basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

ANNUAL NATIONAL ASSESSMENT 2013
ASSESSMENT GUIDELINES
MATHEMATICS
GRADE 6

INTRODUCTION

The 2013 cycle of Annual National Assessment (ANA 2013) will be administered in all public and designated[1] independent schools from 10 to 13 September 2013. During this period all learners in Grades 4-6 will write nationally set tests in Language and Mathematics. The results will be used to report progress related to achieving the goals set in the *Action Plan 2014, Towards Schooling 2025*.

The ANA tests will be written during the third school term and, therefore, the Department of Basic Education (DBE) has developed Assessment Guideline documents for each grade and subject (Language and Mathematics) outlining the minimum curriculum content that must be covered by all learners prior to the writing of the test. The Assessment Guidelines define the scope of work that will be covered in the test for each grade and subject.

INTERMEDIATE PHASE

In Grades 4-6, the tests will cover work that is prescribed for the first three-quarters of the school year. For these grades the Assessment Guidelines are arranged in three columns: Content area; Concepts and Skills; and Content to be assessed.

It is important to note that the ANA 2013 Assessment Guidelines do not imply that the delimited scope is all that must be taught and learnt during the school year. Instead, the Assessment Guidelines provide the minimum curriculum requirements that must be covered by the end of the third school quarter.

Teachers are expected to use these Assessment Guidelines together with the other resources for their teaching and assessment programmes.

[1] "Designated" independent schools are those that will apply and register either their Grade 3 or Grade 6 learners to participate in ANA for purposes of securing State subsidy.

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Number range for counting, ordering, comparing, representing and place value of digits** • Order, compare and represent numbers to at least 9-digit numbers • Represent prime numbers to at least 100 • Recognise the place value of digits in whole numbers to at least 9-digit numbers • Round off to the nearest 5, 10, 100, 1 000, 100 000, and 1 000 000	Represent numbers Represent prime numbers Recognise the place value Round off
	Number range for calculations • Addition and subtraction of whole numbers of at least 6 digits • Multiplication of at least whole 4-digit by 3-digit numbers • Division of at least whole 4-digit by 3-digit numbers • Multiple operations on whole numbers with or without brackets	Multiple operations on whole numbers
	Calculation techniques • Using a range of techniques to perform and check written and mental calculations of whole numbers including: -- estimation -- adding, subtracting and multiplying in columns -- long division -- building up and breaking down numbers -- rounding off and compensating -- using addition and subtraction as inverse operations -- using multiplication and division as inverse operations -- using a calculator	Addition of whole numbers Subtraction of whole numbers Addition and subtraction as inverse operations Multiplying of whole numbers Long division of whole numbers

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Number range for multiples and factors • Multiples of 2-digit and 3-digit numbers • Factors of 2-digit and 3-digit whole numbers • Prime factors of numbers to at least 100	Multiples Factors
	Properties of whole numbers • Recognise and use the commutative, associative, distributive properties of whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property	Recognise and use the properties of whole numbers
	Solving problems • Solve problems involving whole numbers and decimal fractions, including: -- financial contexts -- measurement contexts • Solve problems involving whole numbers, including -- comparing two or more quantities of the same kind (ratio) -- comparing two quantities of different kinds (rate) -- grouping and equal sharing with remainders	Solve problems involving whole numbers and decimal fractions, including financial contexts Solve problems involving grouping and equal sharing with remainders
	Describing and ordering fractions: • Compare and order common fractions, including tenths and hundredths	See relevant concepts and skills
	Calculations with fractions: • Addition and subtraction of common fractions in which one denominator is a multiple of another • Addition and subtraction of mixed numbers • Fractions of whole numbers	Addition of common fractions Subtraction of common fractions
	Solving problems • Solve problems in contexts involving common fractions, including grouping and sharing	See relevant concepts and skills.
	Work on percentages • Find percentages of whole numbers	Find percentages of whole numbers

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Equivalent forms: • Recognise and use equivalent forms of common fractions with 1-digit or 2-digit denominators (fractions in which one denominator is a multiple of another) • Recognise equivalent forms between common fractions and decimal fractions of the same number • Recognise equivalent forms between common fractions, decimal fractions; and also percentage forms of the same number	Recognise equivalent forms between common fractions, decimal fractions; and also percentage forms of the same number
	Recognise, order and place value of decimal fractions • Count forwards and backwards in decimal fractions to at least two decimal places • Compare and order decimal fractions to at least two decimal places • Place value of digits to at least two decimal places	Count forwards and backwards in decimal fractions Compare and order decimal fractions
	Do calculations with decimal fractions • Add and subtract decimal fractions with at least two decimal places • Multiply decimal fractions by 10 and 100	Addition and subtraction of decimal fractions with at least two decimal places
	Solving problems • Solve problems in context involving decimal fractions	See relevant concepts and skills
	Equivalent forms • Recognise equivalent forms between common fractions and decimal fractions of the same number • Recognise equivalent forms between common fractions, decimal fraction; and also percentage forms of the same number	See relevant concepts and skills.

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
PATTERNS, FUNCTIONS AND ALGEBRA	**Do numeric patterns**	
	Investigate and extend patterns • Investigate and extend numeric patterns looking for relationships or rules of patterns: -- sequences not limited to a constant difference or ratio -- of learner's own creation -- represented in tables • Describe the general rules for the observed relationships	Investigation and extension of numeric patterns looking for rules of patterns
	Do input and output values • Determine input values, output values and rules for the patterns and relationships using: -- flow diagrams -- tables	Determining input values, output values and rules for patterns and relationships
	Do equivalent forms Determine equivalent forms of different descriptions of the same relationship or rule presented: • Verbally • In a flow diagram • In a table • By a number sentence	Seeing relevant concepts and skill.
	Geometric patterns	
	investigate and extend patterns • Investigate and extend geometric patterns looking for relationships or rules of patterns: -- represented in physical or diagram form -- sequences not limited to a constant difference or ratio -- of learner's own creation -- represented in tables • Describe the general rules for the observed relationships	Investigation and extension of geometric patterns and looking for relationships or rules of patterns

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Do input and output values Determine input values, output values and rules for the patterns and relationships using: • flow diagrams • tables	See relevant concepts and skills.
	Do equivalent forms • Determine equivalent forms of different descriptions of the same relationship or rule presented: -- verbally -- in a flow diagram -- in a table -- by a number sentence	Determine equivalent forms of different descriptions of the same relationship or rule presented
	Number sentences • Write number sentences to describe problem situations • Solve and complete number sentences by: -- inspection -- trial and improvement • Check solution by substitution	Solve and complete number sentences
SPACE AND SHAPE	**Do properties of 2-D shapes**	
	Range of shapes • Recognise, visualise and name 2-D shapes in the environment and geometric settings focusing on: -- regular and irregular polygons: triangles, squares, rectangles, parallelograms, other quadrilaterals, pentagons, hexagons, heptagons, octagons -- circles -- similarities and differences between rectangles and parallelograms	Recognise, visualise and name similarities and differences between rectangles and parallelograms Recognise, visualise and name 2-D shapes focusing on regular polygons

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Characteristics of shapes • Describe, sort and compare 2-D shapes in terms of: -- number of sides -- lengths of sides -- sizes of angles ◊ acute ◊ right ◊ obtuse ◊ straight ◊ reflex ◊ revolution	Describe, sort and compare 2-D shapes
	Angles • Recognise and name the following angles in 2-D shapes: -- acute -- right -- obtuse -- straight -- reflex -- revolution	Recognise and name angles
	Properties of 3-D objects	
	See Range of objects • Recognise, visualise and name 3-D objects in the environment and geometric settings, focusing on: -- rectangular prisms -- cubes -- tetrahedrons -- pyramids -- similarities and differences between tetrahedrons and other pyramids	See relevant concepts and skills

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Characteristics of objects • Describe, sort and compare 3-D objects in terms of: -- number and shape of faces -- number of vertices -- number of edges	See relevant concepts and skills
	Further activities • Make 3-D models using: -- drinking straws, toothpicks etc -- nets	See relevant concepts and skills
	Symmetry	
	Recognise, draw and describe line(s) of symmetry in 2-D shapes	Recognise, draw and describe line(s) of symmetry
	Transformations	
	Enlargement and reductions • Draw enlargement and reductions of 2-D shapes to compare size and shape of: -- triangles -- quadrilaterals	Draw enlargement and reductions of 2-D shapes
	Describe patterns • Refer to lines, 2-D shapes, 3-D objects, lines of symmetry, rotations, reflections and translations when describing patterns: -- in nature -- from modern everyday life -- from our cultural heritage	See relevant concepts and skills
	Viewing of objects	
	Position and views Link the position of viewer to views of: • Single everyday objects or collections of objects • Single or composite geometric objects	Links the position of viewer to views

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
MEASUREMENT	**Length** Millimetres (mm), centimetres (cm), metres (m), kilometres (km)	
	Practical measuring of 2-D shapes and 3-D objects by: • Estimating • Measuring • Recording • Comparing and ordering	Practical measuring of 2-D shapes and 3-D objects
	Measuring instruments: Rulers, metre sticks, tape measures, trundle wheels	See relevant concepts and skills
	Calculations and problem solving involving length • Solve problems in contexts involving length • Conversions include converting between any of the following units: -- millimetres (mm) -- centimetres (cm) -- metres (m) -- kilometres (km) • Conversions should include common fractions and decimal fractions to two decimal places	Calculations and problem solving involving length
	Read Mass Grams (g) and kilograms (kg)	
	Practical measuring of 3-D objects • estimating • measuring • recording • comparing and ordering	See relevant concepts and skills
	Measuring instruments Bathroom scales (analogue and digital); kitchen scales (analogue and digital) and balances	See relevant concepts and skills

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Calculations and problem-solving involving mass include: • Problems in contexts involving mass • Converting between grams and kilograms • Conversions should include fraction and decimal forms (to two decimal places)	Problem-solving involving mass
	Capacity/Volume Millilitres (*ml*), litres (*l*) and kilolitres (*kl*)	
	Practical measuring of 3-D objects • Estimating • Measuring • Recording • Comparing and ordering	Practical measuring of 3-D objects
	Measuring instruments Measuring jugs	See relevant concepts and skills
	Calculations and problem solving involving capacity/volume • Problems in contexts involving capacity/volume • Converting between kilolitres, litres and millilitres - Conversions should include fraction and decimal forms (to two decimal places)	Convert between kilolitres, litres and millilitres
	Handle time instruments • Read, tell and write time in 12-hour and 24-hour formats on both analogue and digital instruments in: -- hours -- minutes -- seconds • Instruments include clocks, watches and stopwatches	See relevant concepts and skills
	Read calendars **Calculations and problem solving time** • Problems in contexts involving time • Reading time zone maps and calculating time	Read time zone maps Calculate time differences based on time zones

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Tell the differences based on time zones • Calculation of time intervals where time is given in -- seconds and/or minutes -- minutes and/or hours -- hours and/or days -- days, weeks and/or months -- years and/or decades -- centuries, decades and/or years	
	History of time Know some ways in which time was measured and represented in the past	See relevant concepts and skills
	Temperature Degrees Celsius	
	Practical measuring of temperature • Estimating • Measuring • Recording • Comparing and ordering	Practical measuring of temperature
	Handle measuring instruments • Thermometers (analogue and digital)	See relevant concepts and skills
	Calculations and problem solving related to temperature • Problems in contexts related to temperatures • Calculating temperature differences limited to positive whole numbers	See relevant concepts and skill
DATA HANDLING	**Collecting and organising data** • Collect data -- using tally marks and tables for recording -- using simple questionnaires (yes/no type responses) • Order data from smallest group to largest group	See relevant concepts and skills

CONTENT AREA	CONCEPTS AND SKILLS To test whether the learner is able to …	CONTENT
	Representing data Draw a variety of graphs to display and interpret data including: • Pictographs (many-to-one correspondence) • Bar graphs and double-bar graphs	See relevant concepts and skills
	Interpreting data Critically read and interpret data represented in: • Words • Pictographs • Bar graphs • Double bar graphs • Pie charts	Critically read and interpret data
	Analysing data Analyse data by answering questions related to: • Data categories, including data intervals • Data sources and contexts • Central tendencies (mode and median)	Analyse data by answering questions
	Reporting data Summarise data verbally and in short written paragraphs that includes: • Drawing conclusions about the data • Making predictions based on the data	See relevant concepts and skills
	Ungrouped data Examine ungrouped numerical data to determine: • The most frequently occurring score in the data set (mode) • The middlemost score in the data set (median)	Examine ungrouped numerical data