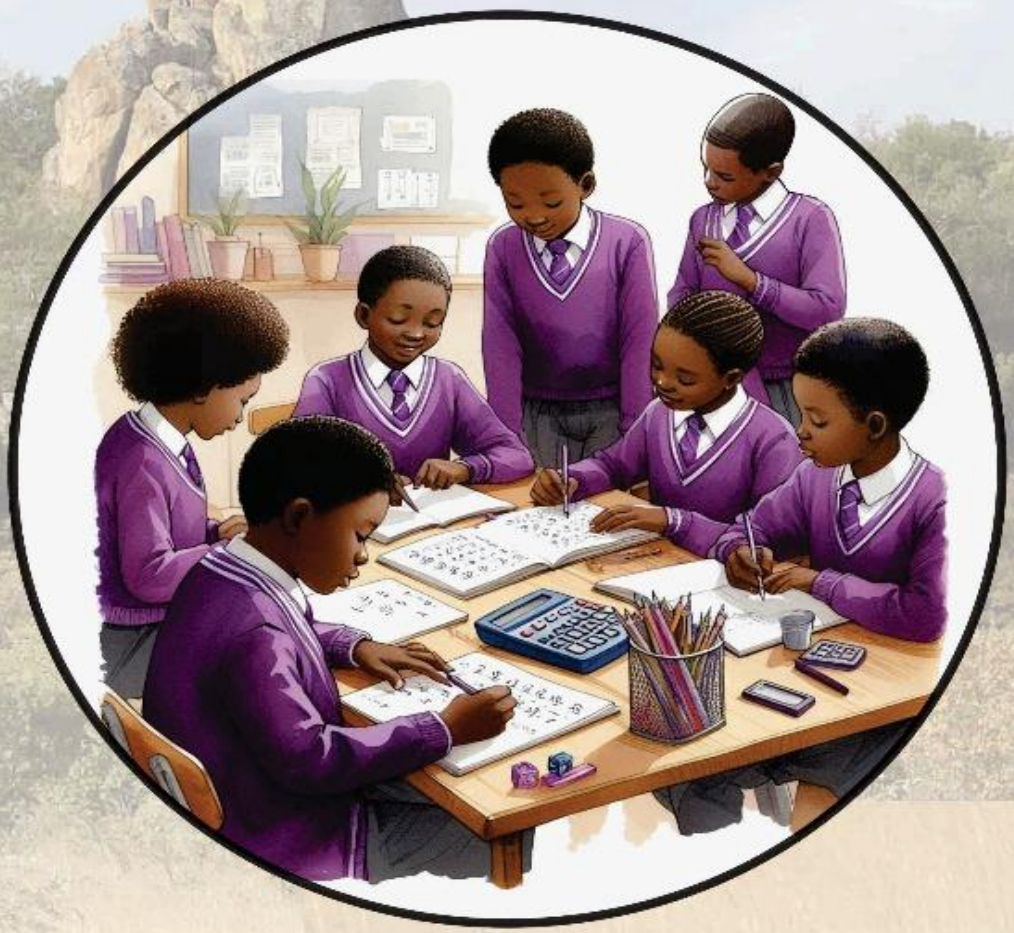
ZIMBABWE

Ministry of Primary and Secondary Education



MATHEMATICS

SYLLABUS A

2024-2030

FORMS 1-4

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1.0 ACKNOWLEDGEMENTS

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Table of Contents

1.0 PREAMBLE

1.1 Introduction

Mathematics is often viewed as a universal language but its development and application are deeply rooted in diverse cultural and historical contexts. This syllabus views mathematics through the lens of heritage and intends to align it to our rich heritage and Indigenous Knowledge Systems (IKS) highlighting the contributions of communities. The syllabus is designed for learners who want to obtain basic mathematical knowledge and skills. It is meant for pupils who want to pursue the skills development programmes to be artisans in specific vocational and other trades in life. It aims to balance understanding and skills to help learners solve contemporary practical problems.

1.2 Rationale

The incorporation of heritage-based learning, in this syllabus aims to develop, consolidate and apply mathematical knowledge and skills in all facets of everyday life. The thrust is to contextualise mathematical concepts within real world applications. The syllabus encourages critical thinking, creative thinking and communication in problem solving. It also develops mathematical numeracy as learners add value to their environment through solving problems and producing goods and services for socio-economic transformation.

1.3 Summary of Content

The syllabus is designed to cover Forms 1-4 of secondary education in mathematics syllabus A which will lay a firm foundation for its application in real world situations and career development. The syllabus covers theory and practical activities in number, operations, measures and relationships. Learners' performance will be evaluated through summative and continuous assessment

1.4 Assumptions

It is assumed that learners:

- are able to do simple arithmetic i.e adding, subtracting, multiplying and dividing
- have basic mathematical knowledge and experiences
- can solve mathematical problems

1.5 Cross Cutting Themes

The following are some of the cross-cutting themes in mathematics:

- Health and wellbeing
- ICT
- Business enterprise skills
- Disaster risk management
- Environmental management
- Climate change

1.0 PRESENTATION OF THE SYLLABUS

Mathematics syllabus A is a single document covering forms 1 – 4. It contains the preamble, aims, objectives, syllabus topics, scope and sequence, competency matrix and assessment procedures. The syllabus also suggests a list of resources to be used during learning and teaching process.

2.0 AIMS

The syllabus should enable learners to:

2.1 develop a positive attitude towards mathematics in a way that encourages enjoyment, establishes confidence and promotes enquiry and further learning
2.2 acquire knowledge and skills for further education and training
2.3 appreciate the role, value and use of mathematics in society
2.4 develop a feel for numbers and understand the significance of the results obtained
2.5 use creativity and resilience to analyze and solve problems
2.6 engage, persevere, collaborate and show intellectual honesty in performing tasks in mathematics in the spirit of ubuntu/unhu/vumunhu

3.0 SYLLABUS OBJECTIVES

The learners should be able to:

3.1 recognise and use mathematical symbols, terms and definitions
3.2 carry out mathematical operations accurately
3.3 perform simple calculations
3.4 estimate and approximate to a stipulated degree of accuracy
3.5 measure to a suitable degree of accuracy
3.6 gather, organise, process, present and analyse data
3.7 interpret information presented in the form tables, graphs and diagrams
3.8 carry out geometrical constructions and manipulations accurately
3.9 convert mathematical information from one form to another
3.10 make logical inferences and draw conclusions from given data
3.11 apply appropriate mathematical models to solve life problems
3.12 solve routine and non-routine problems using appropriate formulae, algorithms and procedures
3.13 work collaboratively
3.14 use ICT tools in problem solving

4.0 METHODOLOGY AND TIME ALLOCATION

5.1 Methodology

It is recommended that teachers use techniques in which mathematics is seen as a process which arouse interest and confidence in solving problems in both familiar and unfamiliar contexts. The teaching and learning of mathematics must be learner centred. Multi-sensory principles should be applied during teaching and learning of mathematics.

The following are some of the suggested methods of the teaching and learning of mathematics:

- Guided discovery
- Discussion
- Interactive e-learning
- Exposition
- Demonstration and illustration
- Problem solving
- Individualisation
- Simulation
- Visual-tactile
- Educational tours
- Expert guest presentation
- Project based learning
- Scaffolding

5.2 Time allocation

6 periods of 35 minutes each per week should be allocated for the adequate coverage of the syllabus.

5.0 SYLLABUS TOPICS

The following topics will be covered from Forms 1 to 4

5.1 Number Systems
5.2 Set Language and notation
5.3 Financial Mathematics
5.4 Measures and Mensuration
5.5 Graphs of linear functions
5.6 Algebra
5.7 Geometry
5.8 Statistics and Probability
5.9 Matrices

5.10

6.0 SCOPE AND SEQUENCE

7.1 TOPIC 1: NUMBER SYSTEMS

FORM 1	FORM 2	FORM 3	FORM 4
• Types of numbers • Factors and multiples • Fractions • Decimals • Percentages • Directed Numbers • Approximations • Estimations • Ratio	• Rules of precedence (order of operations) • Square and square roots • Ratios, rates and proportion	• Standard form and ordinary form • Number bases • Rational and Irrational numbers • Number patterns	• Scale • Approximations and estimations – limit of accuracy

7.2 TOPIC 2: SET LANGUAGE AND NOTATION

FORM 1	FORM 2	FORM 3	FORM 4
• Sets and Set notation • Types of sets	• Types of sets • Set builder notation	• Types of sets • Venn diagram with two subsets	

7.3 TOPIC 3: FINANCIAL MATHEMATICS

FORM 1	FORM 2	FORM 3	FORM 4
• Simple interest • Profit and loss • Discount • Ready reckoners	• Foreign exchange • Hire purchase • Commission	• Bills • Bank statements	• Taxations • Budget

7.4 TOPIC 4: MEASURES AND MENSURATION

FORM 1	FORM 2	FORM 3	FORM 4
Measures • Time • Mass • Length • Temperature	**Measures** • Area • Volume • Capacity • Density		
Mensuration • Perimeter • Area	**Mensuration** • Perimeter • Area	**Mensuration** • Perimeter • Area	**Mensuration** • Volume of shapes • Surface area • Density

7.5 TOPIC 5: GRAPHS OF LINEAR FUNCTIONS

FORM 1	FORM 2	FORM 3	FORM 4
• Cartesian plane • Scale • Coordinates	• Scale • Straight line graphs	• Gradient of a straight line • Equation of a straight line	• Graphical solution of linear equations

7.6 TOPIC 6: ALGEBRA

FORM 1	FORM 2	FORM 3	FORM 4
• Algebraic expressions • Substitution • Linear equations • Inequalities • Index form	• Algebraic expressions • Factorisation • Equations • Substitutions • Change of subject of formulae • Simultaneous linear equations • Linear inequalities	• Algebraic fractions • Quadratic expressions • Simultaneous equations • Change of subject of formulae • Substitution	

7.7 TOPIC 7: GEOMETRY

FORM 1	FORM 2	FORM 3	FORM 4
• Points, lines and angles • Construction of lines and angles • Polygons • Circles	• Angles • Bearing • Similarity and congruency • Scale drawing	• Angles in polygons • Area factor • Volume factor	• Circle theorems • Construction of triangles and quadrilaterals

7.8 TOPIC 8: STATISTICS AND PROBABILITY

FORM 1	FORM 2	FORM 3	FORM 4
	• Data collection and presentation • Measures of central tendency (ungrouped data) • Statistical graphs	• Frequency distribution of ungrouped data • Measures of central tendency	• Elementary Probability

7.9 TOPIC 9: MATRICES

FORM 1	FORM 2	FORM 3	FORM 4
	• Order of matrices • Types of matrices	• Operations • Scalar Multiplication	• Multiplication • Determinant • Inverse of a 2x2 matrix

7.0 COMPETENCY MATRIX

12.1 FORM 1

8.1 TOPIC 1: NUMBER SYSTEMS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Types of numbers	• define types of numbers given • identify types of numbers • list examples of each type of numbers	• Odd and even • Prime • Whole number • Natural number Integer	• Defining types of numbers given • Identifying types of numbers	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Factors and Multiples	• find factors and multiples of given numbers • express a number as a product of its prime factors including index form • find the HCF and LCM of given numbers	• Factors and Multiples • Prime factors and index form • Highest common factor (HCF) • Lowest common multiple (L.C.M.)	• Listing factors and multiples of numbers • Expressing a number as a product of its prime factors including index form • Finding H.C.F and L.C.M.	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Fractions	• convert fractions to decimals • convert fractions to percentages and vice versa • carry out calculations involving percentages	• Fractions • Decimals • percentages	• Operations with fractions • Converting fractions to decimals	• Relevant texts • ICT tools • Environment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
			• Converting fractions to percentages • Calculations involving decimals and percentages	• Braille materials and equipment • Talking books/ software
Directed Numbers	• operate with directed numbers • apply directed numbers to practical situations in everyday life	• directed numbers • number line	• Performing operations with directed numbers	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Approximations and Estimations	• Round off numbers to specified degree of accuracy.	• Place value • Rounding off • Decimal places • Significant figures	• Rounding off numbers using the place value system	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Ratio	• simplify ratio • solve problems involving ratio	• Ratio	• Simplifying ratio • Solving problems involving ratio	• Relevant texts • ICT tools • Environment • Braille materials and equipment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
				• Talking books/ software

8.2 TOPIC 2: SET LANGUAGE AND NOTATION

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Sets and set notation	• define a set • represent sets by listing, describing and using diagrams • describe given sets using set notation	• Sets • Set notation	• Defining a set • Listing elements of various sets • Discussing examples of sets in life • Using set notation to describe sets	• Relevant texts • Environment • ICT tools • Braille materials and equipment • Talking books/software
Types of Sets	• describe the types of sets • illustrate the types of sets by use of set notations and diagrams	• Universal set • Finite set • Infinite set • Null or empty set • Equal sets	• Discussing the types of sets • Set illustration • Distinguishing the types of sets	• Relevant texts • Environment • ICT tools • Braille materials and equipment • Talking books/software

8.3 TOPIC 3: FINANCIAL MATHEMATICS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Simple Interest	• calculate simple interest • solve problems involving simple interest	• Simple Interest • Principal, rate, time and amount	• Finding simple interest, principal, rate, time and amount from given data	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Profit and Loss	• calculate profit and loss • find buying and selling price • calculate percentage profit/loss	• Profit and loss • Buying and selling price • Percentage profit/loss	• Finding profit and loss, buying price and selling price • Finding buying and selling price • Calculating percentage profit/loss	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Discount	• calculate discount • determine percentage discount • find the price after discount	• Discount • Percentage discount • Discounted price	• Calculating discount • Determining the discount as a percentage • Finding the price after discount (discounted price)	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Ready reckoners	• interpret ready reckoners	• Ready reckoners	• Interpreting ready reckoners	• Relevant texts

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
				• ICT tools • Environment • Braille materials and equipment • Talking books/software

8.4 TOPIC 4: MEASURES AND MENSURATION

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Measures	• identify uses of units of measurement in life • calculate using the units of measurement • convert units of measurement from one form to another	• Time • Mass • Length • Temperature	• Listing the units of measurement in life • Calculating using the units of measurement • Converting units of measurement from one form to another • Solving problems using the units of measurement	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
	• solve problems using the units of measurements			
Mensuration	• find the perimeter of plane shapes • find the area of plane shapes	• Perimeter of • Square • Rectangle • Triangle • Area of • Square • Rectangle • Triangle	• Finding the perimeter of plane shapes • Calculating the area of plane shapes	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

8.5 TOPIC 5: GRAPHS OF LINEAR FUNCTIONS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Cartesian plane	• draw and label the Cartesian plane using a given scale • locate points on the Cartesian plane	• Cartesian plane • Scale • Coordinates	• Drawing Cartesian plane using a given scale • Identifying points on the Cartesian	• Relevant texts • ICT tools • Environment • Braille materials and equipment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
	• state the coordinates of a point • plot points on the Cartesian plane		plane and stating their coordinates • Plotting points on the Cartesian plane	• Talking books/software

8.6 TOPIC 6: ALGEBRA

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Algebraic expressions	• represent unknown quantities with letters/symbols • define a coefficient • simplify algebraic expressions • substitute values	• Symbolic expression • Coefficient • Like and unlike terms	• Expressing given information in letters • Simplifying algebraic expressions • Collecting like and unlike terms • Substitute values for letters or symbols	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Linear Equations	• solve linear equations where the unknown appears one side • solve linear equations where the unknown appears on both sides of the equation	• Linear equations	• Solving linear equations where the unknown appears on one side • Solving linear equations where the unknown appears on both sides	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Inequalities	• use the inequality signs $<, >, \leq and \geq$ to show smaller than, greater than, smaller or equal to and greater or equal to respectively • represent linear inequalities on a number line • solve linear inequalities	• Inequality signs • Linear inequalities • Number line	• Explaining the inequality signs using suitable words • Representing linear inequalities on a number line • Solving linear inequalities	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Algebraic expressions in index form	• express product of letters in index form • find common factor of algebraic expressions • find common multiples of algebraic terms • find highest common factor and lowest common multiple of algebraic expressions	• Index form • Common factors • Common multiples • Highest common factor • Lowest common multiples	• Expressing the product of letters in index form • Finding common factors of algebraic expressions • Finding common multiples of algebraic terms • Finding highest common factors of algebraic expressions	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

8.7 TOPIC 7: GEOMETRY

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Points, lines and angles	• mark and label a point • identify types of lines • identify types of angles • measure angles • solve problems involving angles on a straight line and at a point	• Points • Lines • Acute, right, straight, obtuse and reflex angle • Angles on a straight line • Angles at a point	• Marking and labelling a point • Discussing types of lines and angles • Measuring angles • Solving problems involving angles on a straight line and at a point	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Polygons	• define a polygon • state the names of n-sided polygons (up to n=10) • describe the properties of polygons • state the number of lines of symmetry of a polygon	• Regular and irregular polygons • Properties of polygons including lines of symmetry	• Discussing regular and irregular polygons • Naming polygons with up to ten sides • Stating properties of polygons • Stating number of lines of symmetry	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Circles	• name parts, lines and regions in a circle	• Centre • Diameter • Radius • Chord • Circumference • Arc • Sector • Segment	• Drawing and naming parts of a circle	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Construction of lines and angles	• measure lines and angles • construct lines and angles using ruler and protractor • draw parallel lines using ruler and set square	• Measuring lines and angles • Construction of lines • Construction of angles • Construction of parallel lines	• Measuring lines and angles • Constructing lines and angles • Drawing parallel lines using ruler and set square	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

8.0 COMPETENCY MATRIX

12.2 FORM 2

9.1 TOPIC 1: NUMBER SYSTEMS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Rules of precedence	• perform arithmetic calculations using order of operations	• Order of operations	• Applying the rules of precedence in real numbers	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Squares and Square roots	• find squares of integers • find square roots of perfect squares	• Squares and square roots	• Finding squares and square roots	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Ratio, Rate and Proportion	• simplify ratio • solve problems involving ratio and rate • solve problems involving direct and inverse proportion	• Ratio • Direct proportion • Inverse proportion • Rate	• Simplifying ratio Solving problems involving ratios, proportion and rate	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software

9.2 TOPIC 2: SET LANGUAGE AND NOTATION

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Types of Sets	• describe the types of sets • form subsets from universal set • find union and intersection of 2 sets	• Subset • Union of 2 sets • Intersection of 2 sets	• Describing types of sets • Forming subsets from universal sets • Discussing union and intersection of 2 sets	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Set Builder Notation	• describe sets using a set builder notation • draw Venn diagrams to show relationships in different subsets • solve problems using Venn diagram up to 2 sets	• Set builder notation • Venn diagrams up to two subsets • Word problems	• Describing sets using set builder notation • Listing elements of sets • Describing sets using set notation • Discussing Venn diagrams with up to two subsets • Solving problems involving Venn diagram	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

9.3 TOPIC 3: FINANCIAL MATHEMATICS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Foreign Exchange	• convert from one currency to another	• Currency conversion	• Converting from one currency to another	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Hire Purchase and Lay-bye	• solve problems involving hire purchase and lay-bye	• Lay-bye • Hire purchase -Deposit -Installment	• Discussing hire purchase • Solving problems on hire purchase and lay-bye	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Commission	• calculate commission • solve problems involving commission	• Commission	• Calculating commission • Solving problems involving commission	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

9.4 TOPIC 4: MEASURES AND MENSURATION

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Measures	• state the units of measurement accurately solve problem involving the different units of measurements	• Area • Volume • Capacity Density	• Using the units of measurement in life Solving problems using the different units of measurement	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Mensuration	• find the perimeter of shapes • find the area of plane shapes	Perimeter of • circle • parallelogram • trapezium Area of • Circle • Parallelogram • trapezium	• Finding the perimeter of shapes • Calculating the area of plane shapes	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

9.5 TOPIC 5: GRAPHS OF LINEAR FUNCTIONS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Straight line graph	• draw the Cartesian plane using a given scale • construct a table of values for a given linear function • draw the straight-line graph	• Scale • Straight line graphs	• Drawing a Cartesian plane using a given scale • Constructing table of values for a given linear function • Plotting points on the Cartesian plane • Drawing straight line graph on the Cartesian plane	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software Talking books/software

9.6 TOPIC 6: ALGEBRA

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Algebraic Expressions	• substitute values for letters • expand algebraic expressions with brackets • factorise linear algebraic expressions • factorise quadratic algebraic expressions where the coefficient of the quadratic term is one • find Highest Common Factor and Lowest Common Multiple of algebraic expressions • simplify algebraic fractions in the form $\frac{x}{a} \pm \frac{y}{b}$ where *a* and *b* are positive integers	• Algebraic expressions with two or more variables • Algebraic expressions with brackets • Linear expressions • Quadratic expressions • H.C.F and L.C.M • Algebraic fractions	• Substituting values for letters • Expanding algebraic expressions with brackets • Factorising linear expressions • Factorising algebraic expressions • Factorising quadratic algebraic expressions where the coefficient of the quadratic term is one • Finding H.C.F. and L.C.M. of algebraic expressions • Simplifying algebraic fractions	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Equations	• solve linear equations where the unknown appears on both sides of the equation • solve equations with brackets • solve equations with algebraic fractions	• Linear equations • Equations with brackets • Equations with fractions	• Solve linear equations where the unknown appears on both sides	• Relevant texts • ICT tools • Environment • Braille materials and equipment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
	• solve simultaneous linear equations • solve quadratic equation where the coefficient of x^2 is one	• Simultaneous equations • Quadratic equations	• Expanding and solving equations with brackets • Simplifying and solving algebraic fractions • Solving simultaneous linear equations • Solving quadratic equations where the coefficient of x^2 is one	• Talking books/software
Inequalities	• represent linear inequalities on a number line • formulate linear inequalities • solve linear inequalities • state the integral solution set	• Linear inequalities • Number line • Solution set	• Representing linear inequalities on a number line • Solving linear inequalities • Stating the integral solution set	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

9.7 TOPIC 7: GEOMETRY

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Points, lines and angles	• identify types of angles formed on parallel and transversal lines • calculate angles on parallel and transversal lines	• Angles • Parallel and transversal lines	• Discussing angles formed on parallel and transversal lines • Calculating angles on parallel and transversal lines	• ICT tools • Environment • Relevant texts • Braille materials and equipment • Talking books and software
Bearing	• identify cardinal points • give direction using cardinal points • find compass bearing of points • calculate three figure bearing of points • solve problems in life involving bearing	• Cardinal points • Three figure bearing • Compass bearing	• Discussing cardinal points • Discussing importance of compass in life • Finding compass bearing • Calculating three figure bearings • Solving problems in life involving bearing	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books and software
Similarity and congruency	• identify similar figures • state cases of congruency • identify congruent triangles	• Similar figures • Congruent triangles	• Identifying similar figures • Stating cases of congruency • Identifying congruent triangles	• Relevant texts • ICT tools • Environment • Braille materials and equipment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
				• Talking books/software
Scale drawing	• find scales from given information • draw lines and diagrams using a given scale • calculate distances using a given scale	• Scale drawing	• Measuring and drawing lengths using given scales • Solving problems in familiar and less familiar contexts using the concept of scales	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

9.8 TOPIC 8: STATISTICS AND PROBABILITY

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
• Data collection and presentation • Statistical graphs • Measures of central tendency (ungrouped data)	• collect data • represent data using frequency table, bar chart, pie chart and tally tables • define measures of central tendency • state the mode in a given distribution	• Data collection • Representing data using frequency table, bar chart, pie chart and tally tables. • Mean • Mode • Median	• Collecting data • Representing data using frequency table, bar chart and pie chart and tally tables • Field excursion • Determining the mode in a given distribution • Calculating the mean and median	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
	• calculate the mean and median		• Discussing the application of the measures of central tendency	

9.9 TOPIC 9: MATRICES

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Matrices	• define a matrix • state the order of a given matrix • identify the different types of matrices • discuss the uses of matrices	• Definition of a matrix • Order of matrices • Types of matrices	• Defining a matrix • Presenting information in matrix form • Discussing the order of matrices • Listing types of matrices • Locating elements in a given matrix • Applying matrices in life situations	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

9.0 COMPETENCY MATRIX

12.3 FORM 3

10.1 TOPIC 1: NUMBER SYSTEMS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Standard form	• convert ordinary numbers to standard form and vice versa • perform operations in standard form	• Ordinary numbers • Standard form Operations in standard form	• Adding and subtracting numbers in standard form Dividing and multiplying in standard form	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Number bases	• convert from denary to bases 2 and 5 and vice versa • add and subtract numbers in base 2 and 5	• Denary system • Converting number bases • Operations in number bases 2,5, 10	• Converting from denary to bases 2 and 5 and vice versa • Adding and subtracting in number bases	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Rational and Irrational numbers	• distinguish between rational and irrational numbers • simplify surds	• Rational numbers • Irrational numbers • Surds	• Differentiating between rational and irrational numbers	• Relevant texts • ICT tools • Environment • Braille materials and equipment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
			• Simplifying problems involving irrational numbers	• Talking books/ software
Number patterns	• identify number patterns in daily life	• Patterns: -Numbers	• Exploring and discovering number patterns	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software

10.2 TOPIC 2: SET LANGUAGE AND NOTATION

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Sets	• define types of sets by listing and describing • represent 2 sets using Venn diagrams	• Subset • Compliment of a set • Venn diagrams with two subsets	• Guided discovery on types of sets • Representing given information	• Relevant texts • ICT tools • Environment • Braille materials and equipment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
	• solve problems using Venn diagrams with two subsets		on a Venn diagram • Solve problems using Venn diagrams	• Talking books/software

10.3 TOPIC 3: FINANCIAL MATHEMATICS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Bills	• interpret bills	• Utility bills: -Electricity -Council -Telephone -Water • Other bills	• Interpreting utility bills such as council bills, electricity bills, telephone bills • Interpreting other bills	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Bank Statements	• interpret bank statements	• Bank statements	• Interpreting bank statements	• Relevant texts • ICT tools • Environment

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
				• Braille materials and equipment • Talking books/software

10.4 TOPIC 4: MEASURES AND MENSURATION

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Mensuration	• find the length of an arc • calculate the area and perimeter of a sector • find the perimeter of combined shapes • find the area of combined shapes	• Length of arc • Perimeter of a sector • Area of a sector • Perimeter of combined shapes • Area of combined shapes	• Calculating the length of an arc • Calculating the perimeter and area of a sector • Finding the perimeter of combined shapes • Calculating the area of combined shapes	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

10.5 TOPIC 5: GRAPHS OF LINEAR FUNCTIONS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Equation of a straight line	• compute the gradient of a line using two given points • find the equation of a straight line given a point and a gradient • find the equation of straight line using two given points • determine the equation of a line parallel to a given line	• Gradient of a straight line • Equation of a straight lines	• Computing the gradient of a line using two given points • Finding the equation of a straight line using a point and a gradient • Finding the equation of straight line using two given points • Determining the equation of a line parallel to a given line	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

10.6 TOPIC 6: ALGEBRA

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Algebraic Expressions	• simplify algebraic fractions, in the form in the form $\frac{2}{3} \pm \frac{4}{x \pm 5}$ where the common denominator $3(x \pm 5)$ is linear and $\frac{ax \pm b}{c} \pm \frac{dx \pm f}{e}$ where a,b,c,d,e and f are constants	• Algebraic fractions	• Simplifying algebraic fractions, where the denominators are whole numbers	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Equations	• change the subject of formulae for equations where the power is $\frac{1}{2}$, 1 or 2 eg ax=*y*, $ax^2 = y$ and $\sqrt{ax + b}$=y • solve linear simultaneous equations using elimination and substitution • solve quadratic equations of the form $x^2 + bx + c = 0$ by factorisation	• Change of subject • Simultaneous equations • Quadratic equations • Substitution of values	• Changing subject of formulae • Solving linear equations by substitution and elimination • Solving linear simultaneous equations • Solving quadratic equations using factorisation • Solving problems from life situations using equations	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

10.7 TOPIC 7: GEOMETRY

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Angles in polygons	• calculate the interior angles of a polygon • calculate the exterior angles of polygons • find the number of sides of a polygon	• Interior angles • Exterior angles • Number of sides	• Finding the interior angles of polygons • Finding exterior angles of polygons • Finding number of sides of polygons	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Area factor and Volume factor	• find the scale factor for two given similar shapes • calculate the lengths of sides of similar figures • calculate the area of similar figures • calculate the volume and mass of similar solids	• Scale factor, area factor and volume factor • Area of similar figures • Volume and mass of similar solids	• Discussing scale factor, area factor and volume factor • Computing lengths in similar shapes • Computing areas of similar shapes • Solving problems on volumes and masses of similar solids	• Relevant texts • ICT tools • Environment • Indigenous Knowledge Systems (IKS) • Braille materials and equipment • Talking books/software

10.8 TOPIC 8: STATISTICS AND PROBABILITY

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
• Frequency distribution of ungrouped • Measures of central tendency	• construct frequency tables • draw bar chart, pie and chart • analyse information on the graphs • compute the mean • find the mode	• Data representation - Frequency table - Bar graph - Pie chart • Mean • Mode • Median	• Constructing frequency tables • Constructing graphs • Interpreting the graph • Computing the mean • Finding the mode and the median	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software

10.9 TOPIC 9: MATRICES

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Operations	• add matrices • subtract matrices • multiply matrices by a scalar	• Addition and subtraction of matrices • Scalar multiplication of matrices	• Carrying out addition and subtraction of matrices • Using scalar quantities to multiply matrices • Solving problems involving matrices	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

10.0 COMPETENCY MATRIX

FORM 4

11.1 TOPIC 1: NUMBER SYSTEMS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Scale	• identify types of scales • determine lengths using a given scale • use given scales to draw lines or diagrams • calculate distances using a given scale	• Representative fraction • Ratio scale	• Identifying types of scales • Finding lengths using given scales • Making scale drawings using given scale • Calculating distances	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software
Approximation And estimation – limits of accuracy	• solve problems involving limits of accuracy	• Limits of accuracy • Area and perimeter of plane shapes	• Computing the minimum and maximum perimeters of plane shapes • Computing the minimum and maximum areas of plane shapes	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software

11.2 TOPIC 2: FINANCIAL MATHEMATICS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Taxation	• define different types of tax • calculate different types of tax	• VAT • PAYE • Customs and import duty	• Defining different types of tax • Calculating different types of tax	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Budget	• prepare household budget • prepare small business budget	• Budgets -Household -Small business budget	• Preparing household budget • Preparing small business budget	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

11.3 TOPIC 3: MEASURES AND MENSURATION

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Mensuration	• calculate the volume of solid shapes • calculate the surface area of solid shapes • find density of materials	Volume of • Cuboid • Cylinder Surface area of • Cuboid • Cylinder Density of materials	• Finding the volume of solid shapes • Calculating the surface area of solid shapes • Finding the density of different materials	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

11.5 TOPIC 5: GRAPHS OF LINEAR FUNCTIONS

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Graphical solution of simultaneous equations	• draw a straight-line graph • find the x- and y-intercepts • solve simultaneous equations graphically	• straight line graph • coordinates of the x- and the y-intercepts • graphical solution of linear equations	• Drawing a straight-line graph • Finding the x- and y-intercepts • Solving simultaneous equations graphically	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

11.7 TOPIC 7: GEOMETRY

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Circle theorems	• calculate angles in circles using circle theorems (excluding tangents and touching circles)	• Circle theorems (excluding tangents and touching circles)	• Calculating angles in circles using circle theorems (excluding tangents and touching circles)	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Construction of triangles and quadrilaterals	• construct lines and angles • bisect lines and angles • construct triangles • construct quadrilaterals	• Construction of lines and angles • Bisecting lines and angles • Construction of triangles and quadrilaterals	• Constructing lines and angles • Bisecting lines and angles • Solving problems using construction of triangles and quadrilaterals	• Geometrical instruments • Indigenous Knowledge Systems (IKS) • Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books and software

11.8 TOPIC 8: STATISTICS AND PROBABILITY

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
• Probability	• describe experimental and theoretical probability • deduce probabilities from results of experiments • identify situations where experimental and theoretical probabilities are applied • use probability rules to compute probabilities of single events • solve problems that involve experimental and theoretic probability in life	• Experimental probability • Theoretical probability Single events	• Discussing theoretical and experimental probability • Carrying out probability experiments • Computing probabilities of single events • Solving problems that involve experimental and theoretical probability	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/ software

11.9 TOPIC 9: MATRICES

KEY CONCEPT	OBJECTIVES Pupils should be able to:	CONTENT (knowledge, skills, values and attitudes)	SUGGESTED ACTIVITIES	SUGGESTED RESOURCES
Multiplication of matrices	• multiply matrices	Multiplication of matrices (up to 2x2)	• Multiplying matrices	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Determinant	• find the determinant of a 2x2 matrix • distinguish between singular and non-singular matrices • solve simple problems that involve singular and non-singular matrices (up to linear equations)	• Determinant of a 2x2 matrix • Singular and non-singular matrices	• Calculating determinant of a 2x2 matrices • Solving simple problems that involve singular and non-singular matrices (up to linear equations)	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software
Inverse matrix	• find the inverse of a 2x2 non-singular	• Inverse of a 2x2 matrix	• Calculating the inverse of a 2x2 non-singular matrix	• Relevant texts • ICT tools • Environment • Braille materials and equipment • Talking books/software

12.0 ASSESSMENT

Learners shall be assessed through School Based Continuous Assessment (SBCA) and Summative Assessment (SA). These assessments shall be guided by the principles of inclusivity, practicability, authenticity, transparency, flexibility, validity and reliability. The principles are crucial for creating a supportive and effective learning environment that fosters growth and development in learners. Arrangements, accommodations and modifications shall be visible to enable candidates with special needs to access assessments.

This section covers the assessment objectives, the assessment model, the scheme of assessment, and the specification grid.

12.1 Assessment Objectives

Learners will be assessed on their ability to:

12.3.1 recognise and apply mathematical symbols, terms and definitions
12.3.2 carry out calculations accurately with or without a calculator
12.3.3 estimate to a stipulated degree of accuracy
12.3.4 approximate to a stipulated degree of accuracy
12.3.5 measure to a stipulated degree of accuracy
12.3.6 draw tables, graphs, charts and diagrams accurately
12.3.7 read tables, graphs, charts and diagrams accurately
12.3.8 interpret tables, graphs, charts and diagrams accurately
12.3.9 carry out geometrical constructions and manipulations accurately
12.3.10 convert mathematical information from one form to another
12.3.11 deduce and draw inferences through manipulation of statistical data
12.3.12 solve routine and non-routine problems using appropriate formulae, algorithms and procedures

12.2 Assessment Model

Assessment of learners shall be both Continuous and Summative as illustrated in Figure 1. School Based Continuous Assessment shall include recorded activities from the School Based Projects done by the learners. The mark shall be included on learners' end of term and year reports. Summative assessment at school level shall include terminal examinations which are at the end of the term and year.

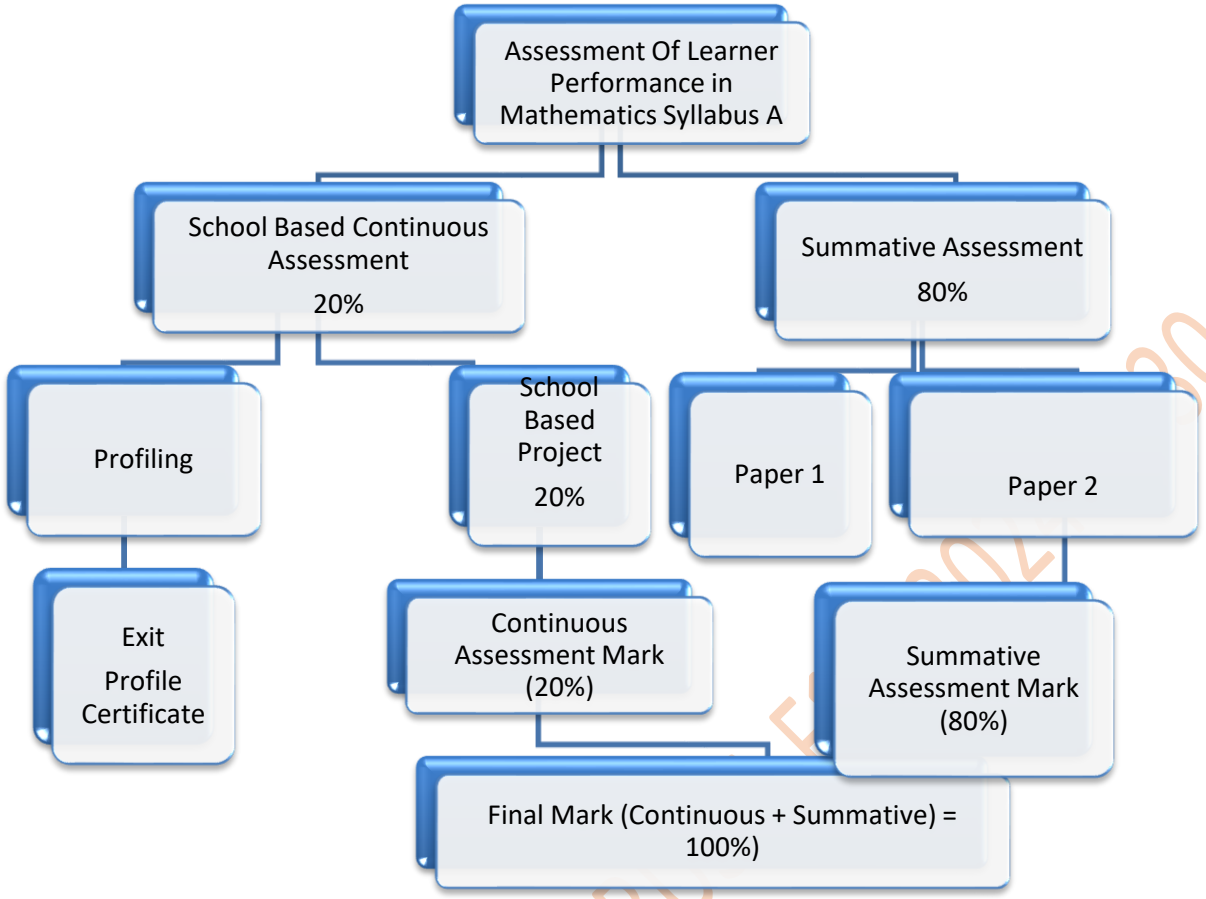

Fig. 1 Assessment Model

In addition, learners shall be profiled and learner profile records established. Learner profile certificates shall be issued for checkpoints assessment in schools as per the dictates of the Teacher's Guide to Learning and Assessment. The aspects to be profiled shall include learner's prior knowledge, values and skills, and subsequently the new competences acquired at any given point.

12.3 Scheme of Assessment

The Assessment Model shows that learners shall be assessed using both School Based Continuous Assessment and Summative Assessment for both School and ZIMSEC assessments.

The table shows the Scheme of Assessment where 20% is allocated to School Based Continuous Assessment and 80% to School or ZIMSEC Summative Assessment.

FORM OF ASSESSMENT	WEIGHTING
School Based Continuous Assessment	**20%**
Summative Assessment	**80%**
Total	**100%**

12.3.1 **Description of School Based Continuous Assessment**

Learners shall do one school-based project per form which contributes to 20% of the end of year final mark. The end of year summative assessment shall then contribute 80%. However, for ZIMSEC public examinations, two (2) school-based projects shall be considered as School Based Continuous Assessment at Form 6. The two School Based Projects shall include those done during Form 3 and 4 sessions. Each will contribute 10%.

School – Based Project Continuous Assessment Scheme

The Table given below shows the Learning and Assessment Scheme for the School Based Project.

Project Execution Stages	Description	Timelines	Marks
1	Problem Identification	January	5
2	Investigation of related ideas to the problem/innovation	February	10
3	Generation of possible solutions	March	10
4	Selecting the most suitable solution	April-May	5
5	Refinement of selected solution	June	5
6	Presentation of the final solution	July	10
7	Evaluation of the solution and Recommendations	August-September	5
	TOTAL		**50**

The learning and assessment scheme shows the stages that shall be executed by pupils and the timeline at which each stage shall be carried out. Possible marks, totalling 50, are highlighted to indicate how much can be allocated.

12.3.2 Description of the ZIMSEC Summative Assessment

ZIMSEC Summative Assessment shall be a public examination at Form 4. The examination shall consist of two (2) papers of equal weighting.

Description of the papers

Paper 1
Duration: 2 hours, 30 minutes

The paper consists of about 30 short structured questions marked out of 100. The paper is compulsory and will be set on all syllabus topics.

Paper 2
Duration: 2 hours, 30 minutes

The paper consists of two sections, Section A and Section B, and it will be set to cover all topics of the syllabus

Section A: This section has five (5) compulsory questions, marked out of 52

Section B: This section has seven (7) long questions. Candidate answer 4 questions of their choice. Each question carries twelve (12) marks.
The section is marked out of 48

Paper	Paper type	Marks	Duration	Weighting
1	Structured – short answer items	100	2 ½ hours	35%
2	Structured – short answer items and long questions	100	2 ½ hours	35%
TOTAL				**70%**

12.4 Specification Grid

Skill	Paper 1	Paper 2
Knowledge and comprehension	40%	40%
Application and Analysis	40%	40%
Problem solving	20%	20%
TOTAL	**100%**	**100%**