PRIMARY MATHEMATICS SYLLABUS

CLASS 3

MINISTRY OF EDUCATION AND HUMAN RESOURCE DEVELOPMENT

BARBADOS

TABLE OF CONTENTS

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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.

OBJECTIVES FOR THE PRIMARY MATHEMATICS SYLLABUS

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 syllabuses for Classes 1-4, 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 FOR CLASSES 1, 2, 3 and 4

□ **Begin teaching the concept/skill**
√ **Maintain and develop concept/skill**

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

□ **Begin teaching the concept/skill**
√ **Maintain and develop concept/skill**

	CLASSES			
	1	**2**	**3**	**4**
2.0.10 Value of a number	□	√	√	√
2.0.11 Place Value of a number	□	√	√	√
2.0.12 Prime and Composite numbers		□	√	√
2.0.13 Factors		□	√	√
2.0.14 Multiples		□	√	√
2.0.15 Squares and square roots			□	√
2.1 PROPERTIES OF NUMBERS				
2.1.1 The commutative property	□	√	√	√
2.1.2 The associative property	□	√	√	√
2.1.3 The identity property under addition	□	√	√	√
2.1.4 The identity property under multiplication	□	√	√	√
2.1.5 Multiplication by zero	□	√	√	√
2.1.6 The order of operations (BODMAS)			□	√
3.0 FRACTIONS AND DECIMALS				
3.0.1 The concept of a fraction	□	√	√	√
3.0.2 Written symbols for fractions	□	√	√	√
3.0.3 Operations with fractions	□	√	√	√
3.0.4 The concept of a decimal			□	√
3.0.5 Decimal notation			□	√
3.0.6 Operations with decimals			□	√
3.0.7 The relationship between fractions and decimals			□	√

□ **Begin teaching the concept/skill**
√ **Maintain and develop concept/skill**

		CLASSES			
		1	**2**	**3**	**4**
4.0	**RATIO AND PROPORTION**				
4.0.1	The concept of ratio and proportion			□	√
4.0.2	Ratios as fractions			□	√
4.0.3	Simplification of ratios			□	√
5.0	**PERCENTAGES**				
5.0.1	The concept of a percentage			□	√
5.0.2	The relationship between fractions, decimals and percentages			□	√
5.0.3	Operations with percentages			□	√
6.0	**MEASUREMENT**				
6.0.1	Non-standard units of measurement	□	√	√	√
6.0.2	Standard units of measurement	□	√	√	√
6.0.3	The metric system	□	√	√	√
6.1	**Linear**				
6.1.1	Determining length	□	√	√	√
6.1.2	Instruments for measuring length	□	√	√	√
6.1.3	Units for measuring length	□	√	√	√
6.1.4	Perimeter of shapes	□	√	√	√

√ **Begin teaching the concept/skill**
□ **Maintain and develop concept/skill**

		CLASSES			
		1	**2**	**3**	**4**
6.2	**Area**				
6.2.1	Units for measuring area			□	√
6.2.2	Area of regular shapes			□	√
6.2.3	Area of irregular shapes			□	√
6.2.4	Surface area			□	√
6.3	**Mass**				
6.3.1	Units for measuring mass		□	√	√
6.3.2	Mass of objects		□	√	√
6.4	**Capacity**				
6.4.1	Units for measuring capacity		□	√	√
6.4.2	Capacity of various containers		□	√	√
6.5	**Time**				
6.5.1	Times of the day	□	√	√	√
6.5.2	Periods of time – year, month, day, etc.	□	√	√	√
6.5.3	Instruments used for measuring time	□	√	√	√
6.5.4	Choice of instruments for measuring time	□	√	√	√
6.5.5	Measurement of elapsed time			□	√
6.5.6	Relationship between units of time			□	√
6.6	**Money**				
6.6.1	The local currency	□	√	√	√
6.6.2	The use of coins and notes	□	√	√	√
6.6.3	The relationship between coins and bills	□	√	√	√
6.6.4	Buying and selling			□	√
6.6.5	Currency conversions			□	√

√ **Begin teaching the concept/skill**
□ **Maintain and develop concept/skill**

		CLASSES			
		1	**2**	**3**	**4**
7.0	**GEOMETRY**				
7.0.1	Properties of two-dimensional shapes	□	√	√	√
7.0.2	Properties of three-dimensional shapes	□	√	√	√
7.0.3	Line, point, ray and line segment	□	√	√	√
7.0.4	Types of lines (horizontal parallel etc.)		□	√	√
7.0.5	Lines of symmetry		□	√	√
7.0.6	Types of angles			□	√
7.0.7	Measurement of angles				□
7.0.8	Types of quadrilaterals				□
7.0.9	Types of triangles			□	√
7.0.10	The circle			□	√
8.0	**SET THEORY**				
8.0.1	Definition of a set	□	√	√	√
8.0.2	Description of a set	□	√	√	√
8.0.3	Elements in a set	□	√	√	√
8.0.4	Types of sets		□	√	√
8.0.5	Diagrams of sets			□	√
9.0	**DATA HANDLING**				
9.0.1	Data collection and representation	□	√	√	√
9.0.2	Averages of given data (mean, mode)	□	√	√	√
9.0.3	Probability terms			□	√
9.0.4	Probability of outcomes			□	√
9.0.5	Predictions			□	√

CLASS 3

Pupils should be able to:

1. read and write numbers up to 99 999;
2. compare and order numbers up to 99 999;
3. determine the place value of a digit in numbers up to 99 999;
4. add and subtract whole numbers up to 99 999;
5. multiply and divide whole numbers up to 99 999 by one- and two- digit numbers;
6. determine the square and square root of a given number;
7. understand the concept of a mixed number and an improper fraction;
8. express a mixed number as an improper fraction and vice versa;
9. add fractions to whole numbers;
10. subtract fractions from whole numbers;
11. add fractions with mixed numbers;
12. subtract fractions with mixed numbers;
13. multiply a fraction by a whole number;
14. multiply a fraction by a fraction;
15. divide a whole number by a fraction;
16. divide a fraction by a fraction;
17. read and write decimal fractions up to thousandths;
18. write the place value of digits in decimal fractions;
19. write the value of digits in decimal fractions;

Pupils should be able to:

20. compare and order decimal fractions;
21. add decimal fractions up to thousandths;
22. subtract decimal fractions up to thousandths;
23. multiply a decimal fraction by a whole number;
24. multiply a decimal fraction by a decimal fraction;
25. understand the concept of a ratio;
26. read and write ratios;
27. express a ratio as a fraction;
28. express ratios in their simplest form;
29. apply the concept of ratios to problems requiring sharing;
30. understand the concept of a percentage;
31. express percentages as fractions and vice versa;
32. express percentages as decimals and vice versa;
33. determine percentages of a number or quantity;
34. use percentages to determine taxes, discounts etc.
35. use scales to determine distances;
36. determine the surface area of a cube or cuboid;
37. convert form one unit of time to another;
38. add and subtract units of time;
39. determine the time between events;

Pupils should be able to:

40. convert foreign currency to local currency and vice versa;
41. develop an appreciation for budgeting and saving money;
42. classify triangles – equilateral, right-angled, isosceles, scalene;
43. name and draw angles;
44. identify and name the parts of a circle – centre, diameter, circumference, chord;
45. state the relationship between the radius and the diameter;
46. identify the intersection of two sets;
47. identify the union of two sets;
48. use Venn diagrams to illustrate sets;
49. use Venn diagrams to list the elements in a set;
50. illustrate data using Bar Graphs / Line Graphs / Co-ordinate Graphs;

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
	Pupils should be able to:			
NUMBER CONCEPTS	Read and write numbers in words or symbols from 0 – 99 999. Compare and order numbers up to 99 999. Write the value and/or place value of any digit in numbers up to 99 999. Read and write Roman Numerals up to 1000. Approximate/round off numbers to the nearest 10, 100, or 1000. Write numbers up to 99 999 in expanded form and vice versa.	Find articles in the newspaper where numbers are used. Discuss which numbers are exact and which are approximate. E.g. Number attending a concert Cost of an airline ticket.	Illustrations Oral Reporting Discussion Written exercises	Newspapers Magazines Calculator
Addition	Add and subtract numbers up to 99 999 with and without regrouping.			Flash cards
Multiplication	Build and use multiplication tables up to 12 times 12.	Use different colours to create and describe a mosaic formed from the multiplication table.		Squared paper Number charts

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
Division	Multiply numbers up to 999 by numbers up to100. Divide numbers up to 99 999 by one-digit and two- digit numbers with and without regrouping and with and without remainder. Build number sequences in ascending/descending order. Determine the factors of given numbers. Calculate the Highest Common Factor and Lowest Common Multiple of given numbers. Determine the square and square root of given numbers. Understand the concept of a mixed number Identify and name sets of equivalent fractions.	There are 1558 children in the stadium. A bench can seat 25 children. How many benches are needed to seat all the children? Draw factor trees for given numbers. 24 6 4 2 3 2 2 Red, blue and green lights flash every 2, 5 and 6 minutes. If all are started together, how long will it be before the blue and green flash together; before they all flash at the same time. Use shapes to model mixed fractions. Divide the whole into fractional parts. For example how many quarters are in the 1 $\frac{1}{4}$	Simulation Discussion Illustration Simulation	Torch lights Card Compasses Rulers

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
FRACIONS AND DECIMALS	Add fractions to whole numbers.	Answer four quarters plus one = five. $\frac{5}{4}$	Discussion	Magazines
	Subtract fractions from whole numbers.		Oral presentation	Newspapers
			Creative writing	Fabric
	Change improper fractions to mixed numbers and vice versa.	Use pie charts to show fractional parts of a day spent on different activities.	Written exercises	Photographs
	Multiply and divide fractions.			
	Multiply fractions by whole numbers.	Examine the use of fractions in everyday situations such as recipes, craft and purchasing material. Write a poem entitled: "Where are all the fractions?"		Squared paper
	Divide fractions by whole numbers.			Number lines
	- Express decimal fractions in words and figures. - Find the value and/or the place value of any digit in a decimal fraction.	Use squared paper to illustrate tenths and hundredths. Have pupils express in words and symbols.		Fraction number line
Decimal Fractions	Compare and order decimal fractions.			
	Add and subtract decimal fractions up to thousandths.	Use the number line to show decimals. Relate decimal fractions to measurement conversions. 25 cm = 0.25 m 130 cm = 1.30 m		

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
RATIO AND PROPORTION	Multiply decimal numbers (tenths, hundredths, thousandths) by whole numbers. Multiply decimal fractions by decimal numbers. Understand the concept of a ratio. Express ratios in their simplest form. Express a ratio as a fraction. Use the concept of a ratio to share a given item.	400 g = 0.4 kg 1560 g = 1.56 kg Use pictures and/or tables to show the concept of a ratio. E.g. Share $12 between Sean and Shelley in the ratio 1:3. Sean Shelley / /// / /// / ///	Illustrations Demonstration	Coins Bills
PERCENTAGES	Understand the concept of the percent. Express percentages as common fractions and decimal fractions and vice versa. Determine the percentage of a given quantity. Solve problems with percentages (taxes, discounts etc.)	Make a hundred square using egg boxes. Plant seeds in some of the boxes and monitor their growth over a two-week period. What percentage of the boxes contains seeds? What percentage of the seeds sprouted? Use articles from the newspapers, magazines to determine the sale price of items reduced by a	Observation Oral and written reports. Written exercises Discussion	Egg boxes Seeds Newspapers Magazines Calculator

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
MEASUREMENT **Linear**	Learn to work in teams. Begin, follow through and complete tasks. Measure lengths accurately, using the appropriate instruments. Determine the perimeter of regular and irregular shapes. Determine distances using scales. Determine the area of regular and irregular shapes by using the formula or counting squares. Determine the mass of various objects using the appropriate instrument. Determine the capacity of various containers, using the appropriate methods. Read and record time in hours and minutes.	percentage. Compare the prices of items sold with and without a sales tax added. Pupils estimate the heights of their colleagues. Write the estimates in a table. Measure the heights and compare to the estimate. Repeat above activity for the masses of the pupils. Use the word processor to produce the data collected as a class booklet with information on each pupil, such as name, age, address, height, mass. Include a picture of each pupil. Each pupil should draw up a timetable of how they intend to spend their weekend, from Saturday morning to Sunday night. Use the timetable to calculate the time spent on various events.	Illustrations Charts Observations Booklet Class album	Measuring tape Scales Computer Digital camera Clock

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
Mass	Calculate the length of time that elapses between given times.	Make notes on the activities you did, including how much time was spent on each activity.	Journal	
Capacity	Convert from one unit of time to another.			
Time	Add and subtract units of time. Learn about and accept cultural differences.			
Money	Combine coins and bills to make up a given sum of money. Calculate the amount of money spent when purchasing a number of items. Determine the change to be received from a given sum of money used to purchase items. Convert from one currency to another. Solve problems involving profit and loss.	Collect information on the currency conversions from the newspaper. Locate the countries listed on a map of the world write in the currency used in each area. Set up a classroom bank and answer questions such as: John received a gift of US $10.00. The rate of exchange was US $1 = BDS $1.98. How much money would he get in Barbadian dollars?	Written exercises Illustrations / Drawings Simulation	Coins Bills Newspapers Calculators

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
GEOMETRY	Identify two-dimensional shapes; state the properties of two-dimensional shapes. Classify two-dimensional shapes according to their attributes. Identify three-dimensional shapes; state the properties of three-dimensional shapes. Classify three-dimensional shapes according to their attributes. Identify the parts of a circle. State the relationship between parts of the circle. Identify and draw pairs of lines to show those that are: parallel, perpendicular, intersecting. Express whole turns, half turns and quarter turns in degrees. Classify angles as acute, obtuse, right of straight.	Find shapes, lines and angles in the environment and discuss how they are used. E.g. Buildings, utility poles, fences, traffic signals. Collect pictures of buildings and identify the shapes in the buildings. Design a collage using pieces of fabric to create geometrical designs. Use potato halves to make stencils of two-dimensional shapes. Create a pattern of the print on paper or fabric. Determine the size of the angle and the type of angle formed when the clock is showing various times.	Discussion Oral questioning Illustrations Demonstration Observation Discussion	Two dimensional shapes Photographs Digital camera Fabric Paints Potatoes Rulers Set squares Clock faces Protractors Paper

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
SET THEORY	Identify the lines of symmetry of a given shape. Use Venn diagrams to illustrate sets. Determine the members of a set from the Venn diagram. Use a Venn diagram to show the intersection of two sets. List the members of the intersection of two sets. Use a Venn diagram to show the union of two sets. List the members of the union of two sets. Collect data using the appropriate methods.	Use paper and origami to create models. Solve problems such as: In a group of 35 persons, 23 play football and 18 play cricket. How many play both? Collect information on animals that live in various habitats. Note the animals that live in more than one habitat and show information on a Venn diagram.	Illustration Written reports	Computer Internet access
DATA HANDLING	Understand different family norms and structures. Represent the data collected in a diagram: table, pictograph, bar	Conduct surveys at the school to determine the size of families. Use a spreadsheet to tabulate and graph the information.	Oral presentation Interviews Illustrations	Computer Calculator

CLASS 3

TOPIC	OBJECTIVES	SUGGESTED ACTIVITIES	ASSESSMENT	RESOURCES
	graph, line graph, co-ordinate graph. Read and interpret the information in a diagram or chart. Choose a suitable scale to display data on graphs. Find the mode from a set of data Find the mean from a set of data. Understand the concept of probability. Determine the probability of outcomes. Use probability to make predictions.	Determine the most common family size, the smallest family size etc. Determine the mean family size found at the school. Throw a die 100 times and note the number seen each time. Investigate the probability of throwing various numbers. Repeat exercise with a coin and determine the probability of throwing heads or tails.	Demonstrations Quizzes	Dice Coins Calculator

APPENDIX

SUGGESTED TEXTS

PUPILS

Caribbean Primary Mathematics Levels 1-6 - Ginn
Nelson Primary Maths for Caribbean Schools 1-4 - Errol Furlonge
Steps To Common Entrance Mathematics 1 -3 Walter Phillips
Steps To Common Entrance Mathematics Text book Walter Phillips
Steps To Common Entrance Mathematics Workbook Walter Phillips

TEACHERS

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JOURNALS

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Teaching Children Mathematics. Reston, VA: National Council of Teachers of Mathematics. *(formerly Arithmetic Teacher*)