INTRODUCTION

At lower primary, learners acquired knowledge and understanding of mathematics in numeracy, computational and problem solving skills through practical activities, explorations and group work. The syllabus aims to further develop the skills learnt at lower primary. In addition, the Upper Primary syllabus intends to give learners an opportunity to approach problems with flexibility as well as trying alternative approaches to overcome any difficulties.

Learners would use number system more confidently by counting accurately with all four number operations. They will explore features of shape and space and develop measuring skills in a range of contexts. They will also learn to present their findings and reasoning using a wide range of methods, mathematical language, diagrams and charts.

RATIONALE

Mathematics plays a key role in everyday life as a communication tool that makes extensive use of symbolic notation. It stirs the intellectual challenge, the outcome of which is cognitive development that assists in sustaining the thinking span. It helps to develop mental processes that enhance logical and critical thinking, accuracy and problem solving; all of which are very important in decision making.

Mathematics provides a foundation for logical and lateral thinking essential in acquiring and organising knowledge, developing concepts and skills, and understanding principles for further learning. It empowers learners to make associations and generalisations, which are important in the study of, natural, physical and social sciences as well as in the operation of industry and business. It is also seen in nature and thus helps in the interpretation of the environment. Its study will develop in learners the appreciation of its cultural and traditional development.

AIMS OF THE PRIMARY SCHOOL MATHEMATICS PROGRAM

To develop in all learners

1. competence and confidence in the application of computational skills in order to solve day to day problems
2. inquiry skills, creativity, critical thinking and problem solving ability
3. an awareness of mathematics as a language to analyse and communicate information and ideas
4. an awareness of the interrelationship of topics within mathematics and with other subjects
5. positive attitudes and values toward mathematics and its integration with other subjects
6. numeracy and literacy skills compatible with technological and scientific developments
7. the ability to demonstrate the use of acquired mathematical concepts and skills in making informed decisions and drawing conclusions
8. appropriate and adequate concepts for further study of mathematics and other related subjects
9. an awareness and appreciation of the role of mathematics in cultural and traditional activities within the environment
10. an awareness of emerging issues in relation to mathematics.

The subject demands the active participation of learners to explore the world around them through investigation as well as application of learned principles.

ATTAINMENT TARGETS

At the end of 7 years of primary education every student should be able to

Read and write numbers

1. read and write in numerals any given whole number up to 1000 000
2. read and write whole numbers in words up to 1000 000
3. classify whole numbers into odd, even, factors, multiples, prime, squares, cubes, triangular and rectangular
4. read and write money values in numerals
5. round off a whole number up to the nearest 1000 000
6. find the place value of digits in numbers up to 1000 000
7. use symbols =, <, > to compare whole numbers up to 1 000 000
8. write whole numbers in expanded form up to 1 000 000
9. identify positive and negative numbers
10. order directed numbers
11. identify use of numbers in various occupations and every day life

Compute fractions

1. express proper fractions as decimals, percentages and vice-versa
2. express fractions in their lowest term
3. determine equivalent of fractions
4. express improper fractions as mixed numbers
5. order fractions with different denominators
6. add two fractions with different denominators of up to two digit numbers
7. subtract one fraction from another with different denominators of up to two digit numbers
8. add two decimals each with up to 3 decimal places (thousandth)
9. subtract decimals each with up to 3 decimal places (thousandth)
10. order decimals
11. multiply and divide fractions by whole numbers
12. calculate percentages
13. solve problems involving ratio and direct proportion

Carry out basic operations

1. add whole numbers sum up to 1000 000
2. subtract whole numbers up to 1000 000
3. multiply up to a 4-digit number by up to a 2-digit number
4. divide up to a 4-digit number by a 1-digit number and express the remainder as a fraction or decimal
5. multiply and divide by powers of 10 up to 1000
6. determine equivalent amounts of money
7. make and apply estimates
8. use the correct order of operation

Carry out and compute measurements

1. select appropriate instruments and units of measurement to a level of accuracy required in a particular situation
2. convert from one measurement to another within the same metric system
3. find perimeter, circumference of given shapes
4. find volumes of objects: cube, cuboids and cylinders
5. measure length, capacity and mass of different objects
6. calculate the circumference of a circle
7. carry out the four basic operations on measurement
8. tell time using 12 and 24 hour notations
9. read and interpret simple timetables given in 12 and 24 hour notations
10. convert time between 12 and 24 hour notation
11. convert up to 3 consecutive time measures using the following time spans: millennium, century, decade, year, month, week, day, hour, minute and second

Geometry

1. identify and name types of lines: vertical, horizontal, slanting, parallel and perpendicular
2. identify and name kinds of angles: right, straight, acute, obtuse, reflex
3. draw angles: right, straight, acute, obtuse, reflex
4. complete the drawing of an object given the line of symmetry

5. identify and name up to 10 sided polygons
6. identify properties of polygons
7. construct triangles given specific measures of angles and sides using a variety of tools
8. identify and draw circumference, diameter and radius of a circle
9. use the first quadrant of Cartesian coordinate to describe and find the position of given points
10. describe and carry out simple transformations: translations, reflections, rotations
11. identify tessellation
12. identify and name polyhedra and their nets
13. find the relationship between sides, edges and vertices of prisms(Euler's formula)

Problem solving

1. play games and solve simple puzzles
2. apply addition, subtraction, multiplication and division to solve problems in real life situations
3. carry out simple investigations

Statistics

1. read, interpret and draw pictographs, bar graphs, pie charts and line graphs
2. represent information on pictograph, bar, pie chart and line graphs
3. carry out investigation using appropriate statistical methods
4. calculate averages
5. Work out simple probability

Algebra

1. complete given sequences
2. simplify expression with different variables
3. evaluate given expressions
4. solve simple linear equations of the form ax + b = c
5. find input, output sets or mapping

TEACHING METHODOLOGY

The teaching method expected to be used by teachers when using this syllabus must be predominantly learner centred. This includes, discussions, brainstorming, group work, research work, project work, problem solving.

SYLLABUS ORGANISATION

The syllabus consists of six modules: Numbers and Operations, Geometry, Measures, Problem solving, Statistics and Algebra. The syllabus maintains the progressive and spiral approach to the modules.

It ends with an APPENDIX giving the list of words to be covered throughout the syllabus.

Module 1: Numbers and Operations

The module addresses number facts, which include addition, subtraction, multiplication and division facts. Learners would apply these facts to solve problems in real life situation. Learners would also use their knowledge of the number facts to solve problems that involve percentages and fractional ideas. The module also includes more knowledge about the sequence of numbers, writing numerals in words as well as the place value of the number system.

Module 2: Geometry

This module deals with both two and three-dimensional geometrical shapes, their names, properties, construction and relationship to each other. The module also covers position as an important aspect of our world through finding direction, using simple maps and co-ordinates. The module would develop in learners an appreciation of patterns in space as

seen in symmetry, transformations, and tessellation as well as the occurrence of geometry in the environment.

Module 3: Measures

The module allows learners to recognise the importance of measurement in real life situation through practical experiences in using measuring, measuring devices, making estimations of quantities and in mastering equivalence between units. This would enable learners to further develop and use measurement formulas.

Module 4: Problem Solving

Problem solving develops in learners the ability to be creative in applying mathematical concepts and techniques and to reflect critically on the methods they have chosen. Learners could apply some of the problem solving strategies, such as: drawing a picture, acting out the problem, guessing and checking the solution, using a drawing, finding the pattern, making an organised list, making a table, working backwards, using visual reasoning and using logical reasoning. Problem solving also encourages co-operative learning.

Module 5: Statistics

Statistics develops the skills of collecting, organising and analysing data and presenting reports and summaries. It helps learners to interpret data in charts, tables and graphs of various kinds. In this module, learners would also develop the idea of probability and its use in every day life.

Module 6: Algebra

Algebra introduces learners to a new way of communicating mathematics through letters and symbols. Algebra also and provides a shorter and more precise way to write mathematical statements. This includes patterns and sequences, expressions and equations.

ASSESSMENT PROCEDURES

Learners Continuous Assessment

It is expected that teachers will closely monitor each learner's performance. This monitoring should be made up of observations and class exercise performance. The results of this monitoring will help the teacher to diagnose weaknesses early. Teachers are encouraged to take time to discuss with each individual learner on their performance from time to time. It is also important to encourage learners to continuously reflect on their performance for self-introspection.

Assignment

Assignments should be given to learners to enable them to continuously revise all previous work done.

Tests

Teachers must use different types of tests to ensure that different aspects of their teaching are covered. Each test should be well planed for so that they can achieve their intended objectives. They can be given weekly, fortnightly or monthly to diagnose, lessons, topics or modules. Mock examination tests can be use to give the learners the fill of examinations.

TIME ALLOCATION

According to recommendations put forward, the following time allocation has been suggested.

Standard 5 to 7	3.5 hours per week

STANDARD 5

MODULE 1: NUMBERS AND OPERATION		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
1.1 Whole Numbers	1.1.1 Develop numeracy skills	1.1.1.1 read in numerals and words numbers up to 10 000 1.1.1.2 write in numerals and words numbers up to 10 000 1.1.1.3 classify whole numbers as odd, even and prime 1.1.1.4 denote place value up to 10 000 1.1.1.5 write numbers in expanded form 1.1.1.6 use symbols: =, <, > to compare numbers up to 10 000 1.1.1.7 round off to the nearest 10, 100, 1000 1.1.1.8 identify the use of numbers in various occupations and everyday life
1.2 Operations	1.2.1 apply the four basic operations on whole numbers	1.2.1.1 estimate sum of given numbers 1.2.1.2 add two to three numbers of up to 4-digits, sum up to 10 000 1.2.1.3 apply the commutative and associative law of addition 1.2.1.4 identify the identity element of addition 1.2.1.5 estimate differences of given numbers 1.2.1.6 subtract up to 4-digit numbers within 10 000 1.2.1.7 find factors of numbers up to fifty 1.2.1.8 identify the Lowest Common Multiple (LCM) 1.2.1.9 identify the Highest Common Factor (HCF) 1.2.1.10 estimate products of given numbers 1.2.1.11 multiply whole numbers by 10 and 100 with product up to 10 000 1.2.1.12 multiply numbers by multiples of ten 1.2.1.13 multiply up to a 2-digit number by a 2-digit number with product up to 10 000 1.2.1.14 estimate quotient of given numbers 1.2.1.15 divide up to 3-digit number by a 1-digit number with remainder 1.2.1.16 divide whole numbers by 10, 100 and 1000 1.2.1.17 use the correct order of operations in solving number sentences up to 3 steps 1.2.1.18 solve word problems involving the four basic operations 1.2.1.19 identify the use of number operations in various occupations and the environment

1.3 Fractions	1.3.1	develop computational skills on fractions	1.3.1.1	identify fractions with denominators 6, 7, 8, 9, 10, 11, 12 and 100
			1.3.1.2	identify equivalent fractions
			1.3.1.3	order fractions with the same denominators in descending or ascending order
			1.3.1.4	convert improper fractions to mixed numbers
			1.3.1.5	convert mixed numbers to improper fractions
			1.3.1.6	use =, <, > to compare two proper fractions with same denominators
			1.3.1.7	use =, <, > to compare two proper fractions with different denominators
			1.3.1.8	add a whole number and a fraction
			1.3.1.9	subtract a fraction from a whole number
			1.3.1.10	add fractions with different denominators
			1.3.1.11	subtract fractions with different denominators
			1.3.1.12	express percentages as fractions
			1.3.1.13	express fractions as percentages (restrict to whole numbers)
1.4 Decimals	1.4.1	compute decimals	1.4.1.1	use place value to represent decimals up to hundredths
			1.4.1.2	convert fractions with denominators 10 and 100 to decimals.
			1.4.1.3	add two decimal numbers up to 1 decimal place (tenths)
			1.4.1.4	subtract decimals within tenths
			1.4.1.5	multiply a decimal number up to one decimal place by a whole number
			1.4.1.6	multiply a decimal number up to one decimal place by 10 and 100
			1.4.1.7	divide a decimal number up to one decimal place by a whole number
			1.4.1.8	solve word problems involving decimal
1.5 Money	1.5.1	apply the four basic operations on money	1.5.1.1	interpret and understand the significance of national symbols on money
			1.5.1.2	read and write money in *Pula* and *Thebe*
			1.5.1.3	convert *Pula* to *Thebe* and vice-versa
			1.5.1.4	add money up to P1000
			1.5.1.5	subtract money within P1000
			1.5.1.6	multiply money up to P1000
			1.5.1.7	divide money up to P1000
			1.5.1.8	make purchases of and change for items up to P100
			1.5.1.9	make simple bills

MODULE 2: GEOMETRY		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
2.1 Lines	2.1.1 develop an understanding of lines	2.1.1.1 differentiate types of lines: Perpendicular, parallel and curve 2.1.1.2 identify parallel, perpendicular and curved lines in shapes and within the environment 2.1.1.3 draw perpendicular lines using a compass, ruler and set square 2.1.1.4 draw perpendicular lines using a ruler and set square 2.1.1.5 combine different types of lines to make shapes
2.2 Angles	2.2.1 acquire more knowledge on angles	2.2.1.1 name angles as straight and reflex 2.2.1.2 identify angles as straight and reflex in the environment 2.2.1.3 identify a revolution and fractions of a revolution using right angles 2.2.1.4 measure angle sizes in whole numbers using a protractor 2.2.1.5 make clockwise and anti-clockwise turns using cardinal points and relate them to angles 2.2.1.6 construct angles accurately given their sizes (restrict to whole numbers)
2.3 Quadrilaterals	2.3.1 develop knowledge on quadrilaterals	2.3.1.1 identify and name quadrilaterals 2.3.1.2 investigate the relationship between angles and sides of quadrilaterals 2.3.1.3 identify quadrilaterals with equal opposite angles and sides 2.3.1.4 identify quadrilaterals with different opposite angles and sides 2.3.1.5 state properties of quadrilaterals 2.3.1.6 draw quadrilaterals 2.3.1.7 1dentify quadrilaterals in the environment
2.4 Symmetry	2.4.1 acquire knowledge on symmetry and its existence in the environment	2.4.1.1 identify lines of symmetry in two dimensional shapes 2.4.1.2 identify symmetry in objects in the environment 2.4.1.3 determine line of symmetry for two-dimensional shapes using paper folding and reflection 2.4.1.4 draw lines of symmetry given a two dimensional figure 2.4.1.5 complete a drawing of any two dimensional figure given a part and a line of symmetry 2.4.1.6 sort quadrilaterals according to lines of symmetry 2.4.1.7 identify and appreciate symmetry in nature

2.5 Tessellation	2.5.1	apply knowledge of shapes on tessellation	2.5.1.1 2.5.1.2	identify tessellation in objects in the surroundings make tessellation of different shapes
2.6 Transformation	2.6.1	understand basic concepts on transformational geometry	2.6.1.1 2.6.1.2 2.6.1.3	identify flips, slides and turns using concrete materials and drawings carry out flips, slides and turns using concrete objects and drawings identify flip, slides and turns in the environment
2.7 Co-ordinates	2.7.1	acquire knowledge on position and direction of objects / points on a grid	2.7.1.1 2.7.1.2 2.7.1.3 2.7.1.4	give directions using left and right describe the position of object on the grid using left and right describe the position of objects in a grid using rows and columns use a grid reference to identify position of objects in a grid

MODULE 3: MEASURES		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
3.1 Length	3.1.1 demonstrate an understanding of and ability to apply measurement units of length	3.1.1.1 select appropriate instruments and units to measure linear dimensions 3.1.1.2 measure perimeters of circles and irregular shapes using strings and rulers 3.1.1.3 measure boundaries and diagonals in shapes and objects in *mm, cm* & *m* 3.1.1.4 calculate perimeters of quadrilaterals and triangles 3.1.1.5 convert *mm* to *cm*, and *cm* to *m* 3.1.1.6 convert *cm* to *mm* and *m* to *cm*
3.2 Area	3.2.1 demonstrate skills on measuring area of two dimensional shapes	3.2.1.1 calculate the area of rectangles and squares 3.2.1.2 Estimate the area of irregular polygons using a square grid 3.2.1.3 use manipulation to find the formula for the area of a triangle
3.3 Mass	3.3.1 apply knowledge on measurement of mass	3.3.1.1 select appropriate standard units to measure mass 3.3.1.2 convert kilograms to grams 3.3.1.3 convert grams to kilograms 3.3.1.4 solve word problems on mass involving the four basic operations
3.4 Capacity	3.4.1 demonstrate an understanding on measurement of capacity	3.4.1.1 estimate to the nearest litre 3.4.1.2 measure to the nearest litre 3.4.1.3 convert *ml* to *l* 3.4.1.4 convert *l* to *ml* 3.4.1.5 solve word problems involving capacity
3.5 Volume	3.5.1 understand the concept of volume	3.5.1.1 find the volume of boxes using *1cm3* units cube 3.5.1.2 use the formula for the volume of cubes and cuboids 3.5.1.3 make models of cubes and cuboids of given volumes 3.5.1.4 solve word problems involving volume
3.6 Time	3.6.1 gain knowledge on time	3.6.1.1 convert hours to minutes 3.6.1.2 convert minutes to hours 3.6.1.3 read analogue clock to the nearest minute in 12 hour notation 3.6.1.4 read digital clock to the nearest minute using 12 hour notation 3.6.1.5 estimate time intervals to the nearest minute 3.6.1.6 measure time intervals to the nearest minute 3.6.1.7 identify time spans: year, decade and century

MODULE 4: PROBLEM SOLVING		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
4.1 Games and Puzzles	4.1.1 acquire problem solving skills and processes	4.1.1.1 play mathematical games 4.1.1.2 solve mathematical puzzles
4.2 Investigations	4.2.1 acquire process skills to carryout investigations	4.2.1.1 carry out simple investigations involving numbers, geometry, measures and algebra 4.2.1.2 conduct mathematical investigative project on numbers, geometry and measures 4.2.1.3 communicate mathematically, using appropriate mathematical languagein discussions and presentations
MODULE 5: STATISTICS		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
5.1 Graphs	5.1.1 show understanding of displaying data	5.1.1.1 display data in pictographs using two or more symbols 5.1.1.2 show data on bar graphs 5.1.1.3 display data on line graphs 5.1.1.4 read and analyse information given in a graph
5.2 Measures of central tendency and range	5.2.1 acquire skills to summarise data	5.2.1.1 find the mode in a distribution of not more than 10 numbers 5.2.1.2 find the median in a distribution of not more than 10 numbers 5.2.1.3 calculate the range of a given distribution 5.2.1.4 show how the mode, median and range can be used to interpret data
5.3 Data collection and analysis	5.3.1 apply manipulative skills to collect and analyse data	5.3.1.1 conduct simple surveys, including HIV/AIDS and Environmental Education issues 5.3.1.2 collect data and record information in tabular form 5.3.1.3 represent data in appropriate graphs using pictograph, bar graph and/ or line graph 5.2.1.4 make conclusions from the survey
5.4 Probability	5.4.1 understand the concept of probability	5.4.1.1 discuss events of chance: election outcome, winning a game, weather prediction 5.4.1.2 classify events as never, sometimes, always, certainly, possible or impossible

MODULE 6: ALGEBRA		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
6.1 Algebra	6.1.1 acquire knowledge on algebra	6.1.1.1 generate number patterns 6.1.1.2 complete a linear sequence given at least four consecutive terms 6.1.1.3 identify pattern rules for linear geometric patterns 6.1.1.4 map arrow diagrams using two or more operations 6.1.1.5 replace missing numbers in number sentences involving addition and subtraction with alphabets and solve by inspection (e.g. $4 + \square = 10 \Rightarrow 4 + a = 10$ 6.1.1.6 given a number sentence involving up to three terms, form a story 6.1.1.7 given a story form a number sentence involving three terms 6.1.1.8 given an expression form a story 6.1.1.9 given a story form an expression

STANDARD SIX

MODULE 1: NUMBERS AND OPERATIONS		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
1.1 whole Numbers	1.1.1 acquire knowledge on numbers	1.1.1.1 denote place value of numbers up to hundred thousands using place value materials including abacus, drawings and symbols 1.1.1.2 write Roman numerals up to 12 1.1.1.3 read whole numbers in numerals and words up to 100 000 1.1.1.4 write whole numbers in numerals and words up to 100 000 1.1.1.5 classify whole numbers as square, rectangular and triangular 1.1.1.6 read whole numbers in expanded form up to 100 000 1.1.1.7 write whole numbers in expanded form up to 100 000 1.1.1.8 round off to the nearest 10 000 1.1.1.9 use symbols: =, <, > to compare numbers up to 100 000
1.2 Number Operations	1.2.1 understand basic number operations	1.2.1.1 add two to four numbers of up to a 4-digits sum up to 100 000 1.2.1.2 apply the associative law of addition 1.2.1.3 subtract up to a 4-digit number within 100 000 1.2.1.4 use estimation to check addition and subtraction 1.2.1.5 find factors of numbers up to 100 1.2.1.6 find the Lowest Common Multiple and Highest Common Factor 1.2.1.7 multiply a 3-digit number by up to a 2-digit number with product up to 10 000 1.2.1.8 multiply whole numbers by 10,100,1000 1.2.1.9 multiply whole numbers by multiples of hundred 1.2.1.10 apply the distributive law of multiplication 1.2.1.11 divide up to 4-digit numbers by a 1-digit number with and without remainders 1.2.1.12 use estimation to check multiplication and division 1.2.1.13 use the correct order of operations in solving number sentences up to 4 steps 1.2.1.14 solve word problems involving the four basic operations

1.3 Fractions	1.3.1	apply the four basic operations on fractions	1.3.1.1	order proper fractions with different denominators in descending or ascending order
			1.3.1.2	express fractions in their lowest term
			1.3.1.3	develop fractional patterns and sequences
			1.3.1.4	use the symbols =, <, > to compare fractions
			1.3.1.5	express proper fractions as decimals
			1.3.1.6	express decimals as proper fractions
			1.3.1.7	express improper fractions as decimals
			1.3.1.8	express decimals as improper fractions
			1.3.1.9	add fractions with different denominators
			1.3.1.10	subtract fractions with different denominators
			1.3.1.11	add mixed numbers with different denominators
			1.3.1.12	subtract mixed numbers with different denominators
			1.3.1.13	use a fraction as an operator to find fractions of quantities
			1.3.1.14	multiply a fraction by a whole and vice versa
			1.3.1.15	solve word problems involving fractions
1.4 Decimals	1.4.1	apply the four basic operations on decimals	1.4.1.1	read decimal numbers in numerals and words up to thousandths
			1.4.1.2	write decimal numbers in numerals and words up to thousandths
			1.4.1.3	order decimals in descending or ascending order
			1.4.1.4	use the symbols =, <, > to compare decimals
			1.4.1.5	add two decimal numbers up to 2 decimal places
			1.4.1.6	subtract decimal numbers up to 2 decimal places
			1.4.1.7	multiply a decimal number up to 2 decimal places
			1.4.1.8	multiply a decimal number up to 2 decimal places by 10, 100 and 1000
			1.4.1.9	divide a decimal number up to 2 decimal places by 10 and 100
			1.4.1.10	divide a decimal number up to 2 decimal places by a whole number
			1.4.1.11	solve problems involving mixed operations on decimals and whole numbers
			1.4.1.12	solve word problems involving decimals
1.5 Percentages	1.5.1	compute percentages	1.5.1.1	express percentages as proper fractions
			1.5.1.2	express percentages as decimals
			1.5.1.3	calculate percentages of given quantities (restrict to whole numbers)
			1.5.1.4	express one quantity as a percentage of another
			1.5.1.5	solve simple word problems involving percentages

1.6 Ratios	1.6.1	acquire knowledge on ratios	1.6.1.1 1.6.1.2 1.6.1.3 1.6.1.4	define ratio use concrete material to show ratios write ratios in their simplest form divide a quantity into a given ratio
1.7 Money	1.7.1	perform computational techniques involving money	1.7.1.1 1.7.1.2 1.7.1.3 1.7.1.4	read and write money values to P10 000 in numerals and words represent amounts of money up to P100 using the smallest possible number of notes and coins interpret bills solve simple word problems involving addition, subtraction, multiplication and division of money up to P1000

MODULE 2: GEOMETRY		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
2.1 Angles	2.1.1 develop skills on measuring and constructing angles	2.1.1.1 measure angles of different sizes accurately 2.1.1.2 construct angles of different sizes accurately 2.1.1.3 use correct angle notation 2.1.1.4 calculate the sum of the interior angles of squares, rectangles and triangles 2.1.1.5 calculate the sum of the interior angles of a quadrilateral 2.1.1.5 construct squares, rectangles and triangles given sizes of angles and lengths of sides using mathematical instruments
2.2 Polygons	2.2.1 acquire knowledge on polygons and their properties	2.2.1.1 name polygons of up to ten sides 2.2.1.2 state properties of polygons 2.2.1.3 sort polygons as regular or irregular 2.2.1.4 identify and sort regular polygons according to number of lines of symmetry 2.2.1.5 identify the circumference, diameter and radius in a circle 2.2.1.6 identify shapes of faces in three dimensional figures 2.2.1.7 sort polyhedral as pyramids and prisms: up to octagonal prism and square pyramid 2.2.1.8 sketch all the faces that make up a three dimensional figure 2.2.1.9 make nets of different polyhedral
2.3 Tessellation	2.3.1 apply knowledge of shapes and polygons to tessellation	2.3.1.1 carry out tessellation using various polygons 2.3.1.2 carry out tilling of polygons, composite and curved shapes 2.3.1.3 classify polygons as tessellating and non tessellating
2.4 Transformation	2.4.1 demonstrate an understanding of transformational geometry using concrete materials and drawings	2.4.1.1 identify translations, reflections and enlargements 2.4.1.2 show reflections using concrete materials and drawings 2.4.1.4 carryout enlargement of scale factor 2, using concrete materials and drawings 2.4.1.5 identify the occurrence and application of geometric properties in the environment

2.5 Coordinate Geometry	2.5.1 show understanding of simple maps and directions	2.5.1.1	draw and label the first quadrant of a Cartesian plain
		2.5.1.2	identify the y-axis and x-axis in the first quadrant of a Cartesian plain
		2.5.1.3	describe specific location of a point on the Cartesian plain with reference to the origin
		2.5.1.4	use first quadrant Cartesian coordinates to describe the position of a point
		2.5.1.5	show the position of a point given coordinates in the first quadrant
		2.5.1.6	relate co-ordinates to everyday life

MODULE 3: MEASURES		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
3.1 Length	3.1.1 show an understanding and application of measurements of length	3.1.1.1 measure length, height, width, depth and thickness of objects in the environment in millimetres, centimetres and metres 3.1.1.2 measure a variety of distances between two objects/points up to a kilometre 3.1.1.3 estimate distances up to two kilometres 3.1.1.4 select the most appropriate standard unit to measure linear dimensions: *mm*, *cm, m* and *km* 3.1.1.5 measure and find perimeters and diagonals of polygon of up to 10 sides 3.1.1.6 ketch and draw rectangles given perimeters 3.1.1.7 measure perimeters of objects in the surroundings 3.1.1.8 use the formula to find the circumference of a circle 3.1.1.9 find the perimeter of irregular polygons 3.1.1.10 convert within *mm*, *cm*, *m* and *km*
3.2 Area	3.2.1 demonstrate skills on calculating area of two dimensional shapes	3.2.1.1 calculate areas of triangles using formula 3.2.1.2 calculate the area of composite shapes excluding semi-circle 3.2.1.3 draw a rectangle or square given its area 3.2.1.4 use the formula to find the area of circle 3.2.1.5 use word problems involving areas of rectangles, squares and triangles
3.3 Mass	3.3.1 gain more knowledge on measuring mass	3.3.1.1 record measurements in grams and kilograms using decimal notation 3.3.1.2 measure accurately mass of objects in the environment using appropriate measuring units and devices 3.3.1.3 calculate gross and net mass 3.3.1.4 solve word problems in mass
3.4 Volume	3.4.1.1 develop skills in measuring volume	3.4.1.1 calculate the volume of cuboids using formula 3.4.1.2 measure volume of various objects by displacement 3.4.1.3 differentiate between volume and capacity 3.4.1.4 determine the relationship between units of volume and capacity 3.4.1.5 convert units of volume and capacity 3.4.1.6 solve word problems on volume and capacity

3.5 Capacity	3.5.1	develop more knowledge on capacity	3.5.1.1 3.5.1.2 3.5.1.3	carryout inter-conversions of units of capacity select appropriate unit to measure capacity of different objects solve word problems on capacity
3.6 Time	3.6.1	develop understanding of time	3.6.1.1 3.6.1.2 3.6.1.3 3.6.1.4 3.6.1.5 3.6.1.6 3.6.1.7 3.6.1.8	write analogue time as digital time and vice versa read, write and tell time in 24 hour notation identify leap years identify time span in year, decade, century, millennium read and interpret distance-time graphs and time tables calculate length of time (duration) identify time differences of places with reference to the Greenwich Meridian solve word problems involving time
MODULE 4: PROBLEM SOLVING				
Topics	*General Objectives*		*Specific Objectives*	
	Students should be able to:		*Students should be able to*	
4.1 Games and Puzzles	4.1.1	apply acquired knowledge, skills and processes in problem-solving	4.1.1.1 4.1.1.2	play mathematical games that require problem-solving processes solve mathematical puzzles that require problem-solving processes
4.2 Investigations	4.2.1	develop skills to carryout investigations and solve problem solving activities	4.2.1.1 4.2.1.2 4.2.1.3 4.2.1.4 4.2.1.5 4.2.1.6	discuss different problem solving strategies to use in order to solve a problem use problem solving strategies to solve problems involving numbers and operations, geometry, measures, algebra and statistics formulate problem solving activities solve non-routine problems conduct simple mathematical investigations on numbers, geometry, measures and algebra use correct mathematical language, symbols and vocabulary to present a problem or a solution

MODULE 5: STATISTICS		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
5.1 Graphs	5.1.1 acquire knowledge on data display and interpretation	5.1.1.1 read and interpret line graph representing information on everyday life 5.1.1.2 discuss and interpret graphs that keep records of current events: including HIV/AIDS, Environmental Education issues and accidents in Botswana
5.2 Data collection analysis	5.2.1 develop manipulative skills on collecting, recording, displaying and analysing data	5.2.1.1 collect and record data in tabular form 5.2.1.2 identify an appropriate graph to display data 5.2.1.3 make conclusions about the findings of the data collected
5.3 Measure of Central Tendency	5.3.1 acquire more knowledge on summarising data	5.3.1.1 find mode and median in a distribution not more than 10 numbers (use up to 2-digit numbers 5.3.1.2 calculate the mean of a distribution not more than 10 numbers (use to 2-digit numbers 5.3.1.3 show how the mean can be used to interpret data 5.3.1.4 solve problems involving the mode, median and mean
5.4 Probability	5.4.1 relate meaningful experiences about probability	5.4.1.1 discuss probability situations in everyday life 5.4.1.2 use mathematical language in discussions to describe probability (e.g. likely, unlikely, probably, never, sometimes, always) 5.4.1.3 explore through simple games and experiments the likelihood that an event may occur 5.4.1.4 use events from meaningful experiences to discuss probability

MODULE 6: ALGEBRA		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
6.1 Algebra	6.1.1 acquire knowledge on algebra	6.1.1.1 simplify a one step linear expression of the first-degree with one variable restricted to addition and subtraction (e.g. a + a, 2c + c, 2p – p) 6.1.1.2 solve linear equations involving three terms with one variable and coefficient of one by inspection (e. g x + 1 = 5, m – 2 =7) 6.1.1.3 translate simple statements into algebraic expressions 6.1.1.4 translate simple statements into algebraic equation 6.1.1.5 evaluate simple algebraic expressions by substitution 6.1.1.6 solve word problems giving rise to first-degree equations with one variable by inspection

STANDARD 7

MODULE 1: NUMBERS AND OPERATION		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
1.1 Whole Number	1.1.1 gain more knowledge on numbers	1.1.1.1 read and write whole numbers in numerals and words up to 1 000 000 1.1.1.2 use symbols such as =, <, > to compare numbers up to1 000 000 1.1.1.3 round off to the nearest 100 000 1.1.1.4 write numbers in expanded form up to 1 000 000
1.2 Directed numbers	1.2.1 gain knowledge on directed numbers	1.2.1.1 identify positive and negative numbers 1.2.1.2 order directed numbers in ascending and descending order
1.3 Number operations	1.3.1 demonstrate proficiency on number operations	1.3.1.1 use estimation to check addition and subtraction 1.3.1.2 add numbers up to one million 1.3.1.3 subtract numbers within one million 1.3.1.4 use estimation to check multiplication and division solutions 1.3.1.5 multiply a 4-digit number by up to 2-digit number 1.3.1.6 discuss the characteristics of multiples and factors of numbers up to 1000 1.3.1.7 find Lowest Common Multiples of given numbers 1.3.1.8 find Highest Common Factors of given numbers 1.3.1.9 multiply whole number by powers of ten 1.3.1.10 multiply by multiples of 1000 1.3.1.11 divide up to 4-digit number by a 2-digit number and express the remainder as a fraction 1.3.1.12 divide up to 4-digit number by a 2-digit number and express the remainder as a decimal 1.3.1.13 write numbers in index form 1.3.1.14 use the correct order of operations to solve number sentences 1.3.1.15 solve word problems involving the four basic operations giving rise to answers not exceeding 1 000 000

1.4 Fractions	1.4.1	demonstrate understanding of operations on fractions	1.4.1.1	express the relationship between proper fractions, decimals and percentages
			1.4.1.2	express improper fractions as mixed numbers
			1.4.1.3	express mixed numbers as improper fractions
			1.4.1.4	order mixed numbers, proper and improper fractions
			1.4.1.5	use the symbols =, <, > to compare fractions with whole numbers
			1.4.1.6	add proper, improper fractions and mixed numbers with denominator of up to two digits and express the answer as a mixed number
			1.4.1.7	subtract proper, improper fractions and mixed numbers with denominator of up to two digits and express the answer as a mixed number
			1.4.1.8	relate division to fractions
			1.4.1.9	multiply fractions with denominators of up to two digits by whole numbers and vice versa
1.5 Decimals	1.5.1	apply basic operations on decimals	1.5.1.1	use the symbols =, <, > to compare decimals with whole numbers
			1.5.1.2	use the symbols =, <, > to compare decimals with fractions
			1.5.1.3	add decimals to the thousandths place
			1.5.1.4	subtract decimals to the thousandth place
			1.5.1.5	multiply numbers up to 3 decimal places by 10, 100 and1000
			1.5.1.6	multiply numbers up to 3 decimal places by whole numbers
			1.5.1.7	divide numbers up to 3 decimal places by 10, 100 and 1000
			1.5.1.8	divide numbers up to 3 decimal places by whole numbers
			1.5.1.9	round off decimals to specified numbers of decimal places
			1.5.1.10	solve problems involving mixed operations with decimals and fractions
1.6 Percentages	1.6.1	gain more knowledge on percentages	1.6.1.1	express percentages as decimals and proper fractions
			1.6.1.2	express proper fractions as decimals and percentages
			1.6.1.3	calculate simple percentages (restrict to whole numbers)
			1.6.1.4	find percentages of given quantities (restrict to whole numbers)
			1.6.1.5	express one quantity as a percentage of another
			1.6.1.6	calculate percentage increase and decrease
			1.6.1.7	use percentages to make comparisons
			1.6.1.8	discuss the use of percentages in everyday life, including emerging issues

1.7 Rates and Ratios	1.7.1 acquire more knowledge on rates and ratios	1.7.1.1 express ratios as fractions 1.7.1.2 describe direct proportion 1.7.1.3 solve simple problems involving direct proportion 1.7.1.4 define rates 1.7.1.5 use rates to compare quantities 1.7.1.6 calculate exchange rates of different currencies (up to a tenths)
1.8 Money	1.8.1 apply money in everyday life	1.8.1.1 explain Value Added Tax (VAT) 1.8.1.2 calculate VAT 1.8.1.3 interpret bills and invoices 1.8.1.4 make a budget of up to P1 000 1.8.1.5 calculate selling and buying price (profit and loss) 1.8.1.6 calculate percentage increase and decrease 1.8.1.7 solve word problems involving addition, subtraction, multiplication and division of money up to P1000

MODULE 2: GEOMETRY		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
2.1 Angles	2.1.1 develop skills on angles in 2-dimensional shapes	2.1.1.1 name different types of triangles and their properties 2.1.1.2 estimate angles of triangles in degrees 2.1.1.3 measure angles of triangles in degrees 2.1.1.4 estimate angles of quadrilaterals in degrees 2.1.1.5 measure angles of quadrilaterals in degrees 2.1.1.6 construct triangles given specific measures of angles and sides using a variety of tools 2.1.1.7 demonstrate congruency of figures by measuring angles and sides 2.1.1.8 identify simple factors of 360 degrees 2.1.1.9 make clockwise and anti clockwise turns to specific angle sizes
2.2 Polygons	2.2.1 acquire knowledge on 3-dimensional and their properties	2.2.1.1 determine and find the relationships of faces, edges and vertices of right prisms 2.2.1.2 make nets of cubes, prisms and pyramids (polyhedral) 2.2.1.3 identify the properties of prisms 2.2.1.4 identify the properties of pyramids
2.3 Transformations	2.3.1 understand key concepts in transformational geometry	2.3.1.1 carry out simple transformations: translation, reflection and enlargement of scale factor 2, 3 and 4 2.4.1.2 carryout rotations using concrete materials and drawings 2.4.1.3 find the image of an object given the angle of rotation (angles 90°, 180° and 270°) 2.3.1.4 identify a transformation given an object and an image 2.3.1.5 describe a transformation given an object and an image
2.4 Coordinate geometry	2.4.1 show understanding of coordinates in the Cartesian plane	2.4.1.1 plot points given co-ordinates in the first quadrant 2.4.1.2 plot co-ordinates in the first quadrant and join them to form different shapes

MODULE 3: MEASURES		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
3.1 Length	3.1.1 show the ability to apply length measurements	3.1.1.1 find length of a rectangle or square side given one side and perimeter 3.1.1.2 find perimeter of composite shapes 3.1.1.3 use prefixes in the metric system of length correctly (milli-, centi-, deci-, kilo-) 3.1.1.4 carryout inter conversions of metric systems of length 3.1.1.5 solve word problems involving perimeters
3.2 Area	3.2.1 gain knowledge on calculating area	3.2.1.1 calculate area of triangle and circles 3.2.1.2 calculate the length of side of a square or rectangle given the area 3.2.1.3 find area of shaded rectangular regions 3.2.1.4 calculate area of composite shapes 3.2.1.5 solve word problems involving area
3.3 Mass	3.3.1 develop more knowledge in measuring mass	3.3.1.1 calculate gross and net mass 3.3.1.2 measure mass of water 3.3.1.3 solve word problems on mass
3.4 Volume	3.4.1 develop skills in measuring volume	3.4.1.1 compare mass and volume of water 3.4.1.2 derive and use formula to calculate volumes of cylinders 3.4.1.3 find volume of irregular shapes 3.4.1.4 solve word problems on volume
3.5 Time	3.5.1 acquire more knowledge on time	3.5.1.1 compare 12 hours and 24 hour clock times 3.5.1.2 solve problems on calendars and timetables 3.5.1.3 identify time difference of places using their respective local times 3.5.1.4 convert up to 3 consecutive time measures using time span up to a millennium 3.5.1.5 solve word problems on time 3.5.1.6 calculate distance, time and speed 3.5.1.7 interpret distance-time graphs

MODULE 4: PROBLEM SOLVING		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
4.1 Games, Puzzles	4.1.1 use acquired knowledge to design games and puzzles	4.1.1.1 design mathematical games 4.1.1.2 play mathematical games 4.1.1.3 design mathematical puzzles 4.1.1.4 solve mathematical puzzles
4.2 Problem solving	4.2.1 apply knowledge, skills and processes learnt to solve real life problems	4.2.1.1 use problem solving strategies to solve problems involving numbers and operations, geometry, measures, algebra and statistics 4.2.1.2 solve non-routine real life problems
MODULE 5: STATISTICS		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
TOPIC	GENERAL OBJECTIVE	SPECIFIC OBJECTVE
5.1 Graphs	5.1.1 acquire more knowledge on graphs	5.1.1.1 read and interpret information on pie charts 5.1.1.2 draw a pie chart to represent given information
5.2 Measures of central tendency	5.2.1 acquire more knowledge on summarising data	5.2.1.1 find mean, mode, median and range in a distribution of not more than 10 numbers 5.2.1.2 solve word problems involving mode, median and mean
5.3 Data collection and manipulation	5.3.1 develop skills to design a survey and process data	5.3.1.1 design surveys, collect data and record, including HIV and AIDS issues, in tabular form 5.3.1.2 identify an appropriate graph to display data 5.3.1.3 make conclusions about the findings of the investigations
5.4 Probability	5.4.1 demonstrate an understanding of probability	5.4.1.1 use dice to assign roles and discuss fairness of games 5.4.1.2 use probability games and identify all possible outcomes 5.4.1.3 connect real life statements with probability concepts (e.g. if I'm 1 out 5 of people in a group, the probability of being chosen is 1 out of 5) 5.4.1.4 predict probability in simple experiments 5.4.1.5 use fractions to describe probability

MODULE 6: ALGEBRA		
Topics	*General Objectives*	*Specific Objectives*
	Students should be able to:	*Students should be able to*
6.1 Algebra	6.1.1 understand expressions and equations	6.1.1.1 translate simple statements into algebraic expressions or equations involving three terms 6.1.1.2 solve word problems giving rise to first-degree linear equations with one variables by inspection or systematic trail involving three terms 6.1.1.3 solve equations of the form ax = c and ax + b = c by systematic trial and error using whole numbers 6.1.1.4 simplify expressions with up to two variables involving up to four terms (restrict to coefficients as whole numbers not exceeding 9 e.g. 2a + b + 3a + 2b) 6.1.1.5 evaluate simple algebraic expressions by substituting whole numbers for the variables (up to two variables)

APPENDIX 1

Mathematics can no longer be portrayed as an isolated subject that deals only in numbers and symbols. When students learn mathematics, they do more than mastering basic skills; they acquire a concise and powerful means of **communication**. The aims of the primary school mathematics program emphasise the teaching of mathematics which will impart in learners, knowledge of mathematical **language**, structure and operation which will in turn help them to reason, justify their conclusions, engage in discussions of different mathematical solutions and strategies for a given problem. They will be able to use mathematics alongside technology and in their daily lives, and, eventually in the work place

By the end of Standard Seven, learners should be able to read, write and use basic mathematics vocabulary listed below in their daily lives.

The vocabulary is mostly covered throughout the primary syllabus. Continuous use of these words is encouraged.

STANDARD FIVE

addends	cube	formula	mixed number	possible	title
addition	cuboids	game	mode	properties	transformation
always	curve	graph	multiples	protector	translation
angle	data	grid reference	multiplicand	puzzles	turns
appreciate	notes	highest	multiplier	quadrilateral	units
appropriate	number	common	nearest	quotient	unlikely
ascending	sentence	factor	never	range	volume
associative law	numerical	range	notation	record	year
anti clockwise	decade	record	weight	reflection	
bills	decimal place	reflection	year	reflex angle	
boundaries	denominator	identity element	numerator	represent	
cardinal point	descending	impossible	objects	revolution	
century	diagonal	improper	operations	right angle	
certainly	difference	fractions	order of	rotation	
chance	differentiate	instruments	operation	round off	
circle	digit	interval	ordinal	row	
clockwise	dimensions	investigate	parallel	select	
collecting	discussions	irregular	prediction	shapes	
column	display	key	presentations	sketch	
communication	distribution	likely	probably	slides	
commutative law	environmental	line graph	product	sometimes	
compare	equivalent	information	project	straight angle	
compass	fraction	lowest	proper	subtract	
conclusion	estimate	common	perimeter	survey	
conduct	expanded	multiple	perpendicular	symbol	
convert	form	median	pictograph	symmetry	
	factor	Millilitre	place value	tabular form	
	flips	millimetre	polygon	tenths	
	fold	minuend	position	tessellation	

STANDRAD SIX

Ascending	congruency	event	mean	proper fraction
accurate	convert	expression	median	pyramid
always	co-ordinates	faces	millennium	ratio
anti-clockwise	corner	factor	mixed number	record
appropriate	cube	findings	mode	remainder
associative law	cuboids	formula	net mass	semi-circle
capacity	data	gross mass	never	sequence
century	decade	highest common factor	notation	sketch
Chart	descending	improper fraction	number sentence	sometimes
circle	design	include	occur	symbol
circumference	dimension	interpret	patterns	tabular form
clockwise	discuss	introduction	percentage	term
collect	displacement	investigate	pie chart	units
commutative	display	irregular	polygon	unlikely
compare	distributive law	likely	presentation	variable
composite	duration	line graph	probability	variable
shape	edge	lowest common	probably	variety
conclusion	equation	multiple	product	vertex
conduct	estimate	lowest term	project	volume
				year

STANDARD SEVEN

accurately	correct	estimate	irregular	polyhedral	rotation
appropriate	demonstrate	estimation	lowest term	position	round off
ascending	Depth	evaluate	Mass	Positive	scale factor
associative law	descending	expanded	mean	powers of ten	set square
axis	design	expanded form	measure	predict	shaded
bills	diameter	express	million	prism	sides
budget	difference	expression	minuend	probability	simplest form
capacity	digits	faces	mixed numbers	properties	speed
characteristics	direct proportion	fairness	multiples	protractor	substitute
circumference	directed numbers	figure	negative	puzzles	subtrahend
clockwise	display	findings	nets	pyramid	sum
closeness	distance time graph	grid	non regular	quadrilaterals	symbols
coefficient	distances	Horizontal	occurrence	quantity	tabular form
compare	distributive law	identity element	operation	radius	thickness
compass	divider	image	order of operation	rates	thousandths
composite shapes	divisible	improper fraction	outcome	ratio	trail and error
conclusions	divisor	index form	pattern	reflection	translation
congruency	edges	information	percentages	relationship	value added tax
consecutive	enlargement	interior angles	perpendicular	remainder	variable
diagonal	equation	interpret	pie chart	product	vertical
construct		investigate	polygons	represent	vertices
convert		invoices		roman number	weight