PRIMARY MATHEMATICS SYLLABUS

CLASS I

MINISTRY OF EDUCATION AND HUMAN RESOURCE DEVELOPMENT

BARBADOS

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RATIONALE

There is a need for all primary school pupils in Barbados today to experience a shift in emphasis in the teaching/learning process in mathematics from that which was practised twenty or even five years ago. The rapid advances in computer technology, the easy accessibility of inexpensive calculators, the implementation of the project, EduTech 2000 and the ever-increasing rate of change in all aspects of society require that pupils develop new skills and attitudes to meet these demands.

It is no longer sufficient that pupils develop proficiency in computation and in applying that computation to their day-to-day problems. By the time these pupils reach adolescence and adulthood in the twenty-first century, they will be faced with new problems and challenges. It is crucial, therefore, that these pupils be a part of an environment which allows them to **think, reason, and solve problems** using as much of the available technology as possible. Pupils of different ages think, reason and solve problems at different levels, but all pupils are capable of rational thought, reasoning and solving problems.

This Primary Mathematics Syllabus supports the new initiatives of the Ministry of Education, which stress that:

- the child-centred approaches be used in conjunction with the traditional teacher-centred approaches
- problem-solving should be the focus of mathematics instruction
- reasoning about mathematics should be used to help pupils make sense of mathematics, rather than just memorizing rules and procedures
- mathematics is an ideal subject for the development of critical-, creative- and decision-making skills of the pupils from at a very early age
- manipulatives are powerful tools that can help pupils link the concrete experiences to pictorial representations and finally to abstract symbols to build mathematical understanding
- mathematics should be connected to other subject areas and to the pupils' everyday experiences to make it meaningful

- information technology, namely, calculators and computers, be used as tools to help pupils explore and develop concepts and solve problems
- instruction using the multi-media approach, visual, auditory and tactile/kinesthetic should be used to reach all pupils
- assessment should be multi-faceted and evaluate what pupils can do and understand

Through the piloting and implementation of this syllabus and the feedback and consultation from teachers and other educators, modifications will be made to ensure that this document is user-friendly to all teachers of mathematics in primary schools in Barbados.

GENERAL OBJECTIVES

The general objectives for the primary mathematics syllabus are to help pupils:

- acquire a range of mathematical techniques and skills
- develop an awareness of the importance of accuracy in computation
- develop an awareness of mathematics in their environment
- cultivate the ability to apply mathematical knowledge to the solutions of problems in their daily lives
- cultivate the ability to think logically, creatively and critically
- use technology to explore mathematical situations.

FORMAT OF THE SYLLABUS

In addition to the syllabus for Class 1, this document contains the following sections: Scope and Sequence, Attainment Targets and Suggested Activities and Assessment Procedures. Highlighted in the syllabus are the integration of technology into instruction and the development of critical, creative and decision-making skills. Both areas were already in use but are now being highlighted because of the need to have all pupils computer literate and to be critical and creative in their thoughts and actions.

The nature of mathematics instruction requires that concepts are introduced in the earlier stages and developed in the later stages. The *Scope and* Sequence therefore, indicates the classes in which a topic is to be introduced and developed. The ν indicates in which class the topic/skill/concept should be introduced and the 4indicates that the concept has to be developed and maintained in these classes.

The *Attainment Targets* are presented as a list of objectives and indicate what each pupil should be able to achieve at the end of the school year. It is understood that because of varying abilities and aptitudes, some pupils might be able to achieve a higher standard than that which is set and some may not be able to complete all the objectives for the particular age group. The targets for a particular class represent the objectives that should be achieved at that level, in addition to those of the lower classes.

The *Suggested Activities* included in the syllabus will ensure that pupils use and apply mathematics to promote mathematical reasoning, make decisions and analyse data. In addition, the proposed tasks meet both the individual needs of the pupils as well as provide activities for group work, thereby facilitating collaboration between pupils, teachers and parents, while consolidating instruction and developing the necessary skills.

Assessment is a fundamental part of the teaching and learning process. It should measure not only what the pupils know and can produce, but should provide more authentic information about the learner. Further, continuous assessment is essential in monitoring the progress of pupils and teachers are therefore encouraged to use mathematics profiles to record each child's progress. To this end a variety of assessment methods should be utilised including achievement tests, portfolio assessment, journals and discussions.

The *Integration of Technology* is integral to mathematics instruction and can be beneficial in areas such as computation, geometry, data handling and problem solving. The use of technology is particularly effective in reducing the fear and anxiety associated with learning mathematics, since it allows the pupils to focus less speed and memorization and more on the processes necessary to obtain the solutions.

Teachers are encouraged to use strategies and methodologies to develop *Critical Thinking and Problem Solving Skills.* The mathematics classroom should provide the opportunity for pupils to formulate problems from everyday situations, use concrete materials, reason logically and use a variety of problems solving strategies.

SCOPE AND SEQUENCE

ν **Begin teaching the concept/skill/fact**
4 **Maintain and develop concept/skill/fact**

		CLASSES			
		1	**2**	**3**	**4**
1.0	**PROBLEM SOLVING STRATEGIES AND SKILLS**				
1.0.1	Problem solving as it relates to everyday situations	ν	4	4	4
1.0.2	Problem solving steps	ν	4	4	4
1.0.3	Problem solving strategies	ν	4	4	4
1.0.4	Estimation strategies	ν	4	4	4
1.0.5	Interpretation of data and diagrams	ν	4	4	4
2.0	**NUMBER CONCEPTS**				
2.0.1	Mental computations and estimation techniques	ν	4	4	4
2.0.2	Read and write numbers	ν	4	4	4
2.0.3	Comparison of numbers	ν	4	4	4
2.0.4	Addition of whole numbers	ν	4	4	4
2.0.5	Subtraction of whole numbers	ν	4	4	4
2.0.6	Multiplication of whole numbers	ν	4	4	4
2.0.7	Division of whole numbers	ν	4	4	4
2.0.8	Solution of basic problems using the four basic operations	ν	4	4	4
2.0.9	Odd/Even numbers	ν	4	4	4
2.0.10	Value of a number	ν	4	4	4
2.0.11	Place Value of a number	ν	4	4	4

ν **Begin teaching the concept/skill/fact**
4 **Maintain and develop concept/skill/fact**

		CLASSES			
		1	**2**	**3**	**4**
2.1	**PROPERTIES OF NUMBERS**				
2.1.1	The commutative property	ν	4	4	4
2.1.2	The associative property	ν	4	4	4
2.1.3	The identity property under addition	ν	4	4	4
2.1.4	The identity property under multiplication	ν	4	4	4
2.1.5	Multiplication by zero	ν	4	4	4
3.0	**FRACTIONS AND DECIMALS**				
3.0.1	The concept of a fraction	ν	4	4	4
3.0.2	Written symbols for fractions	ν	4	4	4
3.0.3	Operations with fractions	ν	4	4	4
4.0	**MEASUREMENT**				
4.0.1	Non-standard units of measurement	ν	4	4	4
4.0.2	Standard units of measurement	ν	4	4	4
4.0.3	The metric system	ν	4	4	4
4.1	**Linear**				
4.1.1	Determining length	ν	4	4	4
4.1.2	Instruments for measuring length	ν	4	4	4
4.1.3	Units for measuring length	ν	4	4	4
4.1.4	Perimeter of shapes	ν	4	4	4

ν **Begin teaching the concept/skill/fact**
4 **Maintain and develop concept/skill/fact**

		CLASSES			
		1	**2**	**3**	**4**
4.2	**Time**				
4.2.1	Times of the day	ν	4	4	4
4.2.2	Periods of time – year, month, day, etc.	ν	4	4	4
4.2.3	Instruments used for measuring time	ν	4	4	4
4.2.4	Choice of instruments for measuring time	ν	4	4	4
4.3	**Money**				
4.3.1	The local currency	ν	4	4	4
4.3.2	The use of coins and notes	ν	4	4	4
4.3.3	The relationship between coins and bills	ν	4	4	4
5.0	**GEOMETRY**				
5.0.1	Properties of two-dimensional shapes	ν	4	4	4
5.0.2	Properties of three-dimensional shapes	ν	4	4	4
5.0.3	Line, point, ray and line segment	ν	4	4	4
6.0	**SET THEORY**				
6.0.1	Definition of a set	ν	4	4	4
6.0.2	Description of a set	ν	4	4	4
6.0.3	Elements in a set	ν	4	4	4
7.0	**DATA HANDLING**				
7.0.1	Data collection and representation	ν	4	4	4
7.0.2	Averages of given data (mean, mode)	ν	4	4	4

ATTAINMENT TARGETS

INTRODUCTION

The Attainment Targets in Mathematics set out the knowledge, skills, attitudes and behaviours that pupils are expected to have by the end of the class. They enable schools to give future citizens the knowledge and skills they need to acquire a range of mathematical skills and techniques.

These Mathematics Attainment Targets are designed to ensure that pupils:

- understand, apply and analyse mathematical concepts;
- select and perform computations appropriate to specific problems;
- use mathematical language appropriately;
- develop the ability to apply mathematical knowledge to everyday situations.

Simulate and create problems involving everyday situations and solve those and other problems using a variety of strategies.

The pupil should be able to:

- use technology to formulate/create problems from everyday situations;
- apply a variety of problem solving strategies to solve problems and explain the variety of strategies used;
- explain and justify the solutions to questions;
- use technology to solve problems beyond the pencil-and-paper skills;
- interpret charts, tables and graphs;
- use a variety of mental computations and estimation techniques;
- work cooperatively in groups to solve problems.

Understand and explain basic operations (addition, subtraction, multiplication and division) involving whole numbers by modelling and discussing a variety of problem solving situations.

The pupil should be able to:

- read and write numbers up to 999;
- compare and order numbers up to 999;
- determine the place value of a digit in numbers up to 999;
- add and subtract whole numbers up to 999;
- multiply and divide whole numbers up to 999 by one-digit numbers;

- use the four basic operations to solve problems with whole numbers.

Understand fractions using concrete materials and diagrams and carry out basic operations.

The pupil should be able to:

- identify and compare fractional parts;
- illustrate given fractions of a whole;
- use symbols to represent fractions;
- read and write fractions;
- add fractions with the same denominator;
- subtract fractions with the same denominator.

Demonstrate an understanding of, and an ability to apply measurement terms, identify relationships between and among measurement concepts and estimate and measure objects in their day-to-day environment.

The pupil should be able to:

- use non-standard units to measure quantities;
- use standard units to measure quantities;
- convert between units of measure;
- determine the perimeter of a given shape;

- differentiate between times of the day;
- identify the days of the week in various sequences;
- identify the months of the year in various sequences;
- tell time by the hour, half hour and quarter hour;
- manage time effectively;
- identify the local coins and bills;
- use coins and bills in money transactions;
- develop an appreciation for saving money.

Understand key concepts of geometry using concrete materials and drawings.

The pupil should be able to:

- identify two and three dimensional shapes;
- draw two dimensional shapes – square, rectangle, triangle, circle;
- classify two and three dimensional shapes according to their attributes.

Understand data and display them in a variety of ways.

The pupil should be able to:

- collect data on area of interest;
- illustrate data using tables and tally charts;
- illustrate data using pictographs;
- interpret information given in diagrams;
- determine the mode for a set of data.

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
PROBLEM SOLVING **NUMBER CONCEPTS**	*Pupils should be able to:* Create problems from everyday situations. Identify the steps in problem solving. Apply problem-solving strategies to solve problems in all topics of the syllabus. Interpret diagrams to draw logical conclusions. Read and write numbers up to 999 Compare and order numbers up to 999. Use the signs <,=,> correctly. Read, write and use ordinal numbers up to the 31st to place given objects in position. Read and write Roman numerals up to 12.	Use the following to solve problems in the various topics: Concrete models Drawings / Diagrams Acting out the problem An ice cream vendor sells four flavors of ice cream – chocolate, vanilla, cherry and coconut. How many different ways can Shelly order a double scoop of ice cream? Use the hundred board to identify number patterns, sequences, 'the number before' or the 'number after'. Fill in the spaces with <,=,> 20 ……. 200 50 ……. 15 thirty ……. Thirteen Mary is ninth is line. Sue is fifth. How many people are between Mary and Sue?	Oral questioning Discussion Written tests Observation Quizzes	Manipulatives Calculator Number charts Number lines Flash cards with simple exercises in addition, subtraction, multiplication and division.

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
Addition **Subtraction**	Determine the value and/or place Value of digits. Add numbers up to 999 with and without regrouping. Recall addition facts up to 18 in mental arithmetic activities. Demonstrate the commutative property under addition Demonstrate the associative property under addition Recognise and use the identity property of zero under addition and subtraction Demonstrate addition as the inverse of subtraction Recall subtraction facts up to 18 in mental arithmetic activities. Subtract numbers up to 999 without and with regrouping.	Use straws to complete subtraction with regrouping. Complete subtraction tables such as: -- 7 9 11 4 3 5 7 6 1 3 5 3 4 6 8 Create flash cards that show a subtraction on one side and the answer on the next. 10 – 4 6 Front Back Joan bought three apples on Monday and four on Wednesday. Her brother bought four apples on Monday and three on Wednesday. Who had more	Role Playing Oral Presentations	Number machine Straws; Match sticks for counting in bundles. Boxes Counters

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
Multiplication	Recall multiplication facts up to 50 in mental arithmetic activities. Build and use the multiplication tables 2, 3, 4, 5 and 10. Demonstrate the commutative and associative properties under multiplication Write the multiples of tables taught. Demonstrate multiplication as repeated addition. Recognise and use the property of zero under multiplication Recognise and use the property of one under multiplication. Multiply up to 2-digit numbers by 2, 3, 4, 5, and 10 without and with regrouping.	apples? Pretend you are the number zero. Make a speech telling your friends why you are special. Sandra had 12 boxes with 4 apples in each box. John had 4 boxes with 12 marbles in each box. How many more marbles did John have than Sandra? Fill in the spaces using <,=,> 2 x 3 3 x 2 5 + 2 0 + 5 3 x 0 3 + 0	Simulation Written tests Quizzes	Multiplication cards Beads Multiplication tables Calculator Worksheets

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
Division **FRACTIONS**	Demonstrate multiplication as the inverse of division and vice versa. Divide numbers up to 99 by 2, 3, 4 and 5 with and without remainders. Demonstrate division as repeated subtraction. Use the vocabulary of the operations (sum, difference, product, quotient, add, subtract, divide, multiply, remainder). Round off whole numbers to the nearest ten and hundred. Read and write Roman Numerals up to 12. Define a fraction as part of a whole. Identify parts of a whole (½, 1/4, 1/8, 1/16); (1/3, 1/6, 1/12); (1/5, 1/10)	Which is the better buy? 4 pencils at a total cost of 40 cents or 5 pencils at a total cost of 45 cents. Share 87 nuts equally among 5 boys. How much would each boy get? Will any be left? There are 24 cherries to be placed in bags. A bag can only hold 5 cherries. How many bags are needed? Read articles in the newspaper, magazine or journals. Give a report of what you read, rounding off any numbers to the nearest ten. Fold card to show fractions of circles, squares and rectangles. Using paper plates, divide into equal sectors to show fractions.	Quizzes Written tests Written report Illustrations Demonstration Sentence Writing Observation	Newspapers Magazines Fraction chart Card Paper plates Crayons Fraction strips Fraction number line Cake, pizza, fruit Card plates

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
	Combine and match fractional parts to make a whole. Determine half / quarter of a set of objects. Write a fraction in the form $\frac{\text{Numerator}}{\text{Denominator}}$ Identify the numerator and denominator of a fraction. Compare and order fractions with the same denominator Compare fractions with different denominators but same family i.e. 1/3, 1/6 etc. Add and subtract fractions with like denominators Learn to be creative	Colour various sectors to create a pattern. Share fruits, cake and pizza among students in the class. Using different coloured card, create fractional parts of the square, rectangle, triangle and circle. Combine different shapes to form a design.	Illustration / Drawing Observation Demonstration	Metre rule Strips of card Foot rule Sticks Worksheets Calendars Watch - analog - digital Alarm clock Clock faces

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
MEASUREMENT **Linear**	Estimate, measure and compare lengths of various objects using non-standard units. Estimate, measure and compare lengths of various objects using non-standard units. Convert from metres to centimetres and vice versa Choose the appropriate unit to measure given lengths. Measure the perimeter of objects and shapes using standard units	Use the hand span and footstep to measure distances in the classroom. Compare the measurements collected by different students. Students guess the length of various objects, using a stick. For example the desk is 2 sticks long and the door is 5 sticks long.	Illustrations Role playing Questioning	Computer Bills Coins Discarded cartons, cans, wrappers
Time	Recognise varied traditions in society eg. be aware of holidays. - Name the days of the week and the months of the year. - Read the date (day, month, year) from a calendar. - Use a.m. and p.m. to distinguish between time in the morning and afternoon.	Use the computer to create monthly calendars for the year. Shade dates to show the birthdays of the pupils in the class, holidays etc. Ask students to write sentences to say what activities they did on		Two dimensional shapes Three dimensional shapes

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
Money **GEOMETRY**	- Tell time on the hour, half hour and quarter hour. Identify the local coins as well as the following bills $5, $10, $20. Give coins and bills of the equivalent value for amounts up to $5. Determine the correct coins and bills needed to purchase one, two or three items. Make the change for amounts up to $5. Use appropriate body language when addressing others. Identify two-dimensional shapes: square, rectangle, triangle, circle. Classify two-dimensional shapes according to their attributes. Draw two-dimensional shapes.	Saturday morning. Set up a shopping center in the classroom. Visit a local shop or supermarket and talk to the owner / workers. Show pupils a collection of objects such as a matchbox, a ball, a party hat, an eraser, a	Oral questioning Illustrations Oral presentations Observation	Nets of solids Geoboards Computer Paint Crayons Card Two dimensional shapes Sorting trays

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
SET THEORY	Distinguish between the square and other rectangles. Identify three-dimensional shapes. Classify three-dimensional shapes according to their attributes. Distinguish between the cube and cuboid and the cylinder and cone. Identify a line, a line segment, a point and a ray. Identify/distinguish between horizontal and vertical lines. Identify lines of symmetry. Identify open and closed curves. Sort objects and numbers into sets. - Describe a group of objects that have a feature in common. - List the members of a given set.	pencil, a can. Ask pupils to describe the shapes and group them according to the features. Use the computer to draw line segments, and rays. Manipulate the line segments to illustrate horizontal and vertical lines. Use paint or ink to make designs by folding the paper and spreading.	Written tests Illustrations Discussion Graphical representations Illustrations Discussion	Maps Squared paper Rulers

TOPIC	OBJECTIVES	SUGGESTED ACTITIVES	ASSESSMENT	RESOURCES
DATA HANDLING	- Count the number of elements in a given set. Identify sets that contain the same members. Collect information on a given topic. Record the information collected using a table or chart. Illustrate the information collected using a pictograph. Determine the mode for given data. Interpret the information given in a diagram to draw conclusions	Group attribute shapes in various ways: - All red shapes - All triangles - All small shapes Ask pupils to indicate which parishes their relatives live in. Show the information on a map of Barbados, using a stick man to represent each person. Show the information on a horizontal pictograph. Ask pupils what conclusions can be drawn from the information. E.g. Parish where most people live; How many people live near to the school.	Oral questioning	