning to solve the identified issue.	Designs and develops a step-by-step plan of the activities to be carried out in the process of solving the problem.	Plans to solve the identified issue.	Outlines a plan to solve the identified problem.	States activities to be included in a plan to solve the identified problem.
Designing and implementing solutions to the identified problem.	Designs, analyses and implements solutions to the identified problem.	Designs and implements solutions to the identified problem.	Designs solutions to the identified problem.	Suggests solutions to the identified problem.