



NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

MATHEMATICAL LITERACY **NQF Level 3**

September 2007

MATHEMATICAL LITERACY – LEVEL 3

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SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides the lecturer with guidelines to develop and implement a coherent, integrated assessment system for Mathematical Literacy in the National Certificates (Vocational). It must be read with the *National Policy Regarding Further Education and Training Programmes: Approval of the Documents, Policy for the National Certificates (Vocational) Qualifications at Levels 2 to 4 on the National Qualifications Framework (NQF)*. This assessment guideline will be used for National Qualifications Framework Levels 2-4.

This document explains the requirements for the internal and external subject assessment. The lecturer must use this document with the *Subject Guidelines: Mathematical Literacy* to prepare for and deliver Mathematical Literacy. Lecturers should use a variety of resources and apply a range of assessment skills in the setting, marking and recording of assessment tasks.

SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

1 ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

Assessment in the National Certificates (Vocational) is underpinned by the objectives of the National Qualifications Framework (NQF). These objectives are to:

- Create an integrated national framework for learning achievements.
- Facilitate access to and progression within education, training and career paths.
- Enhance the quality of education and training.
- Redress unfair discrimination and past imbalances and thereby accelerate employment opportunities.
- Contribute to the holistic development of the student by addressing:
 - social adjustment and responsibility;
 - moral accountability and ethical work orientation;
 - economic participation; and
 - nation-building.

The principles that drive these objectives are:

- **Integration**

To adopt a unified approach to education and training that will strengthen the human resources development capacity of the nation.

- **Relevance**

To be dynamic and responsive to national development needs.

- **Credibility**

To demonstrate national and international value and recognition of qualification and acquired competencies and skills.

- **Coherence**

To work within a consistent framework of principles and certification.

- **Flexibility**

To allow for creativity and resourcefulness when achieving Learning Outcomes, to cater for different learning styles and use a range of assessment methods, instruments and techniques.

- **Participation**

To enable stakeholders to participate in setting standards and co-ordinating the achievement of the qualification.

- **Access**

To address barriers to learning at each level to facilitate students' progress.

- **Progression**

To ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system.

- **Portability**

To enable students to transfer credits of qualifications from one learning institution and/or employer to another institution or employer.

- **Articulation**

To allow for vertical and horizontal mobility in the education system when accredited pre-requisites have been successfully completed.

- **Recognition of Prior Learning**

To grant credits for a unit of learning following an assessment or if a student possesses the capabilities specified in the outcomes statement.

- **Validity of assessments**

To ensure assessment covers a broad range of knowledge, skills, values and attitudes (SKVAs) needed to demonstrate applied competency. This is achieved through:

- clearly stating the outcome to be assessed;
- selecting the appropriate or suitable evidence;
- matching the evidence with a compatible or appropriate method of assessment; and
- selecting and constructing an instrument(s) of assessment.

- **Reliability**

To assure assessment practices are consistent so that the same result or judgment is arrived at if the assessment is replicated in the same context. This demands consistency in the interpretation of evidence; therefore, careful monitoring of assessment is vital.

- **Fairness and transparency**

To verify that no assessment process or method(s) hinders or unfairly advantages any student. The following could constitute unfairness in assessment:

- Inequality of opportunities, resources or teaching and learning approaches
- Bias based on ethnicity, race, gender, age, disability or social class
- Lack of clarity regarding Learning Outcome being assessed
- Comparison of students' work with other students, based on learning styles and language

- **Flexibility**

- **Practicability and cost-effectiveness**

To integrate assessment practices within an outcomes-based education and training system and strive for cost and time-effective assessment.

2 ASSESSMENT FRAMEWORK FOR VOCATIONAL QUALIFICATIONS

The assessment structure for the National Certificates (Vocational) qualification is as follows:

2.1 Internal continuous assessment (ICASS)

Knowledge, skills values, and attitudes (SKVAs) are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. The internal continuous assessment (ICASS) practical component is undertaken in a real workplace, a workshop or a "Structured Environment". This component is moderated internally and externally quality assured by Umalusi. All internal continuous assessment (ICASS) evidence is kept in a Portfolio of Evidence (PoE) and must be readily available for monitoring, moderation and verification purposes.

2.2 External summative assessment (ESASS)

The external summative assessment is either a single or a set of written papers set to the requirements of the Subject Learning Outcomes. The Department of Education administers the theoretical component according to relevant assessment policies.

External summative assessments will be conducted annually between October and December, with provision made for supplementary sittings.

3 MODERATION OF ASSESSMENT

3.1 Internal moderation

Assessment must be moderated according to the internal moderation policy of the Further Education and Training (FET) college. Internal college moderation is a continuous process. The moderator's involvement starts with the planning of assessment methods and instruments and follows with continuous collaboration with and support to the assessors. Internal moderation creates common understanding of Assessment Standards and maintains these across vocational programmes.

3.2 External moderation

External moderation is conducted by the Department of Education, Umalusi and, where relevant, an Education and Training Quality Assurance (ETQA) body according to South African Qualifications Authority (SAQA) and Umalusi standards and requirements.

The external moderator:

- monitors and evaluates the standard of all summative assessments;
- maintains standards by exercising appropriate influence and control over assessors;
- ensures proper procedures are followed;
- ensures summative integrated assessments are correctly administered;
- observes a minimum sample of ten (10) to twenty-five (25) percent of summative assessments;
- gives written feedback to the relevant quality assurer; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures for students who experience barriers to learning be customised and supported to enable these students to achieve their maximum potential.

4 PERIOD OF VALIDITY OF INTERNAL CONTINUOUS ASSESSMENT (ICASS)

The period of validity of the internal continuous assessment mark is determined by the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificates (Vocational)*.

The internal continuous assessment (ICASS) must be re-submitted with each examination enrolment for which it constitutes a component.

5 ASSESSOR REQUIREMENTS

Assessors must be subject specialists and should ideally be certified as a competent assessor. If the lecturer conducting the assessments has not been declared a competent assessor, an assessor who has been declared competent may be appointed to oversee the assessment process to ensure the quality and integrity of assessments.

6 TYPES OF ASSESSMENT

Assessment benefits the student and the lecturer. It informs students about their progress and helps lecturers make informed decisions at different stages of the learning process. Depending on the intended purpose, different types of assessment can be used.

6.1 Baseline assessment

At the beginning of a level or learning experience, baseline assessment establishes the knowledge, skills, values and attitudes (SKVAs) that students bring to the classroom. This knowledge assists lecturers to plan learning programmes and learning activities.

6.2 Diagnostic assessment

This assessment diagnoses the nature and causes of learning barriers experienced by specific students. It is followed by guidance, appropriate support and intervention strategies. This type of assessment is useful to make referrals for students requiring specialist help.

6.3 Formative assessment

This assessment monitors and supports teaching and learning. It determines student strengths and weaknesses and provides feedback on progress. It determines if a student is ready for summative assessment.

6.4 Summative assessment

This type of assessment gives an overall picture of student progress at a given time. It determines whether the student is sufficiently competent to progress to the next level.

7 PLANNING ASSESSMENT

An assessment plan should cover three main processes:

7.1 Collecting evidence

The assessment plan indicates which Subject Outcomes and Assessment Standards will be assessed, what assessment method or activity will be used and when this assessment will be conducted.

7.2 Recording

Recording refers to the assessment instruments or tools with which the assessment will be captured or recorded. Therefore, appropriate assessment instruments must be developed or adapted.

7.3 Reporting

All the evidence is put together in a report to deliver a decision for the subject.

8 METHODS OF ASSESSMENT

Methods of assessment refer to who carries out the assessment and includes lecturer assessment, self-assessment, peer assessment and group assessment.

LECTURER ASSESSMENT	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
SELF-ASSESSMENT	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
PEER ASSESSMENT	Students assess another student or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
GROUP ASSESSMENT	Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.

9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE

All evidence collected for assessment purposes is kept or recorded in the student's Portfolio of Evidence (PoE).

The following table summarises a variety of methods and instruments for collecting evidence. A method and instrument is chosen to give students ample opportunity to demonstrate the Subject Outcome has been attained. This will only be possible if the chosen methods and instruments are appropriate for the target group and the Specific Outcome being assessed.

	METHODS FOR COLLECTING EVIDENCE		
	Observation-based (Less structured)	Task-based (Structured)	Test-based (More structured)
Assessment instruments	• Observation • Class questions • Lecturer, student, parent discussions	• Assignments or tasks • Projects • Investigations or research • Case studies • Practical exercises • Demonstrations • Role-play • Interviews	• Examinations • Class tests • Practical examinations • Oral tests • Open-book tests
Assessment tools	• Observation sheets • Lecturer's notes • Comments	• Checklists • Rating scales • Rubrics	• Marks (e.g. %) • Rating scales (1-7)
Evidence	• Focus on individual students • Subjective evidence based on lecturer observations and impressions	Open middle: Students produce the same evidence but in different ways. Open end: Students use same process to achieve different results.	Students answer the same questions in the same way, within the same time.

10 TOOLS FOR ASSESSING STUDENT PERFORMANCE

Rating scales are marking systems where a symbol (such as 1 to 7) or a mark (such as 5/10 or 50%) is defined in detail. The detail is as important as the coded score. Traditional marking, assessment and evaluation mostly used rating scales without details such as what was right or wrong, weak or strong, etc.

Task lists and **checklists** show the student what needs to be done. They consist of short statements describing the expected performance in a particular task. The statements on the checklist can be ticked off when the student has adequately achieved the criterion. Checklists and task lists are useful in peer or group assessment activities.

Rubrics are a hierarchy (graded levels) of criteria with benchmarks that describe the minimum level of acceptable performance or achievement for each criterion. It is a different way of assessment and cannot be compared to tests. Each criterion described in the rubric must be assessed separately. Mainly, two types of rubrics, namely holistic and analytical, are used.

11 SELECTING AND/OR DESIGNING RECORDING AND REPORTING SYSTEMS

The selection or design of recording and reporting systems depends on the purpose of recording and reporting student achievement. **Why** particular information is recorded and **how** it is recorded determine which instrument will be used.

Computer-based systems, for example spreadsheets, are cost and time effective. The recording system should be user-friendly and information should be easily accessed and retrieved.

12 COMPETENCE DESCRIPTIONS

All assessment should award marks to evaluate specific assessment tasks. However, marks should be awarded against rubrics and not simply be a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) a student must demonstrate to achieve each level of the rating scale.

When lecturers or assessors prepare an assessment task or question, they must ensure that the task or question addresses an aspect of a Subject Outcome. The relevant Assessment Standard must be used to create the rubric to assess the task or question. The descriptions must clearly indicate the minimum level of attainment for each category on the rating scale.

13 STRATEGIES FOR COLLECTING EVIDENCE

A number of different assessment instruments may be used to collect and record evidence. Examples of instruments that can be (adapted and) used in the classroom include:

13.1 Record sheets

The lecturer observes students working in a group. These observations are recorded in a summary table at the end of each project. The lecturer can design a record sheet to observe students' interactive and problem-solving skills, attitudes towards group work and involvement in a group activity.

13.2 Checklists

Checklists should have clear categories to ensure that the objectives are effectively met. The categories should describe how the activities are evaluated and against what criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN MATHEMATICAL LITERACY

1 SCHEDULE OF ASSESSMENT

At NQF levels 2, 3 and 4, lecturers will conduct assessments as well as develop a schedule of formal assessments that will be undertaken in the year. All three levels also have an external examination that accounts for 75 percent of the total mark. The marks allocated to assessment tasks completed during the year, kept or recorded in a Portfolio of Evidence (PoE) account for the other 25 percent.

The Portfolio of Evidence (PoE) and the external assessment include written components. The practical assessment in Mathematical Literacy, must, where necessary, be subjected to external moderation by Umalusi or an appropriate Education and Training Quality Assurance (ETQA) body, appointed by the Umalusi Council in terms of Section 28(2) of the *General and Further Education and Training Quality Assurance Act, 2001 (Act No. 58 of 2001)*.

2 RECORDING AND REPORTING

Mathematical Literacy is assessed according to seven levels of competence. The level descriptions are explained in the following table.

Scale of achievement for the Fundamental component

RATING CODE	RATING	MARKS (%)
7	Outstanding	80 – 100
6	Meritorious	70 – 79
5	Substantial	60 – 69
4	Adequate	50 – 59
3	Moderate	40 – 49
2	Elementary	30 – 39
1	Not achieved	0 – 29

The programme of assessment should be recorded in the Lecturer's Portfolio of Assessment for each subject. The following should at least be included in the Lecturer's Assessment Portfolio:

- A contents page
- The formal schedule of assessment
- The requirements for each assessment task
- The tools used for each assessment task
- Recording instrument(s) for each assessment task
- A mark sheet and report for each assessment task

The college must standardise these documents.

The student's Portfolio of Evidence (PoE) must at least include:

- A contents page
- The assessment tasks according to the assessment schedule
- The assessment tools or instruments for the task
- A record of the marks (and comments) achieved for each task

Where tasks cannot be contained as evidence in the Portfolio of Evidence (PoE), its exact location must be recorded and it must be readily available for moderation purposes.

ASSESSMENT OF MATHEMATICAL LITERACY

LEVEL 3

3 INTERNAL ASSESSMENT OF OUTCOMES IN MATHEMATICAL LITERACY - LEVEL 3

3.1 Topics for Mathematical Literacy

Topic 1: Numbers: Calculate and measure using numbers in the workplace

SUBJECT OUTCOME	
1.1 Uses numbers correctly when working with problems in the workplace.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Numbers are used appropriately in context.	Use numbers to count; order and estimate
Positive and negative numbers are used as directional indicators	Use positive and negative numbers as directional indicators
Fractions; decimals and percentages are compared in terms of size and used in estimation	Use fractions; decimals and percentages as measures of parts of a whole
Fractions; decimals and percentages are compared in terms of size and used in estimation	Find decimal equivalents of any fraction using a calculator
Conversions are made between decimal fractions and percentages	Convert between decimal fractions and percentages
<i>Note: The fractions used in problems should be limited to those fractions that arise naturally in the context of the learner – it is anticipated that these will include: $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{1}{3}, \frac{2}{3}, \frac{1}{10}, \frac{1}{100}$</i>	
ASSESSMENT TASKS OR ACTIVITIES	
Integrated throughout all assessment tasks	
ASSESSMENT STANDARD	LEARNING OUTCOME
Different time notations are compared and understood	Write time using conventions of: • am/pm • 24 hour clock • analogue and digital
Conversions are made between different time notations	Convert between different time notations
ASSESSMENT TASKS OR ACTIVITIES	
Integrated throughout all assessment tasks	

SUBJECT OUTCOME	
1.2 Perform calculations correctly to solve problems in the workplace.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Calculations are performed correctly and with confidence	Perform calculations correctly by means of paper, mental and/or calculator methods
Numbers are rounded off appropriately	Round numbers (rounds up, down and off) according to the requirements of the context
Distributive and associative properties of addition and multiplication are applied to simplify calculations where possible and/or useful	Apply addition and multiplication properties (distributive and associative) to simplify calculations where possible and/or useful
Answers are estimated and results of calculations are evaluated	Estimate to anticipate answers and evaluate the result of a calculation and/or measurement
Unknowns are estimated	Estimate unknowns as necessary to solve problems
Functions on a basic calculator are used	Use the following functions on a basic calculator: • addition; subtraction; multiplication and division; • percentage; • memory; and • “clear” and “clear all” keys

Problems dealing with ratio/proportion, rate and percentage are solved	Solve problems that involve ratio/proportion (linear and inverse) and/or rate and/or percentage
ASSESSMENT TASKS OR ACTIVITIES	
Integrated throughout all assessment tasks	

SUBJECT OUTCOME	
1.3 Identify and use appropriate measuring tools and techniques to solve problems in the workplace.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Anticipated measurements are estimated	Estimate anticipated measurements where possible based on a sense/"feel" for different dimensions (i.e. have a "feel" of dimensions in relation to common objects)
Measuring instruments are selected and used to make direct measurements of: - length; - weight; - volume/capacity; - temperature; and - time intervals to levels of precision appropriate to the context	Select and use appropriate measuring instruments <i>Range: Instruments include:</i> - Ruler, measuring tape, trundle wheels and vernier scales; - Scale; - Measuring jugs, cups, measuring cylinders, burettes and pipettes as appropriate); - Thermometer; - Watch and/or stopwatch; and - Other measuring instruments appropriate to the context/qualification
Meters and dials on instruments, tools and machines are read	Read meters and dials on instruments, tools and machines
Prescribed dial settings on instruments, tools and machines are set	Set prescribed dial settings on instruments, tools and machines
Correct formulae are selected and used to calculate measurements and solve problems.	Calculate the following measurements using formulae as necessary: <u>Area</u>: rectangle; triangle; circle and other shapes that can be decomposed into rectangles, triangles and circles <u>Volume</u>: rectangular prisms; cylinders and other objects that can be decomposed into rectangular prisms, and cylinders <u>Time</u>: elapsed time; calculations involving time zones <u>Distance</u> (using scale) and <u>direction</u> - Other dimensions appropriate to the context/qualification using formulae supplied Report the solution with a number of decimal places and in units appropriate to the problem
Indirect measurements are calculated from information available	Calculate indirect measurements from information available
Conversion between units are performed as needed	Perform conversions using known relationships between: - mm – cm – m – km; - ml – l; - g – kg – tonne; - sec – min – hours – days
Conversion tables (supplied) are used to perform conversions appropriate to the context/qualification	Use conversion tables (supplied) to perform conversions appropriate to the context/qualification
Rates are appropriately applied and used to solve contextual problems	Calculate values using rates including: - conversion rates e.g.: grams to kilograms; - consumption rates e.g.: kilometers per litre; - distance, time, speed rates e.g.: kilometers per hour; - cost rates e.g.: rand per kilogram; - mixing rates e.g.: milliliters of tint per milliliters of peroxide

	Other rates appropriate to the context/ qualification
Rates are determined from given values/relationships	Determine rates from given values/relationships
ASSESSMENT TASKS OR ACTIVITIES	
Integrated throughout all assessment tasks	

Topic 2: Patterns and Relationships: Identify patterns and relationships between varying quantities in the workplace

SUBJECT OUTCOME	
2.1 Identify and extend patterns for different relationships in the workplace.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Numerical and geometric patterns and trends in data are investigated and extended	Investigate and extend numerical and geometric patterns and trends in data <i>Range: Patterns include:</i> - Constant difference patterns (arithmetic progressions) e.g. the cost of a number of items - Constant ratio patterns (geometric progressions) e.g. fixed deposit bank account with a fixed interest rate - Patterns associated with inverse and direct proportion relationships - Situations in which there is no mathematical relationship between the independent and dependent variable but in which a trend can be identified e.g. height vs. age for children
Relationships between terms are used to complete number patterns	Use both the relationship between consecutive terms and the relationship between the term's position and its value to find missing/additional terms in a pattern
Values based on trends evident in situations are estimated and predicted by interpolation and extrapolation	Interpolate and extrapolate to estimate and predict values based on trends evident in situations
Patterns are described in words and/or through formulae and trends are described in words	Describe patterns in words (spoken and written) and through algebraic descriptions of them (formulae)
Trends are described in words	Describe trends in words that include - Increasing and/or decreasing; - Critical values; - Maximum and minimum values; and - Discrete and/or continuous
Numerical and geometric patterns are generated from their verbal and formulaic descriptions	Generate numerical and geometric patterns from descriptions given in words (instructions) and formulae.
ASSESSMENT TASKS OR ACTIVITIES	
Investigation	

SUBJECT OUTCOMES	
2.2 Identify and use information from different representations of relationships to solve problems in the workplace.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Information is identified and selected from different representations of relationships to solve problems	Identify and select information including: - dependent variables for given independent variables; - independent variables for given dependent variables - critical points including zeros - intervals over which the relationship values increase and/or decrease from the following representations of relationships: - tables; - graphs

	• formulae and equations
Formulae are used and developed with confidence	Use formulae supplied to: • determine dependent variables for given independent variables • determine independent variables for given dependent variables by performing appropriate operations including: • basic arithmetic operations • calculations with exponents, square and cube roots • solving equations
Formulae and/or equations to describe relationships are determined	Determine formulae and/or equations to describe relationships where these exist, including: • constant relationships • linear relationships • inverse proportion relationships
ASSESSMENT TASKS OR ACTIVITIES	
Investigation	

SUBJECT OUTCOMES	
2.3 Translate between different representations of relationships found in the workplace	
ASSESSMENT STANDARD	LEARNING OUTCOME
Representations of relationships are converted from one form to another to reveal features of patterns and relationships to solve problems	Translate between representations of relationships as follows: • complete a table of values by reading values from the graph • complete a table of values for formulae and/or descriptions of relationships • plot a graph from the values in a table of values • match formulae/equations to graphs and/or tables of values of the relationship based on features and/or trends
Representations of relationships are selected and developed to solve a problem and/or communicate/illustrate a result	Choose and develop a representation from among: • tables • graphs • formulae and equations that most effectively communicates and/or illustrates a result or finding
ASSESSMENT TASKS OR ACTIVITIES	
Investigation	

Topic 3: Finance: Deal with finances in personal and/or familiar contexts, as well as finances associated with workplace based job descriptions, in a responsible manner

SUBJECT OUTCOMES	
3.1 Manage finances with confidence in personal and/or familiar context as well as finances associated with workplace based job descriptions.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Sources of income related to workplace based job description are identified; recorded and managed	Identify, record and manage sources of income related to workplace based job description <i>Range: Sources of income include:</i> • sales/services • rental • donations/grants
How/ where income is kept (bank account; cash) is accounted for, and sources of income are categorised as	• Account for how/where income is kept (bank account; cash). • Categorise sources of income as fixed/variable

fixed/variable	
Records of income are maintained according to requirements of workplace (e.g. receipts; petty cash vouchers; invoices)	Maintain records of income according to requirements of workplace (e.g. receipts; petty cash vouchers; invoices)
Expenses related to workplace based job description are listed and managed	List and manage expenses related to workplace based job description <i>Range: Expenses include:</i> • salary/wages/commission • running expenses • raw materials/stock/products • investment/savings
Importance of saving for future/occasional expenses is understood	Understand the importance of saving for future/occasional expenses. Expenses are categorized as fixed and variable.
Records of expenses maintained according to requirements of workplace (e.g. receipts; petty cash vouchers; invoices)	Maintain records of expenses according to requirements of workplace (e.g. receipts; petty cash vouchers; invoices)
Finances are planned and monitored according to workplace based job expectations	Develop and maintain income/expenditure statements
Budgets based on previous income/expenditure statements are developed	Develop budgets based on previous income/expenditure statements
Budgets for new projects and/ or activities are developed	Develop budgets for new projects and/ or activities (e.g. new product/service)
Variations between budgeted and actual income/expenditure are explained	Explain variations between budgeted and actual income/expenditure
ASSESSMENT TASKS OR ACTIVITIES	
Control test	

SUBJECT OUTCOMES	
3.2 Read, interpret and act on financial information presented in documents in a personal, workplace based and familiar context.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Documents are read and appropriate information identified and/or selected. <i>Range: Information and documents include:</i> • financial statements (income/ expenditure; budgets etc.) • rates tables/price lists/catalogues	Identify balance on a statement and distinguish between credit and debit. Identify the following: • income/credit and/or expenses/debit • balance • beneficiaries/recipients • payments due • date/time period • rates/times • costs • payment options
<i>Note: Documents include: pay slip; cheque; receipt; bank statement; accounts; cell phone rate tables; catalogues/price lists; transport rate tables; advertisements; service charges (e.g. water, electricity and sewerage)</i>	
ASSESSMENT STANDARD	LEARNING OUTCOME
Information from documents is selected and interpreted to answer questions relating to a context. Financial documents are completed	Select and interpret information from documents. <i>Range: For example can analyse which transactions contribute most significantly to bank charges on a bank statement. Documents include:</i> • cheques • withdrawal/deposit slips • other documents related to personal finance (e.g. account application forms) • receipts/petty cash vouchers

	• <i>invoices/statements</i>
Decisions are made and explained and/or justified in solving a problem related to a context. Problems are solved and solutions explained/justified using information from financial documents	Make and justify decisions taken to solve problems using information from financial documents. <i>Range: For example the time of day for making a phone call is influenced by the different rates at different times of day. Make decisions that are affordable; cost and/or time efficient.</i>
	Consider the benefits of buying in bulk vs. buying individually
ASSESSMENT TASKS OR ACTIVITIES	
Control test	

Topic 4: Space, shape and orientation: Read, interpret, make and use representations of the physical world appropriate to the workplace

SUBJECT OUTCOME	
4.1 Use and apply the vocabulary of space, shape and orientation appropriately.	
ASSESSMENT STANDARD	LEARNING OUTCOME
The vocabulary of space; shape and orientation is used correctly	Know and use correctly the vocabulary of space, shape and orientation. <i>Range: Vocabulary should include the following:</i> • <u>Space</u>: block; rectangular prism; pyramid; cone; cylinder; sphere; cube; prism; base • <u>Shape</u>: rectangle; square; triangle; circle; • <u>Attributes</u>: length; breadth; height; side; perimeter; diagonal; area; angle; centre; radius; diameter; circumference; volume; perpendicular; parallel; scale; column; row; co-ordinates/grid reference; weight (mass) • <u>Representation</u>: grid; map; plan; scale drawing; diagram • <u>Time</u>: 24hour /12 hour clocks and conventions
<i>Note: It is assumed that the knowledge listed in the Assessment Criteria will be taught in an integrated way with the other Space; Shape and Orientation outcomes. The vocabulary listed should be assessed in context of problems and not as dictionary definitions.</i>	
ASSESSMENT TASKS OR ACTIVITIES	
Integrated throughout all assessment tasks	

SUBJECT OUTCOME	
4.2 Performs space; shape and orientation calculations correctly to solve problems in workplace based contexts.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Space; shape and orientation calculations are performed to solve job related problems in the workplace	Calculate the following with appropriate conversions and rounding (see Numbers) • <u>Area</u>: rectangle; triangle; circle and other shapes that can be decomposed into rectangles, triangles and circles • <u>Volume</u>: rectangular prisms; cylinders and other objects that can be decomposed into rectangular prisms, and cylinders • <u>Time</u>: elapsed time; calculations involving time zones • <u>Distance</u> (using scale) and <u>direction</u>
<i>Note: Space; shape and orientation provide a context for the attainment of the Subject Outcomes, Assessment Standards and Learning Outcomes of the calculations and measurement theme.</i>	
ASSESSMENT TASKS OR ACTIVITIES	
Control test	

SUBJECT OUTCOME	
4.3 Read, interpret and use representations to make sense of and solve problems in workplace based contexts.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Required information is read from representations and used	Use maps (e.g. road map and, route maps for buses and trains etc.) to determine: • Location • Distance between two or more positions using the scale of the map • Routes to get from one position to another
Required information is read from representations and used	Use plans (e.g. house and building plans) to determine: • Dimensions • Positions • Quantities of materials needed
Required information is read from representations and used	Use diagrams (e.g. assembly; packing and stacking diagrams) to: • Identify parts and objects • Follow instructions
Decisions are made and explained/justified	Plan trips choosing the shortest and/or fastest and/or most appropriate routes for a given mode of transport using maps
	Sequence activities to complete a task (e.g. make a dress; build a building; move contents of a house/office) using plans and/or diagrams
ASSESSMENT TASKS OR ACTIVITIES	
Assignment or investigation	

SUBJECT OUTCOME	
4.4 Make physical and diagrammatic representations to investigate problems and/or illustrate solutions in workplace based contexts.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Diagrammatic and physical representations of shapes and objects are made to investigate problems	Make 2-D and/or 3D scale models of 3-D objects to investigate packing problems (e.g. arranging furniture in a room; arranging items in a box)
3-D scale models are made from 2-D plans	Make 3-D scale models of objects from 2-D plans (e.g. make a model of a building from its plan; make a model of a product from its diagram)
<i>Note: In terms of investigation, physical representations – models – are made for two distinct reasons:</i> • 3D-scale models made from 2D-diagrams/plans can help with the visualisation of the object – e.g. when designing buildings etc. • scale models (including maps and diagrams) can help us to investigate problems and develop solutions (e.g. how best to pack a container; how best to arrange furniture in a room; how to design space to accommodate particular furniture). <i>Modelling – the use of models to investigate problems – is an important skill and attribute of mathematically literate persons.</i>	
ASSESSMENT STANDARD	LEARNING OUTCOME
Diagrammatic representations are used to illustrate solutions	Make rough sketches of objects and/or areas in order to make scale drawings (e.g. rough maps and plans)
Diagrammatic representations are used to illustrate solutions	Make maps, plans and diagrams to scale from rough sketches and or objects
Diagrammatic representations are used to illustrate solutions	Make route maps to illustrate proposed trips
Diagrammatic representations are used to illustrate solutions	Make flow diagrams to illustrate a proposed sequences of activities

ASSESSMENT TASKS OR ACTIVITIES
Assignment or investigation

Topic 5: Information communicated through numbers, graphs and tables: Use information communicated through numbers, tables and graphs in order to make sense of, and make predictions about, the workplace

Note: The philosophy that underlies this theme is to develop in individuals the ability to critically engage with the information (communicated through numbers/graphs and tables) they face so that they can be more effective self managing individuals, contributing workers, life-long learners and critical citizens.

In order to understand how information (communicated through numbers/graphs and tables) is generated, individuals should have some experience with collecting, organising and interpreting information. However, it is not anticipated that students in their daily lives will regularly be involved in this process and so the Subject Outcomes and Assessment Standards give greater focus to interpreting information than to gathering and/or generating it.

To develop a healthy cynicism toward arguments based on information (communicated through numbers/graphs and tables) students should be aware that information can be represented and interpreted (and misrepresented) in different ways.

SUBJECT OUTCOME	
5.1 Collect and organise information in order to answer questions in workplace based contexts.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Questionnaires are developed for the collection of data	Develop sets of questions for collecting information, being aware that the way in which the questions are posed will influence the responses given
Information is collected	Compile and use a information collection tool (e.g. survey; questionnaire; tally list)
Appropriate samples are selected	Select appropriate samples from the population for collecting data, in awareness of the impact that sample choice has on the information gained
Collected information is organized, summarised and represented	Organise information using tables and/or grouping as appropriate, being aware of the impact that the data group has.
	Summarise information by calculating the mean, median and mode of both ungrouped and grouped information as appropriate, being aware of how the choice of summary statistic will impact on the answer to the question
Data is appropriately represented in different way	Represent information using tables, pie charts, bar graphs, line and broken line graphs as appropriate to the information collected, in awareness of the manner in which the choice of representation impacts on the impression it creates
Information represented in different ways is interpreted in order to answer questions	Use summarised and/or represented information to develop and substantiate answers to the questions that led to the information collection
	Use summarised and/or represented information to show that different interpretations are possible
<i>Note: Students should recognise that information gained is influenced by all of the following:</i> • the method of information collection; • the sample used; • the method(s) used to summarise the information; and • the choice of representation <i>Students should realise that collecting and comparing prices from a range of shops for a possible purchase is as much an information activity as conducting a census.</i>	
ASSESSMENT TASKS OR ACTIVITIES	
Research task or project	

SUBJECT OUTCOME	
5.2 Critically interpret information presented (and misrepresented) in various forms in workplace based contexts.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Information represented through graphs, tables and statistics is read and interpreted	Read and select information from tables and graphs in order to answer questions.
Trends are identified from the data presented in graphs and tables	Identify trends from the information presented in graphs and tables
The meaning of 'mean', 'median', 'mode' are correctly interpreted	Correctly interpret the meaning of the following statistics: • Mean • Median • Mode with reference to both ungrouped and grouped information as appropriate
Information represented through graphs, tables and statistics is critically analysed	Critique the choice of representation and/or statistic(s) in terms their impact on the impression created and conclusion(s) drawn
<i>Note: Students should know that:</i> • Pie charts reveal relationships between different characteristics of the information but do not reveal the population/sample size • Bar graphs reveal the population/sample size but do not show the relationship as effectively; • The choice of scale on the axes, and/or the point at which the axes cross, etc. impact on the impression created by the graph Tables will often have more information than graphs but that the trends/patterns are less easy to observe	
ASSESSMENT STANDARD	LEARNING OUTCOME
Questions are asked to reveal possible bias	Ask questions about the information collection, organisation, summary and representation processes to reveal sources of error/ bias/ misinterpretation
<i>Note: Questions should include:</i> • Which statistic was used in text that uses the word 'average' • The range of the information • What was done with outliers in the information • The size of the sample • How representative the sample is • How the information was grouped • The method of information collection • The neutrality of the information collection process • Whether the information collected was fact or opinion	

SUBJECT OUTCOME	
5.3 Interpret the implications of expressions of likelihood in personal and workplace based contexts.	
ASSESSMENT STANDARD	LEARNING OUTCOME
Independent and dependent events are differentiated	Differentiate between independent and dependent events
Expressions of likelihood in are engaged with and interpreted correctly	Differentiate between expressions of likelihood based on evidence (theoretical/ empirical likelihood/ probability) and expressions of likelihood based on the properties of the situation (theoretical likelihood/ probability)
Implications of expressions of likelihood are explained	Explain the implications of expressions of likelihood found in text
<i>Note: By expressions of likelihood is meant what is also known as chance and/or more formally, probability. Expressions of likelihood are used (correctly and incorrectly) in daily conversation and in text to predict what may happen (e.g.: "the likelihood of Bafana Bafana winning the cup is .."; "the likelihood of winning the LOTTO is ..."; "the probability of throwing an even number when a die is rolled is ...")</i> <i>Learners should interpret such statements of likelihood aware:</i> • that the likelihood (probability) scale goes from 0 (the event will not happen) to 1 or 100% (the event will definitely	

happen); of the difference between random events (rolling die; spinning a spinner) and non-random events such as the weather and/or the performance of a sports team which are based on history that some things can be predicted while others cannot – we can predict that $\frac{1}{2}$ of a very large number of coin tosses will give a head, however, we <u>cannot</u> predict what will happen when we toss the next coin
ASSESSMENT TASKS OR ACTIVITIES
Research task or project

4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN MATHEMATICAL LITERACY - LEVEL 3

A national examination is conducted annually in October or November each year by means of two papers set externally and marked and moderated internally. The examinations will be structured as follows:

	Knowing 30%	Applying routine procedures in familiar contexts 30%	Applying multi-step procedures in a variety of contexts 20%	Reasoning and reflecting 20%
Numbers 20%	Paper 1 (150 marks) Paper 1 is intended to be a basic knowing and routine applications paper		Paper 2 (150 marks) Paper 2 is intended to be an applications and reasoning and reflecting paper	
Patterns and relationships 20%				
Finances 20%				
Space, Shape and Orientation 20%				
Information communicated ... 20%				