Examinations Council
of Eswatini

EPC

ESWATINI PRIMARY CERTIFICATE

Mathematics

Syllabus

Subject Code: 212
For Examination In 2023 - 2024

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1. INTRODUCTION

The Eswatini Primary Certificate (EPC) syllabus is designed as a seven-year course for examination in Grade 7. The syllabus assumes that learners have acquired knowledge, understanding and skills in their everyday life activities at home and in the community. The curriculum content of the syllabus is arranged into topics covering four areas: Number & Measurement; Shape, Position and Space; Information Handling and Problem Solving but it is treated throughout in a holistic way. It is intended to promote imaginative and innovative styles of teaching and learning so that the course is enjoyable for all learners, and is designed to assess what learners know, understand, and can do. As such, it forms the basis for the development of fundamental tools for learners to progress to higher-level courses of mathematical studies.

Learners will follow **one basic curriculum**. The curriculum is examined by two written papers and continuous assessment done during normal classroom activities. The papers are described in the Scheme of Assessment.

The syllabus will act as an instrument that will direct instruction and assessment in the classroom, as well as guide examinations. It is structured such that it dovetails with the Junior Certificate [JC].

The main sections of the syllabus are:

- Aims
- Assessment objectives
- Scheme of Assessment
- Curriculum Content
- Grade Descriptions

2. AIMS

The aims set out below describe the National Curriculum Educational Goals for a course in Mathematics for Primary and are the same for all learners. They are not written in order of priority.

The aims are to enable students to:

1.   develop their mathematical knowledge and oral, written and practical skills in a way which encourages confidence and provides satisfaction and enjoyment;

2.   read mathematics and write and talk about the subject in a variety of ways;

3.   develop a feel for number, carry out calculations and understand the significance of the results obtained;

4.   apply mathematics in everyday situations and develop an understanding of the part which mathematics plays in the world around them;

5.   solve problems, present the solution clearly, check and interpret the results;

6.   recognize when and how a situation may be represented mathematically, identify and interpret relevant factors and, where necessary, select an appropriate mathematical method to solve the problem;

7.   use mathematics as a means of communication with emphasis on the use of clear expression;

8.   develop the ability to apply mathematics in other subjects;

9.   develop the abilities to reason logically;

10.   appreciate patterns and relationships in mathematics;

11.   produce and appreciate imaginative and creative work arising from mathematical ideas;

12.   develop their mathematical abilities by considering problems and conducting individual and cooperative enquiry and experiment, including extended pieces of work of a practical and investigative kind;

13.   acquire a foundation appropriate to their further study.

3. ASSESSMENT OBJECTIVES

There is a single Assessment Objective in Mathematics

TECHNIQUE WITH APPLICATION

A description of the assessment objective follows.

Learners should be able to:

1. organise, interpret and present information accurately in written, tabular, graphical   and diagrammatic forms;

2. perform calculations by suitable methods;

3. understand systems of measurement in everyday use and make use of them in the solution of problems;

4. estimate, approximate and work to degrees of accuracy appropriate to the context;

5. use mathematical and other instruments to measure and to draw to an acceptable degree of accuracy;

6. interpret, transform and make appropriate use of mathematical statements expressed in words or symbols;

7. recognise and use spatial relationships in two and three dimensions;

8. recall, apply and interpret mathematical knowledge in the context of everyday situations;

9. make logical deductions from given mathematical data;

10. recognise patterns and structures in a variety of situations, and form simple generalisations;

11. respond to a problem relating to a relatively unstructured situation by translating it into an appropriately structured form;

12. analyse a problem, select a suitable strategy and apply an appropriate technique to obtain its solution;

13. apply combinations of mathematical skills and techniques in problem solving;

14. set out mathematical work, including the solution of problems, in a logical and clear form using appropriate symbols and terminology.

4. APPROACHES

The curriculum content of the syllabus is arranged into topics covering four areas: Number; Shape, Position and Space; Data Handling and Problem Solving but it is treated throughout in a holistic way.

Number

Number is the foundation of mathematics. Number enables us to interpret and represent the world in which we live. In Number, learners develop their understanding of the concept of number and competence in using mental and written strategies for solving problems

Mathematics has been defined as the study of patterns. Learning to recognise, analyse, describe and represent patterns and number relationships connects math to the world and helps us to appreciate fully the value of such pleasures as art, science etc. Maths concepts formerly taught only in basic algebra courses are increasingly part of the culture and vocabulary of modern life.

Being able to see and use patterns has been identified as a fundamental skill needed for developing mathematical understanding. Algebra serves as a bridge between arithmetic and more broadly generalise mathematical situations. These generalisations can be expressed in words, tables and charts. In later years, learners will use the notation of formulas and graphs to represent these generalisations.

Information Handling

Numeracy and literacy learning is linked by Statistics and Probability. Numbers, logical reasoning and texts interweave to describe phenomena visually, numerically and verbally in what is termed data.

Reading and recording data is very important in our daily lives. We learn about the power of evidence as we develop the skills to make statements and evaluate arguments based on data. We learn the power of the question and the framer of the question when we collect and represent data, and we learn that sometimes true, sometimes false, pictures are created when we express data into statistics. Data is a powerful descriptive tool.

Shape, Position and Space

Geometry helps us represent in an orderly fashion what we see in our world. Whether we are shopping or designing, we continually bump up against these mathematical organisers.

In Geometry, learners learn about the features, properties and representation of two-dimensional shapes and three-dimensional objects.

Hands-on, interactive investigations, using non-standard and standard units, help learners develop an understanding of the many measurable attributes of physical objects. Measurement including length, time, temperature, capacity, weight, mass area, volume, and angle will benefit from this approach. This approach helps build an accessible measurement vocabulary and a meaningful comprehension of what it means to measure.

Problem Solving

Word problems which reflect the social life and related to the environment of the child are of particular importance. It is the primary goal of all mathematics instruction and an integral part of all mathematical activity.

In problem solving, learners learn to solve routine and non-routine problems using the problem solving [model] steps. Problem solving is not a distinct topic but a process that should permeate the entire program and provide the context in which concepts and skills can be learned.

Specification Grid

Objective Number	Short-answer questions	Structured/longer answer questions	*Paper 1*	*Paper 2*
1 and 2	✓	✓	✓	✓
3 to 7	✓	✓	✓	✓
8	✓	✓	✓	✓
9	✓	✓	✓	✓
10	✓	✓	✓	✓
11		✓		✓
12		✓		✓
13		✓		✓
14		✓		✓

The grid above is for general guidance only and illustrates where particular objectives might receive more emphasis. Ticks are placed in the grid only where there is likely to be emphasis although the objective may also be met in other areas. There is no rigid emphasis between particular assessment objectives and individual examination components; the objectives may be assessed in any question. The components of the scheme will differ in emphasis placed on various objectives.

The short-answer questions fulfil a particularly important function in ensuring Paper 1 coverage and allowing the testing of knowledge, understanding and manipulative skills, while greater emphasis is placed on applications to the processes of problem solving in the structured/longer answer questions.

The purpose of assessment in Mathematics is two-fold:

(i)   it is to provide feedback to both the teacher and the learner as part of the teaching/learning process

(ii)   it is to evaluate the effectiveness of the Mathematics programme at the secondary school level.

5. Scheme of Assessment

Continuous assessment constitutes 5% of the candidate's final mark. This percentage is subject to be reviewed by the Examination Council of Eswatini.

All candidates must enter for two papers. These will be Paper 1 and Paper 2.

Paper 1 (1 hours and 30 minutes)

Compulsory short-answer paper consisting of 100 marks. The paper is divided into multiple choice and short answer questions.

This paper will be weighted at 50% of the final total available marks.

Paper 2 (2 hours)

Compulsory structured/longer answer paper consisting of 100 marks.

 This paper will be weighted at 50% of the final total available marks.

Weighting of papers

Paper	Weighting Papers 1 and 2 only
1	50%
2	50%

6. CURRICULUM CONTENT

Learners will follow the Eswatini Primary Certificate Mathematics curriculum. The curriculum content is divided into topics covering four areas: Number & Measurement; Shape, Position & Space; Information handling and Problem solving. The table shows the approximate weighting of these areas in each of the components of the examination.

Paper	Number & Measurement	Shape, Position & Space	Information Handling	Problem Solving
1	55%	20%	10%	15%
2	50%	25%	10%	15%

As well as demonstrating skill in the following techniques, candidates will be expected to apply them in the solution of problems.

Appropriate teaching time for the Mathematics syllabus should be equivalent to *ten (10)* periods of thirty (30) minutes each over a period of seven years.

CONTENT

OUTCOME	TOPIC/SUB-TOPIC	OBJECTIVES
NUMBER	1.NUMBERS AND NUMERALS	**All learners should be able to:** 1.1 read and write numerals up to 9 999 999 (million) 1.2 identify and use place value up to millions 1.3 read and write numbers up to 7 digits in words 1.4 round off numbers up to the nearest 10 000 1.5 write numbers up to 7 digits in expanded form 1.6 find factors of given numbers 1.7 find common factors of given numbers 1.8 find the highest common factor of 2 or 3 given numbers 1.9 find multiples of given numbers 1.10 find the common multiples of given numbers 1.11 find the lowest common multiples of given numbers 1.12 define odd, even, prime numbers, factors and multiples of 1.13 Identify or list odd, even, prime numbers, factors and multiples of 1.14 use symbols <, > or = to compare numbers

NUMBER	**2.OPERATIONS**	2.1 add up to 6 numbers with a sum of 7 digits or less without regrouping.
		2.2 add up to 6 numbers with a sum of 7 digits or less with regrouping.
		2.3 subtract any 2 numbers involving up to 7-digits numbers without regrouping
		2.4 subtract any 2 numbers involving up to 7-digits numbers with regrouping
		2.5 multiply numbers resulting with up to a 7-digit number
		2.6 divide up to 7-digit numbers by up to 2 - digit numbers without a remainder
		2.7 divide up to 7-digit numbers by up to 2 - digit numbers with a remainder
		2.8 use the identity properties of addition and multiplication
		2.9 use the correct order of operations
	3.FRACTIONS AND PERCENTAGES	3.1 write decimal numbers in expanded form
		3.2 change common fractions to decimal fractions and vice versa
		3.3 order common and decimal fractions by size.
		3.4 round off
		3.4.1 to the nearest whole number
		3.4.2 decimal fractions to the nearest tenths and hundredths
		3.5 add and subtract common fractions with
		3.5.1 same denominators
		3.5.2 different denominators
		3.6 change mixed number to improper/top-heavy fractions and vice versa
		3.7 add and subtract mixed numbers
		3.8 multiply a unit fraction by a whole number
		3.9 multiply a common fraction by a whole number
		3.10 add and subtract decimal fractions up to the thousandths place
		3.11 multiply decimal fractions by a whole number
		3.12 divide decimal fraction by powers of 10; ten (10) and one hundred (100)

NUMBER		3.13 multiply a unit fraction by a unit fraction
		3.14 multiply a mixed number by a unit fraction
		3.15 express common fractions with denominators that are factors of 100 as percentages
		3.16 express decimals up to 2 decimal places as percentages and vice versa
		3.17 divide a whole number by a unit fraction
	4. RELATIONS	4.1 draw and interpret mapping diagrams to show number relations
		4.2 draw and interpret arrow diagrams to show number relations
	5. PROPORTION	5.1 work out simple direct proportion problems
		5.2 solve word problems using direct proportion
	6. MONEY	6.1 perform the four operations involving money
		6.2 solve word problems involving
		6.2.1 income
		6.2.2 expenditure (shopping bills, measures)
		6.2.3 simple interest
		6.2.4 budget (yearly, monthly)
		6.3 work out the cost of items to determine which is the **cheaper or the better buy** in comparative shopping
		6.3.1 calculate profit or loss, buying price and selling price
		6.3.2 calculate profit or loss using percentages
		6.4 solve problems involving Post Office transactions such as buying postal orders, rentals of post boxes, phone bills, sending of parcels, sending telegrams, sending money/postal orders and sending registered letters and parcels

SHAPE, POSITION & SPACE	7. SHAPES	7.1 name and identify polygons up to 8 sides
		7.2 state properties of triangles and quadrilaterals
		7.3 identify the types of triangles and quadrilaterals
		7.4 tessellate with one polygon
		7.5 identify the nets of cubes and cuboids
		7.6 draw the nets of cubes
		7.7 draw a circle
		7.8 name parts of circle
	8. LENGTH	8.1 draw and measure the length of a line segment
		8.2 convert km to m, m to cm, cm to mm and vice versa
		8.3 solve word problems involving length
		8.4 calculate the circumference of a circle using the relationship that circumference is approximately three times the diameter
		8.5 given radius find the diameter or vice versa
	9. MASS	9.1 convert tonnes to kg, kg to g and vice versa
		9.2 solve word problems involving mass
	10. CAPACITY AND VOLUME	10.1 convert millilitres to litres and vice versa
		10.2 find the volume of a rectangular prism (cubes and cuboids) by counting the cubes in the bottom layer then multiply that by the number of layers
		10.3 solve word problems involving volume
	11. AREA	11.1 find area of flat shapes by counting squares and parts of squares
		11.2 convert between square metres and hectare
		11.3 solve problems involving area
	12. GEOMETRY	12.1 construct a 60° angle using a pair of compasses and a ruler only
		12.2 bisect angles by using a pair of compasses and a ruler
		12.3 identify, measure and draw all the types angles

SHAPE, POSITION & SPACE		using a protractor and a ruler
		12.4 construct triangles using a pair of compasses, ruler and protractor when given
		12.4.1 the lengths of the three sides
		12.4.2 any two sides and an angle between them
		12.4.3 any side and two angles
		12.5 construct quadrilaterals using a pair of compasses, ruler and protractor
		12.6 construct a regular hexagon using a pair of compasses and ruler given one side
		12.7 use the sum of interior angles of triangles and quadrilaterals to solve problems
		12.8 identify and name parallel and perpendicular lines
SHAPE, POSITION AND SPACE	**13.SCALE DRAWING**	13.1 read and interpret scale such as 1 cm represents 5 km
		13.2 draw a scaled diagram of a simple shape
		13.3 choose a suitable scale and draw a scale diagram
		13.4 convert actual to scaled lengths and vice versa using simple proportion
		13.5 solve simple direct proportion problems
	14.TIME	14.1 use a.m. and p.m. in writing time
		14.2 add and subtract time without renaming
		14.3 add and subtract time with renaming
		14.4 use the conversion of units of time, from seconds up to a year, in calculations
		14.5 interpret a variety of timetables involving 12 and 24 hour times
		14.6 convert 12-hour time to 24-hour time and vice versa
		14.7 place historical events on a timeline using BC and AD
		14.8 solve problems involving time
	15.SYMMETRY	15.1 identify symmetrical and non-symmetrical objects
		15.2 find and draw lines of symmetry of a given object
		15.3 complete symmetrical shapes given the line of symmetry

	16.GRAPHS	16.1 draw vertical and horizontal number lines (axes) and use the zero point (origin) as the starting point 16.2 a) read and locate points on a coordinate diagram b) write points as ordered pairs 16.3 plot points on a coordinate diagram 16.4 plot points of ordered pairs and join them

	17.TRANS FORMATION	17.1 slide objects on a grid paper in:
		    17.1.1 one direction
		     17.1.2 two directions and indicate the size of the movement by counting squares
		
		17.2 identify and describe sliding
		
		17.3 rotate objects clockwise or anticlockwise through $\frac{1}{4}$ and $\frac{1}{2}$ turn
		
		17.4 identify shapes that have been rotated clockwise or anticlockwise.
		
		17.5 reflect a whole object in a mirror line that is attached to the object
		
		17.6 reflect one way any object that is away from the mirror line
		
		17.7 perform and identify combined movements

DATA HANDLING	**18. AVERAGE**	18.1 collect and record data 18.2 find the mode and median
	19.GRAPHS	19.1 represent data using pictograms and bar graphs 19.2 interpret pictograms and bar graphs 19.3 construct pie charts using given data 19.4 interpret pie charts 19.5 record and interpret information on the line graphs

Problem solving	20.Critical thinking	20.1 generalise 20.2 make inferences and draw conclusions 20.3 develop alternate strategies
	21.Visual thinking	21.1 manipulate shapes to demonstrate spatial perception 21.2 extend visual patterns and sequences
	22.Decision-making	22.1 analyse options by weighing advantages of each option 22.2 decide by choosing the best option
	23.Interpretation	23.1 state problem in own words 23.2 develop an analogy on problem to simplify a given one 23.3 dramatize problem 23.4 ask questions to clarify information given
	24.Deciding on a method	24.1 make a verbal plan 24.2 show mathematical representation 24.3 identify a pattern in given data 24.4 develop a worded plan
	25.Computation	Manipulate concrete object/information

	26.Reflection	26.1 evaluate a solution to justify its reasonableness 26.2 feed answer to a question to give its meaning 16
Problem solving	**27.Extension**	27.1 pose a problem that could be solved in a 27.2 similar way to discovered method 27.3 try out discovered or used method on a new situation
	28.NON-ROUTINE STRATEGIES	28.1 trial and check 28.2 working backwards 28.3 finding a pattern 28.4 logical reasoning 28.5 elimination

GRADE DESCRIPTIONS

The scheme of assessment is intended to encourage positive achievement by all candidates. Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded particular grades. The grade awarded will depend on the extent to which the candidate has met the assessment objectives overall.

Criteria for the standard of achievement likely to have been shown by candidates awarded Grades A, C and E is shown below.

Grade A

1   Interconvert between the metric units of Mass, Length, Area and Capacity

2   Interconvert between 12- and 24-hour clock

3   Apply the principle of comparative shopping

4   Workout transactions (e.g. buying stamps, registered letters, sending parcels, sending telegrams

5   Find the LCM and HCF

6   Convert common fractions to decimal fractions and vice versa

7   Calculate, use and convert percentages

8   multiply numbers with up to 5-digits by an up to 3-digit number

9   divide an up to 5-digit number by an up to 2-digit number with / without remainder

10   Add and subtract common fractions and mixed numbers with same and different denominators.

11   Divide a whole number by a unit fraction

12   Use commutative, associative and distributive properties for addition and multiplication

13   Solve simple proportion problems

14   Draw nets of prisms, pyramids and cuboids

15   Construct triangles and quadrilaterals using geometrical instruments

16   Tessellate with one polygon

17   Use the property of the sum of interior angles and quadrilaterals

18   Bisect lines using geometrical instruments

19   Construct a 60° angle using geometrical instruments

20   Bisect angle of any given size using geometrical instruments

21   Sliding (expressed as movement to the right or left followed by movement up or down),

22   Reflection (one way, mirror line not attached to an object),

23   Rotation (rotation through ¼ and ½ turn)

24   Combined movements (two only)

25   Bar graphs (one to many correspondence)

26   Pie chart (using angles, fractions, percentage)

27   Information tables

28 Solve problems using problem solving strategies and employing appropriate reasoning skills:

    (a) Problem solving model

        (i) understanding

        (ii) interpreting

        (iii) deciding on a method

        (iv) computing

        (v) reflecting

        (vi) extension

    (b) Non-routine

        (i) trial and check

        (ii) working backwards

        (iii) finding a pattern

        (iv) logical reasoning

        (iv) elimination

    (c) Reasoning skills

        (i) visual thinking

        (ii) critical thinking

        (iii) decision making

Grade C

1. Use metric units to measure Mass, Area and Capacity

2. Use 12- and 24-hour clock

3. Identify perimeter and circumference as length

4. Solve problems involving Mass, Area and Capacity

5. Use seconds, minutes, hours, decades and century

6. Use calendar, timetables, timelines

7. Find simple interest for a period of one year

8. Find profit and loss

9. Solve problems on income, expenditure, simple interest, budget, cost

10. Write numbers in words and expanded form

11. Classify numbers as prime, odd, even, factors and multiple

12. Round off number up to the nearest ten thousand

13. Use set diagrams and number line

14. Use common and decimal fractions

15. Draw arrow and mapping diagrams to show number relations

16. Subtract numbers of up to 7-digit with or without re-grouping

17. Multiply common fractions by whole number and by another common fraction

18. Add and subtract decimal fractions up to 3-decimal places

19. Multiply decimal fraction by powers of 10 and whole numbers

20. Divide decimals by the powers of 10

21. Name and show relationships between parts of a circle

22. Identify line segments; intersecting; horizontal; vertical, parallel and perpendicular

23. Name measure and draw right, acute, obtuse, straight, reflex angles

24. Plot and read points on coordinate diagram on the first quadrant only

25. Number line (from 0 upwards)

26. Interpreting and representing information using pictograms (one to many)

27. workout averages (mode and median)

Grade E

1 Use arbitrary and class standard units to measure Mass area Length and Capacity

2 Use a ruler, tape measure, trundle wheels to measure length

3 Use days, weeks, months and years

4 Identify and use coins and notes

5 Write numbers in numerals

6 Identify place value

7 Use the symbols <, >, = to compare numbers

8 add numbers of up to 6-digits

9 Identify solid shapes

10 Classify solid shapes as prisms, pyramids, cuboids

11 Identify flat shapes

12 Name polygons up to 8 sides

13 Name and classify triangles and quadrilaterals