KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

A Skilled and Ethical Society

JUNIOR SCHOOL CURRICULUM DESIGN

MATHEMATICS

GRADE 8

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FOREWORD

The Government of Kenya is committed to ensuring that policy objectives for Education, Training and Research meet the aspirations of the Constitution of Kenya 2010, the Kenya Vision 2030, National Curriculum Policy 2019, the United Nations Sustainable Development Goals (SDGs) and the regional and global conventions to which Kenya is a signatory. Towards achieving the mission of basic education, the Ministry of Education (MoE) has successfully and progressively rolled out the implementation of the Competency Based Curriculum (CBC) at Pre-Primary, Primary and Junior School levels.

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

The reviewed Grade 8 curriculum designs build on competencies attained by learners at the end of Grade 7. Further, they provide opportunities for learners to continue exploring and nurturing their potentials as they prepare to transit to Senior Secondary School.
The curriculum designs present National Goals of Education, essence statements, general and specific expected learning outcomes for the subjects as well as strands and sub strands. The designs also outline suggested learning experiences, key inquiry questions, core competencies, Pertinent and Contemporary Issues (PCIs), values and assessment rubric.

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

HON. EZEKIEL OMBAKI MACHOGU, CBS
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PREFACE

The Ministry of Education (MoE) nationally implemented Competency Based Curriculum (CBC) in 2019. Grade 8 is the second grade of Junior School in the reformed education structure.

The reviewed Grade 8 curriculum furthers implementation of the CBC from Grade 7 in Junior School. The main feature of this level is a broad curriculum for the learner to explore talents, interests and abilities before selection of pathways and tracks at the Senior Secondary education level. This is very critical in the realisation of the Vision and Mission of the on-going curriculum reforms as enshrined in the Sessional Paper No. I of 2019 whose title is: *Towards Realizing Quality, Relevant and Inclusive Education and Training for Sustainable Development* in Kenya. The Sessional Paper explains the shift from a Content - Focused Curriculum to a focus on **Nurturing every Learner's potential.**

Therefore, the Grade 8 curriculum designs are intended to enhance the learners' development in the CBC core competencies, namely: Communication and Collaboration, Critical Thinking and Problem Solving, Creativity and Imagination, Citizenship, Digital Literacy, Learning to Learn and Self-efficacy.

The curriculum designs provide suggestions for interactive and differentiated learning experiences linked to the various sub strands and the other aspects of the CBC. They also offer several suggested learning resources and a variety of assessment techniques. It is expected that the designs will guide teachers to effectively facilitate learners to attain the expected learning outcomes for Grade 8 and prepare them for smooth transition to 9. Furthermore, it is my hope that teachers will use the designs to make learning interesting, exciting and enjoyable.

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ACKNOWLEDGEMENT

The Kenya Institute of Curriculum Development (KICD) Act Number 4 of 2013 (Revised 2019) mandates the Institute to develop and review (*SNE adapt*) curricula and curriculum support materials for basic and tertiary education and training. The curriculum development process for any level of education involves thorough research, international benchmarking and robust stakeholder engagement. Through a systematic and consultative process, the KICD conceptualised the Competency Based Curriculum (CBC) as captured in the Basic Education Curriculum Framework (BECF)2017, that responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, the Kenya Vision 2030, East African Community Protocol, International Bureau of Education Guidelines and the United Nations Sustainable Development Goals (SDGs).

KICD receives its funding from the Government of Kenya to facilitate successful achievement of the stipulated mandate and implementation of the Government and Sector (Ministry of Education (MoE) plans. The Institute also receives support from development partners targeting specific programmes. The revised Grade 8 curriculum designs were developed with the support of the World Bank through the Kenya Primary Education Equity in Learning Programme (KPEELP); a project coordinated by MoE. Therefore, the Institute is very grateful for the support of the Government of Kenya, through the MoE and the development partners for policy, resource and logistical support. Specifically, special thanks to the Cabinet Secretary-MoE and the Principal Secretary-State Department of Basic Education,

We also wish to acknowledge the KICD curriculum developers and other staff, all teachers, educators who took part as panelists; the Semi-Autonomous Government Agencies (SAGAs) and representatives of various stakeholders for their roles in the development of the Grade 8 curriculum designs. In relation to this, we acknowledge the support of the Chief Executive Officers of the Teachers Service Commission (TSC) and the Kenya National Examinations Council (KNEC) for their support in the process of developing these designs. Finally, we are very grateful to the KICD Council Chairperson and other members of the Council for very consistent guidance in the process.

We assure all teachers, parents and other stakeholders that this curriculum design will effectively guide the implementation of the CBC at Grade 8 and preparation of learners for transition to 9.

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TABLE OF CONTENT

NATIONAL GOALS OF EDUCATION

Education in Kenya should:

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

2. **Promote the social, economic, technological and industrial needs for national development**
   Education should prepare the youth of the country to play an effective and productive role in the life of the nation.
   i) **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.
   ii) **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.
   iii) **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.

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

4. **Promote sound moral and religious values**
   Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.

5. **Promote social equity and responsibility**
   Education **respect** 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.

6. **Promote 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.

7. **Promote international consciousness and foster positive attitudes towards other nations**
   Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.

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

LESSON ALLOCATION AT JUNIOR SCHOOL

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

LEARNING OUTCOMES FOR JUNIOR SCHOOL

By end of Junior School, the learner should be able to:
1. Apply literacy, numeracy and logical thinking skills for appropriate self-expression.
2. Communicate effectively, verbally and non-verbally, in diverse contexts.
3. Demonstrate social skills, spiritual and moral values for peaceful co-existence.
4. Explore, manipulate, manage and conserve the environment effectively for learning and sustainable development.
5. Practise relevant hygiene, sanitation and nutrition skills to promote health.
6. Demonstrate ethical behaviour and exhibit good citizenship as a civic responsibility.
7. Appreciate the country's rich and diverse cultural heritage for harmonious 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 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 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.

SUMMARY OF STRANDS AND SUB STRANDS

STRANDS	SUB STRANDS	Suggested Number of Lessons
1.0 Numbers	1.1 Integers	6
	1.2 Fractions	6
	1.3 Decimals	8
	1.4 Squares and Square Roots	6
	1.5 Rates, Ratio, Proportions and Percentages	14
2.0 Algebra	2.1 Algebraic Expressions	6
	2.2 Linear Equations	7
3.0 Measurements	3.1 Circles	5
	3.2 L Area	10
	3.3 Money	9
4.0 Geometry	4.1 Geometrical Constructions	12
	4.2 Coordinates and graphs	14
	4.3 Scale Drawing	14
	4.4 Common Solids	16
5.0 Data Handling and Probability	5.1 Data Presentation and Interpretation	10
	5.2 Probability	7
Total Number of Lessons		**150**
Note: The suggested number of lessons per sub strand may be less or more depending on the context.		

STRAND 1.0: NUMBERS

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.1 Integers** (6 lessons) • *represent integers on a number line* • *operations of addition and subtraction integers* on the number line	By the end of the sub- strand the learner should be able to: a) identify integers in different situations b) represent integers on a number line in different situations c) carry out operations of addition and subtraction integers on the number line in real life situations d) use IT or print resources for learning more on integers and for skills development e) reflect on use of integers in real life situations.	The learner is guided to: • identify integers by carrying out activities involving positive and negative numbers and zero. For example, climbing upstairs (positive), going down stairs (negative). Others may include standing at a point (the zero point) and count the number of steps moved either forward or backward. • draw and represent integers on number lines on learning materials. • perform operations, including combined operations of integers on a number line. • play creative games that involve number lines, for example jumping steps.	1. Where do we use integers in real life situations? 2. How do we carry out operations of integers?

			• use IT tools or other resources to learn more on operations of integers on number lines.	

Core Competencies to be developed
- Creativity and imagination- creating games: as the learner plays creative games that involve number lines, for example jumping steps.
- Learning to learn: as the learner represents integers on the number line.
- Digital literacy- interacting with technologies: as the learner uses IT devices to learn and play games on integers.

Values
- Respect: as the learner works with peers to play games that involve integers.
- Unity: as the learner works together in creating games on integers.

Pertinent and Contemporary Issues (PCIs):
Environmental education: as the learner uses available resources and spaces to jump steps.

Link to other learning areas
Integrated Science: as the learner works out different arithmetic's in Science that involve integers.

Sub-Strand: Fractions

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.2 Fractions** (6 lessons) • *Reciprocal of fractions* • *combined operations on fractions*	By the end of the sub- strand, the learner should be able to: a) work out reciprocal of fractions in different Situations b) carry out combined operations on fractions in different situations c) promote use of fractions in real life situations.	The learner is guided to: • discuss and use the correct order of operations in fractions. • discuss and carry out operations on fractions from activities such as model shopping and other real life cases. • play games on operations of fractions using IT devices or other resources.	How do we use fractions in real life situations?

Core Competencies to be developed
- Citizenship: as the learner discusses and uses the correct order of operations in fractions in some aspects such as populations.
- Critical thinking and problem solving: as the learner works out operations on fractions from model shopping activities,

Values:
- Responsibility: as the learner plays games of operations on fractions using IT devices or other resources.
- Respect: as the learner works together to work out operations on fractions from shopping activities.

Pertinent and Contemporary Issues (PCIs):
Self-esteem: as the learner plays games of operations on fractions using IT devices or other resources.

Link to other learning areas
- Languages: as the learner discusses and uses the correct order of operations in fractions.
- Agriculture : as the learner estimates different quantities in fractions such in harvests, seeds or fertilizer.

Sub-Strand: Decimals

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.3 Decimals** (8 lessons) • *Conversions in decimals* • *Recurring decimals* • *Rounding off decimals* • *significant figures* • *numbers in standard form* • *combined operations on decimals*	By the end of the sub-strand, the learner should be able to: a) convert fractions to decimals in different situations b) identify recurring decimals in different situations c) convert recurring decimals into fractions in different situations d) round off a decimal number to a required number of decimal places in different situations e) express numbers to a required significant figures in real life situations. f) express numbers in standard form in different situations g) carry out combined operations on decimals in different situations h) apply decimals to real life situations	The learner is guided to: • practice converting fractions to decimals. • discuss and classify non-recurring and recurring decimals. Indicate the recurring digits. • practice converting recurring decimals to fractions. • discuss and round off decimal numbers to a required number of decimal places • write decimal and whole numbers to a given significant figures • write numbers in standard form in learning materials such as cards or charts. • work out combined operations on decimals in the correct order.	1. How do we work out operations on decimals? 2. How do we use decimals in real life situations?

		i) use IT tools or other resources for learning more on decimals and for enjoyment, j) promote use of decimals in real life situations.	● discuss and apply decimals to real life cases. ● play games of operations on decimals using IT tools or other materials.	

Core Competencies to be developed:
- Citizenship: as the learner works together with others, discusses and classifies non- recurring and recurring decimals.
- Critical thinking and problem solving: as the learner practices converting recurring decimals to fractions.

Values
- Responsibility: as the learner discusses and classifies non- recurring and recurring decimals.
- Respect: as the learner works with peers to discuss and classify non- recurring and recurring decimals.

Pertinent and Contemporary Issues (PCIs):
- Self-esteem: as the learner works out combined operations on decimals in the correct order.
- ESD: as the learner plays games of operations on decimals using IT or other materials.

Link to other learning areas:
Integrated Science: as the learner expresses different quantities of measurement in Science in decimals.

Sub-Strand: Squares and Square Roots

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.4 Squares and Square roots** (6 lessons) *Squares and square roots of numbers from tables and calculators*	By the end of the sub- strand the learner should be able to: a) work out the squares of numbers from tables in different situations b) work out the square roots of numbers from tables in different situations c) work out squares and square roots of numbers using a calculator in different situations d) enjoy using squares and square roots in real life situations	The learner is guided to: • read and write the squares of numbers from tables • read and write the square roots of numbers from tables • practice working out squares and square roots using a calculator. • use IT devices or other materials to play square and square root games. • create games that involve squares and square roots of numbers.	1. What are squares and square roots of numbers? 2. Where do we apply squares and square roots in real life situations?
Core Competencies to be developed				
• Communication and collaboration: as the learner works with peers to read and write the square roots of numbers from tables. • Imagination and creativity: as the learner reads and writes the square roots of numbers from tables.				
Values				
• Respect: as the learner appreciates each other's contribution in creating games that involve squares and square roots of numbers.				

• Unity: as the learner works in teams to play games involving squares and square roots of numbers.
Pertinent and Contemporary Issues (PCIs):
Life skills: as the learner uses IT devices or other materials to play games on squares and square root games.
Link to other learning areas
Pre-Technical Studies**:** as the learner applies skills of working out squares and square roots in designing items to make.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Numbers	**1.5 Rates, Ratio, Proportions and Percentages** (14 lessons) • *Rates and fractions* • *Comparing ratios* • *Increase and decrease of quantities* • *percentage change of given quantities* • *direct and indirect proportions*	By the end of the sub- strand the learner should be able to: a) identify rates in different situations b) work out rates in real life situations c) express fractions as ratios in real life situations d) compare two or more ratios in different situations e) divide quantities in given ratios in real life situations f) work out ratios in different situations g) work out increase and decrease of quantities using ratios in real life situations h) work out percentage change of given quantities in real life situations.	The learner is guided to: • time while doing different activities such as calling using for example different mobile service providers. • role play this activity and note time taken to call, Record on a table and compare. • use cut outs from whole objects or substances to relate fractions to ratios. • discuss and compare ratios from the cut outs. • discuss and share quantities of concrete objects in different ratios. • discuss and determine percentage increase and decrease of different quantities.	1. How do we use rates in real life situations? 2. How do we use ratios in daily activities?

		i) identify direct and indirect proportions in real life situations j) work out direct and indirect proportions in real life situations k) promote use of ratios and proportions in real life.	• use IT devices or other materials to explore percentage change. • role play shopping activities to show and determine direct relationships and can use any other activities. • use hourglass to show and determine indirect relationships and can use any other activities. • watch videos on ratios and proportions as used in daily activities	

Core Competencies to be developed
- Critical thinking and problem solving: as the learner carries out different activities such as calling using different service providers to determine calling rates.
- Imagination and creativity: as the learner uses hourglass to show indirect relationships.

Values
- Respect: as the learner shares out different quantities of items in given ratios
- Fairness: as the learner shares out quantities in different proportions or percentages.

Pertinent and Contemporary Issues (PCIs):
- Social cohesion: is enhanced as the learner role plays calling for a specified time and also charges from different telecom service providers.

• Decision making: as the learner uses ratios to divide quantities such as money on different items to buy as part of consumer awareness.
Link to other learning areas
• Agriculture : as the learner works out ratios of ingredients in various aspects of home care e.g. baking.
• Pre-technical studies: as the learner works out ratios or proportions of different building materials

Suggested Assessment Rubric

Level Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to represent integers and carry out operations of integers on a number line	The learner represents integers and carries out operations of integers on a number line correctly and systematically	The learner represents integers and carries out operations of integers on a number line correctly	The learner represents integers or carries out operations of integers on a number line correctly	The learner represents integers on a number line partially correctly
Ability to carry out combined operations on fractions and convert fractions to decimals	The learner carries out combined operations on fractions and converts fractions to decimals correctly and systematically	The learner carries out combined operations on fractions and converts fractions to decimals correctly	The learner carries out combined operations on fractions or converts fractions to decimals correctly	The learner carries out combined operations on fractions or converts fractions to decimals partially correctly

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to identify and convert recurring decimals into fractions	The learner identifies and convert recurring decimals into fractions correctly and systematically	The learner identifies and converts recurring decimals into fractions correctly	The learner identifies or converts recurring decimals into fractions correctly	The learner identifies recurring decimals correctly
Ability to round off a decimal number to required number of decimal places, express numbers in standard form and carry out combined operations on decimals	The learner rounds off a decimal number to a required number of decimal places, expresses numbers in standard form and carries out combined operations on decimals correctly and systematically	The learner rounds off a decimal number to a required number of decimal places, expresses numbers in standard form and carries out combined operations on decimals correctly	The learner rounds off a decimal number to a required number of decimal places or expresses numbers in standard form or carries out combined operations on decimals correctly	The learner rounds off a decimal number to a required number of decimal places or expresses numbers in standard form or carries out combined operations on decimals partially correctly
Ability to work out squares and square roots of numbers using Mathematical tables and a calculator	The learner works out squares and square roots of numbers using Mathematical tables and a calculator correctly and systematically	The learner works out squares and square roots of numbers using Mathematical tables and a calculator correctly	The learner works out squares or square roots of numbers using Mathematical tables or a calculator correctly	The learner works out squares or square roots of numbers using Mathematical tables or a calculator partially correctly

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to identify and work out rates	The learner identifies and works out rates correctly and systematically	The learner identifies and works out rates correctly	The learner identifies or works out rates correctly	The learner identifies rates correctly
Ability to express fractions as ratios, compare two or more ratios and divide quantities in given ratios	The learner expresses fractions as ratios, compares two or more ratios and divides quantities in given ratios accurately and logically	The learner expresses fractions as ratios, compares two or more ratios and divides quantities in given ratios accurately	The learner expresses fractions as ratios or compares two or more ratios accurately	The learner expresses fractions as ratios or compares two ratios accurately
Ability to work out percentage increase and decrease of quantities	The learner works out percentage increase and decrease of quantities correctly and systematically	The learner works out percentage increase and decrease of quantities correctly	The learner works out percentage increase or decrease of quantities correctly	The learner works out percentage increase or decrease of quantities partially correctly
Ability to identify and work out direct and indirect proportions	The learner identifies and works out direct and indirect proportions correctly and systematically.	The learner identifies and works out direct and indirect proportions correctly	The learner identifies or works out direct or indirect proportions correctly	The learner identifies or works out direct proportions correctly

STRAND 2.0: ALGEBRA

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Algebra	**2.1 Algebraic Expressions** (6 Lessons) *Factorizing, simplifying and evaluating algebraic expressions*	By the end of the sub- strand the learner should be able to: a) factorize algebraic expressions in different situations b) simplify algebraic fractions in different situations c) evaluate algebraic expressions by substituting numerical values in different situations d) enjoy using algebraic expressions in real life situations.	The learner is guided to: • discuss and identify like and unlike terms and factorize algebraic expressions. • discuss like and unlike terms and simplify the algebraic fractions • discuss how to substitute the given numerical values to work out a given algebraic expression. • use IT to work out exercises and activities in algebra or drag and drop activities of grouping similar terms to simplify algebraic expressions • use other resources to work out exercises involving algebra.	1. How do we factorize algebraic expressions? 2. How do we simplify algebraic expressions?

Core Competencies to be developed

Critical thinking and problem solving: as the learner discusses like and unlike terms to factorize and simplify algebra.

Values

Responsibility: as the learner discusses and substitute values in algebraic expressions.

Pertinent and Contemporary Issues (PCIs):
Environmental education: as the learner uses varied local resources for like and unlike terms in algebra.
Link to other learning areas
Integrated Science: as the learner uses symbols to represent quantities for substances.

Sub-Strand: Linear Equations

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Algebra	**2.2 Linear Equations** (7 Lessons) • *linear equations in two unknowns* • *solving linear equations by elimination method*	By the end of the sub strand the learner should be able to: a) form linear equations in two unknowns in real life situations b) solve linear equations in two unknowns by Substitution method in real life situations c) solve linear equations in two unknowns by elimination method in real life situations d) apply linear equations in two unknowns in real life situations e) recognize use of linear equations in real life.	The learner is guided to: • role play activities such as shopping on two different items in the shop to form linear equations in two unknowns. • discuss with others and use activities involving two unknowns • discuss and use substitution method to find the solutions of simultaneous equations in two unknowns. • discuss and use elimination method to find the solutions of simultaneous equations in two unknowns. • practice forming and solving simultaneous equations in two unknowns of real-life cases using any method.	1. How do we solve linear equations in two unknowns? 2. Where do we use linear equations in two unknowns in real life situations?

			• watch videos or use other materials involving linear equations in two unknowns.	

Core Competencies to be developed
Communication and collaboration: as the learner discusses and uses substitution methods to find the solutions of simultaneous equations in two unknowns.

Values
Responsibility: as the learner practices forming and solving simultaneous equations in two unknowns of real life cases

Pertinent and Contemporary Issues (PCIs):
Citizenship: as the learner role plays shopping activities on two different items in the shop to form linear equations in two unknowns.

Link to other learning areas
Language: as the learner discusses and uses substitution methods to find the solutions of simultaneous equations.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to factorize, simplify and evaluate algebraic expressions	The learner factorises, simplifies and evaluates algebraic expressions systematically and correctly	The learner factorises, simplifies and evaluates algebraic expressions correctly	The learner factorises, simplifies or evaluates algebraic expressions correctly	The learner factorises, or simplifies algebraic expressions correctly
Ability to form linear equations in two unknowns and solve the equations by substitution and elimination method	The learner forms linear equations in two unknowns and solves the equations by substitution and elimination method systematically and accurately	The learner forms linear equations in two unknowns and solves the equations by substitution and elimination method accurately	The learner forms linear equations in two unknowns or solves the equations by substitution or elimination method accurately	The learner forms linear equations in two unknowns accurately
Ability to apply linear equations in two unknowns to real life cases	The learner applies linear equations in two unknowns correctly with sufficient examples	The learner applies linear equations in two unknowns correctly	The learner applies linear equations in two unknowns correctly partially correctly	The learner applies linear equations in one unknowns partially correctly

STRAND 3.0: MEASUREMENTS

Sub-Strand: Circles

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.1 Circles** (5 lessons) • *circumference of a circle* • *length of an Arc of a circle* • *perimeter of a sector of a circle*	By the end of the sub-strand the learner should be able to: a) work out the circumference of a circle in real life situations b) work out the length of an Arc of a circle in different situations c) calculate the perimeter of a sector of a circle in different situations d) promote use of circles in real life situations.	The learner is guided to: • discuss with others and find the circumference of different circular objects in the environment. • use cut outs to relate arc length to the circumference of a circle, starting with semicircle, then quarter of a circle etc. • draw circles and work out the circumference of a circle, and arc length of a circle. • use cut outs of sectors of circles from locally available materials and work out the perimeter	1. How do we determine the circumference of a circle? 2. How do we use sectors of a circle in real life situations?

| | | | of the sectors. Discuss and make any object with the sector that can be used in real life situations. | |
| | | | • use IT tools or other resources to explore use of sectors of circles in daily life. | |

Core Competencies to be developed
- Communication and collaboration: as the learner discusses and finds the circumference of different circular objects in the environment.
- Creativity and imagination: as the learner uses cut outs to relate arc length to the circumference of a circle.

Values
- Integrity: as the learner draws circles of given dimensions and work out the circumference of a circle.
- Responsibility: as the learner makes any objects with the sector that can be used in real life situations.

Pertinent and Contemporary Issues (PCIs):
Environmental education: as the learner uses locally available materials to cut out sectors responsibly.

Link to other learning areas
Language: as the learner discusses with others and finds the circumference of different circular objects in the environment.

Sub-Strand: Area

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.2 Area** (10 lessons) • *area of circles* • *area of a sector of a circle* • *Surface Area of Cubes, Cuboids, cylinders, and triangular Prism* • *Area of irregular shapes*	By the end of the sub-strand the learner should be able to: a) calculate the area of circles in different situations b) work out the area of a sector of a circle in different situations c) work out the Surface Area of Cubes and Cuboids in real life situations d) work out the Surface area of a cylinders in real life situations e) determine the Surface Area of a triangular Prism in different situations	The learner is guided to: • discuss and work out areas of different circles. • use cut outs of sectors of circles from locally available materials and find the area of the sectors and relate the angle of the sector to the area of the circle. Determine the area of a sector of a circle. • use models to find the surface area of cubes, cuboids and cylinders and derive the formulas for each.	How do we use area in real life situations?

		f) work out the Area of irregular shapes using square grids in real life situations g) use IT tools and other materials for learning more on area and for enjoyment h) recognize use of length in real life situations.	• apply the formulas to work out surface area of given cubes, cuboids and cylinders. • use models to find the surface area of triangular prisms • draw irregular shapes, for example the palm of hands, feet or leaves and trace on square grid to estimate the area. • watch videos on models of cubes, cuboid, cylinders and prisms and how to find the surface area.	

Core Competencies to be developed

- Critical thinking and problem solving: as the learner uses cut outs of sectors of circles from locally available materials and find the area of the sector.
- Learning to learn: as the learner uses models to find the surface area of cubes, cuboids and cylinders and derive the formulas for each.

Values

Responsibility through excellence as the learner uses models to find the surface area of triangular prisms.

Pertinent and Contemporary Issues (PCIs):
- Safety: as the learner handles different instruments to make cut outs of sectors from locally available materials and finds the area where they relate the angle of the sector to the area of the circle.
- Environmental education: as the learner uses locally available materials to draw irregular shapes, for example the palm of hands, feet or leaves and trace on square grid to estimate the area.

Link to other learning areas

Creative Arts and Sports: promotes the learner's drawing skills of irregular shapes, for example the palm of hands, feet or leaves.

Sub-Strand: Money

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Measurements	**3.3 Money** (9 lessons) • *interest and principal* • *simple and compound interest* • *appreciation and depreciation* • *hire purchase*	By the end of the sub-strand, the learner should be able to: a) identify interest and principal in real life situations b) calculate simple interest in real life situations c) calculate compound interest per annum step by step up to three years in real life situations d) work out appreciation and depreciation per annum step by step up to three years in different situations	The learner is guided to: • visit or invite resource persons from different financial institutions in the neighborhood of the school or home and gather information about simple and compound interests offered on deposits (principal). • enquire and discuss meaning of terms such as interest, deposits (principal) as part of consumer awareness and protection • discuss and work out compound interest • identify and discuss objects or goods that	1. What is interest in money? 2. How do we pay for goods on hire purchase?

| | | | e) work out hire purchase in real life situations

f) use calculators to carry out operations related to money.

g) spend money responsibly on needs and leisure | appreciate and depreciate in value to inform decision making on goods that are worth investing in or buying.

• determine Appreciation and Depreciation using a step by step method.

• visit shopping centres where items or goods are offered on hire purchase and discuss different terms of purchase. This can be done either as physical or online searches. Relate different pricing of the goods and discuss the installments periods and time to inform purchasing decisions that will protect from products that highly lose value with time.

• use IT tools to access online shopping | |

			platforms and identify terms of sale.	

Core Competencies to be developed
- Communication and collaboration: as the learner gathers information about simple and compound interests offered on deposits (principal) in different financial institutions.
- Critical thinking and problem solving: as the learner determines Appreciation and Depreciation using step by step methods and discuss what goods are worth investing in or buying.
- Digital literacy: as the learner do search on online shopping platforms or other sources on different types of goods for consumer awareness.

Values
Responsibility: as the learner makes responsible choices on shopping goods that they appreciate in value.

Pertinent and Contemporary Issues (PCIs):
Citizenship: as the learner uses money (Kenya shillings) to buy goods.

Link to other learning areas
Pre-Technical Studies: as the learner identifies and discusses objects and goods that appreciate and depreciate in value.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to work out the circumference of a circle, length of an Arc of a circle and Perimeter of a sector of a circle	The learner works out the circumference of a circle, the length of an Arc of a circle and Perimeter of a sector of a circle correctly and systematically.	The learner works out the circumference of a circle, the length of an Arc of a circle and Perimeter of a sector of a circle correctly.	The learner works out the circumference of a circle or the length of an Arc of a circle or Perimeter of a sector of a circle correctly.	The learner works out the circumference of a circle or the length of an Arc of a circle correctly.
Ability to calculate the Area of circle and sector of a circle	The learner calculates the Area of circle and sector of a circle correctly and systematically.	The learner calculates the Area of circle and sector of a circle correctly.	The learner calculates the Area of circle or sector of a circle correctly.	The learner calculates the Area of circle correctly.
Ability to work out the Surface Area of Cubes, Cuboids, Cylinders and triangular Prisms	The learner works out the Surface Area of Cubes, Cuboids, Cylinders and triangular Prisms correctly and systematically.	The learner works out the Surface Area of Cubes, Cuboids, Cylinders and triangular Prisms correctly.	The learner works out the Surface Area of any 3 of; Cubes, Cuboids, Cylinders or triangular Prisms correctly.	The learner works out the Surface Area of any 2 of; Cubes, Cuboids, Cylinders or triangular Prisms correctly.

Level Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to work out the area of irregular shapes using square grids	The learner works out the area of irregular of most of the shapes using square grids accurately and creatively	The learner works out the area of irregular shapes using square grids accurately	The learner works out the area of few of the irregular shapes using square grids accurately.	The learner works out the area very few of the irregular shapes using square grids partially accurately.
Ability to calculate Simple and Compound Interest per annum step by step up to three years	The learner calculates Simple and Compound Interest per annum step by step up to three years systematically and accurately	The learner calculates Simple and Compound Interest per annum step by step up to three years accurately	The learner calculates Simple or Compound Interest per annum step by step up to two years accurately	The learner calculates Simple Interest accurately.
Ability to work out Appreciation and Depreciation per annum step by step up to three years, and Hire Purchase	The learner works out Appreciation and Depreciation per annum step by step up to three years, and Hire Purchase systematically and accurately	The learner works out Appreciation and Depreciation per annum step by step up to three years, and Hire Purchase accurately	The learner works out Appreciation or Depreciation per annum step by step up to two years, or Hire Purchase systematically and accurately	The learner works out Appreciation or Depreciation per annum for 1 year, or Hire Purchase accurately

STRAND 4.0: GEOMETRY

Sub-Strand: Geometrical Constructions

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Geometry	**4.1 Geometrical Constructions** (12 lessons) • *parallel and perpendicular lines* • *properties of polygons* • *irregular polygon* • *circles*	By the end of the sub- strand, the learner should be able to: a) construct parallel and perpendicular lines in different situations b) divide a line proportionally in different situations c) identify angle properties of polygons in different situations d) construct regular polygons up to a hexagon in different situations e) construct irregular polygons up to a hexagon in different situations f) construct circles passing through the vertices of a	The learner is guided to: • practice constructing parallel and perpendicular lines. • practice dividing a line proportionally, for example, using a set square and a ruler only or pair of compasses. • discuss angle properties of polygons and relate the number of right angles to the number of sides. And determine the angles in a given polygon. • construct regular polygons using pair of compasses, rulers and protractors. • construct irregular polygons using pair of compasses, rulers and protractors.	1. How do we construct polygons? 2. Where do we use polygons in real life situations?

		triangle in different situations g) construct circles touching the sides of the triangle in different situations h) admire geometric patterns in objects and substances in real life.	• practice constructing circles passing through vertices of given triangles. • practice constructing circles touching sides of given triangles. • watch videos on how to construct polygons, use different construction software. • use IT or other devices to create patterns using circles touching sides of triangles or polygons.	

Core Competencies to be developed
- Communication and collaboration: as the learner discusses angle properties of polygons and relate the number of right angles to the number of sides.
- Digital literacy: as the learner uses IT or other devices to create patterns using circles touching sides of triangles or polygons.

Values
Responsibility: as the learner constructs regular polygons using pair of compasses, rulers and protractors and take care of the tools.

Pertinent and Contemporary Issues (PCIs):
Self-awareness: as the learner uses IT or other resources to create patterns using circles touching sides of triangles or polygons.

Link to other learning areas
Pre-technical studies: as the learner constructs regular polygons using a pair of compasses, rulers and protractors.

Sub-Strand: Coordinates and Graphs

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Geometry	**4.2 Coordinates and graphs** (14 lessons) • *Cartesian plane* • *points on the Cartesian* • *table of values for a linear equation* • *scale for a linear equation* • *linear graphs* • *simultaneous linear equations*	By the end of the sub-strand, the learner should be able to: a) draw a labelled Cartesian plane on different learning materials b) identify points on the Cartesian plane in different situations c) plot points on the Cartesian plane in different situations d) generate table of values for a linear equation in different situations e) determine an appropriate scale for a linear equation on the Cartesian plane in different situations f) draw a linear graph from table of values on	The learner is guided to: • draw and appropriately label the axes on the Cartesian plane • practice locating and plotting points on a Cartesian plane appropriately. • discuss and read coordinates of points on the Cartesian plane. And write the coordinates in terms of (horizontal value, vertical value) • discuss, choose and use appropriate scale for a given data. • discuss and make an appropriate table of values for a given linear equation and draw the linear graphs	1. How do we plot coordinates on a Cartesian plane? 2. Where do we use linear graphs in real life?

		Cartesian plane in different situations	• generate values in a table of the simultaneous linear equations and draw the graphs, read the point of intersection as solution for the equations.	
		g) solve simultaneous linear equations graphically in different situations		
		h) apply simultaneous equations in real life situations	• discuss and form simultaneous equations from statements and solve the equations using graphs.	
		i) use IT or other resources to learn more on coordinates and graphs	• use IT graphing tools to create linear graphs or use other materials to practice drawing linear graphs.	
		j) reflect on the use of graphs in real life.		

Core Competencies to be developed
- Communication and collaboration: as the learner discusses and reads coordinates of points on the Cartesian plane.
- Critical thinking and problem solving: as the learner generates values in a table of the simultaneous linear equations.
- Digital literacy: as the learner learns and uses IT graphing tools to create linear graphs.

Values
Respect**:** is enhanced as the learner discusses and appreciate others' views to make an appropriate table of values for a given linear equation and draws the linear graphs

Pertinent and Contemporary Issues (PCIs):
Citizenship: as the learner practices locating and plotting points on a Cartesian plane appropriately as a foundational skill for reading maps.

Link to other learning areas
Integrated Science: contributes to learner's drawing and graphing skills as they draw the graphs of different content areas.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Geometry	**4.3 Scale Drawing** (14 lessons) • *Scale length* • *Conversions in scale* • *linear scales* • *making scale drawings*	By the end of the sub-strand, the learner should be able to: a) represent length to a given scale in different situations. b) convert actual length to scale length in real life situations c) convert scale length to actual length in real life situations. d) interpret linear scales in statement form in different situations. e) write linear scales in statement form in different situations. f) interpret linear scales in ratio form in different situations. g) write linear scales in ratio form in different situations.	The learner is guided to: • measure and represent length of different objects from immediate environment in his/her work book • discuss and practice converting scale from one form to another • read, discuss and interpret given linear scales in statement form. • discuss and write given linear scales in statement form. • read, discuss and interpret given linear scales in ratio form. • discuss and carry out conversions of scales from one form to another. • make scale drawings on different learning	1. How do we determine scales in real life? 2. Where do we use scale drawing in real life situations?

| | | h) convert linear scale from statement form to ratio form and ratio form to statement form in different situations
i) make scale drawings in different situations
j) apply scale drawing in real life situations.
k) recognize the use of scale drawing in maps. | materials using appropriate scale.
• use ICT devices to display the maps and use the zoom functions to demonstrate scale.
• Use maps to demonstrate scale and locate places. | |

Core Competencies to be developed
- Communication and collaboration: as the learner discusses and practices converting scale from one form to another
- Critical thinking and problem solving: as the learner discusses and writes given linear scales in statement form.
- Digital literacy: as the learner uses ICT devices to display the maps and use the zoom functions to demonstrate scale.

Values
- Responsibility: as the learner makes scale drawings on different learning materials using appropriate scale.
- Citizenship: as the learner uses maps to demonstrate scale and locate places.

Pertinent and Contemporary Issues (PCIs):
Environmental education: as the learner measures and represents the length of different objects from the immediate environment in his/her work book.

Link to other learning areas
Pre-Technical Studies: as the learner reads and makes scale drawings learnt from technical drawing.

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Geometry	**4.4 Common Solids** (16 lessons) • *nets of cubes, cuboids, cylinders, pyramids and cones* • *surface area of the solids* • *models of hollow and compact solids*	By the end of the sub- strand, the learner should be able to: a) identify common solids from the environment b) sketch nets of cubes, cuboids, cylinders, pyramids and cones in different situations c) work out surface area of the solids from nets of solids in different situations d) determine the distance between two points on the surface of a solid in different situations e) make models of hollow and compact solids for skills development f) use drawing materials to draw models and nets of solids in different situations	The learner is guided to: • identify and collect common solids such as cubes, cuboids, cylinders, pyramids and cones from the immediate environment. • discuss, open and sketch the nets of hollow solids. • work out the surface area of solids from nets. • discuss and practice measuring the distance between any two points on the surface of the solids. • make models of hollow and compact solids using locally available materials such as clay. Hollow solids (containers) may be of cubes, cuboids, cylinders, pyramids, cones or pots. Compact solids (eg. bricks) may	1. What are common solids? 2. How do we use common solids in real life?

| | | g) promote the use of common solids in real life situations. | be of cubes, cuboids or cylinders.
• use IT devices to watch videos on common solids, nets and draw the solids and nets.
• use other resources to trace or draw nets of solids
• carry out a project in ethno math; how pots were molded and decorated in African culture. | |

Core Competencies to be developed
- Communication and collaboration: as the learner discusses and works with peers to collect solids from the environment.
- Creativity and imagination: as the learner makes the models of different solids.

Values
Responsibility, love and respect: as the learner works with peers to collect solids and make models.

Pertinent and Contemporary Issues (PCIs):
- ESD: as the learner collects solids from the environment and use locally available materials to make models.
- Self -esteem: as the learner engages to open nets of solids and makes models creatively.

Link to other learning areas
- Pre-technical studies: as the leaner enhances drawing skills as they sketch nets of different solids
- Creative Art and Sports: as the learner uses creative skills to make models of different solids.

Suggested Assessment Rubric

Level / Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to construct parallel and perpendicular lines	The learner constructs parallel and perpendicular lines accurately and proficiently	The learner constructs parallel and perpendicular lines accurately	The learner constructs parallel or perpendicular lines accurately	The learner constructs parallel lines accurately
Ability to divide a line proportionally	The learner divides a line proportionally correctly and systematically	The learner divides a line proportionally correctly	The learner divides a line proportionally partially correctly	The learner divides a line disproportionally
Ability to construct regular and irregular polygons up to a hexagon	The learner constructs regular and irregular polygons up to a hexagon accurately and systematically	The learner constructs regular and irregular polygons up to a hexagon accurately	The learner constructs regular or irregular polygons up to a pentagon accurately	The learner constructs regular or irregular quadrilaterals accurately
Ability to construct circles passing through the vertices of a triangle and touching the sides of the triangle	The learner constructs circles passing through the vertices of a triangle and touching the sides of the triangle correctly and concisely	The learner constructs circles passing through the vertices of a triangle and touching the sides of the triangle correctly	The learner constructs circles passing through the vertices of a triangle or touching the sides of the triangle correctly	The learner constructs circles passing through the vertices of a triangle correctly

Level Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to plot Points on the Cartesian Plane	The learner plots most of the Points on the Cartesian Plane accurately and precisely	The learner plots Points on the Cartesian Plane accurately	The learner plots few Points on the Cartesian Plane accurately	The learner plots very few Points on the Cartesian Plane partially accurately
Ability to generate table of values, determine an appropriate Scale and draw a linear graph for a linear equation	The learner generates table of values, determines an appropriate Scale and draws a linear graph for a linear equation accurately and creatively	The learner generates table of values, determines an appropriate Scale and draws a linear graph for a linear equation accurately	The learner generates table of values, determine an appropriate Scale or draws a linear graph for a linear equation accurately	The learner generates table of values or determines an appropriate Scale for a linear equation accurately
Ability to Solve Simultaneous Linear Equations Graphically	The learner solves all Simultaneous Linear Equations Graphically accurately and systematically	The learner solves all Simultaneous Linear Equations Graphically accurately	The learner solves most Simultaneous Linear Equations Graphically accurately	The learner solves few Simultaneous Linear Equations Graphically partially accurately
Ability to convert actual length to scale length and scale length to actual length	The learner converts actual length to scale length and scale length to actual length accurately and systematically	The learner converts actual length to scale length and scale length to actual length accurately	The learner converts actual length to scale length or scale length to actual length accurately	The learner converts actual length to scale length accurately

Level Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to Interpret and write linear scales in statement and ratio form	The learner interprets and writes linear scales in statement and ratio form accurately and concisely	The learner interprets and writes linear scales in statement and ratio form accurately	The learner interprets or writes linear scales in statement or ratio form accurately	The learner interprets or writes linear scales in statement form accurately
Ability to make Scale drawings and sketch nets of cubes, cuboids, cylinders, pyramids and cones	The learner makes Scale drawings and sketches nets of cubes, cuboids, cylinders, pyramids and cones correctly and creatively	The learner makes Scale drawings and sketches nets of cubes, cuboids, cylinders, pyramids and cones correctly	The learner makes Scale drawings or sketches nets of any 3 of; cubes, cuboids, cylinders, pyramids or cones correctly	The learner makes Scale drawings or sketches nets of any 2 of; cubes, cuboids, cylinders, pyramids or cones correctly
Ability to work out surface area of nets of cubes, cuboids, cylinders, pyramids and cones	The learner works out surface area of the solids from nets of cubes, cuboids, cylinders, pyramids and cones accurately and systematically	The learner works out surface area of the solids from nets of cubes, cuboids, cylinders, pyramids and cones accurately	The learner works out surface area of the solids from nets of any 3 of; cubes, cuboids, cylinders, pyramids or cones accurately	The learner works out surface area of the solids from nets of any 2 of; cubes, cuboids, cylinders or pyramids accurately

Level Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to determine the distance between two points on the surface of a solid	The learner determines the distance between two points on the surface of a solid accurately and systematically	The learner determines the distance between two points on the surface of a solid accurately	The learner determines the distance between two points on the surface of a solid partially accurately	The learner determines the distance between two points on the surface of a solid inaccurately

STRAND 5.0: DATA HANDLING AND PROBABILITY
Sub-Strand: Data Representation and Interpretation

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
5.0 Data Handling and Probability	**5.1 Data Representation and Interpretation** (10 lessons) • *Bar graphs and line graphs* • *Mode, mean and median*	By the end of the sub-strand, the learner should be able to: a) draw bar graphs of data from real life situations b) interpret bar graphs of data from real life situations c) draw line graphs of given data from real life situations d) interpret line graphs of data from real life situations e) identify the mode of a set of discrete data from real life situations f) calculate the mean of a set of discrete data from real life situations	The learner is guided to: • collect data from their own experiences, for example size of shoes, height or test scores. Use a suitable scale to represent the data in bar graphs. • discuss and interpret Bar graphs • discuss and represent data in line graphs • discuss and interpret line graphs • recognize the mode from a given set of discrete data • discuss and work out the average from different sets of discrete data and relate it to the mean. • carry out different activities that involve getting the median position. For example, where	1. What are the different ways of representing data? 2. How do we determine the mean of data?

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		g) determine the median of a set of discrete data from real life situations h) recognize use of data representation and interpretation in real life situations.	possible learners use the hand to identify the middle finger in reference to its position. • arrange given data in ascending order and identify the middle value which is the median. • use IT to create bar graphs and line graphs to represent the data, calculate the mean, the mode and the median. • use other resources to represent data on real life cases such as types and number of injuries from roads. Draw bar and line graphs to represent the data,	

Core Competencies to be developed

- Communication and collaboration: as the learner discusses and represents data in line graphs.
- Critical thinking and problem solving: as the learner discusses and interprets Bar graphs.
- Self-efficacy: as the learner collects data from their own experiences, for example size of shoes, height or test scores.

Values

Social cohesion: as the learner collects data from their own experiences, for example size of shoes, height or test scores.

Pertinent and Contemporary Issues (PCIs):

Self-awareness: as the learner collects data from their own experiences, for example size of shoes, height or test scores.

Link to other learning areas
Social Studies: as the learner discusses and works out the average from different sets of discrete data such as populations and relate it to the mean.

Sub-Strand: Probability

Strand	Sub-Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
5.0 Data Handling and Probability	**5.2 Probability** (7 lessons) • *events involving chance* • *experimental probability outcomes* • *probability outcomes in fractions, decimals or percentages*	By the end of the sub- strand, the learner should be able to: a) identify events involving chance in real life situations b) perform chance experiments in different situations c) write the experimental probability outcomes in different situations d) express the probability outcomes in fractions in different situations e) express the probability outcomes in decimals or percentages in different situations f) use IT and other materials to play games involving probability g) recognize that there are events that happen by chance in real life situations.	The learner is guided to: • discuss daily events that are likely/unlikely to happen/will not happen. • discuss and carry out different chance experiments like flipping the coins, tossing the dice or drawing colored balls from a bag one ball at a time. • record the probability of the chance outcomes in fractions, decimals and percentages. • use IT tools or other resources to play games involving probability	1. When do we consider chances that an event is likely to happen? 2. Why is probability important in real life situations?

Core Competencies to be developed

• Communication and collaboration: as the learner discusses daily events that are likely/unlikely to happen/will not happen.
• Critical thinking and problem solving: as the learner discusses and carries out different chance experiments like flipping the coins.

• Self-efficacy: as the learner discusses and carries out different chance experiments like flipping the coins and dice.
Values
• Responsibility: as the learner uses IT devices or other resources such as coins, balls in the study of probability.
Pertinent and Contemporary Issues (PCIs):
Environmental awareness: as the learners discusses daily events that are likely/unlikely to happen/will not happen that may relate to the environment.
Link to other learning areas
Social Studies: as the learner discusses daily events that are likely/unlikely to happen/will not happen that may involve the weather.

Suggested Assessment Rubric

Level Indicators	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to draw and Interpret bar and line graphs of data	The learner draws and Interprets bar and line graphs of data correctly and systematically	The learner draws and Interprets bar and line graphs of data correctly	The learner draws or Interprets bar or line graphs of data correctly	The learner draws or Interprets bar graphs of data correctly
Ability to determine mode, mean and the median of a given set of discrete data	The learner determines mode, mean and the median of a given set of discrete data accurately and systematically	The learner determines mode, mean and the median of a given set of discrete data accurately	The learner determines mode, mean or the median of a given set of discrete data accurately	The learner determines mode or mean or median of a given set of discrete data partially accurately
Ability to Perform chance experiments and write the experimental probability outcomes	The learner performs chance experiments and writes the experimental probability outcomes accurately and fluently	The learner performs chance experiments and writes the experimental probability outcomes accurately	The learner performs chance experiments or writes the experimental probability outcomes accurately	The learner performs chance experiments or writes the experimental probability outcomes partially accurately
Ability to express the probability outcomes in fractions, decimals and percentages	The learner expresses the probability outcomes in fractions, decimals and percentages correctly and consistently	The learner expresses the probability outcomes in fractions, decimals and percentages correctly	The learner expresses the probability outcomes in fractions or decimals or percentages correctly	The learner expresses the probability outcomes in fractions or decimals partially correctly

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

Introduction
In Grade 8, learners will undertake an integrated Community Service Learning (CSL) project of choice from a single or combined subject. The CSL project will enable the learner to apply knowledge and skills from other learning areas to address a problem in the community. The implementation of the integrated CSL project will take a Whole School Approach, where all members of the school community including teachers, school administration, parents/guardians/ local community and support staff. It will be a collaborative effort where the teacher of Social Studies coordinates and works with other subject teachers to design and implement the integrated CSL projects. The teachers will select a theme drawn from different Learning Areas and the broader categories of Pertinent and Contemporary Issues (PCIs) for the CSL project. It should also provide an opportunity for development of core competencies and nurturing of values. Learners will undertake **one common** integrated class CSL project following a 6-step milestone approach as follows:

Milestone	Description
Milestone 1	**Problem Identification** Learners study their community to understand the challenges faced and their effects on community members. Some of the challenges in the community can be: ● Environmental degradation ● Lifestyle diseases, Communicable and non-communicable diseases ● Poverty ● Violence and conflicts in the community ● Food security issues
Milestone 2	**Designing a solution** Learners create an intervention to address the challenge identified.

Milestone 3	**Planning for the Project** Learners share roles, create a list of activities to be undertaken, mobilise resources needed to create their intervention and set timelines for execution
Milestone 4	**Implementation** The learners execute the project and keep evidence of work done.
Milestone 5	Showcasing /Exhibition and Report Writing Exhibitions involve showcasing learners' project items to the community and reflecting on the feedback Learners write a report detailing their project activities and learnings from feedback
Milestone 6	Reflection Learners review all project work to learn from the challenges faced. They link project work with academic concepts, noting how the concepts enabled them to do their project as well as how the project helped to deepen learning of the academic concepts.

NOTE: The milestones will be staggered across the 3 terms of the academic calendar.

Assessment of CSL integrated Project

Assessment for the integrated CSL project will be conducted formatively. The assessment will consider both the process and end product. This entails assessing each of the milestone stages of the integrated CSL class project. It will focus on 3 components namely: skills from various learning areas applied in carrying out the project, core competencies developed and values nurtured.

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

Strand	Sub strand	Suggested Assessment Methods	Resources Suggested Learning	Suggested Non-Formal Activities
Numbers	Integers	Class activities Class written tests Out of school/home assignments or activities	Number lines games on charts Number cards, steps,	Prepare or improvise number lines games on charts
	Fractions	Class activities Class written tests Out of school/home assignments	Multiplication tables	
	Decimals	Class activities Class written tests Out of school/home assignments	Multiplication tables	

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	Squares and square roots	Class activities Class written tests Out of school/home assignments or	Equivalent fraction board, Circular and Rectangular cut outs, Counters	
	Rates, ratios, proportions and percentages	Class activities Class written tests	Place value charts, Number cards	
Algebra	Algebraic Expressions	Class activities Class written tests Out of school/home assignments or	Information from different sources	Carry out activities involving classifying objects in their immediate environment according to given attributes such as similarities or differences. This can be done at home. Take photos and share with class or school. Use the concept of classification of objects to own things at school and home.
	Linear Equations	Class activities	Information from different sources	

		Class written tests		
		Out of school/home assignments or		
Measurement	Circles	Class activities Class written tests Out of school/home assignments or	Cut outs of sectors, papers, ruler	
	Area	Class written tests Out of school/home assignments or activities	Square cut outs, squares, 1m squares	
	Money	Class activities Out of school/home assignments or activities	Price Lists for commodities, model shop, Electronic money	Research, identify and discuss different products/goods that appreciate or depreciate. This can be done through online or other forms of searches. Create a table of products and the two prices: one for cash payment, the other for hire purchase payment. This is to inform

				purchasing decisions that will protect from products that highly lose value with time.
Geometry	Geometric constructions	Class activities Class written tests Out of school/home assignments or activities	Unit angles, Protractors, Pair of compasses, Rulers, Straight edges	
	Coordinates and graphs	Class activities Class written tests Out of school/home assignments or activities	rulers, plotting/graph paper	
	Scale drawing	Class activities Class written tests Out of school/home assignments or activities	Unit angles, Protractors, Pair of compasses, Rulers, Straight edges	
	Common solids	Class activities Class written tests	Containers, compact solid objects, water, soil, clay, waste news/papers	Undertake the project

Data handling and probability	Data handling	Class activities Class written tests	Data from different sources	
	Probability	Class activities Class written tests	Data from different sources	

APPENDIX 3: USE OF ICT DEVICES

The following ICT devices may be used in the teaching/learning of mathematics at this level: Learner digital devices (LDD), Teacher digital devices(TDD), Mobile phones, Digital clocks, Television sets, Videos, Cameras, Projectors, Radios, DVD players, CD's, Scanners, Internet among others.