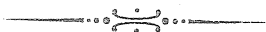
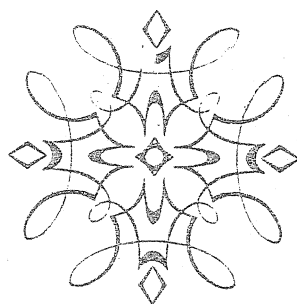


MINISTRY OF EDUCATION



MATHEMATICS PRESCRIPTION

CLASS 7/FORM 1



**Curriculum Development Unit
1997**

MINISTRY OF EDUCATION

CLASS 7/FORM 1 MATHEMATICS

1.0 PREAMBLE

- 1.1 The Class 7/Form I Mathematics course provides opportunities for students to develop a broad range of skills and encourage them to be creative and good problem solvers in their daily lives.
- 1.2 Teachers need to note that the understanding of mathematical concepts involves more than learning a set of rules or using a formula. It involves knowing what method to choose, how to use it and why it works in a particular situation.
- 1.3 The mathematical processes include problem solving, logical reasoning, analytical thinking, communication, making connections and using mathematical tools. These should be developed within the context of the topics and emphasised throughout the course.
- 1.4 Mathematics at this level lays the foundation for mathematics learning in Class 8/Form II.

2.0 AIMS AND OBJECTIVES

2.1 AIMS

The Mathematics course aims to develop

- (a) in the pupils a sound understanding of, and the ability to use mathematical concepts, processes and strategies in problem-solving
- (b) the pupils' mathematical skills and ability to think and reason logically and to communicate mathematical ideas and experiences, orally and in writing
- (c) the pupils' knowledge and skills, and the understanding required for everyday living, and for further learning of mathematics and other subjects

- (d) the pupils' creative and inventive talents in relation to problem-solving
- (e) the pupils' ability to connect mathematics to everyday situations, to other topics within mathematics and to other subjects
- (f) in the pupils favourable attitudes towards, and a continuing interest in mathematics
- (g) in the pupils the ability to recognise and appreciate the mathematics in everyday situations
- (h) the pupils' confidence in their ability to do mathematics.

2.2 OBJECTIVES

On completing the Class 7/Form I course, the pupils should have

- 2.2.1 acquired the knowledge and understanding required to
 - (a) use problem-solving approaches to learn mathematics
 - (b) develop and apply a variety of strategies to solve mathematical problems
 - (c) develop competence in their ability to compute mentally and on paper using a variety of methods
 - (d) develop competence in their ability to estimate and approximate, and to judge whether results and measurements seem reasonable
 - (e) recognise and use patterns and relationships in mathematics and be able to generalise from these
 - (f) use models, known facts, properties and relationships to explain and justify their thinking in solving problems

- (g) relate materials, pictures and diagrams to Mathematical ideas
- (h) make connections with other topics within Mathematics, with other subjects and with the outside world
- (i) apply mathematics to everyday life
- (j) show competence in using instruments and measuring devices.

2.2.2 acquired the skills and understanding of the processes involved in

- (a) applying mathematical ideas, rules, techniques and strategies to solve mathematical problems
- (b) devising, using and modifying problem-solving strategies to solve a variety of problems
- (c) using mathematics in everyday life
- (d) recognising and working with patterns and generalising
- (e) using inductive and deductive reasoning and forming conjectures
- (f) developing flexible thinking and expressing logical arguments
- (g) identifying examples and non-examples of concepts
- (h) reflecting on problems and processes
- (i) estimating when working with quantity, measurement, computation and problem solving
- (j) estimating and approximating, and judging whether results are reasonable

- (k) computing mentally and on paper using appropriate algorithms
- (l) following procedures in order to carry out mathematical activities
- (m) recording information and reporting results of mathematical activities
- (n) choosing and using instruments, measuring devices and resources appropriately
- (o) investigating connections with other topics and subjects
- (p) listening and responding to the views of others.

2.2.3 developed the values and attitudes which help them in

- (a) appreciating that Mathematics is an interesting, enjoyable and a challenging subject
- (b) becoming aware that the learning of mathematics includes inquiry, investigation, discovery and verification
- (c) appreciating that mathematics is a creative, relevant and useful activity in daily living
- (d) gaining confidence in their ability to do mathematics
- (e) showing confidence in using their own language and the language of mathematics to express mathematical ideas
- (f) being resourceful, self-reliant and persevering in doing mathematical activities
- (g) working co-operatively with others and participating in discussions

- (h) exercising self-discipline
- (i) achieving a sense of self-worth through success in doing mathematics
- (j) learning to learn and developing self-assessment skills

3.0 COURSE CONTENT: OUTLINE

3.1 The Class 7/Form 1 content is divided into the following 10 units.

- Unit 1. Spatial Concepts using Geoboards.
- Unit 2. Co-ordinates
- Unit 3. Fractions
- Unit 4. Decimals
- Unit 5. Measurement
- Unit 6. Money
- Unit 7. Number Machines
- Unit 8. Angles
- Unit 9. Area I
- Unit 10. Number Patterns I

3.2 The processes that will be emphasised throughout are

- 1. Problem-solving
- 2. Logical reasoning
- 3. Communicating
- 4. Making connections
- 5. Using mathematical tools/instruments.

4.0 COURSE - CONTENT: DETAILS

ATTITUDES AND VALUES:

These attitudes and values are applicable to all the units.

4.1 Using a wide range of skills students should be able to

- (a) further develop their self-esteem

- (b) recognise that Mathematics is a key to learning of other subjects as well as job opportunities
- (c) realise and appreciate the value of Mathematics in every day living
- (d) appreciate that multiple solutions to problems may exist
- (e) recognise and appreciate that acquired knowledge can be applied to everyday situations
- (f) exhibit co-operative and independent behaviour (ie. Work with a team or independently)
- (g) appreciate that success does not depend only on innate talents
- (h) show a sense of enjoyment and desire to solve problems
- (i) show a desire for further learning.

4.2 UNIT 1: SPATIAL CONCEPTS USING THE GEOBOARDS

CONCEPTS	SKILLS & PROCESSES
Shapes, definitions, properties	<ul style="list-style-type: none"> * Use rubber bands to make patterns and shapes on geoboard * Draw shapes
Definition and properties of line, line segment, ray and parallel lines	<ul style="list-style-type: none"> * Identify a line, line segment and ray * Identify parallel lines * Draw lines, line segments and parallel lines using appropriate instruments
Quadrilaterals Types and properties of quadrilaterals	<ul style="list-style-type: none"> * Classify shapes into sets * Identify quadrilaterals and draw them * Explore properties of quadrilaterals
Types and properties of Triangles	<ul style="list-style-type: none"> * Identify triangles; name triangles * Identify different types of triangles * Draw different types of triangles * Explore the properties of triangles
Problem-solving	* solve problems relating shapes.

4.3 UNIT 2: COORDINATES I

CONCEPTS	SKILLS & PROCESSES
Coordinates Plane	<ul style="list-style-type: none"> * Link the number line concept with the concept of the coordinate plane * Identify horizontal and vertical axes, and the origin on the x-y plane
Coordinates	<ul style="list-style-type: none"> * Identify coordinates of the given points * Plot the given points using the coordinate system * Join points to draw lines/shapes and describe the shapes.
Problem-solving	* Solve problems using x-y plane.

4.4 UNIT 3: FRACTIONS

CONCEPTS	SKILLS & PROCESSES
Fractions Inequality	<ul style="list-style-type: none"> * Describe fractions as a part of a whole * Describe the relationship between a subset and a set as a fraction * Record fractions * Show relations between fractions ($<$, $>$) * Represent fractions on a number line * Order fractions by magnitude (same denominator)
Improper fractions and mixed numbers	<ul style="list-style-type: none"> * Convert fractions to mixed numbers * Convert mixed numbers to fractions
Addition and subtraction	<ul style="list-style-type: none"> * Add and subtract fractions with the same denominators
Multiplication and division	<ul style="list-style-type: none"> * Multiply and divide fractions with the same denominator
Fractions with different denominators	<ul style="list-style-type: none"> * Show fractions with different denominators on a scale * Order fractions with different denominators
Equivalent fractions	<ul style="list-style-type: none"> * Produce sets of equivalent fractions
$+$, $-$, \times & \div of fractions	<ul style="list-style-type: none"> * Add, subtract, multiply and divide fractions with different denominators.
Reasonableness of results Problem-solving	<ul style="list-style-type: none"> * Determine whether the answer makes sense * Apply fractions to problem situations * Estimate answers to fraction problems

4.5 UNIT 4: DECIMALS

CONCEPTS	SKILLS & PROCESSES
Place Value of decimals	<ul style="list-style-type: none"> * Read and write decimal numbers * Name the place value of numbers to 2 decimal places * Show decimal numbers on abacus and by using squares, strips and units * Measure lengths to one decimal place * Apply decimal notation to measurement, money and other quantities
Fractions as decimals	<ul style="list-style-type: none"> * Express fractions involving tenths and hundredths as decimals
Addition and Subtraction of decimals	<ul style="list-style-type: none"> * Add and subtract decimals to one and two places
Multiplication and Division of decimals	<ul style="list-style-type: none"> * Multiply and divide decimals by whole numbers * Multiply and divide decimals by 10, 100 and 1000 * Multiply and divide a decimal by another decimal
Estimation Approximation Problem-solving	<ul style="list-style-type: none"> * Estimate answers to problems involving decimals * Round off decimals to simplify calculations and check to make sure the answer makes sense * Solve problems involving decimals * Link decimals other subject areas * Apply decimals to problem situations

4.6 UNIT 5: MEASUREMENTS

CONCEPTS	SKILLS & PROCESSES
<p>Metres, centimetres, millimetres</p> <p>Mass and Volume</p>	<ul style="list-style-type: none"> * Read and measure lengths in metres, centimeters and millimetres. * Measure to the nearest metre, centimetre and millimetre (rounding off) * Read measuring devices such as a ruler and a tape. * estimate mass & volume of various materials * Use measuring devices such as a beaker or measuring cylinder to measure volumes and scales to measure weights/mass.
Time - am and pm	<ul style="list-style-type: none"> * Read and write time using am and pm. * Read analogue and digital watches. * Read and write time using the 24 hour clock.
- Estimation	* Estimate and measure short and long intervals of time using a stop watch.
- Calendar	<ul style="list-style-type: none"> * Read a calendar. * Investigate patterns on a calendar.
- Timetables	* Make a timetable for a day, week etc
- Speed	* Estimate speed
Scales	* Read distances on the map using scale
Recording	* Record information in table form
Problem-solving	* Solve problems related to speed, time and distance

4.7 UNIT 6: MONEY

CONCEPTS	SKILLS & PROCESSES
Percentages/per hundred	<ul style="list-style-type: none"> * Convert fractions to percentages by multiplying it with 100. * Express one quantity as the percentage of another
Banking and interest	<ul style="list-style-type: none"> * Calculate interest on bank savings * Calculate the amount of interest given the interest rate * Save money by having a bank account
Profit and Loss	<ul style="list-style-type: none"> * Show whether profit has been made or loss has been incurred through a sale * Calculate percentage profit and loss from a sale. * Use percentage in situations involving profit and loss
Selling Price and Cost Price	<ul style="list-style-type: none"> * Calculate the selling price, given the percentage mark-up and cost price * Calculate the cost price given the mark up percentage and selling price
Hire-purchase	<ul style="list-style-type: none"> * Calculate out hire-purchase prices and monthly payments * Deduce that more is paid for goods bought on hire purchase.
Problem Solving	<ul style="list-style-type: none"> * Solve a variety of problems related to the concepts learnt in the unit.

4.8 UNIT 7: NUMBER MACHINES

CONCEPTS	SKILL & PROCESSES
Models	* Draw models of 'number machines'
Input and Output Numbers	* Calculate the output numbers given the input numbers and the rule. * Find the rule when input and output numbers are given. * Calculate the input number when the output number and the rule are given * Express rules in mathematical shorthand
Flowcharts	* Construct and interpret flowcharts
Combined machines	* Find rules for 'Combined machines'
Continuous machines and sequences	* Discover patterns produced by continuous machines.
Connections	* Connect the concepts of continuous machines with the number patterns.
Problem-solving	* Solve problem based on number machines.

4.9 UNIT 8: ANGLES

CONCEPTS	SKILLS & PROCESSES
Angles	<ul style="list-style-type: none"> * Identify examples of angles in the classroom, at home and in the environment * Recognise different kinds of angles * Name angles * Record angles using the correct notation * Estimate angle size in degrees * Use a protractor to measure angles * Use a protractor to draw angles * Establish the properties of opposite angles, adjacent angles and an angle around a point * Relate the ideas in this unit with the relevant sections in 'Spatial Concepts' (geoboards) * Solve problems based on angles
Problem-solving	

4.10 UNIT 9: AREA I

CONCEPTS	SKILLS & PROCESSES
Area	<ul style="list-style-type: none"> * Estimate areas of irregular shapes. * Find area by counting squares, using geoboards and graph paper * Find area by counting squares in rectangular regions * Collect information and put it in a table form * Look for patterns in the table * Develop the formula for the area of rectangles by using the table
Formula for the area of rectangles	<ul style="list-style-type: none"> * Compute the areas of rectangles and shapes made up of rectangles. * Use standard units mm, cm, m
Nets for models	* Make nets for rectangular solids
Surface area of rectangular solids	* Calculate the surface area of rectangular solids
Scales	* Use scales on a map
Problem-solving	* Solve problems based on area

4.11 UNIT 10: NUMBER PATTERNS I

CONCEPTS	SKILLS & PROCESSES
<p>Sequences</p> <p>Kinds of Patterns - numbers, spatial rules</p> <p>Problem-solving</p>	<ul style="list-style-type: none"> * Recognise repetition and order * Recognise patterns in number sequences. * Identify and describe the rules for patterns * Use the rules to generate sequences of numbers and shapes, including odd, even, triangular and square numbers * Identify numbers that do not belong to a sequence * Build up different sequences starting off with first two members * Create and continue number and spatial patterns * Use patterns to solve number tricks and puzzles * Use patterns to create number tricks and puzzles and describe them * Solve problems based on number and spatial patterns

5.0 TIME ALLOCATION

The table below shows the suggested plan of coverage and the time schedule for the units.

TERM	UNITS	NO. OF WEEKS
I	1. Spatial Concepts	2
	2. Co-ordinates I	2
	3. Fractions	5
	4. Decimals	3
II	Decimals (cont'd)	3
	5. Measurement	2
	6. Money	6
III	7. Number Machines	2
	8. Angles	3
	9. Area I	3
	10. Number Patterns I	2

6.0 EVALUATION

6.1 Assessment should be continuous, and emphasis at all times should be on assessing the full range of processes and skills.

6.2 A variety of strategies can be used to assess pupils' needs, strengths, progress and achievement in mathematics. The variety of purposes of assessment give rise to two broad categories of assessment.

6.2.1 Formative Assessment is an integral part of the teaching and learning process. It provides the teacher with information on the strengths and weaknesses of pupils, and the pupils with the feedback about the learning. "I TEST MYSELF" is given at the end of each unit to help the pupils assess their own learning with the help of the teachers. The diagnosis of the errors pupils make enable teachers to plan further learning activities to meet the needs of those pupils.

Informal assessment of pupils' achievement must be carried out all the time. It provides an opportunity for giving immediate feedback.

Observing pupils and interacting with them as they go about their activities and conducting discussions and interviews are some ways through which pupils can be informally assessed. Self-assessment by pupils in other classroom activities must also be encouraged.

- 6.2.2 Summative assessment is formal and is carried out at the end of a period of study to provide an indication of the pupils' achievements. Thus tests and examinations could be given at selected points during the course of study eg. end of term, middle and end of the year.

6.3 School Student Profiles

All schools are encouraged to keep a profile for each student. The students' profiles will have records of achievements in each subject, records of test and examination results, as well as samples of the students' work (eg portfolios of art, essays, poems, etc.). The profile will contain the pupils' history of achievements during his or her school career.

7.0 TEACHER'S NOTES

- (a) Teachers need to prepare and continually revise their scheme of work to suit the class they are teaching.
- (b) Suggestions for teaching are given in the Teachers Guide. Teachers should supplement these with their own ideas.
- (c) Problem solving promotes thinking and should be the focus of mathematics. Problem solving is not a distinct topic but should permeate the entire mathematics programme.

- (d) Mathematical activities should be regarded as opportunities for teachers and students to use and develop appropriate language. The acquisition of mathematical language develops through the use of the four interrelated processes of talking, listening, reading and writing, as their understanding of the mathematical ideas develop.
- (e) The key communication skills are discussing, explaining, listening, justifying and recording. Teachers should view these as an integral part of mathematics learning. Pupils should be encouraged to think about and explain what they are doing and why, and to listen critically to the views of others as they engage in mathematical activities.
- (f) Developing mental computations including skills of estimation should be emphasised throughout the course. Estimation should be used in all computational activities and in problem solving. Pupils should be able to always ask such questions as "Is my answer reasonable?" Within what range of numbers must my answer lie?"
- (g) Students must be taught to reflect on their experiences. It is when they reflect on the investigations they are engaged in, the processes they use, and the answers they get that they learn. Unless reflection takes place, they may be performing a routine which is learnt by rote and will be easily forgotten. Recalling an experience, relating it to other experiences and retelling are useful activities which should be promoted during maths lessons.
- (h) Pupils should be encouraged to question the responses of their peers and teachers in order to seek further clarification, reassurance and approval as a means of extending mathematical thinking and understanding.

8.0 RESOURCES

8.1 PREScribed TEXTS FOR PUPILS

Mathematics for Class 7/Form 1
Ministry of Education, FIJI

8.2 PREScribed TEXTS FOR TEACHERS

Mathematics for Class 7/Form 1 Teachers' Guide
Ministry of Education, FIJI

8.3 TEACHING AIDS

The aids required for each unit are given in the
Teachers' Guide.
Sets of Dienes Blocks have been supplied to schools.
