



Republic of Namibia

MINISTRY OF EDUCATION

JUNIOR SECONDARY PHASE

MATHEMATICS SYLLABUS

GRADES 8 – 10

**Including
ADDITIONAL MATHEMATICS
GRADES 9 - 10**

FOR IMPLEMENTATION IN 2010

Ministry of Education
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Mathematics Syllabus Junior Secondary Phase Grades 8 - 10
(including Additional Mathematics Grades 9 – 10)

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1. INTRODUCTION

This syllabus describes the intended learning and assessment for Mathematics in Grades 8 to 10. As a subject, Mathematics has thematic links to other subjects across the curriculum. In the mathematical area of learning, learners understand and master a variety of mathematical skills, knowledge, concepts and processes, in order to investigate and interpret numerical and spatial relationships and patterns that exist in the world. Mathematics helps learners to develop accuracy as well as logical and analytical thinking, and apply these skills to other areas of learning and real life. The syllabus aims to provide a broad foundation for the future study of Mathematics and of other related disciplines. It also aims to cater to the full range of learner abilities, so that all learners can experience Mathematics as relevant and worthwhile.

The syllabus covers topics on **Mathematics** and **Additional Mathematics**. *The topics on Additional Mathematics are written in italics.* In Grade 8 all learners are offered Mathematics at the same level and all are assessed in the same competencies and skills. In Grades 9 & 10 learners have a choice to study **Mathematics** (core) or **Additional Mathematics** (extended /higher level). The Additional Mathematics syllabus will provide a sound foundation for those learners who want to continue in **Namibia Senior Secondary Certificate** with Mathematics on the Higher Level.

Learners entering for **Mathematics** will write Papers 1 & 2 only, while those entering for **Additional Mathematics** will write Papers 1, 2 & 3. Papers 1 & 2 are the same for all learners. Paper 3 covers the additional topics. **All examinations will be graded on the seven-point scale (A to G). It is strongly recommended that only learners who achieved a grade D or better in Additional Mathematics in Grade 10 will be allowed to continue with Higher Level Mathematics at the Senior Secondary Phase.**

Learners who did not maintain a grade D in Grade 10 will find it very difficult to cope with the demands of Higher Level Mathematics.

NB: The marks for Papers 1 & 2 and the continuous assessment (CA) of a learner who is not graded for **Additional Mathematics** will be converted to a mark for **Mathematics**. The learner will receive a grade for **Mathematics** only if her/his mark is higher than the minimum graded mark for **Mathematics**.

2. RATIONALE AND AIMS

Everybody uses mathematical practices in their daily lives, and the style of thinking that we recognize as mathematical is part of everyday functioning. We all make conjectures and test them using such means as classifying, enumerating, ordering and embedding and build them into generalizations. Mathematics itself is a powerful language, which provides access to viewing the world through number, shape, algebra, measures and statistics that is informative and creative.

All school graduates are expected to be numerate and the study of mathematics at the junior secondary level contributes to the learner's ability to think logically, work systematically and accurately and solve real-world problems. Since mathematics is a compulsory subject, the curriculum caters to a wide range of learner abilities, including those who are going to continue their studies in mathematics and other disciplines for which mathematics is a prerequisite.

The Namibia National Curriculum Guidelines:

- recognise that learning involves developing values and attitudes as well as knowledge and skills;
- promote self-awareness and an understanding of the attitudes, values and beliefs of others in a multi-lingual and multi-cultural society;
- encourage respect for human rights and freedom of speech;

- provide insight and understanding of crucial “global” issues in a rapidly changing world which affect quality of life, i.e. the AIDS pandemic, global warming, environmental degradation, distribution of wealth, expanding and increasing conflicts, the technological explosion and increased connectivity;
- recognise that as information in its various forms becomes more accessible, learners need to develop higher cognitive skills of analysis, interpretation and evaluation to use information effectively;
- seek to challenge and to motivate learners to reach their full potential and to contribute positively to the environment, economy and society.

Aims

The aims are to enable students to:

- develop their mathematical knowledge and skills in a way which encourages confidence and provides satisfaction and enjoyment;
- develop a feel for number and measurement, carry out calculations and understand the significance of the results obtained;
- develop an understanding of spatial concepts and relationships;
- develop their ability to apply mathematics, in the contexts of everyday situations and of other subjects that they may be studying;
- develop an understanding of mathematical principles;
- develop their ability to analyse problems logically, recognise 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;
- use mathematics as a means of communication with emphasis on the use of clear expression;
- appreciate patterns and relationships in mathematics;
- produce and appreciate imaginative and creative work arising from mathematical ideas;
- acquire the mathematical background necessary for further study in this or related subjects.

All learners should be able to achieve the basic competencies. Those who excel should be given enrichment exercises and those who can not cope must receive support teaching through adapted teaching approaches, adapted materials, and assistance from peers.

A small number of learners have some degree of special educational needs, which require greater individual attention or resources. Some learners have handicaps which do not necessarily limit cognitive and affective learning and development (e.g. visual or hearing impairment, physical handicap). Learners with Down's syndrome, other forms of mental handicap, or Attention Deficit Disorder, have very differing competency profiles. Teaching, materials and assessment for these learners have to be more specifically adapted.

3. COMPETENCIES AND LEARNING OUTCOMES

On entry into the Junior Secondary Phase, all learners are expected to be confident and competent in handling numbers and measures. They are expected to have:

- an understanding of the number system;
- a repertoire of computational skills;
- the ability to solve number problems in a variety of contexts;
- a practical understanding of the ways in which information is gathered by counting and measuring, and is presented in graphs, diagrams, charts and tables;
- an understanding of basic two- and three-dimensional shapes and their properties;
- the ability to use the SI system of measures for length, area, volume, mass, capacity and time.

4. PARTICULAR FEATURES OF THE SUBJECT AT THIS PHASE

The Junior Secondary Mathematics Curriculum provides the learner with:

- the essential knowledge to cope with the numeracy demands of the modern world;
- the skills to understand, interpret and make sense of everyday situations in mathematical terms;
- the skills and competencies to solve problems to improve their own lives and the lives of the people around them.

In this phase the concepts and skills acquired at the primary school level are extended and refined. More abstract mathematical concepts and reasoned arguments will be introduced.

The number concept is formalized and includes the whole range of real numbers. The calculator is introduced as a tool to handle more complex calculations as well as irrational numbers, numbers in standard form and the value of trigonometric ratios. Learners will explore the essentials of household finances and calculate areas and volumes of most common everyday objects. Learners are introduced to proportional reasoning, algebraic techniques and symbols and the study of the linear function and its graph. Learners will use definitions and reasoning to understand geometrical objects and apply trigonometry to problems involving right-angled triangles. Learners will become familiar with the most important statistical averages and the concept of probability.

5. GENDER ISSUES

The Junior Secondary Phase of education promotes equality of opportunity in males and females, enabling both sexes to participate equally and fully. Teachers should know and understand how to treat learners equally, and all materials should support gender equity. Teachers must be aware of the ways in which boys or girls often become favouritised in the classroom interaction, and ensure that their role promotes gender equity. There are stereotype expectations that mathematics and science are more difficult for girls. However, it has been shown that “girls will not do so well as boys” becomes a self-fulfilling prophecy unless the teacher is aware of the problem. It is also known that the way problems are contextualised and exemplified in mathematics can act as a gender filter. It is essential that the Junior Secondary Phase create motivation and confidence in girls as much as in boys in mathematics.

6. LOCAL CONTEXT AND CONTENT

Mathematics is a universal language. It is only by local contextualization and application that younger learners will understand and appreciate the uses of mathematics. Where textbooks can only give general examples, it is up to the teacher to use and include local examples by developing appropriate worksheets and exercises.

7. LINKS TO OTHER SUBJECTS AND CROSS-CURRICULAR ISSUES

The main cross-curricular themes across all subjects and all phases deal with particular challenges and risks in our Namibian society.

The main risks and challenges we have to address to ensure that our communities become better places to live, work and learn have been identified as:

- the challenges and risks we face if we do not care for and manage our natural resources;
- the challenges and risks caused by HIV and AIDS;
- the challenges and risks to health caused by pollution, poor sanitation and waste;
- the challenges and risks to democracy and social stability caused by inequity and governance that ignores rights and responsibilities;
- the challenges and risks we face from globalisation.

All of our learners need to:

- understand the nature of these risks and challenges;
- know how they will impact our society and the quality of life of our people now and in the future;
- understand how these risks and challenges can be addressed at both national and global levels;
- understand how each learner can play her or his part in addressing these risks and challenges in their own school and local community.

Mathematics offers a basis and provides the tools for investigations into these issues across the curriculum, e.g. in Life Science (HIV and AIDS), Geography (population and environmental education) and History (human rights and democracy education). Careful planning is required in order to make sure that aspects of topics from different subjects are coordinated in lesson plans and the same topics are treated at the same time in different subjects. To achieve this aim, cooperation between subject teachers is necessary.

8. APPROACH TO TEACHING AND LEARNING

The approach to teaching and learning of mathematics is based on a paradigm of learner-centred education as described in Ministry policy documents, curriculum guides, and the conceptual framework. This approach ensures optimal quality of learning when the following principles are put into practice.

The aim is to develop learning with understanding, and the skills and attitudes to contribute to the development of society. The starting point for teaching and learning is the fact that the learner brings to the school a wealth of knowledge and social experience gained continually from the family, the community, and through interaction with the environment. Learning at school must involve, build on, extend and challenge the learner's prior knowledge and experience.

Learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production. At the same time, each learner is an individual with her/his own needs, pace of learning, experiences and abilities. The teacher must be able to sense the needs of the learners, the nature of the learning to be done, and how to shape learning experiences accordingly. Teaching strategies must therefore be varied but flexible within well-structured sequences of lessons.

The teacher must decide, in relation to the learning objectives and competencies to be achieved, when it is best to convey content directly; when it is best to let learners discover or explore information for themselves; when they need directed learning; when they need reinforcement or enrichment learning; when there is a particular progression of skills or information that needs to

be followed; or when the learners can be allowed to find their own way through a topic or area of content.

Working in groups, in pairs, individually, or as a whole class must be organised as appropriate to the task in hand. Cooperative and collaborative learning should be encouraged wherever possible. In such cases, tasks must be designed that necessitate group work or working in pairs; otherwise the learners will not see any relevance in carrying out tasks together. As the learners develop personal, social and communication skills, they can gradually be given increasing responsibility to participate in planning and evaluating their work, under the teacher's guidance.

Learning experiences should be characterised by an atmosphere of trust, mutual support and the sharing of knowledge. Learners should have the opportunity to solve relevant problems and should be encouraged to attempt to solve these problems before seeking help. Geometrical instruments, calculators and writing materials should be available.

Mathematical problems should always be exemplified in a context that is meaningful to the learners. The relationships between concepts and topics should continuously be developed throughout the phase. The learners' prior knowledge should always be elicited before commencing with a new topic.

Particular attention must be given to ensuring that all learners achieve the basic competencies. Each learner's progress and achievement must be monitored carefully, and any learners not making progress or not achieving these competencies must receive extra support from the teacher, peers, or by receiving individualised materials, etc. Teachers should note that all learners should attain the competencies in the syllabus, but the competencies listed are not intended to limit the initiative of the teacher or the class. Teachers are encouraged to extend their learners' competencies beyond the syllabus requirements, where possible.

9. SUMMARY OF THE SYLLABUS

On completion of the Junior Secondary Phase of Education, a learner is confident in working with the set of real numbers; uses the calculator where appropriate; applies the concepts of ratio and proportion in solving problems; uses algebraic symbols and techniques; generates and solves simple equations; interprets and draws graphs of linear functions; can deduce geometrical properties of objects; draws inferences from statistical data and representations; and applies mathematics to a variety of everyday problems.

TOPIC	GRADE 8	GRADE 9	GRADE 10
NUMBER	apply the four basic operations to integers, common and decimal fractions and percentages; find squares and cubes and their corresponding roots, prime numbers and prime factors; use the calculator efficiently	find terms in sequences, recognise powers of 2, 3 and 5, use positive, zero and negative indices, recognise irrational numbers; write numbers in standard form and round to significant figures; apply the concepts of ratio and rate.	solve problems involving direct and indirect proportion
MONEY AND FINANCE	use percentages to solve problems with profit, loss, discount, mark-up, simple interest. interpret simple bills	calculate compound interest and VAT, convert between currencies, determine telephone costs and solve problems involving earnings	interpret municipal bills, hire purchase and personal income tax
MEASURES	convert between units of area, convert between units of volume and convert between units of capacity		
MENSURATION	use the formulae for perimeter and area of rectangle, square, parallelogram and triangle and volume of cuboids in problem solving situations	deduce the formulae for perimeter and area of trapezium, kite, and rhombus; surface area of cuboids; investigate circumference and area of a circle	apply volume and surface area of a cylinder and a cuboid in problems and structured questions
GEOMETRY	use terminology of lines, angles and triangles; construct and measure lines and angles, construct triangles; find line and rotational symmetry of plane figures; apply the properties of angles on lines and of angles in triangles	apply the Theorem of Pythagoras; construct perpendicular and parallel lines and angle bisectors; interpret and draw reflections and rotations; apply the properties of angles in quadrilaterals	construct and describe enlargements, scale drawings and nets; apply the properties of <i>similar triangles</i> , regular and <i>irregular polygons</i> , and of angles in circles

TOPIC	GRADE 8	GRADE 9	GRADE 10
ALGEBRA	use algebraic notation; simplify expressions applying the four basic operations; construct and solve simple equations.	manipulate algebraic expressions, applying index laws; construct formulae and equations; solve linear equations <i>and inequalities</i> ; <i>find products and factorise expressions, simplify algebraic fractions</i> ; <i>solve simultaneous equations</i>	apply the four operations to algebraic fractions; solve linear equations with brackets <i>and fractions</i> ; <i>solve quadratic equations by factorisation.</i>
GRAPHS AND FUNCTIONS	interpret graphs and draw graphs from tables; plot points on the Cartesian coordinate plane.	draw and interpret conversion and distance-time graphs; <i>interpret gradient as the rate of change</i> ; draw lines of the form $x = a$ and $y = b$ on the Cartesian plane	draw and interpret $y = ax + c$; <i>find equation of a straight line graph</i> ; <i>draw the parabola and hyperbola from tables and interpret such graphs</i>
TRIGONOMETRY			use the sin, cos and tan ratios to solve problems in right-angled triangles; <i>interpret angles of elevation and depression</i>
STATISTICS AND PROBABILITY	construct bar charts and pie charts; read and draw conclusions from these and from pictograms; calculate the mean of discrete data.	critically interpret and discuss statistics appearing in the media; calculate and interpret the mean, the median and the mode and determine the range of discrete data	draw and interpret histograms with equal intervals; find the modal class of frequency distribution; calculate the mean from a table of discrete values; calculate the simple probability of an event occurring

10. LEARNING CONTENT

Note: The syllabi are structured with learning objectives according to topics. The teacher should note that it is not advisable to teach the objectives topic by topic but that they still need translation into a learning programme. For example, calculator skills should be taught in the contexts where the use of the calculator is appropriate to ease calculations, not as a separate topic. Similarly, Topic 4 (Mensuration) and elements of Topic 5 (Geometry) can be combined in the investigation of objects and shapes.

10.1. Learning Content: Grade 8

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
1. Numbers		apply the four basic operations to integers, common and decimal fractions and percentages; find squares and cubes and their corresponding roots, prime numbers and prime factors; use the calculator efficiently.
(a) Whole numbers	know and use the concept of factor, multiple, common factor, lowest common multiple, prime and composite numbers	- find the factors of a number - apply the rules of divisibility of 2, 3 and 5 - recall multiples of numbers smaller than 10 - recognise prime numbers smaller than 100 - express a number as a product of its prime factors - determine the lowest common multiple of at most three whole numbers - generate common whole number sequences, including odd and even numbers, prime numbers, multiples, square numbers and cube numbers
(b) Powers and roots	understand and use the notation and terminology for squares, square roots, cubes, cube roots	- apply the terminology power, base, index - write small positive integer powers in index notation - recall square numbers to from 1^2 to 20^2 - recall cubic numbers for 1^3 to 10^3 - determine square roots and cube roots through decomposition into prime factors

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
(c) Directed numbers	understand and use negative numbers	- indicate the position of a positive or negative integer on the number line - use negative numbers in practical situations, e.g. temperatures below freezing point, quantities below sea level - order integers by magnitude - perform the four basic operations on integers
(d) Common and decimal fractions	- understand the relationship between common and decimal fractions - realise that a common fraction is either a terminating or a recurring decimal - understand the concept of multiplying and dividing by fractional quantities	- convert common fractions to decimals by dividing the denominator into the numerator - convert terminating decimals to common fractions in simplest form - order and compare fractions - multiply and divide quantities by common and decimal fractions
(e) Percentages	understand and use percentages	- convert between fractions and percentages - calculate the percentage of a quantity - express one quantity as a percentage of another
(f) Calculator skills	understand the features of a scientific calculator and use the calculator when appropriate	- use the calculator for calculations involving several digits - select the correct key sequence for calculations with more than one operation - apply the clear, clear-entry and memory keys when appropriate
(g) Estimation	know how to use approximation to check that their answers are reasonable	- round numbers to the nearest whole number or power of 10 - round numbers correctly, up to three decimal places - use rounded numbers to estimate the answer to a calculation - round answers to practical problems to a reasonable degree of accuracy, e.g. money to 2 decimal places

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
2. Money and Finance		use percentages to solve problems with profit, loss, discount, mark-up, simple interest; interpret simple bills
(a) Buying and selling	- understand that transactions involve profit and /or loss - understand and use the concept of mark-up - understand and use the concept of discount	- calculate the difference between cost and selling price and classify this as profit or loss - calculate the selling price if the profit or loss is stated as a percentage - calculate the profit and loss as a percentage of the cost price - solve problems involving mark-up and discount expressed as percentages
(b) Simple bills	read and understand simple bills	- interpret simple bills - extract and use data from simple bills in calculations - read and calculate rate of charge
(c) Simple interest	realise that someone can earn or pay interest	calculate interest earned or interest paid on an amount of money, given the rate of interest and the time (in full years and /or months)
3. Measures		
(a) Area	understand and apply the units for expressing area, including hectares	- convert between mm^2, cm^2, m^2 and km^2 - convert square units to hectares ($1 \text{ ha} = 10\,000 \text{ m}^2$)
(b) Volume and capacity	- understand and apply the units for expressing volume - understand the relationship between volume and capacity	- convert between mm^3, cm^3 and m^3 - convert between units of volume and units of capacity ($1000 \text{ cm}^3 = 1 \ell$)

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
4. Mensuration		use the formulae for perimeter and area of rectangles, squares, parallelograms and triangles and the volume of cuboids
(a) Perimeter and area	understand and apply the formulae for the calculation of perimeter and area of rectangles, squares, triangles and parallelograms	- calculate the perimeter of squares, rectangles, triangles and parallelograms - find the length of a side, if the perimeter and sufficient other information is given - calculate the area of squares, rectangles, parallelograms and triangles - find the length of a side or the height, if the area and sufficient other information is given
(b) Volume	understand and apply the formulae for the volume of cubes and cuboids	- calculate the volume of cubes and cuboids - calculate the value of an unknown dimension, if the volume and sufficient other information is given
5. Geometry		use terminology of lines, angles and triangles; construct and measure lines and angles, construct triangles; find line and rotational symmetry of plane figures; apply the properties of angles on lines and of angles in triangles
(a) Geometrical terms and relationships	understand and apply geometrical terms and relationships	- use and interpret the following geometrical terms: point, line, diagonal, parallel, perpendicular, vertical, horizontal - name angles as right, acute, obtuse, straight or reflex or a revolution - identify pairs of angles as complementary or supplementary - use the term “congruent” for plane figures that are the same in all respects

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
(b) Constructions	know how to perform geometrical constructions using a straight edge, a compass and a protractor	- measure lines and angles - construct triangles, given three sides; two sides and the included angle; a right angle and any two sides; or two angles and a corresponding side - construct other simple geometrical plane figures from given data
(c) Symmetry and transformations	know line and rotational symmetry in plane figures	- identify the number and position of lines of symmetry in simple plane figures and polygons - locate the centre of rotation and state the order of rotational symmetry of given plane figures and polygons
(d) Angle properties	know and understand angle properties to solve problems	- identify and use angle properties to solve problems - calculate unknown angles using the following geometrical properties: - angles at a point - adjacent angles on straight line - angles formed at intersecting lines - angles formed within parallel lines - angles in triangles
6. Algebra		use algebraic notation; simplify expressions applying the four basic operations; construct and solve simple equations
(a) Algebraic representation and formulae	understand and apply algebraic symbols and notation	- use letters to represent numbers - distinguish between a constant and a variable in an algebraic expression - represent arithmetic operations in algebraic notation, e.g. the product of x and y is expressed as xy - substitute positive and negative numbers into algebraic expressions and formulae to calculate values - construct simple formulae from practical situations, e.g. the cost C of n apples at x cents each as $C = nx$

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
(b) Algebraic manipulation	understand that the transformation of algebraic expressions obeys and generalises the rules of arithmetic with numbers	simplify algebraic expressions using the rules for the four operations
(c) Equations and inequalities	understand that letter symbols represent definite unknown numbers in equations	solve simple linear equations by inspection, e.g. $x + 5 = 3$ or $4x = 20$ or $2x - 1 = 9$
7. Graphs and Functions		interpret graphs and draw graphs from tables; plot points on the Cartesian coordinate plane
(a) Graphs in practical situations	understand and appreciate the importance of representing information in a graphical form	- label axes and plot points to show the relation between two variables, e.g. temperature against time of day - interpret information from continuous graphs showing the relation between two variables
(b) Function graphs	use the conventions for the coordinates in a Cartesian plane	- plot points in all four quadrants - write down the coordinates of a point on the Cartesian plane
8. Statistics and Probability		construct bar charts and pie charts; read and draw conclusions from these and pictograms; calculate the mean of discrete data
(a) Data representation	- know how to collect, classify, tabulate and represent data - know how to extract information from graphs and diagrams	- collect, classify and tabulate discrete data obtained from questionnaires, surveys or secondary sources - represent data by constructing bar graphs or pie charts - read and draw conclusions from bar graphs, pie charts and pictograms
(b) Measures of central tendency	understand the use of the arithmetic mean	- calculate the arithmetic mean of small sets of discrete data - compare two sets of similar data by calculating the arithmetic mean

10.2. Learning Content: Grade 9

The parts in *italics* are for the Additional Mathematics syllabus only.

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
1. Numbers		find terms in sequences, recognise powers of 2, 3 and 5, use positive, zero and negative indices, recognise irrational numbers; write numbers in standard form and round to significant figures; apply the concepts of ratio and rate
(a) Integers	know how to generate and describe common integer sequences	- recognise patterns in sequences and continue common integer sequences, including squares, cubes, powers and triangular numbers <i>find the first terms of a sequence if the rule is given, e.g. $2n - 1$</i> <i>find the rule for the n^{th} term of a sequence</i>
(b) Powers and roots	- understand, use and apply the notation and terminology of powers and roots - understand that numbers have rational or irrational roots	- recall all the powers of 2 from 2^1 to 2^{10} - recall all powers of 3 and 5 from 3^1 to 3^5 and 5^1 to 5^4 - convert powers with positive, negative and zero indices to numbers and vice versa <i>convert powers with fractional indices to numbers and vice versa</i> - estimate the square and cube roots of numbers which have irrational roots, e.g. the square root of 30 lies between 5 and 6 - find powers and roots of numbers by using the calculator
(c) Percentages	understand the concept of percentage increase and decrease	increase or decrease quantities by a given percentage
(d) Calculator skills	use more advanced functions of the scientific calculator	- find squares, cubes, other powers and roots - find percentage increase and decrease - find reciprocal values - use the constant key where appropriate

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
(e) Rounding	understand the principle of rounding to significant figures	round numbers to one, two or three significant figures
(f) Standard form	understand the principle of expressing numbers in standard form	- convert large numbers between ordinary and standard form <i>add and subtract quantities in standard form</i>
(g) Ratio	- understand the concept of ratio - understand and apply the concept of ratio as a tool to solve real life problems	- express quantities in a ratio - simplify ratios - find an unknown quantity if a ratio is given - divide a quantity in a given ratio - apply the concept of ratio as a tool to solve problems
(h) Rate	understand common measures of rate	- identify and use rates in practical situations, e.g. calculations involving wages, speed - calculate average speed <i>interpret the steepness of a graph as a rate of change</i>
2. Money and Finance		calculate compound interest and VAT, convert between currencies, determine telephone costs and solve problems involving earnings
(a) Earning and spending	understand concepts of personal income and expenditure	- calculate personal income through wages, salaries, piece-work and commission - calculate VAT as a percentage of expenditure on goods and services - calculate compound interest earned on an amount over a period of at most two years - interpret telephone bills and calculate the cost of telephone calls, including the cell phone - convert between currencies

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
3. Mensuration		deduce the formulae for perimeter and area of trapezium, kite, and rhombus; surface area of cuboids; investigate circumference and area of a circle
(a) Perimeter and area	understand and use the formulae for the calculation of perimeter and area of a trapezium, kite and a rhombus	- calculate the perimeter and area of a trapezium - calculate the perimeter of a kite and a rhombus - calculate the area of a kite, a rhombus and a square using the lengths of the diagonals
(b) Circle	- understand the relationship between the diameter and the circumference of a circle - understand how to find the circumference and area of a circle	- find the approximate value of π as the ratio between the circumference and the diameter of a circle and classify π as an irrational number - calculate the circumference and the area of a circle using formulae - find the diameter or radius of a circle if the circumference or area is given
(c) Three-dimensional shapes	understand the concept of surface area	calculate the surface area of cubes and cuboids
4. Geometry		apply the Theorem of Pythagoras; construct perpendicular and parallel lines and bisectors; interpret and draw reflections and rotations; apply properties of angles in quadrilaterals
(a) Geometrical relationships	understand and apply the Theorem of Pythagoras	- calculate the third side of a right-angled triangle, if two sides are given - apply the Theorem of Pythagoras to prove that an angle is a right angle
(b) Constructions	know how to perform geometrical constructions of parallel and perpendicular lines and of angle bisectors	- using a straight edge and a pair of compasses only, construct: - parallel lines - the perpendicular from a point to a line - the perpendicular from a point on the line - the perpendicular bisector of a line segment - the bisector of an angle

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
(c) Symmetry and transformations	understand how plane figures are reflected and rotated	- draw and describe reflections of plane figures in vertical and horizontal lines - draw and describe rotations of plane figures around the origin, a vertex or the midpoint of a line and through angles which are multiples of 90°
(d) Angle properties	know and understand angle properties of quadrilaterals to solve problems	- identify and use angle properties of quadrilaterals to solve problems - calculate unknown angles using the geometrical properties of the parallelogram, rectangle, rhombus, kite and square
5. Algebra		manipulate algebraic expressions, applying index laws; construct formulae and equations; solve linear equations and inequalities; <i>find products and factorise expressions, simplify algebraic fractions;</i> solve simultaneous equations
(a) Algebraic manipulation	understand that the transformation of algebraic expressions obeys and generalises the rules of arithmetic	- multiply a single term over a bracket, e.g. $3(a + b)$ and $2x(3x - 2y)$ - evaluate algebraic expressions by substituting integer values, with special attention to the use of brackets, e.g. $(-2)^4$ and -2^4 - simplify expressions by applying the four rules of operations and the index rules for multiplication and division <i>determine the product of two binomials and the product of a binomial and a trinomial</i> - factorise expressions by: - taking out a common factor - grouping terms - the difference between two squares - quadratic trinomials - simplify algebraic fractions by factorising the numerators and the denominators - multiply and divide algebraic fractions by factorising

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
		<i>numerators and denominators</i>
(b) Equations and inequalities	- understand how to transform linear equations to find their solutions - realise that the solution of an inequality is a set of real numbers	- solve simple linear equations where the unknown appears on both sides of the equation - construct linear equations from given situations - represent linear inequalities on a number line <i>solve simple simultaneous linear equations</i> <i>construct and solve simple linear inequalities</i>
6. Graphs and Functions		interpret graphs and draw graphs from tables; plot points on the Cartesian coordinate plane
(a) Graphs in practical situations	understand and draw continuous graphs of practical situations	- draw graphs of practical situations from tables or from the interpretation of the situation, e.g. distance-time graphs, conversion graphs - interpret information extracted from such graphs <i>interpret the gradient of such graphs as a rate of change, e.g. speed</i>
(b) Function graphs	understand and draw simple function graphs on the Cartesian coordinate system	- draw lines with equations $x = a$ and $y = a$ where a is an integer - find the equations of vertical and horizontal lines drawn parallel to the coordinate axes - find the coordinates of the point of intersection of horizontal and vertical lines
7. Statistics and Probability		critically interpret and discuss statistics appearing in the media; calculate and interpret the mean, the median and the mode and determine the range of discrete data
(a) Data representation	understand the use of statistical information	critically interpret and discuss statistical information appearing in the media or elsewhere in everyday life
(b) Measures of central tendency	understand the purpose of different measures of central tendency	- find the mean, median and mode for a set of discrete data - determine the range of a set of data - choose the most suitable statistical average to describe data

10.3. Learning Content: Grade 10

The parts in italics are for the Additional Mathematics syllabus only.

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
1. Numbers		solve problems involving direct and indirect proportion
(a) Calculator skills	be able to use the more advanced functions of the scientific calculator	- use the calculator to represent numbers in standard form - translate the calculator display of standard form into the appropriate written notation - find the values of trigonometric functions for given angles and find the angle if the value of the trigonometric function is given
(b) Standard form	understand the principle of expressing numbers in standard form	- write very small numbers in standard form and vice versa <i>perform the four basic operations on simple expressions written in standard form</i>
(c) Proportion	- understand the idea of direct and indirect proportion - know how to use direct and indirect proportion to solve everyday problems	- solve problems involving direct and indirect proportion - solve problems arising from the natural sciences involving direct and indirect proportion <i>draw straight line graphs of relationships that are in direct or indirect proportion</i>
2. Money and Finance		interpret municipal bills, hire purchase and personal income tax
(a) Earning and spending	understand concepts of personal income and expenditure	- calculate the compound interest earned on an amount over periods of 2 or 3 years - interpret municipal bills and calculate the cost of water and electricity used - calculate the difference in cost when paying cash for an item and when buying the item on a hire purchase agreement - interpret personal income tax tables and determine the tax payable on an amount earned

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
3. Mensuration		use the concepts of volume and surface area of a cylinder and a cuboid in problems and structured questions
(a) Volume and surface area	know and apply the concepts of volume and surface area of cuboids and cylinders	- calculate the volumes and surface areas of cuboids and cylinders using appropriate formulae - calculate unknown dimensions of cuboids and cylinders, if the volume or surface area and sufficient other information given
4. Geometry		construct and describe enlargements, scale drawings and nets; apply the properties of <i>similar triangles, regular and irregular polygons, angles in circles</i>
(a) Geometrical relationships	understand the concept of similarity	- recognise plane figures that are similar by referring to the shape and size <i>show that triangles are similar</i> <i>calculate unknown sides of similar triangles</i>
(b) Constructions	perform geometrical constructions	- make accurate scale drawings of maps, plans and journeys, which include directions given as three-figure bearings - construct nets of cubes, cuboids, triangular prisms and cylinders
(c) Transformations	understand how plane figures are enlarged	construct and describe enlargements with positive whole numbers as scale factors
(d) Angle properties	know and understand angle properties of polygons	- identify and use angle properties of polygons - calculate the sizes of the interior and exterior angles of regular polygons <i>calculate the sizes of interior and exterior angles of irregular polygons</i> <i>calculate unknown angles using the following properties</i> <i>the sum of the angles of irregular polygons</i> <i>an angle in a semi-circle</i> <i>the angle between a tangent and a radius of a circle</i> <i>the angle at the centre of a circle is twice the angle at the circumference</i> <i>angles in the same segment are equal</i> <i>angles in opposite segments are supplementary</i>

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
5. Algebra		carry out the four basic operations with algebraic fractions; solve linear equations which contain brackets and fractions; solve quadratic equations by factorisation
(a) Algebraic manipulation	understand that the transformation of algebraic expressions obeys and generalises the rules of arithmetic	- perform the four operations with simple algebraic fractions <i>perform the four operations with more advanced algebraic fractions (include factorisation)</i> <i>apply the index laws to simplify algebraic expressions, including expressions with positive, negative, zero and fractional indices</i>
(b) Equations and inequalities	- understand how to transform linear equations to find the solution - realise the importance of algebraic equations to solve problems	- solve linear equations with brackets - solve word problems by translating them into linear equations <i>solve linear equations with fractions</i> <i>solve simultaneous linear equations in two unknowns</i> <i>solve quadratic equations by factorisation</i>
6. Graphs and Functions		draw and interpret $y = mx + c$, find the equation of a straight line graph; draw parabola and hyperbola from tables and interpret graphs
(a) Function graphs	understand and draw function graphs on the Cartesian coordinate system of axes	In all the following, m, a, b, and c should have simple and suitable rational values: - determine the independent and the dependent variable in a function equation - construct tables of values for the function $y = mx + c$ - draw and interpret graphs of the function $y = mx + c$ - find the gradient of a straight line graph <i>find the equation of a straight line graph</i> <i>find the equation of a linear function if the gradient and the coordinates of one point are given</i> <i>construct tables of values of functions of the form</i> $y = ax^2 + bx + c \text{ and } y = \frac{a}{x}$ <i>draw and interpret such graphs</i> <i>use the terminology of turning point, roots, y-intercept,</i>

THEMES AND TOPICS	LEARNING OBJECTIVES Learners will:	BASIC COMPETENCIES Learners should be able to:
		<i>symmetry and asymptote to describe such graphs</i> • solve simultaneous linear and quadratic equations by graphical methods
7. Statistics and probability		draw and interpret histograms with equal intervals; find the modal class of a frequency distribution; calculate the mean from a table of discrete values; calculate the probability of a simple event occurring
(a) Data representation	• understand the difference between a bar chart and a histogram • classify, tabulate and represent grouped data	• make tables of frequency distributions, including continuous data (e.g. height) • construct histograms with equal intervals • read and draw conclusions from histograms with equal intervals
(b) Measures of central tendency	• understand the purpose of different measures of central tendency	• determine the modal class from a set of grouped data • calculate the mean from a frequency distribution of discrete values (e.g. the mean number of children in a family)
(c) Probability	• understand what is meant by "the probability of an event occurring" • understand and use the probability scale from 0 to 1	• estimate the probability of an event occurring • calculate the probability of a simple event occurring • express probability as a fraction in its lowest terms
8. Trigonometry		use the sine (sin), cosine (cos) and tangent (tan) ratios to solve problems in right-angled triangles; <i>interpret angles of elevation and depression</i>
(a) Trigonometry in right-angled triangles	• know how to use trigonometry to solve problems of right-angled triangles	• recall and use the definitions of the sine, cosine and tangent ratios • solve problems in right-angled triangles, including applications of the Theorem of Pythagoras and bearing • solve problems in two dimensions using angles of elevation and depression

11. ASSESSMENT

A learner-centred curriculum and learner-centred teaching use a broad range of knowledge and skills, which are relevant to the knowledge-based society. The basic competencies in the syllabuses state what understanding and skills a learner must demonstrate as a result of a teaching-learning process, and which will be assessed. However, it is intended that the curriculum be learning-driven, not assessment and examination driven. Assessment and examination are to support learning.

11.1 Continuous assessment

In order to capture the full range and levels of competence, a variety of formal and informal continuous assessment situations is needed to give a complete picture of the learner's progress and achievements in all subjects. Continuous assessment must be clear, simple and manageable, and explicitly anchored in learner-centred principles and practice. Teachers must elicit reliable and valid information of the learner's performance in the basic competencies. The information gathered about the learners' progress and achievements should be used to give feedback to the learners about their strong and weak points, where they are doing well, and why, and where they need to try more, how, and why. The parents should be regularly informed about the progress of their child in all subjects, be encouraged to reward achievements, and given suggestions as to how they can support their learning activities.

The learner's progress and achievements in all subjects must be reported to parents on the school report.

11.2 Formative and summative assessment

The two modes of assessment used are formative continuous assessment and summative assessment. Formative continuous assessment is any assessment made during the school year in order to improve learning and to help shape and direct the teaching-learning process. Assessment has a formative role for learners if and when:

- it is used to motivate them to extend their knowledge and skills, establish sound values, and to promote healthy habits of study
- assessment tasks help learners to solve problems intelligently by using what they have learned
- the teacher uses the information to improve teaching methods and learning materials

Summative assessment is an assessment made at the end of the school year based on the accumulation of the progress and achievements of the learner throughout the year in a given subject, together with any end-of-year tests or examinations. The result of summative assessment is a single end-of-year promotion grade.

11.3 Informal and formal methods

The teacher must assess how well each learner masters the basic competencies described in the subject syllabuses and from this gain a picture of the all-round progress of the learner. To a large extent, this can be done in an informal way through structured observation of each learner's progress in learning and practice situations while they are investigating things, interpreting phenomena and data, applying knowledge, communicating, making value judgements, and in their participation in general.

When it is necessary to structure assessment more formally, the teacher should as far as possible use the same sort of situation as ordinary learning and practice situations to assess the competency of the learner. The use of formal written and oral tests can only assess a limited range of competencies and therefore should not take up a great deal of time. Short tests in any subject should be limited to part of a lesson and only exceptionally use up a whole lesson. End-of-term tests should only be written in the first lesson of the day, so that teaching and learning can continue normally for the rest of the time.

In Grade 10 a mock examination may be held to learn examination skills and to identify areas of the syllabus which may need extra attention. Mock examinations only serve a useful purpose if they are used as a learning experience in how to organise oneself, how to read the paper, how to interpret and

answer examination-type questions, and how to allocate time in an examination. This involves the teacher going through the paper systematically with the class when their answers are returned.

11.4 Evaluation

Information from informal and formal continuous assessment is to be used by the teacher to know where it is necessary to adapt methods and materials to the individual progress and needs of each learner. At the end of each main unit of teaching, and at the end of each term, the teacher together with the learners should evaluate the process in terms of tasks completed, participation, what the learners have learnt, and what can be done to improve the working atmosphere and achievements of the class.

11.5 Criterion-referenced grades

When grades are awarded in continuous assessment, it is essential that they reflect the learner's actual level of achievement in the Basic Competencies, and are not related to how well other learners are achieving or to the idea that a fixed percentage of the learners must always be awarded a Grade A, B, C, and so on (norm-referencing). In criterion-referenced assessment, each letter grade must have a descriptor for what the learner must demonstrate in order to be awarded the grade. Grade descriptors must be developed for each subject for each year. It is important that teachers in each department/section work together to have a shared understanding of what the grade descriptors mean, and how to apply them in continuous assessment, so that grades are awarded correctly and consistently across subjects. Only then will the assessment results be reliable.

11.6. Grade descriptors in the Junior Secondary Phase

In the Junior Secondary phase, grades A-G and U (ungraded) apply as follows:

Grades	Mark range	Grade descriptor
A	80%+	Achieved Basic Competencies exceptionally well. The learner is outstanding in all areas of competency.
B	70-79%	Achieved Basic Competencies very well. The learner is highly proficient in most areas of competency.
C	60-69%	Achieved Basic Competencies well.
D	50-59%	Achieved Basic Competencies satisfactorily.
E	40-49%	Achieved a sufficient number of Basic Competencies to exceed the minimum competency level.
F	30-39%	Achieved the Basic Competencies needed to be considered competent. The learner needs learning support.
G	20-29%	Achieved the minimum number of Basic Competencies worthy of a grade. The learner needs learning support
U	0-19%	Did not achieve the minimum level of competence. The learner needs learning support

11.7 Conducting and recording assessment

Continuous Assessment should be planned and programmed at the beginning of the year, and kept as simple as possible. Marks given for class activities, practical activities, project work, assignments, homework, and short tests on completion of a topic may be recorded for continuous assessment.

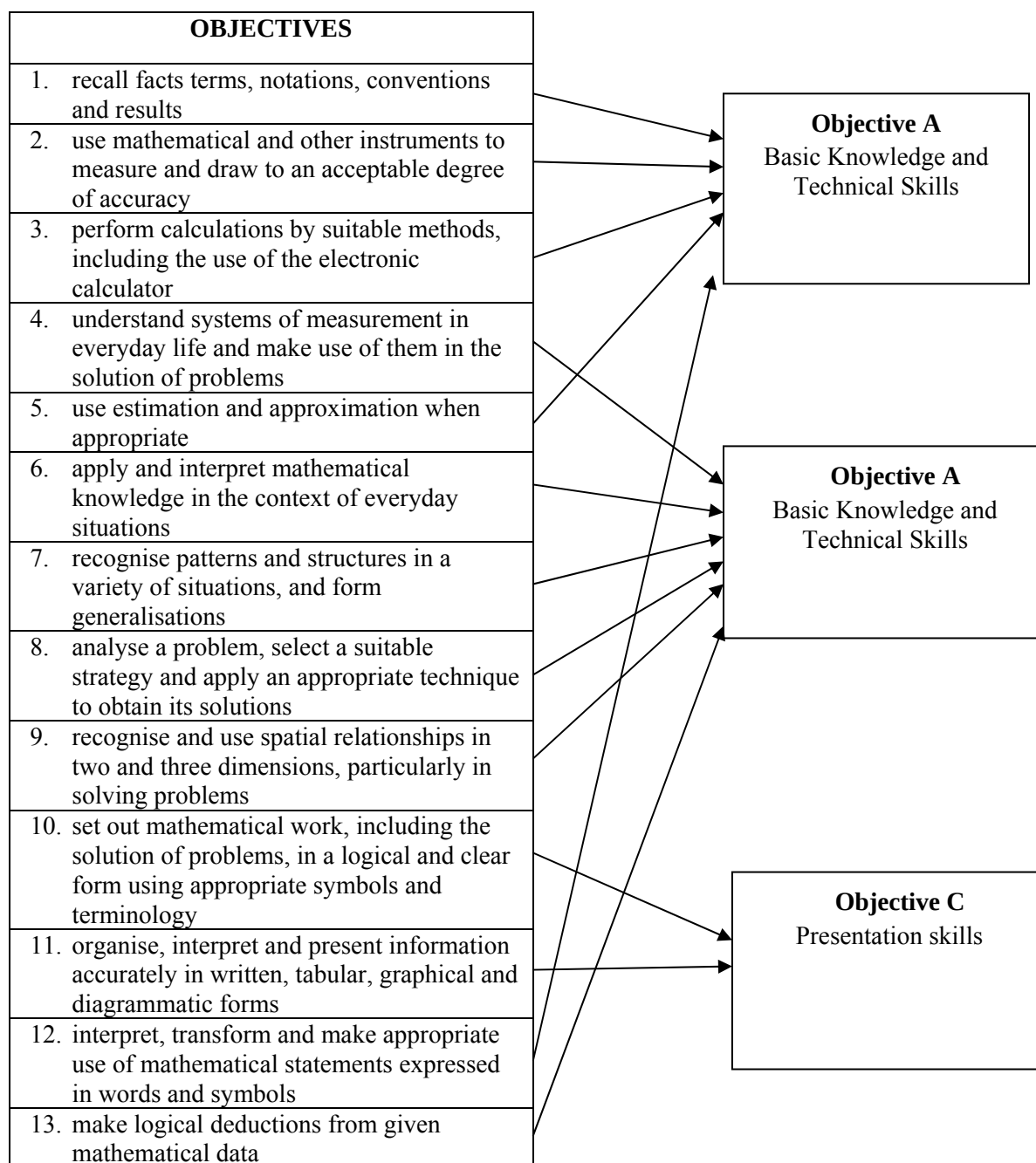
11.8 Assessment objectives

The assessment will include, wherever appropriate, personal, social, environmental, economic and technological applications of Mathematics. The assessment must take into account the learner's ability to communicate clearly and logically and apply conventions where appropriate

Assessment	Numeracy and algebraic	Place value, +, -, *, / , and order of operation,
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Objective A Basic Knowledge and Technical Skills	skills	number sense and approximation, operations with fractions and decimals and conversions, percentages, roots and powers, handling algebraic expressions, solving equations, functions
	Mental arithmetic skills	Multiplication tables, simple + , - , * , / exercises
	Measuring skills	Using measuring instruments (i.e. length, mass, capacity, time) estimating, accuracy
	Drawing skills	Using drawing instruments, i.e. ruler, compass, protractor, accuracy 1 mm, 1°
	Sketching skills(spatial perception)	Recognising and representing key features, i.e. right angles, equi-distance, parallel, proportionality
	Maths language skills	Key words (sum, product,, more, less, equal, large, small), correct use of symbol notations, conventions
	Knowledge of key concepts of Maths in life	Special concepts from money, time and measurements used in real-world problems
Assessment Objective B: Analysing, Abstraction and Synthesising skills	Problem analysis skills	Identify relevant and irrelevant elements, recognise the problem
		Analyse real world situations, connect correctly to mathematical concepts and translate into mathematical language
	Data analysis skills	Recognise patterns and algebraic relationships, make logical deductions
		Recognise and use spatial relationships in two and three dimensions
	Strategy finding skills	Use exploration strategies, like brain-storming, visualisation, exploring examples, testing and identifying steps
	Summarising and abstraction skills	Recognise an abstract mathematical rule in series of examples and formulate mathematical concepts in words, diagrams and formula
Assessment Objective C: Presentation skills	Combination skills and transfer skills	Combine a variety of appropriate mathematical concepts in solving problems
	Formal presentation skills	Write mathematical work in a clear form using appropriate symbols and terminology
	Logical presentation skills	Organise information, document steps and present problem solutions clearly
	Logical argumentation skills	Judge outcomes of investigations supported by convincing reasons

NOTE: In the previous syllabus a single assessment objective, technique with application, included thirteen abilities of the learners where used. These were merged into the three Assessment objectives as follows:



11.9 Continuous Assessment: Detailed guidelines

Continuous assessment at Junior Secondary level consists of informal and more formal assessment. The table in 11.9.2 specifies how formal assessments are required for assignments, projects and shorter tests, in order to give an overall picture of the learner's knowledge and skills.

11.9.1 Types of Continuous Assessment

Investigations assess the ability to think and reason independently and to reflect critically on the own thinking. In this phase investigations into number patterns, and their application to everyday problems and generalisations are appropriate. An investigation into number bases, e.g. binary numbers, can address the cross-curricular issue of information technology.

Projects are longer assignments than topic tasks and give learners an opportunity to complete an investigation into one of the theme topics outlined in the syllabus. This type of investigation will enable

the learner to pursue a topic in greater depth and in more lively and creative ways than possible with short discrete topic tasks or investigations. Projects assess the ability to solve problems and apply mathematical processes to everyday life, and the ability to present the problem, the process and the findings according to certain standards. One compulsory project per year must address cross-curricular HIV and AIDS, population or environmental issues. The information contained in the Population Census 2001 and in the Namibian Atlas can form a basis for these projects.

Topic Tasks are activities that most teachers already use in their day to day teaching. These are recorded and assessed activities that could introduce a topic or be used during teaching a topic or revision of a topic. They may well include assessment on competencies like locating information, conducting surveys, analysing information or presenting information.

Written Tests of the length of one classroom period are specifically set by the teacher to assess the learners' achievement in relation to content and competencies specified in the syllabus and should consist of short questions as well as more structured questions.

End of Term test: A comprehensive test of the whole term's work. No homework should be assigned during the time of writing the end of term test.

11.9.2 Summary of Continuous Assessment tasks

GRADES 8 and 9						
COMPONENTS	TERM 1		TERM 2		TERM 3	
	Number & Marks	Total CA	Number & Marks	Total CA	Number & Marks	Total CA
Investigations	2×15	30	1×15	15	1×15	15
Projects			(1×30)÷2	15		
Topic Tasks	2×10	20	2×10	20	1×10	10
Topic Tests	(2×20)÷2	20	(2×20)÷2	20	1×25	25
End of Term Test	65	(65×2) 130	65	(65×2) 130		
Term Mark		200		200		50
Weighted Term Mark	200÷2	100	200÷2	100		

GRADES 10				
COMPONENTS	TERM 1		TERM 2	
	Number & Marks	Total	Number & Marks	Total
Investigations	2×15	30	1×15	15
Projects			(1×30)÷2	15
Topic Tasks*	2×10	20	2×10	20
Topic Tests	(2×20)÷2	20	(2×20)÷2	20
End of Term Test	65	(65×2) 130	130	130
End of Term Test for Additional	65	(65×2) 130	195	(195 ÷ 3) x 2 130
Term Mark		200		200
Weighted Term Mark	200÷2	100	200÷2	100

11.10 End of year examinations: Detailed guidelines

In Grades 8 and 9 there will be internal end-of-year examinations. As before, the purpose of these examinations is to focus on how well learners can demonstrate their thinking, communication, and problem-solving skills related to the areas of the syllabus, which are most essential for continuing in the next grade. Preparing for, and conducting these examinations should not take up more than two weeks altogether right at the end of the year.

There will be an external examination at the end of Grade 10. The purpose of the examination is to assess how far each learner can demonstrate their achievement in reaching the competencies as a preparation for everyday life and for further studies or training, and to what extent the system as a whole is enabling learners to achieve optimally.

The short-answer questions in Paper 1 of the examination fulfill a particularly important function in ensuring syllabus coverage and allowing the testing of Objective A: Basic Knowledge and Technical Skills, while greater emphasis is placed on Objective B: Analysing, Abstraction and Synthesising Skills in the structured questions in Paper 2 and Paper 3 in the case of Additional Mathematics.

WRITTEN EXAMINATION GRADES 8-10			
Grades	Description of papers	Duration	Marks
8, 9 and 10 Mathematics	This will consist of two papers consisting of:		
	Paper 1: Short questions and include calculations using mental strategies or paper and pencil algorithms.	1 hours	45
	Paper 2: Structured questions and problems	2 hours	85
9 and 10 Additional Mathematics	This will consist of three(3) papers consisting of:		
	Paper 1: Same paper as the Mathematics above	1 hours	45
	Paper 2: Same paper as the Mathematics above	2 hours	85
	Paper 3: Short and structured questions on the Additional Mathematics section of the syllabus.	1 hour 30 minutes	65

11.11 Promotion marks

In Grades 8-10, Continuous Assessment contributes 35% of the summative mark.

Component	Description Grade 8, 9 And 10	Marks	Weighting
Written Examination	Paper 1	45	22.5%
	Paper 2	85	42.5%
Continuous Assessment	Topic Tasks, Topic Tests, Practical Investigations/Projects, End of Term Test (400 ÷ 40) × 7	70	35%
TOTAL			100%

Component	Description Grade 9 And 10 Additional Mathematics	Marks	Weighting
Written Examination	Paper 1	45	15.5%
	Paper 2	85	28.5%
	Paper 3	65	21.5%
Continuous Assessment	Topic Tasks, Topic Tests, Practical Investigations/Projects, End of Term Test $(400 \div 90) \times 21$	105	35%
TOTAL			100%

The promotion marks Grade 8 and 9 are calculated as follows:

PROMOTION MARK FOR GRADES 8 & 9				
Term Mark	Term 1	Term 2	Term 3	Total
	200	200	50	450
CA mark	$(450 \div 45) \times 7$			70
End-of-year examination	130 Marks (Grade 8 & 9)			130
Promotion Mark	Average Term Mark + End-of-Year Examination $\div 2$ $200 \div 2$			100

The promotion marks for Grade 9 Additional Mathematics are calculated as follows:

PROMOTION MARK FOR GRADE 9 ADDITIONAL MATHEMATICS				
Term Mark	Term 1	Term 2	Term 3	Total
	200	200	50	450
CA mark	$(450 \div 90) \times 21$ (CA mark for Grade 9 Additional)			105
End-of-year examination	195 Marks (Grade 9 additional)			195
Promotion Mark	Average Term Mark + End-of-Year Examination $\div 2$ $300 \div 3$			100

The promotion marks for Grade 10 Mathematics are calculated as follows:

PROMOTION MARK FOR GRADE 10			
Term Mark	Term 1	Term 2	Total
	200	200	400
CA mark	$(400 \div 40) \times 7$ (CA mark for Grade 10 to be sent to DNEA)		70
End-of-year examination	130 Marks (JSC exam)		130
Promotion Mark	Average Term Mark + End-of-Year Examination $\div 2$ $200 \div 2$		100

The promotion marks for Grade 10 Additional Mathematics are calculated as follows:

PROMOTION MARK FOR GRADE 10 ADDITIONAL			
Term Mark	Term 1	Term 2	Total
	200	200	400
CA mark	$(400 \div 80) \times 21$ (CA mark for Grade 10 to be send to DNEA)		105
End-of-year examination	195 Marks (JSC exam)		195
Promotion Mark	Average Term Mark + End-of-Year Examination $\div 2$ $300 \div 3$		100

11.12 Specification grid

A rigid association between particular assessment objectives and individual components of assessment is not appropriate since any of the objectives can be assessed in any question. Nevertheless the components of the scheme will differ in the emphasis placed on the various objectives. The Specification Grid below is for general guidance only and illustrates where particular objectives might receive most emphasis on the various components for both the Written Examination and for Continuous Assessment.

Assessment Objectives for Written Examination	
Components	Weighting
Objective A Basic Knowledge and Technical Skills	40%
Objective B Analysing, Abstraction and Synthesising skills	60%
Total	100%
Assessment Objectives for Continuous Assessment	
Components	Weighting
Objective A Basic Knowledge and Technical Skills	20%
Objective B Analysing, Abstraction and Synthesising skills	60%
Objective C Presentation skills	20%
Total	100%

12. Additional Information

A1: Assessment Record Sheet for Grades 8 – 10, Mathematics and Additional Mathematics (Terms 1 and 2)

ASSESSMENT RECORD SHEET FOR MATHEMATICS (TERM 1 & 2)										Grade:			
Year:										Teacher:			
Name of Learner	Term	Investigation s/ Projects		Topic Task		Topic Tests (20÷2)		Total	End of Term Test	Term Mark	Weighted Term Mark	DNEA Grade 10	DNEA Grade 10 Additional
		15	15	10	10	10	10	70	130	200	100	$(400 \div 40) \times 7$ 70	$(400 \div 80) \times 21$ 105
	1												
	2												
	1												
	2												
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A2: Assessment Record Sheet for Grades 8 & 9 Mathematics and Grade 9 Additional Mathematics (Term 3)

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