



higher education
& training

Department:
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REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATES (VOCATIONAL)

SUBJECT GUIDELINES

MATHEMATICAL LITERACY

NQF Level 2

IMPLEMENTATION: JANUARY 2013

INTRODUCTION

A. What is *Mathematical Literacy*?

Mathematical literacy is an attribute of individuals who are prepared and able to participate effectively in the modern world – a world characterised by numbers and numerically based arguments and data represented (and misrepresented) in a large variety of ways. The subject Mathematical Literacy develops this attribute in individuals – an attribute that involves managing situations and solving problems in everyday life, work, societal and lifelong learning contexts by engaging with mathematical concepts (numbers and measurements; patterns and relationships; finances; space, shape and orientation; and data) presented in a wide range of different ways.

B. Why is *Mathematical Literacy* important as a Fundamental subject?

In order to be a more effective self-managing individual, contributing worker, life-long learner and critical citizen in the modern world, people need to be able to engage with numbers and numerically based arguments and data represented (and misrepresented) in a large variety of ways that confront them on a day-to-day basis. Mathematical Literacy develops the knowledge, skills, values and attitudes that enable people to do so.

C. How do the Learning Outcomes link with the Critical and Developmental Outcomes?

Mathematical Literacy aims to encourage students to:

- Develop logical thought processes.
- Develop analytical ability.
- Approach problem solving in a systematic manner.
- Identify and solve problems.
- Evaluate information critically.
- Be accurate.
- Work with numbers with confidence.
- Interpret financial information and manage personal finances in a meaningful manner.

D. Which factors contribute to achieving the Learning Outcomes?

- Interest in working with numbers and experience in and exposure to working with numbers.
- Experience working with a calculator, to work orderly, analytically, critically and evaluate critically.
- Accuracy when analysing, calculating and recording will be an attribute.
- A learning enabling environment is created by:
 - Encouraging an attitude of “*I can work with numbers, data and patterns*” in students.
 - Using different media and learning approaches to accommodate different learning styles.
 - Applying different strategies to develop and encourage creativity and problem solving capabilities.
 - Focusing on strategies that develop higher level cognitive skills such as analytical and logical thinking and reasoning.
 - Adopting a learning pace that will instill a sense of achievement rather than one of constant failure.
 - Practical and relevant examples so that students can apply abstract concepts in real everyday life situations.
 - Providing remedial and support interventions for those students that struggle to grasp fundamental outcomes.
 - Encouraging continuous work and exercise for students to develop a sense of achievement and success.

MATHEMATICAL LITERACY – LEVEL 2

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1 DURATION AND TUITION TIME

This is a one-year instructional programme comprising 200 teaching and learning hours. The subject may be offered on a part-time basis provided all the assessment requirements are followed.

Provision for students with special education needs (LSEN) must be catered for in a way that eliminates the barriers to learning.

2 SUBJECT LEVEL OUTCOMES AND FOCUS

SAQA Qualification ID: 50440

- A range of numbers is used to solve problems in personal and familiar contexts.
- Space, shape and orientation calculations are performed correctly to solve problems in personal contexts.
- Finances are managed in personal and familiar contexts.
- Patterns and relationships are identified and used in varying quantities in personal contexts.
- Collected and organised data obtained from numbers, tables and graphs are interpreted in personal and familiar contexts.

3 ASSESSMENT

Information provided in this document on internal and external assessment aims to inform, assist and guide a lecturer to effectively plan the teaching of the subject.

The *Assessment Guidelines for Mathematical Literacy Level 2*, which compliments this document, provides detailed information to plan and conduct internal and external assessments and suggested mark allocations.

3.1 Internal assessment (25 percent)

Detailed information regarding internal assessment and moderation is outlined in the current ICASS Guideline document provided by the DHET

Distribution of internal assessment components

Three formal written tests & one internal examination	70% of ICASS
Two assignments & one practical assessment	30% of ICASS

Possible distribution of internal assessments during the year.

Term 1	Term 2	Term 3	Term 4	Total
2	2-3	*2-3	0-1	7

*One of these must be an internal examination

3.2 External assessment (75 percent)

A National Examination is conducted in October or November each year by means of a paper(s) set and moderated externally.

Detailed information regarding external assessment and moderation is outlined in the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificate Vocational Gazette number 30287 dated 12 September 2007*.

4 WEIGHTED VALUES OF TOPICS

TOPICS	WEIGHTED VALUE	*TEACHING HOURS
1. Numbers	20	30
2. Space, Shape and Orientation	20	25
3. Finance	20	25
4. Patterns, Relationships and Representations	20	15
5. Data Handling	20	15
TOTAL	100	110

**Teaching Hours* refer to the minimum hours required for face to face instruction and teaching. This number excludes time spent on revision, test series and internal and external examination/assessment. The number of the allocated teaching hours is influenced by the topic weighting, complexity of the subject content and the duration of the academic year.

5 CALCULATION OF THE FINAL MARK

Continuous assessment: $X/100 \times 25/1 =$ a mark out of 25 (a)

Examination mark: $X/100 \times 75/1 =$ a mark out of 75 (b)

Final mark: (a) + (b) = a mark out of 100

All marks are systematically processed and accurately recorded to be available as hard copy evidence for, amongst others, moderation and verification purposes.

6 PASS REQUIREMENTS

The student must obtain a minimum of 30 percent in Mathematical Literacy. A pass will be condoned at 25 percent if it is the only subject preventing the student from progressing to Level 3.

7 SUBJECT AND LEARNING OUTCOMES

On completion of Mathematical Literacy Level 2, the student should have covered the following topics:

Topic 1: Numbers

Topic 2: Space, Shape and Orientation

Topic 3: Finance

Topic 4: Patterns, Relationships and Representations

Topic 5: Data Handling

Topic 1: Numbers

(Minimum of 30 hours face to face teaching which excludes time for revision, test series and Internal and external examination)

Subject Outcome 1.1: Use numbers correctly when working with problems in personal and familiar contexts.

Learning Outcomes:

Students are able to:

- Use elementary activities to recognise and practically illustrate the use of different numbers in everyday life situations.
 - Natural numbers
 - Whole numbers
 - Positive and negative numbers
 - Fractions
 - Decimals

- Percentages
- Arrange the following numbers in descending and ascending order:
 - Natural numbers
 - Whole numbers
 - Positive and negative numbers
- Estimate and anticipate answers using the following numbers:
 - Natural numbers
 - Whole numbers
 - Positive numbers
 - Fractions
 - Decimals – money values
 - Percentages
- Confirm estimations by comparing actual and estimated values.
- Round off numbers (round up, down and off) according to the requirements of the context.
Note: including recurring decimals.
- Apply addition and multiplication facts (distributive, associative properties, priority of operations) to simplify calculations where possible and useful.
NOTE: BODMAS may be used
- Express, write and convert time in different notations:
 - am/pm(analogue)
 - 24 hour clock(digital)

Subject Outcome 1.2: Use an appropriate calculator to perform calculations and solve problems in personal and familiar contexts

Learning Outcomes:

Students are able to:

- Recognise and practice the use of the following functions and characters on an appropriate calculator:
 - Addition
 - Subtraction
 - Multiplication and division
 - Percentages
 - Squares
 - Cubes
 - Memory
 - “Clear” and “clear all” keys
 - Separators
 - Decimal signs
- Use a calculator to perform the following calculations on fractions:
 - Addition, subtraction, multiplication, division.
 - Conversion from fractions to decimals.
 - Conversion from fractions to percentages.
$$\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{1}{3}, \frac{2}{3}, \frac{1}{10}, \frac{1}{100}, 1\frac{1}{2}, \frac{7}{5} \text{ etc.}$$
- Use a calculator to perform the following calculations on decimals:
 - Addition, subtraction, multiplication, division, squares and cubes.
 - Conversion from decimals to fractions.
 - Conversion from decimals to percentages.
- Use a calculator to perform the following calculations on percentages:
 - Addition, subtraction, multiplication, division.
 - Conversion from percentages to decimals.

- Conversion from percentages to fractions
- Perform conversions using known relationships for the following:
 - Distance mm – cm – m – km;
 - Volume/Capacity ml – l - kl;
 - Mass mg - g – kg – t;
 - Time second – minute – hours – day.

Note: Conversion between units of area and volume is excluded in Level 2 e.g. cm^2 to m^2 , cm^3 to m^3 etc.
- Read, record and perform calculations involving time values for the following:
 - Time values from watches, clocks and stopwatches.
 - Time values in different formats:
 - time of day formats (e.g. 8 o'clock, 8:00 am, 8:00 pm, 20:00)
 - elapsed time (e.g. amount of time passed from 8:35 am to 9:27 am)
 - Calendars showing days, weeks and months.
 - Timetables drawn up for studies, lessons, exams and television.

Note: Practical applications must be used e.g. students complete simple tasks to calculate the time for baking a cake, travel time to arrive in time at the college or at a party, drawing up a timetable for studies before the exam, plan time to complete homework and studies before watching a TV programme.

Subject Outcome 1.3: Solve problems in personal and familiar contexts

Learning Outcomes:

Students are able to:

- Perform calculations involving ratios in personal and familiar contexts:
 - Equivalent of ratios/simplifying of ratios
Example 1:50 = 2:100
 - Convert between different forms of a ratio
Example: If the scale of a map is 1:100 000 then 1 cm measured on the map equals 1 kilometer (100 000 cm) in actual distance.
 - Divide or share an amount in a given ratio.
Example: If 1 liter of cold drink is divided between two students in the ratio 2:3, how many ml of cold drink will each student receive?
 - Determine missing numbers in a ratio.
Example: If a party packs of sweets consists of a mixture of toffees, chocolates and lollipops in the ratio of 6:4:1, how many toffees and lollipops must be placed in a party pack containing twelve chocolates?
- Determine rates from given values and solve problems including:
 - conversion rates, e.g. grams to kilograms;
 - consumption rates, e.g. kilometers per liter;
 - distance, time and speed rates e.g. kilometers per hour; cost rates e.g. rand per kilogram.
- Perform calculations to demonstrate the difference in cost when buying in bulk versus buying per unit to select the most appropriate option.
Example: Buy 100 cold drinks vs 1 cold drink or buying a pack with six liters of milk vs 1 liter of mi or buying 50 kg of maize compared to buying a 2,5kg bag.
- Solve problems using percentages:
 - Calculate a percentage of a value.
Example: If 14% discount is offered on a R500,00 play station game, how much discount will you receive?
 - Decrease and increase a value by a percentage.
Example: If a liter of petrol that costs R9,20 increases in price by 7%, what will the new price of the petrol be?

- Express a part of a whole as a percentage.

Example: If a student scores a mark of 14/35 for a test, what percentage was scored for the test?

Topic 2: Space, Shape and Orientation

(Minimum of 25 hours face to face teaching which excludes time for revision, test series and internal and external examination)

Subject Outcome 2.1: Acquire the correct vocabulary for space, shape and orientation.

Learning Outcomes:

Students are able to:

- Recognise and identify the following:
 - Shape: square; rectangle; triangle; circle.
 - Space: block; cube; rectangular prism; cylinder
- Attributes:
 - length; breadth; height; side; base; perimeter; diagonal area; angle; centre; radius; diameter; circumference; volume; perpendicular; height; parallel lines.

Note: The vocabulary listed should be assessed in the context of problems and not as dictionary definitions.

Subject Outcome 2.2: Perform space, shape and orientation calculations correctly to solve problems in personal and familiar contexts.

Learning Outcomes:

Students are able to:

- Estimate anticipated measurements based on a sense or “feel” for the following:
 - length
 - weight
 - volume/capacity
 - temperature
- Select and use the following measurement instruments correctly:
 - ruler
 - measuring tape
 - measuring scale
 - measuring jugs and cups
 - thermometer
- Confirm estimations by comparing actual and estimated values.
- Determine the length of the hypotenuse of a right-angled triangle using the Theorem of Pythagoras.
- Use given formulae and calculate the following:
 - (Use appropriate conversions and rounding off)
 - Perimeter/Circumference:
 - Square; rectangle; triangle; circle.
 - Area:
 - Square; rectangle; triangle; circle.
 - Volume:
 - Cube; rectangle prism; cylinder.

Note: The following are excluded in L2:

- Manipulation of formulae
- Conversion between units of area and volume e.g. cm^2 to m^2 , m^3 to km^3 etc

Subject Outcome 2.3: Read, interpret and use representations to make sense of and solve problems in personal and familiar contexts.

Learning Outcomes:

Students are able to:

- Recognise the following concepts when reading and interpreting maps, plans and diagrams and to solve related problems.
 - grid (columns and rows)
 - map;
 - floor/layout plan;
 - scale;
 - scale drawing;
 - diagram;
 - co-ordinates/grid reference;
 - compass directions;
 - distance (using scale);
 - directional indicators (“left”, “right”, “along”, “straight”, “up” and “down” “horizontal” “vertical”)

- Recognise symbols and notations used on plans

Example: The symbol for a window is a double line; the symbol for a door is a vertical line attached to a quarter circle indicating the swing direction of the door.

- Use a given scale on a plan and/or map (where the measurements are known) to calculate actual length and distance.
- Calculate map and/or plan measurements (where actual lengths and distance are known) according to a given scale.
- Use different maps (taking into account the scale of the map where applicable) to determine a specific location and the distance between two positions:
 - A map showing the seating plan and/or layout for a classroom;
 - A map showing the layout of the buildings and/or sports fields at a college;
 - A map showing the layout of the stores in a shopping centre;
 - A seating plan for a cinema and sports field;
- Use the top view of layout, floor and seating plans, to determine the following:
 - The actual lengths/dimensions of objects shown on plans using measurement and a given scale (number or bar scale)
 - Positions of the objects
- Read manuals and brochures provided to recognise and interpret instructions and/or assembly diagrams, containing words and /or pictures, to do the following:
 - Identify the parts and objects.
 - Explain in every day language what the instructions mean and/or represent.
 - Assemble an object according to the instructions provided.

Examples:

Electrical plugs; plastic models; unassembled wooden furniture units; cell phones (e.g. installing a battery and sim card; or operating instructions); electrical appliances that require individual components to be connected (e.g. connecting speakers to a hi-fi; or connecting an aerial to a television); children’s toys including Lego-type kits.

Subject Outcome 2.4: Use physical and diagrammatic representations to investigate problems and/or illustrate solutions in personal and familiar contexts.

Learning Outcomes:

Students are able to:

- Make 2D scale cut outs (nets) of the top view of 3D objects.

- Build or draw diagrams of 3D scale models of objects from 2D plans (nets) of the object to visualise the object (e.g. build a model of a house from its plan)

Note: In terms of investigation, physical representations – models – are made for two reasons: 3D-scale models made from 2D-diagrams or plans helps with the visualisation of the object and scale models can help to investigate problems and develop solutions

Topic 3: Finance

(A minimum of 25 hours face to face teaching which excludes time for revision, test series and internal and external examination)

Subject Outcome 3.1: Manage finances with confidence in a personal and/or familiar context.

Learning Outcomes:

Students are able to:

- Recognise financial concepts related to personal finances, methods of financing and financial control.

Range: income, expense, fixed income, variable income, fixed expense, variable expense, salary, gross salary, net salary, wage, gifts, pocket money, commission, rent, maintenance, government grants, entertainment costs, budget, debit card, credit card, bank fees/service fees/transaction fees,) savings account, cheque accounts, cheque book, deposit, balance, stokvels, pension funds, PAYE, UIF, interest, simple interest, compound interest principle amount, interest rate, mashonisa, hire purchase agreement.

- Distinguish between sources of fixed, variable and occasional income
 - Salaries and wages; commission
 - Gifts and pocket money
 - Bursaries
 - Loans
 - Money from savings accounts
 - Interest received
 - Inheritance
 - Grants
 - Rent received
 - Child support maintenance
- Distinguish between fixed, variable and occasional expenses.
 - Living expenses (food, hair cut, entertainment, clothing, transport costs, child support maintenance, occasional/unforeseen expenses)
 - Accounts to pay (monthly rent, electricity & water, telephone & cell phone)
 - Fees payable (school fees, bank fees)
 - Insurance (car, household and medical fund)
 - Personal taxes
 - Loan repayment/credit card repayments, store account payments
 - Money transfer to a savings account
- Explain the following:
 - The advantages and disadvantages of keeping money either in cash or in a bank account
 - The importance of saving money for unforeseen payments or expenses.
- Draw up a projected personal and household plan/budget/cash flow forecast based on expected income and expenditure.

Examples: A monthly budget/plan for a trip/holiday, personal projects e.g. dinner party, purchasing a cell phone, television or furniture.
- Identify and explain variances between actual and projected figures.
- Provide possible corrective methods of financial control.

Subject Outcome 3.2: Read and interpret information presented in financial documents.

Learning Outcomes:

Students are able to:

- Read and interpret documents (till slips, cash invoices, credit invoices) provided to identify and/ select appropriate information:
 - Date and number of document
 - Buyer and seller
 - Amounts recorded:
 - Amount of purchases/transaction
 - Total amount rendered
 - VAT amount
 - VAT is inclusive/exclusive
 - Change received/paid out
- Read and interpret from given statements of accounts (e.g. clothing account) the following:
 - Date/time period
 - Opening balance at the beginning of the month
 - Closing balance at the end of the month
 - Distinguish between and explain credit and debit entries on a statement.
 - The minimum payment due/installment required on the account.
 - Credit available/amount for which purchases can still be made
 - Credit limit
 - Amounts overdue/in arrear
 - Club/membership fees
- Read and interpret a pay slip to identify the following:
 - Gross salary,
 - Nett salary,
 - Deductions for the following:
 - Income tax/PAYE
 - Medical fund/aid
 - Pension fund
 - UIF
 - Other deductions – e.g. funeral plan, insurance, annuities
- Differentiate between a VAT “inclusive” value and a value “excluding” VAT.
- Investigate through calculation how the final price has been determined by adding VAT to a price excluding VAT.
- Investigate through calculation the amount of, for example, 14 % VAT that has been added to a VAT “inclusive” price.

Note: The following methods may be used for calculations of VAT:

- *Dividing the VAT “inclusive” value by 1,14*
- *Identifying VAT “inclusive” as being 114% and working out the “value excluding VAT” as 100%*

Subject Outcome 3.3: Read and interpret financial information regarding banking in a personal/familiar context

Learning Outcomes:

Students are able to:

- Investigate the following type of bank accounts for personal use:
 - Savings account
 - Cheque/current account – using a cheque book and/or a debit card
 - Credit card account
- Identify documents related to opening and operating bank accounts:

Range: documents include – account application forms; cheques; withdrawal and deposit slips; other documents related to personal finance.
- Read and interpret banking material (e.g. bank statements and fees brochures) to make sense of the following terminology:
 - branch and branch code
 - opening and closing balance
 - debit entries
 - credit entries
 - stop order
 - debit order
 - bank charges/transaction fees
 - ATM
 - EFT(electronic funds transfer)
 - interest
 - deposit
 - withdrawal
- Read and interpret or calculate from given bank statements and ATM statements the following:
 - Opening balance at the beginning of the month
 - Closing balance at the end of the month
 - Credit and debit entries
 - Credit/balance available on an account
 - The influence of credit and debit entries on the bank balance
 - Bank charges/fees and the influence thereof on the bank balance
- Investigate which transactions contribute most significantly to bank charges on a bank statement.
- Distinguish between valid and stale cheques.
- Compare bank charges/service fees for different bank accounts from given fee tables and formulae.

Subject Outcome 3.4: Apply tariff systems in personal and familiar context**Learning Outcomes:**

Students are able to:

- Investigate the following tariff systems:
 - Telephone tariffs (e.g. cell phone and land/fixed line)
 - Transport tariffs (e.g. bus, taxi and train tariffs)
- Calculate how much a particular taxi, bus, train or plane trip will cost using given transport tariffs from scenarios, time tables and brochures.
- Calculate cost using given telephone tariffs from scenarios and brochures.

Topic 4: Patterns, Relationships and Representations

(A minimum of 15 hours face to face teaching which excludes time for revision, test series and internal and external examination)

Subject Outcome 4.1: Identify relationships and complete patterns to solve problems in personal and familiar contexts.

Learning Outcomes:

Students are able to:

- Describe features of patterns and/or relationships in words including the following:
 - Dependent and independent variables
 - Direct/linear and indirect/inverse proportions
 - Increasing and/or decreasing relationships

Example: Consider a cell phone contract where the cost of talking on the phone is R1,50 per minute. In this scenario, cost is dependent on the amount of time spent talking on the cell phone; also, the relationship between cost and talk time is an increasing relationship, with cost increasing at a fixed rate of R1,50 per minute.
- Use given information to establish a specific pattern.

Patterns include:

 - 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.
- Use a range of techniques to determine missing and/or additional terms in a pattern, including:
 - the relationship between consecutive terms;
 - the formulae provided for calculations

Example: The following table shows the cost of fuel. There are two ways to determine the pattern in the values in the table

Liters	0	1	2	3	4
Cost	R0,00	R8,00	R16,00

Method 1:

The difference between consecutive cost values is R8,00. To find the cost of buying 3 liters of petrol you can add R8,00 to the cost of buying 2 liters (i.e. R16,00) to get $R16,00 + R8,00 = R24,00$

Method 2:

The relationship between liters of petrol and cost is R8,00 per liter of petrol. The cost of filling a car with 3 liters of petrol is $R8,00/\ell \times 3 \ell = R24,00$.

- Construct patterns from given formulae and represent these patterns in a table.

Example:

A quotation states that the cost of hiring a photocopier is R1 500,00 per month and an additional R0,50 per copy.

The following table can be constructed to represent the relationship between number of copies and cost.

Pages photocopied	0	10	20
Total monthly cost	R1 500,00	R1 505,00	R1 510,00

- Identify and extend numerical patterns arising from formula

Example:

The following formula can be used to determine the cost per day for a person selling hotdogs at a food stall:

Cost per day = [stall rent + (number of hot dogs x cost per hot dog)]

Use the formula to construct a table indicating how the cost varies as the number of hotdogs increases.

Cost per hot dog = R 5,00

Stall rent = R 50 per day

Number of hot dogs	0	1	5	10
Total cost per day	R50,00	R 55,00	R 75,00	R 100,00

Subject Outcome 4.2: Move between different representations of relationships in familiar and personal contexts.

Learning Outcomes:

Students are able to:

- Move between representations of relationships as follows:
 - complete a table of values by reading values from the graph;
 - complete a table of values from given formulae and/or descriptions of relationships.
- Draw graphs of one relationship on a system of axes by:
 - plotting points from a given table of values
 - plotting points from values calculated using given equations;
 - constructing axes with an appropriate scale chosen for both the vertical and horizontal axes
 - labeling the vertical and horizontal axes and the graph appropriately;
- Identify and distinguish between the dependent and independent variables
- Identify and select the following information when working with relationships represented in tables, equations, graphs and formulae:
 - dependent variables for given independent variables
 - independent variables for given dependent variables
- Describe relationships represented in tables and/or graphs for:
 - Direct/Linear relationships
 - Indirect relationships
- Use formulae supplied to determine:
 - The value of the dependent variable for given value(s) of the independent variable using substitution

Topic 5: Data Handling

(A minimum of 15 hours face to face teaching which excludes time for revision, test series and internal and external examination)

The philosophy underlying this topic is to develop the ability in students to critically engage with and communicate data. Some experience in collecting, organising and interpreting data is required. However the focus should be on interpreting information rather than gathering and/or generating it.

To develop a healthy and critical approach towards arguments based on data, students should be aware that data can be represented and interpreted (and misrepresented) in different ways.

Subject Outcome 5.1: Collect and organise data to answer questions in personal and familiar context.

Learning Outcomes:

Students are able to:

- Describe key concepts relating to information/data collection and handling:
 - Range: Research question, population, target and sample population, survey, questionnaire, tally, bias/subjectivity, reliability of information, sample size, interview, observation, misrepresentation.*
- Note: Examples of data relating to the personal lives of students and/or to issues that are familiar may be:*
 - data on electricity consumption of various appliances in a household;
 - data on telephone call time and duration
 - test and examination results
 - sports results
 - height and weight data of students in a class;
 - Institutional statistics (e.g. number of students per level; number of male and female students);
- Investigate the way in which data has been collected, organised, summarised and represented to reveal possible sources of error/bias or misinterpretation.

Students should ask questions about:

 - The size of the sample
 - The representivity of the sample
 - The methods used for collecting data
 - The neutrality of the data collection process
 - Whether the data collected was fact or opinion
 - The way in which the data was sorted and/or grouped
 - The sizes of the groups used in grouping the data.
 - The range (spread) of the data and what it says about the data.
- Develop a set of questions that requires a single set of data.

Note: Keep in mind that the way in which questions are phrased can impact on the data collected and the outcome/findings of the investigation.
- Justify the use of an appropriate instrument for collecting a single set of data. Instruments include:
 - Observation
 - Interview
 - Questionnaire/survey

Note: Consider the following when selecting an appropriate instrument:

 - *The advantages and disadvantages of each instrument.*
 - *The selection of a representative sample from a population.*
 - *The impact of the choice of sample on the reliability of the data collected.*
- Organise data restricted to one category only using tally tables (.e.g. sort data relating to the heights of the students in a class according to height only).
- Group data using intervals (e.g. it is often appropriate to group test scores in the mark intervals “0-29”, “30-39”, etc.)
- Organize collected data using:
 - Tallies
 - Frequency tables

Subject Outcome 5.2: Represent and interpret given data in various forms in personal and familiar contexts.

Learning Outcomes:

Students are able to:

- Arrange single sets of collected data to calculate the following measures of central tendency and spread: *(keeping in mind that the choice of summary affects the answer to the question.)*
 - mean,
 - median
 - mode,
 - range
- Interpret the calculated or given measures of central tendency and select the preferred answer most suitable/appropriate to the situation.
- Represent single sets of collected data using:
 - tables
 - pie charts
 - histograms
 - single bar graphs
 - line and broken line graphs

Note: Realise that each type of representation offers a different picture of the data and certain types of representations are more appropriate for particular types of data e.g. Although it would be possible to use a pie chart to show the monthly rainfall in a town, it would be difficult to identify trends in the rainfall pattern from this chart. A bar graph and especially a line graph would allow for a much more in-depth analysis of the trends in the rainfall data.

- Read and critically interpret data from representations (i.e. tables, pie charts, histograms, single bar graphs and line and broken line graphs) containing data in order to answer questions relating to the data.
- Recognise how the choice of representation affects the impressions created and conclusion(s) that can be drawn.

Note: Realise the effect that the scale of the axes and the point at which the axes cross have on the impression created.

8 RESOURCE NEEDS FOR TEACHING MATHEMATICAL LITERACY – LEVEL 2

- **Physical resources:**
 - Black board or white board
 - Overhead projector
 - Desks and tables for students
- **Media:**
 - Daily newspapers
 - Magazines
- **Human resources:**

Lecturers should have:

 - A relevant diploma or degree or equivalent recognised qualification and appropriate teaching experience to teach Mathematical Literacy level 2;
 - interest and understanding of the field in which presenting Mathematical Literacy e.g. hair care; agriculture; business management; and
 - enthusiasm for Mathematical Literacy.
- **Other resources (consumables, individual tools/equipment requirements, learning**

materials/resources)

- Basic calculators, rulers and measuring tapes
- Measuring jugs, scales and scissors
- Compass, stopwatch and clock and graph paper
- Glue and string, elastic bands and paper clips
- National, regional and local road maps (world map for tourism)
- Timetables for trains, busses, aeroplane, etc.
- Tournament logs and results, recipe books, banking brochures, etc.
- Municipal tariff tables and municipal utility account statements
- Nutritional panels from food packages and sales brochures offering different options
- Articles and advertisements from the media that are supported by graphs and tables, advertisements from the media that refers to percentage and interest rate, textbooks, etc.
- Manuals and or brochures to assemble a product
- Files for Portfolio of Evidence (PoE) of each student.