



education

Department:
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NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

MATHEMATICAL LITERACY

NQF Level 4

September 2007

MATHEMATICAL LITERACY – LEVEL 4

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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 be customised for students who experience barriers to learning, 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's 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 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	<ul style="list-style-type: none"> • Observation • Class questions • Lecturer, student, parent discussions 	<ul style="list-style-type: none"> • Assignments or tasks • Projects • Investigations or research • Case studies • Practical exercises • Demonstrations • Role-play • Interviews 	<ul style="list-style-type: none"> • Examinations • Class tests • Practical examinations • Oral tests • Open-book tests
Assessment tools	<ul style="list-style-type: none"> • Observation sheets • Lecturer's notes • Comments 	<ul style="list-style-type: none"> • Checklists • Rating scales • Rubrics 	<ul style="list-style-type: none"> • Marks (e.g. %) • Rating scales (1-7)
Evidence	<ul style="list-style-type: none"> • Focus on individual students • Subjective evidence based on lecturer observations and impressions 	<p>Open middle: Students produce the same evidence but in different ways.</p> <p>Open end: Students use same process to achieve different results.</p>	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. These 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. Using rubrics is a different way of assessing 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 be simply a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) that 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 PoE account for the other 25 percent.

The 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 PoE must include at least:

- 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 a task cannot be contained as evidence in the PoE, its exact location must be recorded and it must be readily available for moderation purposes.

ASSESSMENT OF MATHEMATICAL LITERACY
LEVEL 4

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN MATHEMATICAL LITERACY - LEVEL 4

Topic 1: Numbers

SUBJECT OUTCOME	
1.1 Use numbers correctly when working with problems in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Numbers are used appropriately in context. 	<ul style="list-style-type: none"> Use numbers to count; order and estimate.
<ul style="list-style-type: none"> Positive and negative numbers are used as directional indicators 	<ul style="list-style-type: none"> Use positive and negative numbers as directional indicators.
<ul style="list-style-type: none"> Numbers are used appropriately in context. 	<ul style="list-style-type: none"> Use fractions; decimals and percentages as measures of parts of a whole. <i>Range: The fractions used in problems should be limited to those fractions that arise naturally in the context of the student – 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>
<ul style="list-style-type: none"> Fractions; decimals and percentages are compared in terms of size and used in estimation. 	<ul style="list-style-type: none"> Find decimal equivalents of any fraction using a calculator. Convert between decimal fractions and percentages.
<ul style="list-style-type: none"> Different time notations are compared and understood. 	<ul style="list-style-type: none"> Write time using conventions of: am/pm; 24 hour clock; and analogue and digital. Convert between different time notations.
ASSESSMENT TASKS OR ACTIVITIES	
Integrated throughout all assessment tasks	

SUBJECT OUTCOME	
1.2 Performs calculations correctly to solve problems in the workplace and other areas of responsibility	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Calculations are performed correctly and with confidence. 	<ul style="list-style-type: none"> Perform calculations correctly by means of paper, mental and/or calculator methods. Round numbers (rounds up, down and off) according to the requirements of the context. Apply addition and multiplication facts (distributive and associative properties) to simplify calculations where possible and/or useful. Estimate to anticipate answers and evaluate the result of a calculation and/or measurement. Estimate unknowns as necessary to solve problem. Use the following functions on a basic calculator: addition; subtraction; multiplication; division; percentage; memory; and 'clear' and 'clear all' keys.
<ul style="list-style-type: none"> Problems dealing with ratio/proportion, rate and percentage are solved. 	<ul style="list-style-type: none"> 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 and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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). <i>Range: Instruments include, 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.</i> Reads meters and dials on instruments, tools and machines. Sets prescribed dial settings on instruments, tools and machines.
<ul style="list-style-type: none"> Correct formulae are selected and used to calculate measurements and solve problems. 	<ul style="list-style-type: none"> Calculate report the solution with a number of decimal places and in units appropriate to the problem, the following measurements using formulae as necessary: <ul style="list-style-type: none"> area, e.g., rectangle; triangle; circle and other shapes that can be decomposed into rectangles, triangles and circles; volume, e.g., rectangular prisms; cylinders and other objects that can be decomposed into rectangular prisms, and cylinders; time, e.g., elapsed time; calculations involving time zones; distance, using scale and direction; and other dimensions appropriate to the context/ qualification using formulae supplied. Calculate indirect measurements from information available.
<ul style="list-style-type: none"> Conversion between units is performed as needed. 	<ul style="list-style-type: none"> Perform conversions using know relationships between: <ul style="list-style-type: none"> mm – cm – m – km; ml – l; g – kg – tonne; sec – min – hours – days. Use conversion tables (supplied) to perform conversions appropriate to the context/qualification.
<ul style="list-style-type: none"> Rates are appropriately applied and used to solve contextual problems. 	<ul style="list-style-type: none"> Calculate values using rates including: <ul style="list-style-type: none"> 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; currency conversion rates e.g., rand per dollar ; and other rates appropriate to the context/ qualification. Determine rates from given values/relationships.
ASSESSMENT TASKS OR ACTIVITIES	
Integrated throughout all assessment tasks	

Topic 2: Patterns and Relationships:

SUBJECT OUTCOME	
2.1 Identifies and extends patterns for different relationships in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Numerical and geometric patterns and trends in data are investigated and extended. 	<ul style="list-style-type: none"> Investigate and extend numerical and geometric patterns and trends in data <i>Range: Patterns include:</i> <ul style="list-style-type: none"> 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. Long- and short-term trend patterns e.g. sales vs. month of the year; exchange rates vs. time; and population growth 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. Interpolate and extrapolate to estimate and predict values based on trends evident in situations.
<ul style="list-style-type: none"> Patterns are described in words and/or through formulae and trends are described in words. 	<ul style="list-style-type: none"> Describe patterns in words (spoken and written) and through algebraic descriptions of them (formulae).
<ul style="list-style-type: none"> Trends are described in words. 	<ul style="list-style-type: none"> Describe trends in words that include; <ul style="list-style-type: none"> Increasing and/or decreasing; Critical values; Maximum and minimum values; and Discrete and/or continuous
<ul style="list-style-type: none"> Patterns are generated from descriptions of them. 	<ul style="list-style-type: none"> Generate numerical and geometric patterns from descriptions given in words (instructions) and formulae.
ASSESSMENT TASKS OR ACTIVITIES	
Investigation	

SUBJECT OUTCOME	
2.2 Identify and use information from different representations of relationships to solve problems in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Information is identified and selected from different representations of relationships to solve problems. 	<ul style="list-style-type: none"> Identify and select information including: <ul style="list-style-type: none"> dependent variables for given independent variables; independent variables for given dependent variables; critical points including zeros; and intervals over which the relationship values increase and/or decrease from the following representations of relationships: tables, graphs, formulae and equations.
<ul style="list-style-type: none"> Formulae are used and developed with confidence. 	<ul style="list-style-type: none"> Use formulae supplied to: <ul style="list-style-type: none"> 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. Determine formulae and/or equations to describe relationships where these exist, including constant relationships; linear relationships; and inverse proportion relationships.
ASSESSMENT TASKS OR ACTIVITIES	
Investigation	

SUBJECT OUTCOME	
2.3 Translates between different representations of relationships found in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Representations of relationships are converted from one form to another to reveal features of patterns and relationships to solve problems. 	<ul style="list-style-type: none"> Translate between representations of relationships as follows: <ul style="list-style-type: none"> Complete a table of values by reading values from the graph. 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.
<ul style="list-style-type: none"> Representations of relationships are selected and developed to solve a problem and/or communicate/illustrate a result. 	<ul style="list-style-type: none"> Choose and develop a representation that most effectively communicates and/or illustrates a result/finding from among tables, graphs, formulae and equations.
ASSESSMENT TASKS OR ACTIVITIES	
Investigation	

Topic 3: Finance:

SUBJECT OUTCOME	
3.1 Manage finances with confidence in personal and/or familiar context as well as finances associated with workplace based job descriptions and finances within other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Sources of income in the workplace and other areas of responsibility are identified; recorded and managed. 	<ul style="list-style-type: none"> Identify record and manage sources of income related to workplace based job description. <i>Range: Sources of income include sales, services, rental, donations, grants, interest and other investment income.</i> Account for how/where income is kept (bank account; cash). Sources of income are categorized as fixed/variable. Maintain records of income according to requirements of workplace and/or project (e.g. receipts; petty cash vouchers; invoices; statements; etc.).
<ul style="list-style-type: none"> Expenses in the workplace and other areas of responsibility are listed and managed. 	<ul style="list-style-type: none"> Understand the importance of saving for future/ occasional expenses. Expenses are categorized as fixed and variable. <i>Range: Expenses include salary, wages, commission, running, expenses, raw materials, stock, products, investments, savings, taxes (UIF/PAYE/SDL/VAT).</i> Maintain records of expenses according to requirements of workplace and/or project (e.g. receipts; petty cash vouchers; invoices; statements; etc.).
<ul style="list-style-type: none"> Finances are planned and monitored according to workplace based job and/or project descriptions. 	<ul style="list-style-type: none"> Develop and maintain income/expenditure statements. Develop budgets based on previous income/ expenditure statements. Develop a budget for new projects/activities (e.g. new product/service). Explain variations between budgeted and actual income/expenditure. Understand and explain that there are factors that impact on budgets such as inflation and exchange rates in the context of international purchases and expenses.
<ul style="list-style-type: none"> Deductions and or taxes are read from/calculated using tables provided. 	<ul style="list-style-type: none"> Determine deductions including UIF/PAYE/SDL/VAT and bargaining council fees
ASSESSMENT TASKS OR ACTIVITIES	
Control test	

SUBJECT OUTCOME	
<p>3.2 Read, interpret and act on financial information presented in documents in a personal, workplace based and familiar and social context.</p> <p><i>Range: 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); contracts; bank account applications.</i></p>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> • Documents are read and appropriate information identified and/or selected. • Information is identified in and/or selected from documents including: <ul style="list-style-type: none"> ▪ financial statements (income/ expenditure; budgets etc.) ▪ rates tables/price lists/catalogues ▪ contracts. 	<ul style="list-style-type: none"> • Identify balance on a statement and distinguish between credit and debit. Identify the following: <ul style="list-style-type: none"> ▪ income/credit and/or expenses/debit ▪ balance ▪ beneficiaries/recipients ▪ payments due ▪ date/time period ▪ rates/times ▪ costs ▪ payment options ▪ service provider/client ▪ deliverables/specifications
<ul style="list-style-type: none"> • Information from documents is selected and interpreted to answer questions relating to a context. Financial documents are completed. 	<ul style="list-style-type: none"> • Analyse which transactions contribute most significantly to bank charges on a bank statement. <p><i>Range: Documents include:</i></p> <ul style="list-style-type: none"> ▪ cheques ▪ withdrawal/deposit slips ▪ other documents related to personal finance (e.g. account application forms) ▪ receipts/petty cash vouchers ▪ invoices/statements ▪ wage/pay slips
<ul style="list-style-type: none"> • Decisions are made and explained and/or justified in solving a problem related to a context. • Alternate solutions to problems are developed and evaluated in order to make a choice. 	<ul style="list-style-type: none"> • Make and justify decisions taken to solve problems using information from financial <p><i>Range: For example the time of day for making a phone call is influenced by the different rates at different times of day. Develop more than one solution to a problem.</i></p> <ul style="list-style-type: none"> • Consider the benefit of buying in bulk vs. buying individually. • Evaluate and choose with justification the best solution to a problem.
ASSESSMENT TASKS OR ACTIVITIES	
Control test	

Topic 4: Space, shape and orientation

SUBJECT OUTCOME	
4.1 Perform space; shape and orientation calculations correctly to solve problems in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Space; shape and orientation calculations are performed to solve problems in diverse contexts. 	<ul style="list-style-type: none"> Calculate the following with appropriate conversions and rounding (see Numbers): <ul style="list-style-type: none"> Area, e.g. rectangle; triangle; circle and other shapes that can be decomposed into rectangles, triangles and circles. Volume, e.g. rectangular prisms; cylinders and other objects that can be decomposed into rectangular prisms, and cylinders. Time, e.g. elapsed time; calculations involving time zones. Distance, e.g. using scale and direction.
ASSESSMENT TASKS OR ACTIVITIES	
Control test	
<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>	

SUBJECT OUTCOME	
4.2 Read; interpret and uses representations to make sense of and solve problems in the workplace and other areas of responsibility	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Information required is read from representations and used. 	<ul style="list-style-type: none"> Use maps (e.g. road maps, route maps for busses, trains and aeroplanes) to determine: <ul style="list-style-type: none"> Location Distance between two or more positions using the scale of the map Routes to get from one position to another Relative position of objects using compass direction. Use plans (e.g. house, building and development plans) to determine dimensions, positions and quantities of materials needed. Use diagrams (e.g. assembly; packing and stacking diagrams) to identify parts and objects and follow instructions.
<ul style="list-style-type: none"> Decisions are made and explained/justified. 	<ul style="list-style-type: none"> Plan trips subject to constraints (e.g. financial, time and/or availability) choosing the most appropriate route and modes of transport using maps, route maps and timetables. Sequence activities to complete a task in the most cost and/or time effective manner (e.g. make a dress; build a building; move contents of a house/office) using plans and/or diagrams.
ASSESSMENT TASKS OR ACTIVITIES	
Assignment	

SUBJECT OUTCOME	
4.3 Make physical and diagrammatic representations to investigate problems and/or illustrate solutions in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Diagrammatic and physical representations of shapes and objects are made to investigate problems. 	<ul style="list-style-type: none"> Make 2-D and/or 3D models of 3-D objects to investigate packing problems (e.g. arranging furniture in a room, arranging items in a box). Make 3-D scale models of objects from 2-D plans of the object to visualise the object (e.g. make a model of a building from its plan; make a model of a product from its diagram).
<p><i>Note: In terms of investigation, physical representations – models – are made for two distinct reasons:</i></p> <ul style="list-style-type: none"> <i>3D-scale models made from 2D-diagrams/plans can help with the visualisation of the object – e.g. when designing buildings etc.</i> <i>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> <i>Modelling – the use of models to investigate problems – is an important skill and attribute of mathematically literate persons.</i> 	
<ul style="list-style-type: none"> Diagrammatical representations are used to illustrate solutions. 	<ul style="list-style-type: none"> Make rough sketches of objects and/or areas in order to make scale drawings (e.g. rough maps and plans) Make maps, plans and diagrams according to scale from rough sketches and/or objects. Make assembly and/or packing/stacking diagrams to illustrate instructions. Make route maps to illustrate proposed trips. Make flow diagrams to illustrate a proposed sequence of activities.
ASSESSMENT TASKS OR ACTIVITIES	
Assignment or investigation	

Topic 5: Information communicated through numbers, graphs and tables

SUBJECT OUTCOME	
5.1 Collect and organize information in order to answer questions in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Information is collected in order to answer questions. 	<ul style="list-style-type: none"> Develop sets of questions for collecting information, being aware that the way in which the questions are posed will influence the responses given. Compile and use an information collection tool (e.g. survey; questionnaire; tally list) to collect information. Select appropriate samples from the population for collecting data, in awareness of the impact that sample choice has on the information gained.
<ul style="list-style-type: none"> Collected information is organized; summarized and represented. 	<ul style="list-style-type: none"> Organise information using tables and/or grouping as appropriate, being aware of the impact that the group size used to group the data has. Summarise information, showing sensitivity to the role of outliers and awareness of how the choice of summary statistic will impact on the answer to the question, using the following measures: <ul style="list-style-type: none"> <i>mean, median and mode of both ungrouped and grouped information as appropriate</i> <i>quartiles (approximate only)</i> <i>percentiles (Approximate only)</i> Represent information using: tables; pie charts; bar graph; line and broken line graph; and box and whisker plots as appropriate to the information collected, aware of how the choice of representation will impact on the impression it creates.
<ul style="list-style-type: none"> Information represented in different ways is interpreted in order to answer questions. 	<ul style="list-style-type: none"> Use summarised and/or represented information to develop and substantiate answers to the questions that led to the collection of the information. Use summarised and/or represented information to show that different interpretations are possible
<p><i>Note: Students should recognise that:</i></p> <ul style="list-style-type: none"> <i>the method of information collection;</i> <i>the sample used;</i> <i>the method(s) used to summarise the information; and</i> <i>the choice of representation</i> <p><i>will all influence the answer to the initial question</i> <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></p>	
ASSESSMENT TASKS OR ACTIVITIES	
Research task or project	

SUBJECT OUTCOME	
5.2 Critically interprets information presented (and misrepresented) in various forms in the workplace and other areas of responsibility.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Information represented through graphs; tables and statistics is read and interpreted. 	<ul style="list-style-type: none"> Read and select information from tables and graphs in order to answer questions. Identify trends from the information presented in graphs and tables and make predictions through interpolation and/or extrapolation as appropriate Correctly interpret, sensitive to the role of outliers, the meaning of the following statistics in text: <ul style="list-style-type: none"> Mean, median, and mode (both grouped and ungrouped data) Quartiles and percentiles
<ul style="list-style-type: none"> Information represented through graphs; tables and statistics is critically analyzed. 	<ul style="list-style-type: none"> Critique the choice of representation and/or statistic(s) in terms of their impact on the impression created and conclusion(s) drawn. Ask questions about the information collection, organisation, summary and representation processes to reveal sources of error/bias/misinterpretation.
<p><i>Note: Students should know that:</i></p> <ul style="list-style-type: none"> <i>Pie charts reveal relationships between different characteristics of the information but do not reveal the population/sample size</i> <i>Bar graphs reveal the population/sample size but do not show the relationship as effectively;</i> <i>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</i> <p><i>Tables will often have more information than graphs but that the trends/patterns are less easy to observe</i></p> <p><i>Students should know to ask questions about.:</i></p> <ul style="list-style-type: none"> <i>Which statistic was used in text that uses the word ‘average’</i> <i>The range of the information</i> <i>What was done with outliers in the information</i> <i>The size of the sample</i> <i>How representative the sample is</i> <i>How the information was grouped</i> <i>The method of information collection</i> <i>The neutrality of the information collection process</i> <p><i>Whether the information collected was fact or opinion</i></p>	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Expressions of likelihood in are engaged with and interpreted correctly. 	<ul style="list-style-type: none"> Differentiate between random and non-random events. Differentiate between independent and dependent events. 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). Explain the implications of expressions of likelihood found in text. Critique the use of expressions of likelihood found in text.
<p><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></p> <p><i>Students should interpret such statements of likelihood aware:</i></p> <ul style="list-style-type: none"> <i>that the likelihood (probability) scale goes from 0 (the event will not happen) to 1 or 100% (the event will definitely happen);</i> <i>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</i> <p><i>that some things can be predicted while others cannot – we can predict that ½ of a very large number of coin tosses will give a head, however, we cannot predict what will happen when we toss the next coin</i></p>	

ASSESSMENT TASKS OR ACTIVITIES
Research task or project

4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN MATHEMATICAL LITERACY - LEVEL 4

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%				