Domain Title: Numeracy and Problem-Solving Skills

(Mathematics, Science & Environment)

Introduction

Numeracy and Problem-Solving are the foundation skills for a knowledge-based economy. They are important not only from the point of view of the labour market, but are increasingly seen as important for an individual's ability to participate fully in the activities of the modern society. This strand aims at empowering students with the necessary knowledge, skills, and attitudes to solve problems requiring mathematical and scientific reasoning. Building on practical and real-life situations, it will provide students with opportunities to learn scientific ideas, processes and skills and relate these to everyday experiences. These everyday life experiences will also help them to make sense of the environment in which they live. The environment as a concept is not limited to nature or the living world but it has a broader meaning. Hence, students will gain knowledge and understanding of the other dimensions of environment, namely the physical, social, economic, cultural and political dimensions. They will be made to develop appropriate attitudes to protect the environment and develop a sense of belonging and caring for it. Information and Communication Technology (ICT) will be used across the strand as a tool to empower students to solve mathematical and scientific problems and also to understand the world in which they live. In summary, this domain will contribute in making students functionally numerate and scientifically literate to take informed decisions through rational and logical thinking.

The objectives of the domain are achieved through the following strands:

(i) Functional Numeracy

(ii) Understanding Nature (Science)

(iii) Environment

while ICT will be used as a support in the development of these strands.

The aims of Numeracy and Problem-Solving Skills are to:

- develop problem solving skills in mathematical and scientific contexts through investigation;
- develop logical reasoning when dealing with mathematical and scientific issues;
- develop mathematical and scientific language as a means of communication;
- acquire and apply knowledge related to number, measure, geometry and statistics;
- acquire and demonstrate science process skills;
- develop a positive attitude towards Mathematics and Science including satisfaction, confidence, enjoyment and perseverance;
- demonstrate a positive attitude towards the contribution of Science in our everyday life;
- develop a broader understanding of the Environment and its components;
- demonstrate the skills to analyse the threats and risks associated with the Environment;
- develop a caring attitude towards the Environment;
- facilitate the acquisition of basic skills through the use of ICT tools;
- promote creative learning through ICT-supported learning processes.

Assessment objectives

Ongoing assessment should convey to teachers, where their students are in a particular knowledge domain and information gathered from students should guide instructional decisions. Assessment should also convey to students the skills they have already mastered and where they need improvement.

(a) Assessment for learning (formative) will be inbuilt in the teaching learning process to help learners construct appropriate knowledge structures. This would also enable teachers to identify learning difficulties and take constructive measures.

(b) Continuous assessment should form part of the overall assessment of the learners so that there is an objective evaluation of the competencies acquired with time. This will help teachers to take corrective measures and give learners a better opportunity to be able to climb to upper classes.

(c) Summative assessment will also be conducted at the end of each year to test overall competencies acquired.

Project-based assessment

Learners at pre-vocational level need to have prolonged engagement with the subject matter so that they are able to grasp the gist of the concepts being taught. The integrated approach guiding the implementation of the current curriculum requires that students be assessed through different projects. Among other innovative and informative ways in which their learning can be assessed, project work can be of valuable help to both the learner and the tutor. It is proposed that the learning of concepts and skills in Numeracy, Science and Environment be assessed through well structured projects. In order not to put too much pressure on the learners due to the time consuming nature of projects, one group project may be considered per school term based on Mathematics/Science/Environment concepts. These projects will allow students to connect concepts from different knowledge domains and appreciate the practical utility of what they are learning.

Note on Functional Numeracy

The content of Year 1 is primarily based on the 'Essential Learning Competencies' (ELC's) pupils are expected to have acquired at the end of their primary schooling. The components of 'Desired Learning Competencies' (DLC's), as specified by the Certificate of Primary Education (CPE) syllabus, form the major content of Year 2. The Year 3 and Year 4 contents focus on the use and application mathematical knowledge in practical situations. Certain topics are intentionally repeated so as to prepare students for the end of Year 3 and end of Year 4 national examinations.

Curriculum content - Functional Numeracy

Year 1

Whole numbers	• Counting, reading and writing numbers up to 1 000 000 • Number patterns • Place value (abacus) • Writing numbers in expanded form and vice versa • Perform four operations with whole numbers • Types of whole numbers (odd, even, prime, composite) • Factors, multiples, HCF and LCM • Working with powers
Fractions	• Reading, writing and representing fractions • Ordering fractions • Equivalent fractions, mixed numbers and improper fractions, ratio • Four operations with fractions • Solve word problems on fractions
Decimals	• Reading, writing and represent decimal numbers • Ordering decimal numbers • Four operations with decimal numbers • Conversion of decimal numbers into fractions and vice versa
Percentages	• Conversion of fraction and decimal to percentage and vice versa • Solve simple word problems involving percentages (including profit, loss and simple interest)
Length	• Express length in SI units: m, cm, mm, km • Convert units of lengths • Perform operations involving lengths • Solve simple word problems
Mass	• Express mass in standard units (kg, g, tonne) • Convert one unit to another • Perform operations with mass • Solve simple problems
Capacity	• Use of standard units (ml, cl, L) to measure capacity • Conversion of units • Perform four basic operations involving capacity • Solve simple word problems
Time	• Express time in hours, minutes and seconds • Use 12-hour and 24-hour clocks • Read and write the name of the days of a week, months, year (leap and

	common) • Perform operations involving time • Solve simple word problems
Speed	• Introduction to speed
Money	• Identify the coins and notes of the Mauritian currency • Convert rupees into cents and vice versa. • Perform simple mathematical operations involving rupees and cents • Solve simple problems
Geometry	• Use and work with angles, lines and symmetry • Recognise and use triangles, quadrilaterals, pentagon, hexagon
Area	• Calculate area of triangles and quadrilaterals • Use and convert units of area • Solve simple problems involving area
Volume	• Use and convert units of volume • Solve simple problems
Graphs	• use, draw and interpret pictogram, bar chart, pie chart • solve word problems

Year 2

Whole numbers	• Compose and decompose numbers up to 1000000 • Perform four operations • Solve simple word problems • Number patterns and sequences • Factors and multiples, HCF, LCM • Use law of exponents
Fractions	• Solve simple word problems involving fractions • Solve problems involving ratio
Decimals	• Conversion of decimal numbers into fractions and vice versa • Solve simple word problems involving decimals
Percentages	• Solve simple word problems involving percentage • Increase and decrease a quantity by a percentage
Length	• Perform operations involving lengths (including fractions and decimals) • Solve simple word problems involving lengths
Mass	• Perform operations of masses with conversion • Solve simple word problems involving masses with conversion
Capacity	• Perform mathematical operations with conversion • Solve simple word problems involving capacity
Time	• Perform operations involving time • Solve simple word problems involving time
Money	• Perform simple operations involving Mauritian and foreign currencies • Solve simple problems
Geometry	• Use properties of angles of triangle • Use and understand components of circle • Solve problems involving angles and circles
Area	• Find total surface area of cubes and cuboids • Find area of composite shapes
Volume	• Find volumes of cubes and cuboids • Solve problems involving volume
Graphs	• Understand the term axis, coordinates, ordered pairs • Draw and interpret line graphs

Year 3

Whole numbers	• Solve practical problems • Order of operations • Application of factors and multiples (LCM and HCF) • Use of calculators to perform arithmetic operations • Powers • Square roots
Fractions	• Practical problems involving fractions
Decimals	• Practical problems involving decimals
Percentages	• Practical problems involving percentages
Ratio and proportion	• Solve simple word problems involving ratios • Solve simple word problems involving direct proportion
Length and Area	• Circumference of circle • Area of circle • Solve word problems involving circumference and area of circle
Mass	• Solve practical problems involving mass
Volume and Capacity	• Solve practical problems involving volume and capacity
Time	• Perform simple arithmetic operations (with fractions and decimals) involving units of time • Solve practical word problems
Money	• Solve practical problems involving money
Geometry	• Measure and draw angles using a protractor • Bearing • Bisect angles using construction • Construct perpendicular bisector
Handling data	• Record and organise grouped data using frequency table. • Calculate mean, mode, median of ungrouped data including data in frequency table
Unknown quantities	• Simple algebraic representation of mathematical situations

Year 4

Whole numbers	• Introduction to negative numbers • Use of calculators to perform arithmetic operations
Fractions and Decimals	• Practical problems involving fractions and decimals • Decimal places • Significant figures
Percentages	• VAT • Wages and salaries • Hire Purchase
Rate, Ratio and Proportion	• Rates in practical situations • Solve practical problems involving ratios (e.g., map scales) • Solve practical problems involving proportion (including inverse)
Area	• Total surface area of cylinder • Solve practical problems involving total surface area of cylinder
Mass	• Solve practical problems involving masses with conversion
Volume	• Volume of cylinder • Solve practical problems involving volume cylinder
Time	• Relate international time to GMT and vice versa • Interpret time tables
Money	• convert Mauritian currency to $, € and £ and vice versa in practical situations
Geometry	• Apply Pythagoras' Theorem • Use trigonometrical ratios to find unknown lengths in a given right angle triangle
Handling data	• Solve practical problems involving statistical data
Algebra	• Solve simple linear equations • Subject of formula • Gradient • Equation of lines

Curriculum content - Understanding Nature & Environment

Year 1

Understanding Nature

Air	• Composition of air • Properties of pure air • Importance of air in sustaining of life, in travel and entertainment
Water	• Properties of pure water • Importance of water in sustaining life, in travel and entertainment • States in which water exists
Pollution	• Understanding pollution • Causes and consequences of air and water pollution • Measures to avoid air and water pollution
Materials	• Materials commonly used in everyday life • Recognise materials used to make objects of everyday use • Permeable/impermeable substances and soluble/insoluble substances

The Environment

Environment as a broader concept	• Definition and types of environment • Plants in our environment and their importance • Parts of the plants • Germination and factors affecting germination
Role of human beings	• Impact of human beings on the environment • Protection of the environment and natural resources

Year 2

Understanding Nature

Air	• Formation of wind • Use of wind in the production of electricity • Dangers of cyclonic winds
Water	• Uses of water • The water cycle • Rain water harvesting • Drought and flooding
Plants	• Culture of cash crops • Composting and its benefits
Animals	• Feeding, movements and habitat of animals • Domestic and wild animals • Animals and their usefulness
Energy	• Sources and forms of energy • Conversion of energy

The Environment

Human impact on environment	• Shaping of the environment by man over time • Causes of environmental problems and risks • Solutions to environmental problems
Threat to the environment	• Ways of managing resources at home and/or at school • Audit of resources, developing a checklist for audit • The Reduce, Reuse and Recycle (3Rs) principle

Year 3

Understanding Nature

Natural resources	• Natural resources available in Mauritius
Natural calamities	• Common natural calamities affecting Mauritius • Dangers of natural calamities • Precautions taken in case of natural calamities
Water	• Purification and distribution of water for domestic purposes • Water conservation
Electricity	• Uses of electricity • Dangers of electricity • Protective measures in use of electricity
Living things	• What are the characteristics of life • Life threatening hazards

The Environment

Environmental Impact Assessment	• Tools for environmental impact assessment • Environmental audit to identify areas for improvement • Management of resources
Conducting environmental audit	• Checklist for conducting an audit of a resource at school • Adopting the 3Rs principle to manage resources at school

Year 4

Understanding Nature

Electricity	• Components of domestic wiring system • Basics of domestic wiring system • Safe use of electricity at home • Conservation of electrical energy • Earth conductor and lightning conductor
Earth and space	• Occurrence of day and night on Earth • Our solar system • Celestial bodies
Materials	• Good and bad conductors of electricity and their uses • Good and bad conductors of heat and their uses
Energy	• Renewable and non-renewable sources of energy • Benefits of using renewable sources of energy

Environment

Environmental Impact Assessment	• Understanding the multi-dimensional nature of environment • Our rights and responsibilities towards the environment