REPUBLIC OF TRINIDAD AND TOBAGO

MINISTRY OF EDUCATION

GORTT/IBRD BASIC EDUCATION PROJECT

PRIMARY SCHOOL SYLLABUS

MATHEMATICS

September 1999

TABLE OF CONTENTS

Page Number

FOREWORD

In 1994, the Ministry of Education published the Mathematics Curriculum documents now in use in primary schools, the Mathematics Primary School Syllabus and the Mathematics Scheme of Work. Continuing concerns about the problem numeracy of our primary school graduates, the quality of the teaching of Mathematics, the level of performance/achievement and of learning of Mathematics demonstrated by our primary school pupils, and, indeed, the Primary School Mathematics Syllabus /Curriculum itself, compelled a review of the entire issue of the teaching and learning of Mathematics at this level of the educational system - goals, objectives, content, teaching /learning strategies, methods of assessment and the competencies required by teachers of mathematics.

The GORTI/IBRD Basic Education Project presented us with the opportunity to review the existing Mathematics Primary School Syllabus. It also made provision for the training of teachers and the supply of appropriate instructional materials to improve significantly the teaching/learning of Mathematics in our primary schools. Accordingly, the new Mathematics Primary School Syllabus (A Working Document) presented here represents a critical element of the current thrust by the Ministry of Education to address some of the deficiencies, both perceived and expressed, related to the teaching of Mathematics in our primary schools.

Included among such weaknesses are: widespread teaching through the abstract mode with the emphasis on drill and rote learning; the lack of emphasis on hands-on activities in developing mathematical concepts; the inability to deliver the prescribed syllabus for each class/grade level within the expected time frame; and failure to take account of students' experiences and the socio-cultural context in the delivery of the Mathematics content.

In a concerted effort to address some of these above-mentioned widely held perceptions concerning the teaching and learning of Mathematics and the existing Primary School mathematics Syllabus, the new Primary School Mathematics syllabus adopts a constructivist orientation. The aim is to make the learning of Mathematics meaningful and relevant for the pupil. In developing thinking/problem-solving skills and reasoning ability in their pupils, from a constructive perspective, it is critical that teachers model appropriate behavior, guide student activities, and provide various forms of examples rather than use those commonly employed instructional practices that emphasize telling and directing. In other words:

"They must provide a learning environment where students search for [create] meaning, appreciate uncertainty and inquire responsibly."

Reflecting contemporary 'best practice' approaches to curriculum development, a mathematics consultant:, a ministry of Education Mathematics Curriculum specialist, and a specially selected group of Trinidad and Tobago educators (see 'Acknowledgement' for names of Mathematics Curriculum Team members), combined their expertise, experience and efforts to revise the existing mathematics Syllabus and to produce a new Draft Mathematics Syllabus (A Working Document). The Ministry of Education and all the beneficiaries of their efforts owe this team a great debt of gratitude.

It is recognized that there is need for necessary ground work to be undertaken prior to full scale implementation of the Draft Syllabus.

As part of this preparation, a series of Regional Workshops and School Based Coaching Activities on an on-going basis will be held to explain, as well as orient supervisors, principals and teachers toward the constructivist/integrated approach to the teaching of Mathematics advocated in the Draft Mathematics Primary School Syllabus. The teaching strategies and techniques that should be employed in implementing the new syllabus will also be discussed and modeled in these workshops, prior to implementation on a phased basis; initially at the level of Infants Years I and II and Standards I and II in all primary schools by September, 1998.

The Ministry of Education welcomes comments on the Draft Mathematics Syllabus and looks forward to receiving constructive comments for its improvement. Comments should be submitted to the Director, Curriculum Development, Rudranath Capildeo Learning Resource Centre, Mc Bean, Couva.

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i

INTRODUCTION

RATIONALE

The teaching and learning of Mathematics has been under constant scrutiny over the last fifty (SO) years. Reports from external examination bodies, The Ministry of Education, employers, public and private agencies on mathematics achievement have all concluded that the majority of our students and society at large are not well served. As a result, there have been repeated calls for raising the level of mathematics achievement. It is generally felt that an approach to this problem is to provide a curriculum which will embody:

(i)   improved ways of teaching Mathematics and

(ii)   a programme of work which will be truly relevant to society's

The revised Primary Mathematics Syllabus (1998) provides some guidance to teachers for bringing about improvement in the levels of mathematics achievement.

The major principles undergirding the mathematics curriculum framework which informed the revision of the Primary Syllabus are:

(i)   the nature of mathematics

(ii)   the psychological development of the primary school child

(iii)   the constructivist perspective on learnin

The Nature of Mathematics

Mathematics is an activity concerned with logical thinking, spotting patterns, posing premises and investigating their implications and consequences. It also involves the study of the properties of numbers and shapes; the relationship between numbers; inductive and deductive thinking and the formulation of generalizations.

Mathematics is a creation of the human mind and therefore becomes primarily a way of thinking thus facilitating problem-solving.

Mathematical content is sequential in nature. There is a hierarchy of concepts and skills on which each major area of mathematics can be built. The proper ordering of mathematical content for teachers and learners is critical to mathematical achievement.

Psychological and Pedagogical Considerations

It is not intended that the syllabus should fully describe the various schools of thought on learning. Reference is made to the learning theories which in some way influenced the development of the Mathematics Syllabus. These influences were derived from:

-Piaget's stages of intellectual development, namely from sensori -motor to formal thinking;

-Diene's insistence on direct interaction with the environment;

-Bruner's model for depicting levels or modes of representation, namely enactive, iconic and symbolic;

-Skemp's contributions on instrumental and relational understanding;

-Van Hiele's first two levels of geometric thought.

The blending of the psychological bases has resulted in a perspective referred to as constructivism...

Constructivism is both a cognitive and a methodological perspective. It takes the viewpoint that learning is a highly personal matter and that teachers are really facilitators who engage pupils, both in groups or as individuals, in mathematical activities. These activities are to be organized in such a way that the individual connects the known to the unknown and in so doing constructs new mathematical concepts and processes.

Classrooms supporting this perspective ought to reflect activities which are designed to pose challenges and to offer support that will facilitate construction of mathematical skills and knowledge, in a setting where positive attitudes can be acquired.

STATEMENT OF BELIEFS

We believe that all pupils can and must succeed in mathematics, but that individual differences exist among them with respect to learning styles and rates and that to become mathematically literate, pupils must be provided with the opportunities to:

-develop a conceptual understanding of the full range of the content of the syllabus;
-enrich their understanding of concepts through exposure to multiple forms of representations, namely models, diagrams, graphs, manipulatives, simulations, computer visualization and symbolic expressions;
-participate actively in the construction of mathematical knowledge;
-engage in mathematical discourse;
-develop problem solving skills;
-connect mathematical concepts within and outside of mathematics;
-use appropriately the existing technology including but not limited to, calculators and computers as tools of learning;
-participate in assessing their own mathematics learning and progress.

We believe that teaches are essential to the learning process and as such can facilitate pupils in becoming mathematically literate by:

-developing positive attitudes towards the teaching and learning of mathematics;
-expanding   their own mathematics knowledge;
-establishing and working towards high standards in mathematics performance;
-creating classroom settings to facilitate conversation and discourse in mathematics;
-providing connections between the existing network of pupils' ideas and experiences within mathematics and with other disciplines;
-presenting mathematics in the context of meaning and application rather than as a set of procedures;
-connecting mathematics content to problem solving processes and strategies;
-engaging pupils in activity oriented situations where   they can create knowledge and discover concepts through the use of a variety of learning resources.

GOALS

Pupils will:

-become numerate, that is they will:

-develop the ability to demonstrate a facility with numbers and number operations;
-be able to make use of mathematical skills and knowledge necessary for coping with the practical demands of everyday life;
-appreciate and understand information presented in mathematical terms as these relate to shape and the various measurement concepts;

-express mathematical ideas clearly and effectively both orally and in writing;
-interpret instructions, descriptions and explanation in language appropriate to their age and/or attainment;
-analyze information collected by statistical methods and draw conclusions;
-apply the concepts and skills of measurement and geometry to everyday situations and in the process develop critical thinking skills; -know the principles, structures and basic laws of mathematics appropriate to their level;
-learn to reason logically;
-think creatively, so as to solve routine and non-routine problems;
-be able to link mathematics with other subjects across the curriculum.

GENERAL OBJECTIVES

Pupils will be able to:

-develop skills in approaches to problem-solving and inquiry at a level appropriate to their age and attainment using content across the syllabus;
-indicate competence in the knowledge, understanding and application of mathematical concepts, facts and algorithms related to number, money, measurement and geometry (Space and shape);
-make sense of information by demonstrating the steps in the statistical process;
-develop positive attitudes by experiencing mathematics in a real life context through practical and experimental activities;
-appreciate the nature and purpose of mathematics by identifying patterns, sequences and relationships within and across topics in the syllabus and in other subject areas;
-derive pleasure in learning mathematics by creating simulations and imaginary situations;
-allow each pupil to develop according to his/her ability and interest, taking into account the particular needs of individual pupils and groups of pupils.

ORGANISATION OF THE DRAFT SYLLABUS

This document is sequenced from Infant I to Standard 5.

The Draft Syllabus covers the four (4) content strands:

-Geometry
-Number
-Money and Measurement
-Statistics

The content strands are distributed spirally across all class levels.

The Draft Syllabus presents the content strands under the following headings:

i.   Topic
ii.   Objective
iii   Instructional Focus
iv   SuggestedActivities.

Instructional Focus

This heading suggests a hierarchical ordering of the skills and/or knowledge related to the objectives. The suggested sequence takes into consideration the nature of the mathematical content as well as the skills to be acquired by the pupils.

Suggested Activities

The activities presented in the syllabus are designed to represent problem-solving situations in which pupils are encouraged to collaborate with one another through discussion, debate, elaboration and clarification in order to negotiate meaning.

Other Key Words Embedded in the Activities are:

Construct, derive, present, gather information, reflect, give reasons, justify, suggest, design, and provide examples, compare, report, pose questions.

The suggested activities in the Draft Syllabus are not exhaustive and teachers are free to extend and develop their own activities.

The Assessment and Evaluation Procedures associated with the Syllabus will be elaborated in the Standards Document.

CONTENT STRANDS

Geometry

Geometry is the branch of mathematics which deals with the study of shapes, their properties, the relations which exist among them and the ways in which they can be moved or transformed. Through the study of geometry children are better able to represent and describe the world in which they live. As a result, they develop spatial sense and dynamic imagery, which are important processes underlying much of mathematics learning, as well as learning in general.

Number

An understanding of numbers is central to the development of numeracy. If children are to make sense of their everyday world, they must have a thorough grasp of number meanings and they must have acquired an insight into the effects of the fundamental operations - addition, subtraction, multiplication and division on a pair of numbers.

It is the interaction of both a sense of numbers and a sense of operations that provides a framework for the conceptual development of mental and written computational procedures. Computation is the focus for the growth and development of mathematical ideas.

Measurement and Money

Measurement has many practical applications, that can help children to understand that mathematics is useful in everyday life. Measurement skills are essential to daily activities. Basic measurement skills are required in the other strands in Mathematics and are also important concepts in other curriculum areas such as - Science, Physical Education and Language Arts..

Money is the one commodity in life that each individual must experience as a part of life. It is an important resource, that can be used to accelerate understanding in number concepts and skills, in relation to real life situations. It can be used to develop proper attitudes and values in pupils as they study its purpose in society and its historical, cultural and international perspectives

Statistics

The study of statistics is important in the primary school since society frequently gathers, organizes and expresses data numerically or by displaying information graphically. Even from an early age, we have been exposed to statistics as it manifests itself in weather predictions, newspaper advertisements and examination results. In fact daily living requires decisions to be made on the processing of statistical information. The methods of statistics at the primary level can be connected naturally with, the work in science, social studies, sports…, thus providing insights into the integration of mathematics in the other curriculum areas.

PERSPECTIVES ON INSTRUCTION

The Mathematics Syllabus indicates what content is to be taught at the various levels in the primary school. The syllabus also lists activities which teachers may incorporate into their instructional plans.

The teaching perspective which guided the suggested activities is that instruction should reflect mathematics as:

-Problem solving
-reasoning
-communication and
-connections

It is important that such a perspective be maintained while teaching the specific content. A focus on the mathematical content and a focus on the perspective are complementary as both components are essential for the pupils' mathematical growth.

Problem-solving

This facet is the central focus on the Mathematics Curriculum. In the syllabus it is not treated as a separate strand or topic, but as a process permeating the entire mathematics programme. Problem-solving should be seen as providing the context in which concepts and skills could be learned. A useful distinction between routine and non-routine problems should be made. Routine problems involve an application of mathematical procedure, in much the same way that it is learned, to real life situations. Non-routine problems often require more thought as the choice of mathematical procedures to solve them is not as obvious. Story problems at the end of topics presented in textbooks will be considered as routine problems. To develop problem solving skills, pupils must be involved in activities which allow them to pose questions, provide alternative solutions, analyse situations, translate word problems into mathematical symbols and language, illustrate results using drawings and diagrams and trial and error methods.

Reasoning

For the primary years, the pupils' mathematical reasoning is informal. Mathematics as reasoning is concerned with the development of inductive and deductive reasoning skills which comprise a significant part of mathematical thinking. In the Mathematics Syllabus the activities suggested are examples where the pupils can engage in logical arguments, draw conclusions and assess the solution of others. Pupils should acquire self confidence in their ability to do mathematics and determine the reasonableness of their answers. Additionally the activities suggest some ways of involving the pupils in:-

-using mathematical models to justify thinking;
-using discussion to test and validate ideas;
-making and testing conjectures based on observation;
-giving examples and non-examples to support conclusions; and
-building and   recognizing patterns.

Mathematics Communication

This aspect reflects the need to read, write, speak, listen, discuss and represent mathematical ideas, interpret symbols and problems and present solutions. Mathematical language and symbols may cause difficulties for the pupils. Words used in everyday language may be different in meaning when used in a mathematical context. Embedded in the suggested activities are opportunities which will facilitate both teachers and pupils engaging in mathematical discourse.

Mathematics as Connections

Connections in mathematics can be made both within the subject, across other subjects and in the real world. Connections deal with the interrelationship of the various mathematical topics and the connections of mathematics to other content areas. Connections need to be made when introducing a concept with an actual concrete model. Many different models could be used to represent fractions - two-dimensional shapes, groups of objects and the number-line. These models all represent real life situations. Counting as related to addition and addition as related to multiplication demonstrate connections among these algorithms. Mathematics can also be used to convey ideas and information in science, social studies, music, art and many other areas of study.

SCOPE AND SEQUENCE CHARTS

These provide a summary of the Programme of Work in the Primary School Mathematics Syllabus (1998) as the topics relate to the class levels - Infant through Standard Five.

GEOMETRY: SCOPE AND SEQUENCE

Class	Shapes (3D)	Shapes (2D)	Symmetry	Angles
Infant Yr. I	Natural and man-made			
Infant Yr. 2	Representations of solids (boxes, cans, balls, cones)	Polygons (squares, triangles, rectangles, circles)		
Std. I	Relationship between 3D and 2D	Properties of Polygons (sides and corners)		
Std. 2	Relationship of 3D (cube, cuboid, cylinders)	Composition of simple and compound shapes	Symmetry in natural and man-made shapes	
Std. 3	Properties of 3 D shapes (cube, cuboids, cylinder) Introduce nets of solids	Creating new shapes by tessellating Use slides and flips	Symmetry in plane shapes	
Std. 4	Properties of 3D shapes (cube, cuboid, cylinder and cone)	Pattern making by sliding, flipping, turning and re-arranging	Symmetry in letters of alphabet and numerals	Idea of angle Comparing angles
Std. 5	Properties and nets of cube, cuboid, cylinder and cone	Properties of plane shapes Types of triangles	Polygons 3D shapes	Constructing and verifying size of angles using paper - protractors

WHOLE NUMBER: SCOPE AND SEQUENCE

Class	Concept	Notation and Numeration	Addition	Subtraction	Multiplication	Division	Number Theory	Mental Maths/Problem-solving
Infant Yr. 1	(Pre-number) zero to ten	-Recognition of number names to 10 -Number value to 10	-Concepts symbol 2 sets less than 10 (PRACTICAL)	-Concept symbol -less than 10 (PRACTICAL)				Oral problems Number bonds Less than 10
Infant Yr. 2	Groupings (2's, 3's, 4's, 5's, etc.)	-Writing number names to 10 -Number value to 20 -Reading numerals to 20	-Concept 2 or 3 addends less than 20	-Concept 2 sets less than 20	-Concept			Oral problems Number bonds Less than 20
Std. 1	Place value to 99 Rounding to tens	-Number sequence to 100 -Write number names to 20 -Read numerals to 99	Sums less than 100 2d + 1d 2d + 2d	2d – 1d 2d – 2d	-Concept -1d x 1d (multipliers to 5) -Tables: 2, 3, 4, 5	-Concept	-Concept of odd numbers, even numbers.	Even numbers Odd numbers Less than 10 Oral problems +,-.
Std. 2	Place value to 999 Rounding to hundreds	-Number sequence to 1000 -Write number names to 100	Sum less than 1000 3d + 1d 3d + 2d 3d + 3d	3d - 1d 3d - 2d 3d - 3d	2d x 1d (informal) Tables: 6, 7, 8, 9, 10	2d ÷ 1d (informal)		Tables 2, 3, 4, 5. Oral problems +,-
Std. 3	Palce value to 9999 Rounding to -tens -hundreds	Number sequence to 10 000	Sums less than 10 000 4d + 1d 4d + 2d 4d + 3d 4d + 4d	4d - 1d 4d - 2d 4d - 3d 4d - 4d	Algorithm 2d x 1d 3d x 1d 4d x 1d 2d x 2d	Algorithm 2d ÷ 1d 3d ÷ 1d 4d ÷ 1d Dividing by 10		Tables 6, 7, 8, 9, 10. Oral problems +,- Estimation Written problems (four rules)
Std. 4	Place value to millions Rounding to -thousands -millions	-Number sequence to 1 million -Number name -Numerals -Ordering			2d x 3d 4d x 2d	2d ÷ 2d 3d ÷ 2d 4d ÷ 2d	-Square numbers -Square root	Oral problems Written problems (four rules)
Std. 5								Oral problems Written problems (four rules)

12

COMMON -FRACTION: SCOPE AND SEQUENCE

Class	Concept	Comparison/ Ordering	Equivalence	Addition	Subtraction	Multiplication	Division	Mental Math/ Problem solving
Infant Yr. I	--------------------	-------------------						
Infant r. II	Concept of -half -quarter *no symbols	-------------------						
Std. I	Concept of -half (1/2) -quarter (1/4) -third (1/3) -fifth (1/5) -tenth(1/10)	-------------------						
Std. 2	Introduce set model -half (1/2) -quarter (1/4) -third (1/3)	-Comparing 2 fractions -Ordering fractions	-Equivalent fractions	Like denominators (oral)	Like denominators			
Std. 3	-Improper fractions -Mixed numbers	-Conversion of improper fraction to mixed number	Introduce Common Multiples	Like and unlike denominators	Like and unlike denominators			Oral problems
Std. 4				Mixed numbers	Mixed numbers	Fractions by whole number	Whole number by fraction	Written problems
Std. 5						-two proper fractions -two improper fractions -two mixed numbers whole number by a fraction	- fraction by fraction -fraction by whole number	

DECIMAL FRACTIONS: SCOPE AND SEQUENCE

Class	Concept	Place Value	Approximation	Addition/Subtraction	Multiplication	Division	Problem solving
Infant Yr. I							
Infant Y r. 2							
Std. 1							
Std. 2							
Std. 3	-Tenths						
Std. 4	-Expressing common fractions as decimal fractions	Read and write, identify -tenths -hundredths	Rounding to -tenths -hundredths	-tenths -hundredths -tenths and hundredths	-whole number by tenths -tenths by whole number -hundredths by whole number -tenths and hundredths by whole number -tenths and hundredths by tenths and hundredths.	-tenths by whole number -hundredths by whole numbers -tenths and hundredths by whole number	Word problems
Std. 5	↓	↓	↓	↓			

MONEY: SCOPE AND SEQUENCE

class	Recognition/Notation	Value	Equivalence	Computation(excluding percent)	Computation(including percent)	Problem solving/Integration
Infant Yr. I	Bills and coins of Trinidad and Tobago			Informal addition to and subtraction from 10 cents (ONLY PRACTICAL ACTIVITIES)		Mental maths and Problem-solving (ORAL)
Infant Yr. 2	Revise bills and coins of Trinidad and Tobago	1 cent, 5 cents, 10 cents, 25cents	5 cents, 10 cents $1.00 in terms of 25 cents	Informal addition to and subtraction from 20 cents, (ONLY PRACTICAL ACTIVITIES)		
Std. I	Review all notes of Trinidad and Tobago	$1.00 $5.00 $10.00 $20.00	25cents $5.00 $10.00 $20.00	Buying and selling to $20.00 with and without change *(Dollars only)		
Std. 2	Read and write notations Dollars, dollars and cents	$100.00	$100.00	Approximation to the nearest dollar. Buying and selling up to$100.00 with and without change. Making bills		Mental maths and and Problem-solving (WRITTEN)
Std. 3		$1000.00	$1000.00	Problems involving rates to $1000.00 Profit and Loss.		
Std. 4			Wages and salaries Savings and loans (PROJECTS)	Problems involving rates Savings and loans Simple Interest		
Std. (Grade) 5					Profit and loss Discounts Taxes, e.g., VAT	

PERCENT: SCOPE AND SEQUENCE

Year	Concept	Conversation	Application	Equivalence	Computation	Mental math problem solving
Infant Yr. I						
Infant Yr. 2						
Std. I						
Std. 2						
Std. 3						
Std. 4	Concept of percentage	Conversion of percentage to fractions	Percentage of quality	Conversion of fraction to percent	Calculating percent: -Whole quantity -Part of quantity.	Word Problems Applications Wages, Salaries, Loans, Savings, Simple Interest
Std. (Grade) 5	↓	Conversion of percentage to decimal	↓	Conversion of fractions to decimals to percent		Profit and loss Discounts Taxes -VAT
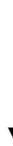
MEASUREMENT: SCOPE AND SEQUENCE

Class	Linear	Area	Volume/Capacity
Infant Yr. I	Concept of length: equal, > and ordering	Concept of are: equal <and>, ordering	Concept of capacity: equal, >and< ordering
Infant Yr. 2	Quantify lengths using arbitrary units. Estimate lengths.	Quantify area using arbitrary units. Estimate area.	Quantify capacity using arbitrary units. Estimate capacity
Std. I	Quantify length using standard unit – metre. Estimate. Quantify length using ½ metre and ¼ metre. Estimate.	Quantify area using square units. Estimate	Quantify capacity using standard unit – litre. Estimate
Std. 2	Quantify lengths using metre and centimeter. Calculate lengths (+, -) using metre and centimeter. Concept of perimeter. Measure perimeter.	Quantify area using one-centimetre squares. Estimate. Approximate.	Quantify capacity using sub-units and multiple units of the litre. Estimate.
Std. 3	Calculate perimeter of squares and rectangles. Concept of the kilometer. Establish relationship among km., m., cm. Conversion of metres to centimeters/vice versa. Calculate lengths. Computation.	Calculate area of squares and rectangles.	Concept of volume. Calculate volume using non-standard units. Calculate volume using standard unit. Estimate. Quantify capacity using (I) arbitrary units (ii) millitres.
Std. 4	Measure lengths using the millimeter. Concept of circumference. Appropriate (pi) $\pi = 3$	Calculate area of triangle (associated to square and rectangle). Calculate area using the square metre. Estimate.	Calculate volume of cubes and cuboids using cubic units.
Std. 5	Calculate circumference. Calculate diameter $\pi = 3\ 1/7$. Calculate radius. Calculate perimeter of compound shapes. Solve problems involving linear measure.	Calculate area of compound shapes. Solve problems involving area and perimeter. Calculate area of triangle using formula.	Solve problems involving volume and capacity Relate Volume to capacity

17

MEASUREMENT: SCOPE AND SEQUENCE

Class	Mass/Weight	Time
Infant Yr. I	Concept of mass; equal, <and>, ordering.	Concept of time. (i) Passing of events. (ii) Duration.
Infant Yr. 2	Qualify mass using arbitrary units. Estimate.	Identify time as duration of activities
Std. 1	Quantify mass using the standard unit – kilogram. Estimate.	Relate time to movement. Tell time to the hour. Relate analog clock to digital clock.
Std. 2	Quantify mass using sub-units and multiple units of the kilogram. Estimate. Approximate.	Relate events to specific time periods. Tell time to half past the hour, quarter-past and quarter to the hour.
Std. 3	Weigh objects using kilograms. Estimate mass. Approximate mass.	Tell time to: (i) Quarter to (ii) Quarter past Tell time to five minutes/intervals.
Std. 4	Introduce the gram as standard unit. Measure mass in grams. Conversion Computation (four operation)	Tell time to the minute. Estimate.
Std. 5	Solve problems associated with mass/weight	Establish relationship between sub-units for time. Solve problems involving time and other related concepts.

STATISTICS: SCOPE AND SEQUENCE

Class	Object/Graph		Pictograph		Block Graph		Bar/Graph	Pie Chart
Infant Yr. I	Classifying objects Construct and interpret object chart.							
Infant Yr. 2			Interpret picture chart Collect and organize data for graph. Construct picture chart.					
Std. I			Interpret pictograph. The Mode. Identify features of the pictograph. Comparing features of picture chart and pictographs. Collect and organize data. Construct and interpret pictograph.					
Std. 2					Formulate problem. Collect and organize data. Construct and interpret block graph. Characteristics of block graph.			
Std. 3							Formulate problem. Collect and organize data Construct and interpret bar graph. Decision making. Mode and mean. Compare and contrast with other graphs.	
Std. 4								Formulate problem. Collect and organize data. Interpret pie chart. Calculate mean, mode. Decision-making. Determine suitability of graphs previously done.
Std. 5								Formulating problem. Data-collection using questionnaire, etc. Organising Data – frequency tables. Displaying data – selection of suitable form. Interpret and write report. Mean/Average from frequency table.

MATHEMATICS PRIMARY SHOOL SYLLABUS 1998

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
GEOMETRY SOLIDS 3 D Shapes Cube Cuboid Cone Cylinder Sphere	1. Manipulate three dimensional shapes to develop awareness of geometrical attributes	<u>Behaviour Attributes</u> <u>Informal Vocabulary</u> Shape round, roll, pointed Size tall, short, thin, thick Position on top, below, next to	Given a selection of 3 D shapes and sizes pupils can be allowed to touch, observe and play with 3 D shapes. Present pupils with a model made with 3 D shapes (e.g. robot) and let them talk about the shapes they observe. Allow pupils to experiment with making their own models and talk about what they have made.

	2. Compare 3 D shapes using a single attribute	Attributes: size, shape	Pick up a 3 D shape and ask pupils to find another that is :
			       - like this one
			       - different from this one
			Pupils may use size (e.g., tall, thin) or shape (e.g., round) as a basis for comparison.

	3. Classify 3 D shapes according to common attributes	Pupil's own criteria
		A single attribute (e.g. shape)
		Two attributes e.g. size and shape (big, round)
			Using a collection of two types of 3 D shapes pupils can be encouraged to:
			       - sort into two groups
			       - stack 3 D shapes
			       - discuss why a group of 3 D shapes belong together
			
			Extend activity to include more 3 D shapes
			Allow sorting and re-sorting on:
			       -one common attribute
			       -two attributes

	4. Identify a 3 D shape from its pictorial representation	Concrete to pictorial representation
		Visual discrimination
			Present pictorial representation of 3D shape and give students the opportunity to match them to their pictures
			       Use worksheet exercise
			For example:
			      - colour in blue a 3 D shape with a particular attribute
			      - draw a ring around the 3 D shapes which are alike
			      - match the 3 D shapes to one like it
			      - count the number of each type of 3 D shape from given pictures of assorted 3 D shapes

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
NUMBER PRE-NUMBER	1. Classify objects into groups	Vocabulary development (qualitative attributes) Names of objects, colours Size, shape and texture: rough, small, flat	Given a selection of objects (e.g., beads, blocks, buttons), children will: - Isolate one group of objects according to an attribute - Sort the collection given two attributes - Resort selection according to pupils' attribute State the common properties (e.g., colour, shape of objects in a group) Decide if a new object belongs to a group
	2. Match the members of one group with the members of another group	One to one correspondence Matching natural objects (natural matching) Matching by joining, drawing etc.	Using items like bottles and straws (or knives and forks. cups and saucers. etc) allow pupils to put one straw in each bottle Using pictures of items, allow pupils to:- - use a strip. string or line to match objects - draw items to match. (e.g.. draw a saucer for each cup, a flower for each vase)

	3. Identify a group that has
	    a. More objects than a given group
	    b. As many objects than a given group
		Vocabulary development (quantitative attributes)
		words associated with numbers:
		some, few, many, more, most, etc.
			From a given collection. pupils will arrange counters in rows to determine which row has more/most.
			Allow pupils to use one to one correspondence to explain outcomes.
			Extend activity for 'as many as'
			Set up situations which allow pupils to:-
			- draw a group with 'more than' or 'same as' a given group

	4. a. Count the number of objects in a given group (1-5)	Number names in sequence. Concept of 1 and 2 Concept of. 3, 4 and 5 as one more than the preceding number Numeral recognition and writing (1-5) Matching numeral with number names (1-5) Conservation of number/number patterns	Provide pupils with opportunities to:- - Recite sing number rhymes or songs to establish number sequence up to 5 - Establish the 'twoness' of a group by one to one correspondence with a familiar group (e.g... eyes. legs. etc.) - Recognise and write numeral by joining dots. Tracing, copying - Make groups of two - Match numeral with group

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

NUMBER CONCEPT (cont'd)			Using lego blocks, counters on abacus, peg boards etc, allow pupils to
			    - add one more to a group of two to make three
			    - Count out a group of three by saying 1, 2, 3, together
			    - clap, skip, hop or jump three times
			    - color/circle three items given groups with more than 3
			    - recognise numeral and match with groups
			    - write numeral
			Extend activity to develop concepts of 4, 5
			Arrange counters in groups of 3,4 or 5 to make different patterns

	b. Count the number of objects in a given group (6-10)	Number names in sequence counting groups up to 10 Numeral recognition and writing (6-10) Matching numeral with group (6-10) Conservation of number (6-10)	Provide pupils with opportunities to:- - recite number rhymes and jingles to become familiar with number names up to 10 Create similar activities to those mentioned above to develop concept of 6-10

	5. Read number names zero to ten	Matching a numeral with its appropriate number name
		Matching a set of objects with its appropriate number name
			Provide opportunities for pupils to match (using flash cards)
			    - numerals with number names
			    - number sets with number names
			Play number games (e.g., a set of pupils can hold flash cards with numerals and another set hold flash cards with number names. One pupil can display a numeral card and another pupil will match with the number name or vice-versa)

	6. Add the number of objects in two groups and state:
	
	a. The sum (less than 5)
	b. the sum (less than 10)
		Concept of addition
		Language of addition - altogether, sum, total
		Identifying two groups
		Counting the members in each group
		Combining the two groups
		Counting the total
		Use of addition symbol and equal sign
		Number sentences
		Addition facts
			Using counters, allow pupils to make two groups and verify
			    - How many in each group;
			    - How many altogether
			Using two containers (e.g. cups, boxes with two sections, large cards separated into two parts), allow pupils to make two groups, then count the total.
			After sufficient oral practice, permit pupils to write the number sentence,
			Example: (_ _ and _) 2 add 1 equal 3
			Use number sentences to introduce addition symbol and equal sign
			Example: $2 + 1 = 3$
			Create exercises for pupils to practise addition.
			Provide opportunities (e.g. games, puzzles) where pupils can perform additions mentally.
			Allow pupils to create number stories involving addition.
			Develop a sequence similar to those mentioned above for addition to two numbers, whose sum is less than 10.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

SUBTRACTION [Take Away]	7. Perform subtraction involving two numbers:
	
	a. Equal to or less than 5
	
	b. Equal to or less than 10
		Concept of subtraction
		Language of subtraction (e.g. take away, left /removed, remain)
		Introducing zero
		Subtraction symbol
		Subtraction sentences
		Subtraction facts
			Create situations for pupils to use concrete materials to:
			   - Count out a set, take away a smaller group and state orally how many are left
			   - Describe action performed
			Create new situations where pupils can count out a set and cover/hide some with their hands. Count how many are not covered.
			Then introduce symbol $5 - 2 = 3$
			Introduce zero as the result when no objects are left.
			Example:
			       Six pupils can be called out
			       Ask how many are left
			       Let pupils describe what took place (e.g. 6 take away 6 – leaves no pupils , none, nothing, no one, etc)
			After oral work, use number sentences involving subtraction, for example:
			       5 take away 2 = 3
			
			Then introduce symbol $5 - 2 = 3$
			Introduce zero involvement in subtraction, for example:
			       5 take away 5 equals zero
			       3 take away 0 equals 3
			Create exercises for pupils to practice subtraction
			Provide opportunities (e.g. games, puzzles) where pupils can perform subtraction mentally.
			Allow pupils to create number stories involving subtraction.
			
			Develop a sequence of activities similar to those mentioned above for the subtraction of two numbers where the number in each set is between 6 and 10.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MONEY	1. Recognise Trinidad and Tobago currency	Identify and select Trinidad and Tobago coins (from among other coins).	Devise activities to establish and strengthen the recognition of denominations of the Trinidad and Tobago currency, for example:
	2. Recognise the individual units of the Trinidad and Tobago currency	Identify and select Trinidad and Tobago dollars (from among those of other countries) Identify the 1 ¢ Identify the 5 ¢ Identify the 10 ¢ Identify the 25 ¢ Identify the $1 Identify the $5 Identify the $10 Identify the $20 Identify the $100	Have a box containing currency including all those from Trinidad and Tobago. Have a student select one note or coin from Trinidad and Tobago currency justify their choice to the class, allow the peers to argue. Take a consensus. Provide situations to allow students to note the distinguishing features of each denomination.　　Example: 　　- rubbing-shading with the paper over the coin 　　- drawing the bills 　　- compare drawings with actual bills 　　- draw conclusions

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT LINEAR MEASURE AREA CAPACITY WEIGHT/MASS TIME	1. Demonstrate an awareness of linear measure 2. Demonstrate an awareness of area 3. Demonstrate an awareness of capacity 4. Recognise the existence of weight/mass 5. Recognise time as – a. framework for the passage of events b. duration	Vocabulary: long / short / tall; wide / narrow; thin / fat; deep/ shallow; high / low; near / far Direct comparison - longer, taller, as long as Order - tallest, longest, shortest Flat Surfaces Direct comparison - larger. smaller, equal area Objects with capacity Vocabulary: full, empty Comparison - more than, less than, equal to Objects with weight/mass - heavy, light Comparison - heavier, lighter, as heavy as Times of the day (e.g., morning, afternoon, night) Sequencing activities in terms of time Vocabulary - 'a long time'; 'a short time'	Design activities for pupils to:- freely explore concrete materials and describe by using the appropriate vocabulary. Examine objects and determine longer/shorter and justify selections. Examine objects to determine equal length. Explain procedure. Arrange objects from shortest to longest/tallest and vice versa. Experience surfaces by touching, colouring, covering. Examine flat surfaces to identify larger, smaller, equal area. Discuss findings. Examine objects to determine those that can be used 'to put things in'. Explain why some objects were not selected. Fill and empty containers into each other and state which holds the same amount/more than/less than. Give reasons. Investigate objects of varying sizes, shapes. materials to identify heavy light. Lift objects manually and state which is heavier/lighter. Discuss. Use equal- arm balance to show 'as heavy as'. Associate daytime, night-time with activities that occur. Arrange activities according to time of occurrence. Associate times with activities that pupils do during the day. Discuss' a long time' and 'a short time'.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
STATISTICS	1. Classify objects	Student's criteria (e.g., shape, size, color) Teacher's criteria e.g., texture, color etc.) Subgroups	Set up problem situation where classification becomes necessary, for example: resource box with toys, shapes, blocks, bottle-caps, etc. Pupils are allowed to sort these using their criteria and give reason for their classification. The teacher can give a criterion which the students use to classify the objects (e.g.: use of the items). The pupils should subdivide each class into subgroups using other criteria (e.g., color, size). Pupils must explain what they did and why.
	2. Construct and interpret object chart	Arrays without grid, for example: - students stand in rows using a criterion - hair ribbon - students arrange objects on desk top Array with grid Students arrange objects on chart, desktop, floor Language development i. more than ii. less than iii. equal (same as) iv. amount in a group Equal spacing Label the sets Horizontal or vertical arrangement	Teacher and pupils must present items for making the groups. Students then arrange each groups vertically and horizontally hence making columns and/or rows. Students discuss each arrangement, i.e. why each object was placed in that manner. They must be allowed to compare each column by counting the number in each. This exercise should be done using grids which can be drawn/presented on desktops. Floor, charts, etc. Students should be allowed to discuss these two arrangements (without and with grid).

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
GEOMETRY SOLIDS 3 D Shapes Cube Cuboid Cone Cylinder Sphere	1. Describe three dimensional shapes (solids) using informal language	Informal names: box ball can cone (Accept pupils' language even if they use formal names)	Ask students to bring a collection of solids. Using their solids (e.g. boxes, cans, balls, cones of various sizes), pupils can: - sort on the basis of shape (cubes and cuboids can be grouped together) -discuss the common properties of a group; -name the groups as: boxes, balls, cans, cones; -set up a classroom display of solids Set up situations where pupils can feel a shape and try to name it without seeing it.
	2. Match the faces of solids to corresponding plane shapes	Congruence	Given an assortment of solids and matching faces pupils can; play the game 'find my faces' by sticking flat shapes on faces of solids. Using a 'shape box' pupils can fit faces of solids onto the outlines of faces on the shape box.
PLANE SHAPES Rectangle Square Triangle Circle	3. Compare plane shapes	Word recognition Associating word name with plane shape Alike (having at least one common attribute)	From a given set of plane shapes, engage students in activities in which they will use matching to determine if: - two shapes are the same -two shapes are different -two shapes are alike Using a set of cut-outs of plane shapes and their outlines drawn on paper, allow students to match the shape to its respective outline. Worksheet activities (e.g., colour all the triangles red; fmd a square larger than a given square; find two different rectangles).
	4. Name plane shapes	Same (identical/congruent) Different Alike (having at least one common attribute)	From a set of plane shapes, have students sort to find shapes that are alike in some way. Challenge their groupings by asking why they place this one here and not there. Present a shape (e.g., rectangle) and let students find all the shapes like it. Introduce names orally and in written form. Match word name to shape.
	5 a. Identify simple plane shapes from compound shapes b. Construct pictures using plane shapes	Compound shapes (examples from the environment) Circle - face, wheels Rectangles - body, house Squares – window Triangle - roof	Examine pictures of buildings, Ladybird shape chart, and allow pupils to identify and name simple plane shapes. Investigate shapes of the environment and make a scrapbook depicting pictures of each shape on a separate page. Assemble a set of plane shapes to make pictures. Display and discuss pictures.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
NUMBER			
REVIEW	1. Demonstrate an understanding of concepts/ skills/ knowledge covered in previous year	Counting to 10 (number names) Counting sets up to 10 Numeral: recognition and writing Number stories Addition and subtraction	Provide practical activities to reinforce the work done in Infant Year 1. Use blocks to build rows and match the number of blocks with numeral cards and number name cards. Allow pupils to create addition and subtraction and verify solution using materials.
INTRODUCING THE NUMBER LINE	2. Identify the 'number before' or 'number after' in a sequence of numbers	Number sequence (numerical)	Using a number line (0 – 10) allow pupils to:- - count forward and backward - call the number before/after a given number - fill in the mussing numbers on the line - skip count in tow's starting at:- (a) zero (b) one
INTRODUCING VERTICAL FORM FOR ADDITION AND SUBTRACTION	3. a. Perform addition (up to three numbers) sum less than 10 b. Perform subtraction using vertical form (single digits)	Addition of two numbers (vertical) Addition of three numbers (horizontal) Addition of three numbers (vertical) Subtraction of two numbers (vertical)	Allow pupils to create pictures by connecting dots following a number sequence. Using objects in three columns, allow pupils to join three sets and obtain total. Record horizontally. Example: 3 + 2 + 1 = 6 Practice adding three numbers. Introduce vertical form for addition: for example: - use coloured concrete materials arranged vertically - guide pupils to arrange objects vertically - guide pupils to investigate that the total is the same when added from top down or bottom up

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
COUNTING TO 20 INTRODUCTORY GROUPING ACTIVITIES	4. Count the number of objects in a given set (1-20)	Number name/numerals in sequence (oral) counting sets up to 20 Numeral recognition to 20 (\ 1-20) Recognition of word names Matching number names with numerals and with sets of objects Writing number names to 10 Writing numerals. to 20	Using a number strip with numerals in sequence allow pupils to recite number names - Cover one numeral and ask pupils to name it. Provide varied activities for pupils to:- - determine the number of objects in a set by counting - draw to make sets of a given number - insert the missing numeral in a sequence on a number line - match number names with numerals - match number names with sets of objects
NUMBER OPERATIONS ADDITION	5. Express numbers to 20 in groups of 2's, 3's,4's....... l0's	Group in 2's, 3's, 4's ... 10's Expressing number in tens and ones	Provide experiences where pupils will:- - group in 2's, 3's, 4's ... etc., to 10's and count - count out a group between (11-19 e.g., 13), make a group of 10, verify by counting and conclude that 13 ones is the same as 1 group of ten and 3 ones

	6. Add the number of objects in two/three sets. (total less than 20)	Revision of:-
		
		- Concept of Addition
		- Horizontal Form and Vertical Form (Sum <10)
		    Addition on Number Line
		- Addition Facts: (11-20)
		          double facts
		          zero facts
		Commutative property
		Addition stories
		Count on strategy (informal)
			Create opportunities for revision of addition, facts up to lO using oral practice.
			
			Allow pupils to create addition stories for (totals) sums to II, 12, 13, etc.
			
			Allow children to illustrate addition facts using two colour beads, peg boards, number lines. Provide oral practice with double facts (8+8), ten facts (10 + 7) and zero fact (0 + 7).
			
			Investigate commutative property through use of concrete materials.

TOPICS	OBJECTIVES		INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
SUBTRACTION	7.	Perform subtraction involving two set each containing objects less than 20	Revision of:- -concept of subtraction, subtraction facts (numbers less than 10) -horizontal and vertical form Subtraction by:- - taking away or reducing a group - comparing groups - counting back/count on	Using empty egg crates of various sizes, pupils can be asked to fill them up with counters, then remove some and state amount left. Write results using horizontal forms. Present drawings of objects, ask students to subtract by crossing out and state how many are left. Record findings. Allow pupils to perform subtraction by counting backwards on number line. Create situations for pupils to match two sets to find out how many more.
SUBTRACTION AND ADDITION	8.	Relate addition and subtraction	Making connections: addition and subtraction	Pupils can be asked to:- Display an addition fact using materials Example: $\quad$ $8 + 4 = 12$ Create two related subtraction facts. Example: $\quad$ $12 - 8 = 4, 12 - 4 = 8$
MULTIPLICATION	9.	Construct equal sets and find the total by repeated addition	Introducing multiplication Setting up groups with same number of objects in each Describing and recording in terms of groups Stating the total.	Using concrete materials, pupils will:- - layout groups of objects having equal amounts - describe what they have set out in words or by drawing - state how many in each group and how many groups - record as 3 groups of 2 blocks equal 6 blocks. - state how many altogether

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
FRACTIONS	10. Identify wholes and parts of wholes	Concept of whole and part. Language of fraction: whole part piece	Using whole shapes divided into parts (e.g. picture puzzles or shape puzzles). Pupils can explore relationships between wholes and parts by:- - assembling whole from parts - matching parts to their respective wholes - dividing a whole into parts (by folding, cutting) - counting the number of parts that make up a whole
	11. Differentiate between equal and unequal parts of a whole	Equal parts:- Two equal parts: halves Four equal parts: quarters [no symbols]	Pupils can recognise equal parts of various shapes by:- - matching parts to determine if they are the same - dividing wholes into two or four equal parts by folding - selecting wholes which have been divided into two equal puts &from among those divided either into two equal or two unequal puts - selecting wholes which have been divided into four equal puts &from among wholes divided either into four equal or four unequal pelts Match number names (halves, quarters) to fraction models.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MONEY	1. Revision of bills and coins of Trinidad and Tobago	Coins carry worth; five cents is worth more than I cent; ten cents is worth more than five cents; twenty five cent is worth more than ten cent	Use proportionately different quantities of the same commodity to establish the ideas of worth among I cent. 5 cents and 10 cents.
	2. Use coins (I-cent, 5-cent, 10-cent) in money transaction	Equivalence: - five one-cent coins are equivalent to one five-cent - ten one-cent coins are equivalent to one ten- cent coin. Two five-cent coins are equivalent to one ten-cent coin. Five one-cent coins and one five-cent coin is equivalent to one ten- cent coin	Establish a fantasy shop. Wrap stones in coloured paper and establish that one of these objects is worth I cent. Make a heap worth 5 cent. Make a heap worth 10 cent.
	3. Build vocabulary associated with money transaction	Vocabulary: - concept of exchanging goods for money Events of a buying and selling situation, making use of language such as:- cost, buy, sell, pay, price, value Equivalence of one dollar in terms of 25-cent coins	Simulation: A bank as a center for money transaction. Simulation: The Class Shop. Present various activities to develop the concept i.e., the concept often.
	4. Investigate the equivalence of $1.00 in terms of 25 cents		Allow pupils to function with $1.00 in terms of 25 cents coins. (Practical only).

INFANT YEAR TWO

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MONEY (cont'd)	5. Use coins in money transactions up to 20 cents	Buying and Selling: a. item to the exact value of the coins b. one item and receive change	Provide a situation which will enable pupils to engage in purchasing activities. Example 1: Have a class shop with items priced. Pupils must go to the shop and identify the item they wish to buy, then they go to the "moneybowl" and select the appropriate coins for transaction. Example 2: Give pupils a specific sum of money. They must go to the school shop and buy whichever item they want and receive change where appropriate.
	6. Recognise all the notes of Trinidad and Tobago currency	Trinidad and Tobago Currency: a. each currency note separately b. distinguishing feature of each note	Provide activities which will:- - allow students to identify each currency notes - observe the distinguishing features of each currency note

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT LINEAR MEASURE	1. Measure length	Direct comparison (use of arbitrary units) Indirect comparison (use of arbitrary units) Unit iteration - - establish that each unit (paper clip) must touch, must be placed end to end (no overlapping) and must be in a straight line - repeating a single unit Ordering objects according to length	Measure length height/width/depth/distance. Allow students to choose arbitrary units (e.g... paper clips, palette sticks, etc). Discuss findings. Guess lengths of objects and justify answers (Use many practical activities before guessing) Discuss ways of determining reasonableness of answers. Measure to determine reasonableness of answers... Create problem situations involving ordering of lengths.
AREA	2. Measure area	Direct comparison Indirect comparison (use of arbitrary unit) Estimation and verification Use of large units Ordering objects according to area	Measure area. Allow students to choose arbitrary units (e.g., copybooks. post cards) 8Dd cover given surfaces. Discuss findings. Compare area of shapes and justify answers. Discuss ways of determining reasonableness of answers. Measure to determine reasonableness of answers. Create problem situations involving ordering of area.
CAPACITY	3. Measure capacity	Direct comparison Indirect comparison (use of arbitrary units) Ordering containers according to capacity Estimation and verification	Measure capacity. Allow students to choose arbitrary units (e.g... small containers etc.). Discuss findings. Create problem situations involving ordering of capacity. Use 3 containers. Guess capacity of containers and justify answers Discuss ways of determining reasonableness of answers. Measure to determine reasonableness of answers...

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT (cont'd)			
WEIGHT	4. Measure weight	Balancing Indirect comparison Estimation and verification Ordering objects according to weight	Allow students to engage in activities which focus on balancing objects with arbitrary units using the equal arm balance. Discuss findings. Estimate weight of objects and justify answers. Discuss ways of determining reasonableness of answers. Measure to determine reasonableness of answers. Create problem situations involving ordering of weight.
TIME	5. Identify time as duration of activities	Comparing duration of activities - more time than less time than / a longer time / a shorter time / same time as Direct comparison	Share experiences to highlight activities that take more time than / less time than / a longer time / a shorter time / same time as. Students demonstrate with their own activities (starting at the same time) more time than / less time than / a longer time / a shorter time / same time as.

TOPICS	OBJECTIVES	INSTRIONAL FOCUS	SUGGESTED ACTIVITIES
STATISTICS PICTURECHART	1. Interpret picturechart	Picturechart (representing) a. vertical arrangement b. horizontal arrangement Interpretation of chart a. identify number in each b. more, less, same c. mode	Teacher presents various picturecharts using pictures that are familiar to the pupils, (e.g., animals, toys). They are allowed to observe and discuss what they see. They should be allowed to orally report their findings. Teacher should present picture charts that are arranged vertically and horizontally for interpretation.

	2. Identify Characteristics of chart	Pictures are same size
		      Equal spacing
		      Label axis (baseline)
		      Horizontal or vertical arrangement
			Picturechart/s is/are presented and students are guided to focus on the characteristics of the chart. Pupils should be allowed to operate/work on the chart, e.g., they should be allowed to measure the spacing between two pictures (using e.g., hand span, piece of stick, etc.).
			Charts arranged both vertically and horizontally should be presented so that the children can look at the characteristics and compare the different arrangements.

	3. Collect and classify data. Construct and interpret picture chart	Data
		a. picture
		b. categories or groups
		Construction
		a. label
		b. picture in column
		Discussion
		a. mode
		b. same, least
		c. amount
			Pupils can be allowed to draw/prepare their own pictures of real objects using templates. They should then categorize their pictures, for example:
			    - horses, goats, birds
			    - animals that fly, animals that don't
			Pupils should decide on the arrangement of their groups/set i.e. (horizontal or vertical).
			They then assign labels to form the variables axis, for example:
			
			_____
			  horse goat birds
			
			and then arrange the pictures accordingly.
			
			Encourage pupils to display their work and report orally or in written form on the result (e.g., mode, amount in each group, etc).

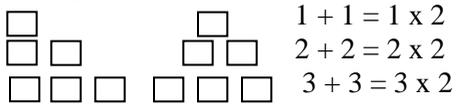| TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTMTIES

GEOMETRY
 	
SOLIDS
Cube
Cuboid
Cone
Cylinder
Sphere
Triangular prism
	1. Identify and name solids using formal names
	
	2. Associate solids with plane shapes
		Word recognition
		Associating word name with solid
		
		Faces of a solid
		
		     cuboid - rectangle (and square)
		     cube - square
		     cylinder - circle
		     cone - circle
		     triangular prism - triangle
			Sort solids by shape, using visual appearance (do not emphasise properties like six faces). Cubes and cuboids may be placed in the same group then later differentiated.
			
			Supply proper names when common characteristics have been identified.
			
			Reinforcement activities - match the solid to its name
			- colour the cubes in green
			- write the name next to the solid
			
			'Face Match Game'.
			Match cut-outs of plane shapes (squares, triangles, rectangles, circles) to the solids (cubes, cuboid, cones, cylinders, triangular prisms).
			
			    - select a flat shape and match it to a solid
			    - select a solid and find a matching flat shape
			    - trace out the outlines of faces using actual solids
			
			Set up situations in which students gather information to predict the type of solid(s) which can be made from given plane shapes.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
SOLIDS (cont'd)	3. Use different solids to construct models	Matching shapes:- Sphere – (e.g., head) Cude and cuboid – (e.g., building) Cylinder – (e.g., posts)	Experiment with cuboids (match boxes, etc) cylinders (spools etc) cones (cups) to create models of toys, buildings. Make models of solids using plasticine. Build a composite model from its pictorial representation.
PLANE SHAPES Squares Rectangles Triangles	4. a. Construct plane shapes (frames) using materials b. State the number of sides and corners in plane shapes	Number of sides Number corners Relationship between number of sides and number of corners.	Construct plane shapes using geostrips, geo-boards and geo-paper to demonstrate an understanding of their properties – number of sides, concerns. Experiment with varying shape while keeping the number of sides constant. Create situations for students to challenge each other (e.g., games). Make a set of 5 different triangles.
	5. a. Describe and copy patterns b. Construct patterns using plane shapes.	Identify shapes in repeated and extended patterns. Use of patterns in real world	Discuss patterns found in pictures and extend using shape Example: Find the next shape in the sequence □ □ △△ □ □△ Using plane shapes to make patterns to decode cards and make borders.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
NUMBER			
REVIEW	1. Demonstrate an understanding of concepts/skills/ knowledge covered in Infant Year 1 and 2 in relation to number	Counting to 20 Counting sets up to 20 Recognition and writing of numeral and word names Number stories: addition, subtraction	Reinforce work done earlier using practical situations. Encourage pupils to obtain answers by recall of known facts and to rely on concrete material as little as possible in reviewing number facts. Use self-correcting activities (e.g., jig saw cards) to reinforce addition facts, number names, etc. Allow opportunities for individual practice
SEQUENCE TO 100	2. Count, read, write and sequence numbers to 100	Number names in sequence (oral) Counting out a set more than 20 Ordering numerals Writing numerals	Prepare number strips with numerals written in sequence and provide oral practice in reading numbers.. Allow pupils to recite number sequences (e.g., twenty-one, twenty-two, ………. Twenty, thirty, forty . . . Provide opportunities for pupils to predict missing number(s) in a sequence using a number strip. Let pupils copy and read sequence (e.g., 21 to 30), then write a sequence (e.g., between 40 and 50) without copying from strip Count out a set beyond 20 Provide practice in naming and writing number pairs (e.g., 37 and 73)
	Concept of numbers to 100	Activities to develop students' quantitative understanding of numbers (number sense)	Use activities and examples in the pupils environment to develop meaning for the numbers e.g., number of children in class. Relate to money and measurement. Encourage pupils to represent numbers using their own number experience.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
SEQUENCE TO 100 (cont'd)	3. Recognise number patterns	Number relationships Communicating relationships Word names to 20	Using a 1-100 number square, allow pupils to look for number patterns Let them discuss their patterns, rationalizing their selection. Explore number relationships within the pattern.
PLACE VALUE	4. State the value of a digit in numbers to 99	Introduction of place value to 20 Introducing structured materials (tens and ones) Connecting language, models and numerals Expanded notation	Using materials that can be bundled/grouped (e.g. straws and rubber bands, beams and cups). Allow pupils to count out a set less than 20 and put these into bundles/groups of 10's. Extend the activity to include numbers beyond 20 (e.g., 34 ones -----------> 3 tens and 4 ones). Introduce structured apparatus where bundles of tens are exchanged (or traded) for ten ones using base ten materials (a ten strip and singles) ore interlocking plastic cubes or bean sticks (palette sticks with 10 beans stuck on). Allow pupils to familiarise themselves with the materials so that they can understand the equivalence of one ten and ten ones. Using structured materials, present oral number name and allow pupils to:- Example: - Count out two-digit numbers in ones. - Regroup and express the number in tens and ones. - Place tens and ones on a place value mat - Record numeral **Tens Ones**

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
PLACE VALUE (cont'd)			Reverse process, where bundles of tens and ones (or base ten materials) are given and pupils must determine how many ones, then write numerals. Using games and other activities, allow pupils sufficient time to practice and develop place value concepts.
ADDITION OF TENS AND ONES	5. Add numbers, results less than 100	Revision of basic addition facts to 20 Count on strategy Derived facts Adding tens to tens Adding without regrouping - ones to tens and ones - tens and ones to tens and ones Adding with regrouping - ones to tens and ones - tens and ones to tens and ones Add three or more numbers	Provide oral practice where pupils can perform addition facts to 20 mentally. Using ten strips, allow pupils to add two tens (20 + 30). Let them record sums and observe patterns. Extend to oral practice. NOTE:- In developing the algorithm, all stages follow a similar sequence. The approach is as follows:- Present addition problem. Allow pupils to use materials to obtain answer. Accept answer orally. Present similar examples. Allow pupils to use materials to obtain answer and record result. (Vertical form). Permit pupils to perform addition with materials and record each part of the answer as the materials are used. Present further examples and allow use of materials is necessary. Permit pupils to interpret the answer in relation to the problems. Encourage the use of informal, invented strategies.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
SUBTRACTION	6. Perform subtraction from two digit numbers	Revision of basic subtraction facts Subtracting tens Subtraction without regrouping - ones from tens and ones - tens and ones from tens and ones Subtraction with regrouping:- - ones to tens and ones - tens and ones to tens and ones	Review subtraction facts through use of simple story problems and miscellaneous examples – vertical and horizontal recording. Encourage pupils to recall facts. Use structured apparatus and allow pupils to subtract tens from tens. Record procedure and observe patterns. Extend to oral practice Using place value mats and base ten materials, develop algorithm by instructing pupils to :- Place the materials representing the larger number on the mat Then remove the amount of material representing the smaller number Develop the algorithm in stages, following a similar sequence as in addition, i.e., use of oral work with materials, then materials with recording, followed by recording without materials. (allow pupils to continue to use concrete materials if needed) Permit pupils to interpret the answer in relation to the problem
MULTIPLICATION	7. Multiply a one-digit number by a one-digit number. (Multipliers not greater than 5)	Review concept of multiplication Language of multiplication Symbol for multiplication Performing multiplication as repeated addition Multiplication tables 2, 3, 4, 5	Conduct practical work where pupils can make equal groups. Use language to describe what was done and record activities. Introduce the multiplication symbol Example; translate '3 groups of 5' to '5 x 3' and read as '3 times 5'. To reinforce this notation, provide practical activities for pupils to engage in discussion. Use objects such as cubes and counters to illustrate 3 sets of 4 3 fours 3 times 4 4 x 3 is the same as $4 + 4 + 4 = 12$ Use number-line to reinforce and further practice multiplication as repeated addition. Build tables of two's by using concrete materials (e.g., interlocking blocks) and allow pupils to make two equal sets: $1 + 1 = 1 \times 2$ $2 + 2 = 2 \times 2$ $3 + 3 = 3 \times 2$

TOPICS	OBJECTIVES		INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
				Extend activity to build tables of 3, 4 and 5. Encourage pupils to memorise facts through extensive oral work
DIVISION THROUGH PRACTICAL ACTIVITIES	8.	Divide a whole number (less than 30) by one-digit divisors not greater than 5	Concept of division, equal sharing Language of division Recording in words Reading using symbol	Set up situations where pupils will perform sharing by distributing objects one at a time from a set and counting how many there are in each share to obtain the answer.
				Introduce word statement and division symbol simultaneously For example: Terry shared 15 plums equally among 3 of his mends. How many plums did each mend get? 15 plums shared equally among 3 gives 5 plums each $15 \div 3 = 5$
			[Note: Sharing should be done before grouping]	Each mend gets 5 plums
				Note:- The division sign is translated as 'shared equally' and not as 'divided' by at this point.
			Review concept of multiplication Language of multiplication Symbol for multiplication Performing multiplication as repeated addition	Interpret answer as the number of objects in each share.
				To introduce 'grouping' aspect of division, use concrete material and appropriate language to create grouping situations. Terry has 15 plums. He gives each mend 3 plums. How many mends get plums? 15 plums grouped in 3s gives 5 groups $15 \div 3 = 5$ 5 friends get plums The division sign is translated as 'grouped in' and not as 'divided by' at this point
				In interpreting the answer it is important to point out that the result is found by counting the number of groups and not the number of objects in each group.

NUMBER PATTERNS
Odd and Even Numbers
	9.	Classify numbers as odd or even	Sharing/making groups of two
			Recording findings
			Making predictions
			Classifying numbers
				Use number-line to reinforce grouping concept of division.
				
				Using concrete materials, have pupils take out any number of objects and:
				   - share them equally in sets of 2
				   - make sets of two
				   - discuss findings and use arrays to describe results
				  00000 0000000
				  00000 000000

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
(cont'd)			Make a table recording numbers which will divide evenly into 2, and those which will leave a remainder of one when divided by 2. Predict which numbers will divide evenly by 2. Name numbers as Even or Odd. Observe position of Odd and Even Numbers in the sequence of counting numbers.

FRACTIONS	10. State the family names of fractions by (counting the number of equal parts in a whole)	Equal and unequal parts Informal definition of fraction Two equal parts : halves Three equal parts : thirds Four equal parts : quarters, fourths Five equal parts : fifths Six equal parts : sixths Ten equal parts : tenths	Present pupils with wholes divided into equal and unequal parts and allow them to:-
			
			    - count the number of parts in the whole. Identify if the whole has equal parts
			
			Present pupils with wholes divided into 2,3,4,5,6, 10 equal parts and allow them to:-
			    - count the number of equal parts
			
			    - orally state the family name of the fraction by word association (e.g., five - fifths)

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MONEY	1. a. Review all the notes of the Trinidad and Tobago currency b. State value of notes of Trinidad and Tobago currency 2. a. Investigate the equivalence of 25 cents in terms of 1 cent, 5 cents and 10 cents coins b. Identify one dollar currency note as the equivalent of one hundred cents 3. a. Investigate equivalent relations among $1, $5, $10, $20	Trinidad and Tobago Currency a. each currency note separately b. distinguishing features of each note Notes carry worth; five dollars is worth more than one dollar, etc. Equivalence in coins for values 25 cents Equivalence in coins for values below 25 cents Combinations of coins which are equivalent to one hundred cents One hundred cents equivalent to one dollar note Combinations of smaller denominations which will be equivalent to larger denomination	Provide activities which will:- - Allow pupils to identify each currency note - Note the distinguishing features of each currency note Buying power of the notes Devise activities to allow pupils to discover the various combinations for the specified value Set up situations which will facilitate pupils discovering the equivalent combination giving one hundred cents, exchange these combinations for one dollar notes. Set up an exchange bank where coins are Exchange for one-dollar notes Some pupils are given coins to the value of Several dollars. They must arrange these coins in amounts of one hundred cents Pupils can be assigned roles as tellers who Must verify the amount being equivalent to one hundred cents, then issue one-dollar bill for each one hundred cents brought in Provide pupils with opportunities to explore the different combinations which will amount to a higher currency note

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MONEY (cont'd)	b.　Write mathematical statements describing these equivalent relations	The value of a larger bill as the sum of smaller bills	Create and exchange bank where pupils can exchange a larger currency note for smaller currency notes. Pupils must provide an accompanying slip detailing how they want the larger note broken down. Example: $20 = $10 + $5 + $1 +$ 1 + $1 + $1 + $1
	4.　Use currency notes up to $20.00 in buying and selling situations. Buying and Selling:-	Shopping problems: Buying and selling involving:-	Create the environment which will allow buying and selling. Encourage discussion and dialogue close to real life situations.
	One item with no change	Items priced at a dollar value with the exact amount of currency	Set up a store, or a shop or a market, where pupils are all the personnel. i.e. vendors, purchasers, etc. Have money available for pupils' use.
	One item with change	Items priced at a dollar value, using larger denomination than the cost of the item	Pupils are encouraged to record all transactions e.g. bills, shopping lists (Practical only).
	More than one item with no change	Items priced at a dollar value with exact amount of currency to the total cost of all the items	
	More than one item with change	Items prices at a dollar value with an amount of currency which exceeds the total cost of all the items	WRITTEN WORK Simulations in supermarkets, shops, stores, malls, and restaurants, will provide the setting for these transactions. Cashiers in the supermarket situation can be requested to verify the money transactions by the use of the calculator. Pupils solve story problems.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT LINEAR MEASURE	1. a. Measure length using the standard unit b. Measure length using sub units ½, ¼	The metre as the standard unit: a. comparison: lengths of the objects to the standard b. measurement: length of lines, objects using the standard (ruler, etc.) c. estimation - lengths in the environment in metres. d. verification by measurement	Discuss problems associated with using different arbitrary units. Suggest possible solutions. Examine lengths of objects in relation to the metre and share findings. Identify and measure lengths of objects. Discuss what can be done to measure lengths of objects; lines that are not straight. Estimate lengths of objects in metres and justify answers. Determine reasonableness of answers.
AREA	2. Measure area	a. establishing the square as the best unit b. estimation c. verification by measurement	Determine, through investigation, the most appropriate shape for covering entire surfaces. Give reasons for choice. Cover different shapes with squares of different sizes and determine area. Share findings. Estimate area of shapes and justify answers. Use examples from everyday life. Determine reasonableness of answers.
CAPACITY	3. Measure capacity using the standard unit	The litre as the standard unit Comparison of capacity of containers to the standard unit. Measurement of capacity of containers using litre. Ordering containers according to capacity. Estimating capacity of containers using the litre as the unit of comparison. Verification by measurement.	Determine through investigation, the need for a standard unit for measuring capacity. Justify answers Examine capacity of containers in relation to the litre and share findings. Select containers and measure capacity in Iitres. Arrange three containers in order by capacity. Estimate capacity of containers in litres and justify answers. Determine reasonableness of answers.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT			
WEIGHT	4. Measure weight using the standard unit (kilogram)	The kilogram as the standard unit Comparison of weight of objects with the standard unit Measurement of weight of objects in kilograms and sub-unit (half kilogram, quarter kilogram) Ordering objects according to weight Estimation of weight of objects Verification of weight of objects by measurement	Determine through investigation, the need for a standard unit for measuring weight. Discuss findings. Classify the weight of objects in relation to the kilogram and share findings. Select objects and measure weight. Discuss what can be done to measure weight of objects less than one kilogram. Arrange objects in order of weight. Estimate weight/of objects and justify answers. Determine reasonableness of answers.
TIME	5. Features of clock Use language to relate time to movement Tell time to the hour	Analog and digital clocks Vocabulary development: fast/slow; faster/slower, fastest/slowest; quickly/slowly	Discuss activities that they do quickly/slowly. Give reasons why some activities are done quickly/slowly. Discuss ways of travelling. State the fastest way. Use analog and digital clocks.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
STATISTICS PICTOGRAPH	1. Interpret pictograph	Pictograph - (with 1: 1 key) - (with 1: many key) Information from the pictograph a. Similar pictures b. How many, less, few The mode	**Pupils are presented with a pictograph** **Example: Favourite flavours of ice-cream** **They examine the pictograph and extract information.** Example i How 'may different' types of pictures are there in the pictograph? Example ii How many objects does each picture in the pictograph represent? Pupils read other information from the graphs Example: more than, less than, same, most, least Other information to be extracted from them.
	2. Identify characteristics of the pictograph	Characteristics of pictograph Frequency and variable axis Vertical or horizontal arrangement Same type of picture used Equal spacing between pictures All pictures same size Different scale factors (1, 2, 5)	These activities above can be used to identify the characteristics of the pictograph.
	3. Collect and classify data	Problem formulation Variable identification, e.g., means of transport tallying frequency table discussion: frequency, more, less, most, least	Provide opportunities for pupils to gather information from common Events/observations in school life. Example: colour of socks, lunch kits, vehicles passing by during a given time/ period. Let pupils select and discuss the simplest or most suitable method for tallying the information. Prepare tally cards, write symbols (see example below) Example C, B, B, T, C , C, C <table><tr><td>**Car**</td><td>**III**</td></tr><tr><td>**Bus**</td><td>**II**</td></tr><tr><td>**Truck**</td><td>**I**</td></tr></table> followed by classification

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
STATISTICS (cont'd)			Create opportunities for pupils to organise data (summarize arrays) in tabular form. Example: | Vehicle	Frequency
---	---
Car	4
Bus	2
Truck	1	 Pupils are expected to identify a problem situation where use of data is required: Example: at home - Parents wish to know favourite snacks/lunch of pupils for preparation at school - brands of sneakers in the environment - trees, flowers, animals. They will be required to make tally, construct frequency table and present this data in a pictograph. Students are expected to make presentations of their findings and draw conclusions.

	4. a. Represent data on the pictograph
	
	b. Interpret the pictograph
		Graphical representation:
		
		    - layout of axes
		    - from frequency table to pictograph
		      allocate pictures to appropriate columns
		
		Discussion:
		
		  - information presented on pictograph
		  Example:
		      mode, least, total, more than, less than,
		  equal numbers
		  - recommendations / summary	

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
GEOMETRY SOLIDS Cube Cuboid Cylinder Sphere Cone	l. Identify solids in the environment and describe their specific use	Recognition of solids in the environment. Use of solids. Rationalize the use of each solid.	Observe the use of solids in the environment. Examine buildings, furniture, objects in the classroom! environment. Make a scrapbook with pictures depicting the use of each solid. Critically appraise the use of a solid for a particular purpose. Example: Why use a cylinder and not a cuboid to roll out a cricket pitch? Investigate the faces of solids by feeling, observing, drawing and describing.

PLANE SHAPES
Simple and Compound
	2. a. Identify the group of all plane shape that form a cube, cuboids or a cylinder
	
	b. Experiment with plane shapes to make other shapes
		Number of faces
		Shape of faces
		Type of face (curved or flat)
		
		Recognition of shapes within shapes.
			Play the game. "Which Solid Am I?", where two faces of a solid are drawn and pupils must suggest which solids can be made from the faces.
			
			Explore the composition of shapes.
			Example: folding, cutting and reassembling.
			
			Use a square to obtain:-
			     - 2 triangles
			     - 4 smaller squares
			Use 4 squares to make:-
			     - a larger square
			     - a rectangle
			Use 2 triangles to make:-
			     - a larger triangle
			     - a rectangle

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
PLANE SHAPES (cont'd)			Determine shapes needed to assemble a pentagon; a rhombus? Fold and cut a regular hexagon to make a rectangle and an isosceles triangle.
SYMMETRY	3. Identify line symmetry in shapes	Line symmetry - shapes in environment	Using paper patterns, leaves, pictures of symmetrical shapes, let students observe to identify sameness within a shape. Let them discuss why they think some are not symmetrical. Use symmetry to predict the form of a complete shape Determine what shape will emerge? Complete the outline. Have pupils construct figures on paper and test for symmetry by folding. Let pupils use geoboards to construct half of a shape and let others complete it using the properties of symmetry. Make decorations using symmetry. Example: Christmas tree.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

NUMBER
 	
REVIEW OF NUMBERS TO 100
		Review counting, number recognition and numeral writing to 100
		Review writing of word names to 20
		Number names in sequence (oral)
		Ordering Numerals: Introducing 'more than' and 'less than' symbols
		Writing numerals
			Use oral work and practical situations to allow pupils to:-
			    - recall number sequence (forward and backward to 100)
			    - match number names with numerals
			    - match quantity to number name
			    - count in tens.
			
			Use a number strip with numerals beyond 100 written in sequence to provide oral practice in reading numerals.

NUMBER SEQUENCE TO 1000	1. Read, write and sequence numbers to 1000	Rote count (forward and backward) in I's, 10's and 100's
		Estimation
		Approximation to 100
		Using the pupils' experiences to develop the concept of numbers to 1000
			Allow pupils to discover number sequences.
			Example:. 501,502,503,....
			                100,200,300, ...
			                101,201,301,....
			and predict missing numbers in a sequence.
			Match number names to numerals.
			To develop the concept of large numbers have pupils collect small items and over a period of time, let them estimate how many there are. Count to verify.

PLACE VALUE	2. State the value of a digit in numbers to 999	Revision of place value to 99
		Introducing structured materials (hundreds, tens and ones)
		Connecting language, models and numerals
		Expanded notation
		Place value chart
			Using two-part place value mats (tens and ones) review place value to 99 using a variety of activities
			Introduce a three-part place value mat and structured materials:
			    - 10 x 10 grids for 100
			    - ten strips for l0
			    - small squares for 1
			Allow pupils to familiarise themselv.es with the materials to establish

STANDARD TWO

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
PLACE VALUE (cont'd)			<table><tr><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td></td><td></td><td></td></tr><tr><td>1</td><td>2</td><td>3</td></tr></table>
ADDITION	3. Add numbers, result less than 1000	Revision of basic addition facts Adding hundreds to hundreds Adding without regrouping Adding with regrouping - Regroup in ones - Regroup in tens and ones Adding more than three numbers	Example: Given oral number name (e.g. one hundred and twenty-three) pupils can:- - use concrete materials to display number on mat - write numeral Vary activities to cover all possible matchings. Use a variety of examples, especially numbers with zero Example: 702 and 720 Use place value chart and introduce Using 100 grids, have pupils add hundreds to hundreds and record result. Provide oral practice so that pupils can make connections with basic facts. Develop the algorithm in stages (see Std. I for details). The suggested sequence is: - use of materials and oral reporting of answers. - use of materials with recording after performing the operation. - materials, recording each part of the answer as the materials are used - resent further examples and allow use of materials if necessary Allow pupils to interpret the answer in relation to the problem.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
SUBTRACTION	4. Perform subtraction from three digit numbers	Revision of basic subtraction facts Performing subtraction by adding on Subtracting hundreds Subtraction without regrouping Subtraction with regrouping Subtraction from hundreds Example: 100, 200	Review subtraction facts by presenting situations which will allow pupils to use adding on (or shopkeeper's method) strategies Example: $12 + \square = 18$ Provide experiences for pupils to connect subtraction facts with hundreds, with subtraction facts with ones. Relate 600 - 400 with 6 - 4. Use structured materials (place value mats, 100 grids, ten strips and ones) to develop the algorithm in stages following a similar sequence as in addition. In the final stage of development, the recording of the algorithm may take this form. Example: 342 - 165 | H	T	O
---	---	---
	13	
2	3̷	12
3̷	4̷	2̷
-1	6	5
1	7	7	 Have pupils interpret the answer in relation to the problem Encourage the use of informal, invented strategies.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MULTIPLICATION	5. a. Multiply a one-digit number by a number not greater than 10 b. Multiply a two-digit number by a number not greater than 5	Revision of:- a. concept, language and symbol for multiplication b. multiplication as repeated addition Introduction of :- a. commutative property b. array models (rows and columns) Multiplication tables: 6, 7, 8, 9, 10 Number patterns for multiplication	Using bundles of sticks, number strips etc., allow pupils to create and represent multiplication stories, exploring fully the language of multiplication Stories can be represented by models and translated into symbol form or vice versa. Give pupils opportunities to connect repeated addition models to array models Example: REPEATED ADDITION MODEL ARRAY MODEL 4 groups of 3 plums 4 rows of 3 plums Using either model, have pupils explore the commutative property. Pupils can :- - build tables using arrays or repeated addition of groups - construct and display multiplication charts - investigate patterns on multiplication tables Develop mental recall of multiplication facts through games, quizzes, etc. Use the calculator and/or computer for number fames involving multiplication.
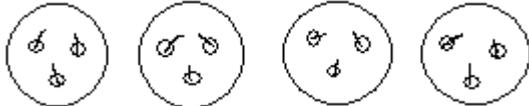
TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

DIVISION	6. Divide a two-digit number by one-digit number with and without remainders	Revision of
		- equal sharing and grouping
		- language, symbol and division word problems.
			Allow pupils to create division stories involving equal sharing and grouping. Have them:
			    - model stories using materials
			    - write division sentences using symbol
			Example: $14 \div 2 = 7$

Using practical activities and division word problems present situations where both meanings of division can be observed.

	Sharing	Grouping
Story/ Word Problem	Share 18 sweets equally among 3 boys. How many will each boy receive?	I have 18 sweets and if I am giving 3 sweets to each boy, how many boys will get sweets?
Model		
Symbol	$18 \div 3 = 6$	$18 \div 3 = 6$
Interpretation of Answer	Each boy will receive 6 sweets	Six boys will each received 3 sweets.

Relating division to multiplication

Pupils can be guided to deduce that the above models illustrate
    3 groups of 6 = 18 and 6 groups of 3 = 18
    or   6 x 3 = 18   3 x 6 = 18
    Thus relating division to multiplication.

Division with remainder

Using real life situations involving sharing or grouping create division problems which do not come out evenly.
Have pupils use models to solve and state remainder as a whole number.

Divisibility by 2, 5, and 10

Have pupils explore divisibility by 2, 5, and 10 by looking for patterns on a 1 – 100 Number Square.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

FRACTIONS
 	
INTRODUCING FRACTION SYMBOLS
	7. Identify and name fractions using number names and symbols	Revision of equal parts, family names of fractions, word names and symbols for:
		- unit Fractions (¼ , $^1/_5$ etc)
		- non unit Fractions ($^2/_3$, $^3/_8$ etc)
			Using linear and area models, allow pupils to recall family names by counting the number of equal parts in wholes,
			
			To introduce number names for unit fractions
			   - allow pupils to construct models by folding whole into equal parts or assembling wholes from equal parts. Establish family name and shade <u>one</u> part
			   - guide pupils to construct a table matching models with word names
			
			For non-unit fractions, continue activity where pupils can shade more than one part.

COMPARISON	8. Use more than/less than to compare two fractions	Introduce symbols Connecting models; number, names and symbols Comparing two fractions from the same family (denominator) Compare two fractions using a benchmark (e.g. more than or less than one half) Order fractions	To introduce symbols, chart can be extended so that models can be matched with number names and symbols. Use concepts (not rules) to make comparisons between fractions Example: pupils can use materials to overlay fractions and give oral explanations to verify conclusions. Allow pupils to illustrate fractions larger than or smaller than a given fraction. Given two fractions from different families. Example: ($^3/_4$ and $^1/_3$) pupils can use models to overlay, draw or compare using one-half as benchmark
EQUIVALENT FRACTIONS	9. Recognize equivalent fractions	Equivalence by: - obtaining new names for equivalent forms Introduce set models for fractions ½, ¼, $^1/_3$	Using linear and area models, pupils can find new names for fractions by overlaying smaller fraction pieces on a given model of a fraction. Allow pupils to experiment on their own and record their findings on a table. [NB: Rule for generating a set of equivalent fractions for a given fraction can be delayed]. Only practical and informal activities.

STANDARD TWO

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MONEY PLACE VALUE	1. Read and write notation for given values (dollars, dollars and cents)	a. Write in numerals b. Write word names	Allow pupils to read money notation from the environment Example: Prices in the newspapers
APPROXIMATE	2. Approximate to the nearest dollar	Example: 1 ruler for $1.99	
EQUIVALENCE	3. Investigate equivalence to $100		

	4. Make bills for values to $100.00	Bills involving:-
		
		- Unit item given unit cost
		  Example: 1 pen at $1.68
		
		- More than one item given unit cost
		  Example: 2 pens at $3.00 each.
		
		These skills will be used to develop bills for measures of:-
		
		- Length (metres etc.)
		- Mass (kilogram, gram, etc.)
		- Capacity (litre)
		- Area (square centimetre, square metre)
			Provide situations where students can select the items they wish to purchase.
			Make the bill, by writing the representative mathematical statements.
			Find the total of each statement.
			Find the total of the whole bill.
			
			Example: Select the items from the class market. Write the representative mathematical statements for the transactions.
			Make the bills for these items.
			
			Have pupils select the items they wish to buy from advertised cost list at the shop or in the newspaper.
			
			Make the representative mathematical statement for the intended transaction.
			Make the bill for the proposed purchases.
			Solve multi-item bills.
			
			Provide activities for pupils to participate in actual trading in a small item shop.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT LINEAR MEASURE	1. a. Measure length using the centimeter	The centimetre as a sub-unit of the metre Use of instruments (ruler) Position of zero Scale reading Approximating to the nearest cm	Discuss what can be done to measure lengths of objects which are less than one metre, in order to establish the need for a smaller unit. Construct and use a centimetre ruler.
	b. Estimate and verify lengths using the centimeter	Correcting for over/under estimation	Measure lengths using the centimetre ruler. Draw lines of given lengths in centimetres Estimate lengths of objects using the centimetre and justify answers. Determine the reasonableness of answers.
	c. Measures lengths using the metre and the centimeter	Recording measures using two units Approximating lengths to the nearest metre	Measure lengths of objects/I ines and record measurements in metres and centimetres
	d. Calculate lengths using metre and centimeter in practical situations	Only addition and subtraction	Estimate lengths of objects and justify answers. Determine the reasonableness of answers. Examine situations in which approximation of lengths (to the nearest metre) is used. Construct squares, rectangles on geo-paper.
	2. Measure perimeter of shapes	Conservation of length Concept of perimeter Measuring of perimeter	Discuss and solve problems which involve measuring the distance around plane shapes. Encourage pupils to describe how to measure the perimeter of rectangles using instruments
AREA	3. a. Measure area using one centimeter squares	The square centimetre as the standard unit Counting squares on square centimetre grids Approximation to the nearest square centimetre	Determine area of shapes (straight or curved edges) by counting squares on grids Determine area of rectangles and squares by counting squares on grids Estimate area of small shapes and justify estimations. Determine the reasonableness of answers.
	b. Estimate area in square centimeters	Estimation and verification of area	Visit the supermarket, observe commodities which are measured in litres and present written report on findings.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
CAPACITY	4. a. Measure capacity using sub-units and multiple units of the litre	1 Litres, 2 Litres, 4 Litres; ½ Litres, ¼ Litres Use of measuring devices (graduated cylinders, measuring cups etc.) Approximating to the nearest sub/multiple unit Estimation and verification Conservation of capacity	Estimate capacity of containers using the litre. and sub-units (half litre.; quarter-litre.). Record and verify. Solve problems involving approximation to the nearest litre. Demonstrate conservation. Devise own activity.
WEIGHT	5. a. Weigh objects using sub-units and multiple units of the kilogram	1 kg, 2kg, 4kg ½ kg, ¼ kg Use of Instruments (balance and scales) Approximation to the nearest sub/multiple unit Estimation and verification	Use both home-made and commercial balances and weights to weigh objects of varying masses. Record weight using kilogram. Discover through measuring weight/mass of objects that different sized objects can have the same weight/mass, while objects of the same size can have different weight/mass. Estimate weight/mass of objects using the kilogram and sub/multiple units of the kilogram. Record weights/mass. Discuss the reasonableness of answers.
TIME	6. a. Associate events to specific time-period	Language of time (yesterday, last year etc.) Activities/Events which occur in periods of: minutes, hours, days, weeks, months, years	Through teachers' modeling and ongoing discussions of events, activities, school happenings, seasons make links between events and times e.g. in a few minutes it's break time; Lunch period is one hour. On Thursdays we go to the library. The rainy season is usually from January to May. Last year you were in Standard I.
	b. Identify the clock as an instrument for measuring time	Features of clock: face, hands, numeral Function of long and short hand	Use guessing game to identify the different features of the clock. Suggest possible function for the various parts. Verbalize and consolidate understanding of the parts of the clock, their names and their purposes.
	c. Tell time to the hour, half hour and quarter hour	Position of hands Recording time: a.m. and p.m.	Construct clocks - (digital and analog). Practice telling and recording the time to the hour, throughout the day. Rationalise the need for using a.m. /p.m. through discussion. Name some activities that may take one hour to complete.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
STATISTICS BLOCKGRAPH	1. Revise the pictograph	Represent data on pictograph one to many	Construct Pictographs using scales of 1:1 or 1: many. Interpret Pictographs.
	2. Interpret blockgraphs	The block graph - scale factor 1:1 Information represented on the blockgraph: - preferences: e.g. different types of snacks bought by pupils, pupils mode of transport number in each category - more than, most, least, less than, many, few - mode	Present as wide a variety of blockgraphs as possible. Use inforn1ation relevant to pupils' experiences which would stimulate their interest. e.g. Blockgraphs illustrating favourite foods, modes of transport etc. Given data in blockgraph pupils will interpret and report responses. Example: What is the mode? How many children travel to school by bus? What type of transportation was used by the smallest number of pupils? Allow pupils to compare and contrast the characteristics of graphs previously done.
	3. Identify the characteristics of the blockgraph	Blockgraph - Scale factors of 2, 5 and 10 Features of the blockgraph: - variable axis/frequency axis - 1 block represents I item In graphs with scale factors, I block represents 2 or more items - equivalence of I block and I symbol (on pictograph) - equal length and width of block equal spacing between each category - horizontal or vertical layout of blocks (→ change in layout of axes)	Examine blockgraphs and extract information. (The similarities/differences among the object chart, pictograph and blockgraph can be discussed).

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
Blockgraph (cont'd)	4. Gather classify data and construct blockgraphs	Problem Formulation: - data to be collected - variable identification Example: favourite T.V. programme Data Organisation - tallying - frequency table Graphical representation: - categories - frequency and variable axes - scale factor - frequency table - blockgraph	Gather information for a purpose, in order to solve a problem situation in the class. Example: "We want to examine our performance in last term's test". Allow pupils to exchange ideas for constructing the blockgraph. Create the opportunity for pupils to develop correct algorithm for constructing the blockgraph.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

GEOMETRY
 	
SOLIDS
Cube
Cuboid
Cylinder
Triangular prism
	1. Identify the set of all plane shapes that belong to:
	  a. triangular prism
	  b. solids done previously:-
	    cube, cuboid, cylinder
		Number of faces
		Type of face (flat, curved)
		Shape of face
			Students can draw around the faces of 3D shapes to make flat shapes. These can be cut out and mounted on a chart next to a picture of the solid (so that they can begin to perceive nets of solids).
			Differentiate between flat and curved face.
			    [Note for the curved surface of a cylinder, they can cut open a toilet roll, or remove the label from a tin or roll the cylinder on a piece of paper].
			Play the game 'which solid am I?' Where at most two faces of a solid are drawn and students must suggest which solids can be represented using these faces.

	2. Describe the properties of cubes, cuboids, cylinders and triangular prisms	Faces of cubes and cuboids Composition of shapes in nets Arrangement of shapes in nets	Open boxes (cubes and cuboids) and trace out their nets. Outline the smaller shapes that make up the nets. Describe the composition of the nets. Investigate different arrangements of the nets. Assemble / arrange faces, test to determine if the arrangement will fold to form the solid. Discuss why some arrangements will form the solid while others will not.
	3. a. identify and draw the nets of cubes and cuboids b. construct cubes and cuboids from faces	Number of vertices Number of edges Type of edge (straight, curved) Number and type off aces	Examine solids and identify vertices and edges. Using straw and plastercine, devise a plan to build models (straws must not be pre-cut to size). Report on how the models were constructed. Analyse models and compare for strength and rigidity. Discuss the use of the solid in construction of buildings, furniture, etc. Play a game "Solid Mystery', where students feel a solid (blindfolded or otherwise) and provide a description (or clues, one at a time) stating the number of edges, vertices or faces and while others listen and identify the name of the solid which fits the description. Make a table noting the number of faces, edges and vertices in four named solids.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
PLANE SHAPES	4. Use slides and flips to construct plane shapes and to create patterns	Tessellation	Examine tiling patterns, gift paper, vinyl and fabric to determine which shapes tessellate. Shape that tessellate will completely cover a surface without overlapping. Discuss why certain shapes will not tessellate. What shapes can be used for tiling? Why? Select a shape and use it to tile a surface. Colour tiles to create tiling patterns. Using postcards or small posters, allow pupils to cut into smaller shapes, then reassemble. Pupils can exchange puzzles and engage in solving each others puzzles. Extend activity by. encouraging pupils to construct tangrams and let others obtain the solutions.
SYMMETRY	5. Determine the number of lines of symmetry in plane shapes	Diagonal lines of symmetry in different orientations	Fold plane shapes (regular, irregular, those with straight or curved sides e.g. sectors, heart-shape) to investigate whether they have line symmetry. Draw shapes with line symmetry - one, o or more than two lines of symmetry. Compile a scrap book of shapes with one line of symmetry, two lines of symmetry, etc.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
NUMBER NUMBER SEQUENCE TO 10 000.	1. Read, write and sequence numbers to 10 000	Review reading, writing, ordering and sequencing numbers up to 1000 Number sequences (number names) Ordering numerals Writing numerals	Using previous knowledge of numbers less than 1000, allow pupils to invent their own sequence for numbers beyond 1000. Use materials (base ten pieces, Dienes Blocks) to assist pupils in conceptualising the structure of the number system i.e. pattern of tens. Provide oral practice in sequencing numbers predicting missing numbers in a sequence and. matching numeral with number name. To conceptualise large numbers, start with a collection of 1000 items in a transparent container. Pupils can think of 10000 as ten of these containers. As an on-going project, have pupils colour 100 dots at a time and mount on a display board. At intervals, they find the total by counting in hundreds then in thousands.
PLACE VALUE	2. State the value of any digit in numbers to 9999 digit in	Revision of place value to 999 Expanded Notation	Extend place value chart to include ten thousands and have pupils write numbers in expanded form given the numerals. Create a vertical Abacus and have pupils read numbers, then use expanded notation to establish number value. Make number cards with numerals 0-9 and have groups of pupils select 4 cards. Each group must construct the lowest possible number using the four digits. Vary tasks.
ROUNDING	3. a. Round off whole numbers to the nearest ten, hundred	Relative position of numbers Rounding numbers in context of a problem	Using a number line, pupils can locate a number on the line and round to the nearest 10 by selecting the 'ten' nearer to the number. The game 'Run for Cover' can be used. Numbers ending in 5 are usually rounded up. Extend using number lines with numerals in hundreds and thousands. Use problem context to allow pupils to appreciate value of rounding.
	b. Use rounding-off techniques to solve problems in addition and subtraction	Computational estimation	Relate rounding to computational estimation by providing problem situations where exact answers are not necessary. Provide opportunities to practice mental computation through use of rounding.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

COMPUTATION ADDITION	4. Add numbers, result less than 10 000	Revision of basic addition facts
		Introducing Associative Law for addition
		Adding thousands to thousands
		Adding without regrouping
		Adding with regrouping
		- regroup In ones
		- regroup in tens and ones
		- regroup in hundreds, tens and ones Estimating sums
		Use of calculators
			Review basic facts, allowing pupils to perform addition mentally. Have pupils:-
			   - explain how they arrived at their answers
			   - discuss different techniques
			   - record process and develop associative property.
			Example: $9 + 8$ can be seen as $(9 + 1) + 7$ (Use of a 10 fact to group);
			      or $(8 + 8) + 1$ (Use of a double fact to group).
			Review commutative property.
			Extend to adding thousands to thousands.
			
			Provide pupils with opportunities to create addition stories with four digit numbers and find total applying commutative or associative properties.
			Use recording charts up to thousands to practice and to provide opportunities for understanding the algorithm.
			Introduce calculators to perform addition of 4-digit numbers and to create opportunities to use computational estimation.
			Example: - predicting whether the answer is even or odd
			       - estimating the answer to the nearest thousand
			Estimate the result of an addition problem using rounding.

SUBTRACTION	5. Perform subtraction from four digit numbers	Revision of Basic Subtraction Facts Subtraction from two and three-digit numbers Subtracting thousands Subtraction without regrouping. Subtraction with regrouping Subtraction from thousands e.g. 1000, 2000 ... Relating subtraction to addition	Create problem situations involving subtracting thousands (e.g. money and measurement) and have pupils compute answers mentally. Explore game situations where pupils use subtraction (adding on) to search for a pair of numbers that add up to one thousand e.g. $795 + 0 = 1000$. Use recording charts up to thousands to provide pupils with opportunities to understand the algorithm. Allow graded practice, speed and accuracy tests and oral explanations of results. Concrete materials may still be used if necessary, especially in subtracting from numbers like 3000 and 4000 etc. Use subtraction and addition stories to enable pupils to select an appropriate operation. Once the operation is identified, calculators can be used to compute answers. Create subtraction stories using words like difference, subtract, minus.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MULTIPLICATION	6. a. Multiply numbers up to four digits by a one-digit number. (results not greater than 999)	Revision of basic multiplication facts Language: product, factor, multiple	Identify patterns in multiplication tables. Explore related facts – multiplication by 6 is the same as multiplication by 3 and by 2. Review facts by skip counting, oral/mental games or selling many of the same items in a shop. Using multiplication matrices, arrays, etc, introduce terms like product, factors and multiples. Using an array (e.g. 13 x 10), allow pupils to use repeated addition to prove 13 x 10 = 130. Provide more examples so that they can generalize the procedure for multiplying by 10
	b. Multiply a two-digit number by a two-digit number	Multiplication by 10, 20, 30, etc. Multiplication by any two-digit number (distributive Property) Developing the algorithm	$\begin{array}{c|c} 16 & X \\ \hline 10 & \\ 20 & \\ 30 & \end{array}$ Extend activity for multiplying by 20, 30, and so on. Then after concrete experiences develop multiplication tables where pupils can use short cuts in computation to calculate answers. Using a similar technique, i.e. array models, have pupils model a multiplication problem (e.g. 14 x 12). Separate the array into two parts: 14 x 10 and 14 x 2. Provide more examples so that they can orally report similar partial products. Then record process as :- 14 x 12 = (14 x 10) + (14 x 2). After sufficient practice in the above form, they can be encouraged to use vertical form. $\begin{array}{ll} 14 \\ x\ 12 \\ \hline 140 & 14 \times 10 \\ 28 & 14 \times 2 \\ \hline 168 \\ \hline \end{array}$ $\begin{array}{ll} 36 \\ x\ 23 \\ \hline 720 & 36 \times 20 \\ 108 & 36 \times 3 \\ \hline 828 \\ \hline \end{array}$ NB: Multiplication by 10, 20, etc was developed orally in the last activity

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
DIVISION	7. Divide two and three digit number by numbers not greater than 10	Revision of multiplication facts and relate to division Vertical Form Developing the algorithm No regrouping Regrouping ones Regrouping tens and ones	Using array models for multiplication, allow pupils to relate 0 0 0 0 0 0 multiplication to division by creating division 0 0 0 0 0 0 stories from multiplication situations. $6 \times 2 = 12$ $12 \div 2 = 6$ $12 \div 6 = 2$ Given division statements in horizontal form have pupils convert to vertical form. The word 'division' may be introduced at this stage. Example: $12 \div 2$ is the same as $2 / 12$ in vertical form. Develop the algorithm in stages using concrete materials and oral reporting of process before recording. The final recorded algorithm may take this form $$\begin{array}{c|c|cc} & & 3 & 4 \quad R3 \\ \hline 7 & 2 & 4 & 1 \\ & & 24 & 31 \\ & & \underline{21} & \underline{28} \\ & & 3 & 3 \end{array}$$
FRACTIONS	8. Differentiate between proper fractions, improper fractions and mixed numbers	Revision of symbol meaning - meaning of top number (numerator) - meaning of bottom number (denominator) Introducing:- Proper and improper fraction Mixed numbers Converting improper fractions to mixed numbers and vice versa Set models for fractions 1/2, 1/4, 1/3, 1/5, 1/10	Set up situations where pupils can count fraction parts from folding wholes or assembling wholes from equal parts. Let them build tables with models, number names and symbols. Discuss the meanings of the top and bottom numerals in the symbol. Introduce numerator and denominator Have pupils count out a set of fractions from the same family (e.g., five quarters, seven thirds, three halves etc.) Let them express these fractions using symbols e.g. 5/4, 7/3, 3/2. Using the fraction models, let pupils make wholes and express the fraction as a whole and a part (e.g. 5/4 = 1 and ¼, i.e., 1¼). Practical and informal activities.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
FRACTIONS (cont'd)	9. Add and subtract fractions	Addition and subtraction with models. Developing the algorithm:- - like denominators - unlike denominators Introducing common multiples	Using standard area or linear models of wholes and fractions up to twelfths, have pupils. - perform addition by joining two parts (e.g. ½ + ¼) and expressing the result as a fraction - Perform subtraction by removing a part and expressing the result as a fraction Develop the algorithm in stages: - same denominators; - one denominator as a multiple of the other (e.g. _ + $1/6$) Use equivalent Fractions to convert one fraction and then add. Develop oral practice in finding common multiples e.g., given two numbers (say 6 and 8), allow pupils to orally run through the multiples of 8 until they reach a multiple of 6). Use common multiples to add/subtract fractions with unlike denominators. Use number stories involving addition and subtraction of fractions in problem solving contexts.
DECIMALS	10. Concept of tenths	Introduce place value column for tenths Relate to other topics/strands eg. measurement Approximate to the nearest whole number eg. 3.9 is approximately 4	Use fraction models, introduce base ten fractions (tenths). Introduce decimal notation as another form of writing base ten fractions (tenths). Extend place value chart to include decimal fractions. Provide practice in oral reading of number ego 1.7 (one and seven-tenths).

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MONEY TRANSACTION	1. Use rates in money transactions	Rates where time is involved. Monthly rates (e.g., house rent) Weekly rates (e.g., car rental) Daily rates (e.g., video rental) Hourly rate (e.g., car park) Charges by the minute (e.g., telephone use)	Devise a project which asks students to investigate businesses which deal in rates Students must present their findings (oral and written) Students must formulate problems from the discoveries in the project Example: If it is found that Janice charges $100. per night for an apartment, how much must I pay for 8 nights?
	2. Trade in measures of length, litres, area and time for values up to $1000.00 examining profit and loss	Profit and loss involving:- - length - Litres - area - time - mass/weight	Design a project which will ask students to go out into the business community and gather information from stores/shops trading in the various measures. By investigating the prices student will make deductions! inferences about profits and/or loss, or the best buy Example: Students may note that the same length of steel costs different prices in different stores. They may speculate on who is making a greater profit Example: Students may compare the price of one litre of oil in a bottle to five litres of oil in a jug and speculate on the saving to oneself, if one buys the 5 litre jug.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT			
LINEAR MEASURE	l. Calculate the perimeter of shapes	Conservation of length Constructing a formula for calculating perimeter of square and rectangle	Allow students to examine shapes and identify length, width/breadth and perimeter. Explore the relationship between length, width breadth and perimeter using:- - string - measurement Discuss. Create problems involving calculating the perimeter of shapes.
	2. a. Recognise the kilometer as the standard unit for measuring long distances b. Convert lengths c. Calculate lengths	The kilometre as a standard unit Relationship between kilometre, metre and centimeter Selecting appropriate unit for measuring lengths of given distances	Allow students to experience the kilometre by travelling the distance. Relate the kilometre to metres. Allow students to investigate distances greater than less than one kilometre. Find out distances in km between towns in the district. Walking a distance of one kilometre.
AREA	3. Calculate area of shapes using formulae	Conservation of area Development of formula for calculating area of square and rectangle Use of formulae to calculate area of squares and rectangles	Illustrate through practical activities that different shaped-figures can have the same area. Allow students to examine rectangles and identify length, width/ breadth and area. Explore the relationship between length, width/breadth and area Discuss findings. Create problems involving calculation of areas from diagrams and from real situations.
VOLUME	4. Calculate volume using non-standard units (cubes of different sizes) 5. a. Calculate volume using the standard unit (cm^3) b. Estimate Volume	Concept of volume (solids) Unit for measuring volume (cubes) Conservation of volume Calculation of volume using cubes The cubic centimetre as the standard unit Measurement of volume of cubes of different sizes Estimation verication of volume	Build structures of various sizes with cubes. Describe 3-D shapes. State number of cubes used. Introduce the term 'volume'. Allow students to define volume in their own words. Discuss. Build as many different structures as possible using the same number of cubes. Determine volume of structures (concrete and visual) by counting cubes. Justify the need for a standard unit, by discussing previous activities. Pack cubes into boxes and count the number of cubes used to fill boxes. Estimate volume of boxes and justify answers. Determine reasonableness of answers. Describe cubes in terms of length, height and width.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

CAPACITY	6. Measure capacity of small containers using:
	  a. arbitrary units
	  b. millilitres
		Measurement of quantities less than 1 litre using arbitrary units
		Measurement of capacity using millilitres
		Estimation/verification
			Present children with situations that necessitate the use of a smaller unit of measure. Examine recipes and prescriptions and list arbitrary units of measure. Use these units (teaspoon, tablespoon, dropper, cup) to measure.
			Visit drug stores, supermarkets to collect data on commodities that measure less than 1 litre and state the different capacities e.g. use measuring devices: graduated droppers, 5ml cups ...
			Use of measuring devices: (graduated droppers, 5 ml cups etc.).
			Make estimates in millilitres and verify by measurement.

WEIGHT/MASS	7. Weigh objects using kilograms	Weighing of objects on scales Comparison of objects according to mass Estimation/Verification Approximation to the nearest kilogram	Use bathroom scales to weigh and compare the mass of different objects of the same size and arrange mass in ascending and descending order. Find out personal mass. Investigate real life situations involving weight e.g. baggage weight, bulk buying. Estimate mass and justify answers. Use real life situations to show where an approximation is all that is needed and have students approximate. Justify answers.

TIME	8 a. Review time to half/quarter hour before and after the hour
	
	  b Review link between analog and digital clock readings
	
	  c. Tell time to 5 minute intervals
		Use of instrument
		Relative position of hands
		Different clock displays: comparing features
		Relationship between time expressed on both types of clocks
			Name some activities that may take half/quarter of an hour.
			Associate particular occurrences with time on clock's face.
			State the number of minutes in half/quarter of an hour.
			Relate half hour / quarter hour before and after to position of hands on clock face.
			Introduce digital clock and have students make frequent comparisons between this and standard analog.
			Record time in digital notation when reading standard clock.
			Engage students in activities in which they are required to match analog and digital clock.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
STATISTICS BARGRAPH	1.　　Interpret bargraph	Information from bargraph(s) where: - scale factor on frequency axis is 1 - scale factor on frequency axis, greater than 1 Bars arrangement: - vertically - horizontally Information interpreted: - mode - frequency (most, least, same) - decision making from data represented on the bargraph	Teacher presents bargraph9s) and uses guide questions to obtain information (from the graph). Example:　How many units does this bar represent? Which bar represents the most/least? Which bars represent the same amount? Present some bargraphs where the bars are arranged vertically and some where the bars are arranged horizontally and let students extract information from these Allow pupils to discuss their preferences for the different positions of the bargraph i.e. vertically or horizontally. Do you prefer the bars arranged this way (vertical) or that (horizontal)? Why? Present bar graphs using a larger scale factor on the frequency axis Example:　5, 10. Pupils discuss suitability Pupils are requested to extract information from these graphs and comment on the different scale factors.
	2.　　Identify the characteristics of the bargraph	Equal width of each bar Equal spacing between each bar Scale factor(s) on the frequency axis Labe(s) on the variable axis Height of each bar	From a variety of bargraph(s) pupils are to observe, measure, and discuss what they found. The teacher can use guide questions so that the main characteristics are observed. Example: What did you observe/find about the width of each bar? Graphs with bars arranged horizontally or vertically should be presented and pupils requested to observe and discuss the characteristics.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

BARGRAPH (cont'd)	3. Collect and classify data, construct and interpret bargraph	Problem formulation
		- the problem
		- the variable
		
		Collect data on tally chart
		
		Summarize data on frequency table
		
		Graphical representation:
		- position of axes (frequency and variable)
		- graduation and Label of respective axes
		- width of bars
		- spacing between bars
		- from frequency table to bargraph - appropriate
		        lengths of bars
		
		Discussion -
		        - Information presented on bar graph
		Example: - mode,
		                - least/same
		
		- recommendation/summary
			Teacher and pupils think of problem situations where the use of data is required.
			Example: What food/snacks should the school café sell to the pupils?
			        What quantities to stock?
			
			Pupils decide on the variables
			Example: macaroni pie, fried rice and chicken etc.
			
			Pupils collect the data using a tally chart.
			
			Pupils transfer this data onto a frequency table which should be used to construct the bargraph.
			
			Pupils present a report on what was done. State findings and draw conclusions.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
GEOMETRY SOLIDS Cube Cuboid Cylinder Pyramid Cone	1. Describe the properties of: - prism - a pyramid	Faces: number and type Edges: number and relationship Vertices: number	Examine solids by: - Drawing outlines of their faces - Discussing the shape of their faces - Constructing frames, using straws/sticks and plasticine, to focus on number of edges and vertices - Construct a table listing properties of solids.
	2. a. Identify the nets of cylinders and triangular prisms b. Draw the nets of cylinders and triangular prisms c. Construct cylinders and triangular prisms from their faces	Faces of cylinders and triangular prisms Composition of shapes in nets Arrangement of shapes in net of triangular prism	Open solids, draw their nets. Describe the composition of their nets. Differentiate between curved and flat surfaces. Roll rectangles of various dimensions to make open cylinders of different heights and widths. Observe different arrangements of nets for triangular prism.
PLANE SHAPES	3. Construct patterns from moving plane shapes	Type of movements -slides - flips	Examine natural and man-made patterns to look for repetition of shapes. Discuss the pattern, reproduce and extend it. Compare and contrast these patterns. Using a single triangle, reproduce the above patterns. Describe how the triangle was moved in each case.
SYMMETRY	4. Identify line symmetry in letters of alphabet and numerals	Line symmetry	Using mirrors and photocopies or stencils of letters of alphabet and numerals, let students identify line/lines of symmetry. Verify by folding. Discuss why some letters and numerals are not symmetrical.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

ANGLES	5. a. Determine an angle	Idea of turn
		Fixed point
		Direction - clockwise
		    - anti-clockwise
			Observe turns using hands of clock, pupils, geo-strips, etc.
			Draw conclusion with regard to:
			    - what remains fixed
			    - what moves
			    - the direction of turn
			Present pupils with geo-strips, straws and twisters, fastened paper strips etc., and allow pupils to make angles.

	b. Compare angles (no unit)	Use of 'larger', 'smaller' and 'same' to describe relative size of angles Direct comparison Ordering angles	Let pairs of pupils compare sizes by direct comparison. Present circular 'angle wheel chart' and allow pupils to manipulate to make turns greater/less than a given angle. Order angles in ascending /descending order using concrete representations
	c. Investigate angles in the environment	Static/fixed Dynamic/moveable	Find an angle whose size lies between two other angles. Investigate angles in the environment. Using a concrete representation (e.g. geo-strips, clock, blackboard) of an angle, students will make a drawing of it.

	6. a. Represent angles using drawings	Attributes of angle
		- fixed point
		- arms
		- direction of turn
		- magnitude (size)
			Example: **Fixed point**
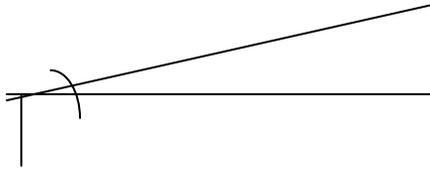			
			Challenge pupils to:
			    - Draw two angles of the same size/different size
			    - Draw one angle twice the size of another

	b. Compare angles using an arbitrary unit		Allow pupils to trace out arms of angle on tracing paper and use it as a unit for comparison.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
ANGLES (cont'd)	7. Measure angles using arbitrary units	Selecting an appropriate unit Performing unit iteration Counting units Recording results: 　- in exact number of units 　- by approximation to the nearest whole number of units	Presented with two angles that are of slightly different sizes, pupils can be asked to: 　- state which angle is larger 　- discuss how they will verify their answer 　- use an arbitrary unit to measure angle [Fold a circle in 8 equal parts, cut out sectors and colour them in different colours. Use these sectors as arbitrary units]. Record the measure by counting units. Presented with angles of varying sizes (drawn on paper) students will measure angles using an arbitrary unit, and state their result to the nearest whole unit (approximation).
	8. Recognise the degree as the unit for measuring angles and express whole turns, half turns and quarter turns in degrees	The degree as the standard unit One whole turn (angle at the centre of a circle) is 360º One half turn is 180º One quarter turn is 90º	Research to find out how the idea of degree originated. Using I whole turn as *360Q,* deduce the size of one half turn (straight angle) and one quarter turn (right angle). Compare angles using 900 and 1800 as benchmarks. Use angle testers for 900 to locate right angles in the environment.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
NUMBER			
NUMBER SEQUENCE TO 1 000 000	1. Associate number, numeral and number name of numbers to 1 000 000	Number sequences (word name) Ordering numerals Writing numerals	Use real situations e.g. cheque books, receipts etc. to allow pupils to associate number names with numerals. Create activities to enable pupils to conceptualise one million. Investigate quantities expressed in millions.
PLACE VALUE	2. State the value of any digit in numbers to one million	Expanded notation	Extend place value chart to include millions. Provide practice in expanded notation. Have pupils connect millions to thousands and hundreds.
APPROXIMATION	3. Round off whole numbers to the nearest thousand and million	Revision of rounding to 10's, 100's Connect approximation to estimation	Create situations to allow pupils to use approximation to facilitate computation, when exact quantities are not desired.
COMPUTATION ADDITION AND SUBTRACTIQN	4. Add and Subtract numbers	Revision of addition facts, commutative and associative laws Multi-Step problems in Addition and Subtraction Use of Calculators	Using problems involving large quantities have pupils add or subtract numbers and record using columns to millions. Create problems involving addition and subtraction which will allow pupils to determine when to apply an appropriate operation. Perform subtraction from numbers like 1000, 10 000 etc. by using adding-on techniques. Explore use of calculators to simplify complex computational tasks.

MULTIPLICATION	5. Multiply 3-digit and 4-digit numbers by two digit numbers	Revision of multiplication of 2-digit numbers by 2-digit numbers
		Use of algorithm
			Extend algorithm to include three/four digit multiplicands. Relate to real world situations.
			Perform simple computational estimation.
			Example:
			    - the approximate size of the product
			    - the value of the last digit in the product
			Use calculators to verify results.

DIVISION	6. Divide numbers (to four digits) by two-digit divisors	Revision of division using one digit divisors and vertical recording Estimating the quotient using two-digit divisors and up to three/four digit dividends Division as repeated subtraction Developing the algorithm	Using number stories, tables, calculators, have pupils solve division problems involving one-digit divisors. Allow pupils to use multiplication to verify their answers. To introduce two-digit divisors, allow pupils to use repeated subtraction and then multiplication to obtain answers.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
DIVISION (cont'd)			Develop the algorithm in stages using concrete and oral reporting of the process before recording. The final recording may take this form:

		1	4	3	**R11**
27	**3**	**8**	**7**	**2**	
		38	**117**	**92**	
		27	**108**	**81**	
		---	---	---	
		11	**9**	**11**	

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
SQUARE AND SQUARE ROOT	7. Recognise square numbers and compute the square root of a number	Repeated factors Number sequences Connecting number to geometry Compute the square roots of only square numbers	Use geo-boards, dot paper, grids to form square arrays. List square numbers. Obtain factors of square numbers and derive square roots. Create number sequences to derive square numbers. Use calculators to build tables of square numbers and to investigate patterns in square numbers. Example: odd number sequence.
FRACTIONS	8. Express a fraction in an equivalent form by using the algorithm	Revision of equivalence by matching Set models for fractions Forming equivalent fractions Renaming fractions Using equivalent fractions to: - add and subtract fractions, including mixed numbers - order fractions	Using area or linear models and paper folding, have pupils establish many names for a given fraction. Extend to include set models, then allow pupils to make a table, listing a set of new names for given fractions. Pupils can deduce the rule by inspecting the top and bottom numerals.
	9. Multiply fractions by whole numbers	Review meaning of multiplication: - whole number multipliers (e.g. 3 sets ¼) - fractional part of a set (e.g. ¼ of 12)	Use equivalent fractions to order a set of fractions and to add/subtract fractions. Using any type of fraction models, have pupils use repeated addition to multiply a fraction by a whole number, then record process. Example: 3 ¼ = ¼ 3 = ¼ + ¼ + ¼ = ¾
	10. Divide a whole number by a fraction	a. Review grouping concept of division b. Use grouping concept of division to develop the skill of dividing a whole number by a fraction	Create more examples using unit and non-unit fractions and allow pupils to build tables and generalize rule. Demonstrate that $1 \div \frac{1}{2}$ means: how many halves are in 1 whole. Provide similar examples for pupils. Example: $2 \div \frac{1}{2}$, $3 \div \frac{1}{2}$, $4 \div \frac{1}{2}$ Allow pupils to derive and describe patterns. Assist pupils with discovering algorithm.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
DECIMALS	11. Read, write and state the place value of decimal fractions to hundredths	Base Ten fractions Decimal notation Expanded notation Decimals to fractions Connecting decimals to metric system	Using fraction models, introduce base ten fractions (tenths and hundredths). Introduce decimal notation as another form of writing base ten fractions. Extend place value chart to include decimal fractions. Provide practice in oral reading of decimals and in translating word name to numeral. Allow pupils to use expanded notation to express decimals as fractions. Create situations where pupils can use calculator to explore patterns in the number system. Example $\quad {}^1/_{10} = 1 \div 10 = 0.1$ $\quad\quad\quad {}^1/_{100} = 1 \div 10 = 0.01$ Apply decimal notation to problems in measurement.
	12. Add and subtract decimal fractions	Revision of adding and subtraction whole numbers Extensions to include place values in tenths, hundredths Rounding to tenths, hundredths	Using real world problems involving decimal fractions, have pupils perform addition and subtraction, using vertical recording. Create situations where approximation can be used to estimate. Develop and extend skills in using calculators to simplify computational tasks. Using a whole, divided into 100 equal parts, connect fractions to percent Example: $\quad \dfrac{3}{100} \longrightarrow$ 3 per cent $\longrightarrow$ 3%...
PERCENT	13. Express hundredths as percents and calculate the percent of a quantity	Connecting fraction to percent Introducing percent notation Percent to fraction Percent of a quantity Applying percent to real world problems	Create problems involving a fraction of a set, which pupils can use models to solve. Extend ideas to percent of a quantity Example $\quad$ 20% of 60 is the same as $\quad\quad\quad \dfrac{20}{100} \text{ x } \dfrac{60}{1}$ Apply percent to solve real world problems. Example: value added tax, discount, etc. Continue to use the calculator and computer as a computational tool in solving problems.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

PROPORTION (DIRECT)	14. Use the unitary method to solve problems on proportion	Revision of:
		- Multiplication problem stories
		- Division problems stories
		Unitary method
		Connection proportion to problems on percent
		Communicating orally and in writing
			Use multiplication and division stories in real world situations (e.g. problems involving buying items and measurement) where pupils will calculate.
			Example:
			    - the cost of many items, given the cost of one
			    - the cost of one item, given the cost of many
			Extend to include problems where pupils will calculate the cost of some items given the cost of any number of items.
			Ensure that pupils have opportunities to communicate these processes orally and in writing.
			Apply proportional reasoning to solve problems on percent.
			Example: If 30% of a quantity is 120, how much is 50% percent of the quantity?
			Continue to explore the use of calculators in solving problems on proportions especially for those involving difficult computations.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

MONEY	1. Use money in economic situations
	
	   a. Wages and salaries
	   b. Savings and loans
	   c. Simple Interest
		Wages:
		- daily wage
		- weekly wage
		- fortnightly wage
		
		Salaries
		- monthly salary
		- yearly salary
		
		Simple interest:
		Meaning of:
		- interest
		- principal
		- rate
		- time
		- amount
		
		Calculate simple interest
		Calculate amount
			Set up a project where students can interview members of the community (including their relatives) on activities related to the particular economic situation being studied. Present findings.
			
			Students can interview their relatives on their wages or their salaries.
			Make a distinction about who receive wages and who receive salaries.
			Students can also determine how the wages and salaries were computed.
			
			Set up bank where pupils can carry out transactions involving loans and savings.
			Project: collect from bank, cooperatives, mortgage companies, data on current rates of interest. Record and present findings.
			Encourage pupils to write problems based on the project.
			
			Provide pupils with opportunities to solve problems based on the use of money in economic situations.
			Use calculators to check answers.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
MEASUREMENT LINEAR MEASURE	1. Measure small lengths using the millimeter	The millirnetre as a small unit of measure	Justify the need for a smaller unit by presenting appropriate problem situations. Allow students to build table of length relationships.
		The relationship between the kilometre, metre, centimetre and the millimetre	Create situations where pupils can measure actual lengths and record their answers as accurately as possible (e.g. m, cm, mm).
AREA		Measurement of length in mm Use of decimal notation to record measurement	Using real-life situations, allow pupils to estimate and record lengths using centimeter and millimetre and justify answers.
	2. Approximating circumference of circle	Parts of the circle: Radius diameter and circumference Development of relationship between diameter and circumference Comparison between perimeter of other shapes and circumference of various circles	Fold cut-outs of circles to identify diameter and radius. Introduce the term 'circumference'. Explore the relationship between diameter and circumference using circles of varying sizes. Discuss findings and make conclusions as to the length of the circumference.
	3. Calculate area of triangle	The relationship between areas of rectangles and associated triangle: base, height	Use practical activities to demonstrate that the area of a triangle is half the area of associated rectangle. Use the relationship to develop formula for area of triangle, i.e. ½ (base x height). Use formula to calculate area of triangle in problem situations.
	4. Identify the square metre as the approximate unit for measuring area of large surfaces.	Area of large regions (e.g. floor, play ground etc.) Area in square metres	Justify the need for a larger square unit by presenting pupils with appropriate situations. Allow pupils to list materials that can be used to cover large surfaces for example floor tiles, vinyl. Solve real-life problems which involve calculating area of large surfaces.

TOPICS	OBJECTIVES			INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
AREA (cont'd)				Estimation/verification Approximation	Estimate and record area of shapes and justify answers. Approximate area to the nearest square metre.
VOLUME	5.		Calculate volume of cubes/cuboids	Formula for calculating volume of cubes/cuboids; - length - breadth - height - cubic units	Build larger cubes/cuboids using one-centimetre cubes. Through exploration, allow pupils to find other ways to determine the number of cubes used without counting each cube. Discuss findings. Use formula to calculate volume in problem situations. Present pupils with situations that necessitate the need for a
WEIGHT/MASS	6.	a.	Identify the gram as a standard un it for measuring mass	The gram as a small unit for measuring mass Relationship between gram and kilogram Measurement of mass in grams Use of appropriate instruments	smaller unit of measure than the quarter kilogram weight. Compile list of items available in the home/drugstore or supermarket whose weight is expressed in grams.
		b.	Measure mass in grams Computation (4 operations)		
TIME	7.	a.	Tell time to the minute	One-minute and five-minute intervals on clock face	Give pupils opportunities to experience one-minute periods and five-minute periods in a variety of ways. Make one-minute sand-timers and use with activities.
		b.	Estimate time	One-minute and five-minutes intervals Relationship between hour and minutes	Use activities, for example, keeping eyes closed for one minute; run around building for five minutes. Demonstrate, through activities with a standard clock.
				Telling time to the minute Analog and digital clocks	Read and record various times on standard clock and relate to display on digital clock. Record time in digital notation when reading the standard clock and vice versa.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
STATISTICS PICTOGRAPH BLOCKGRAPH		Review of work done previously Problem selection	Use problem solving strategies.
BARGRAPH	1. Gather data 2. Tabulate data 3. Display tabulated data on bargraph	Data collection i.e. interview, list of questions to be asked. Organising Data: - frequency table Construct bargraph - title - axes correctly labeled - equal width bars	Pupils select a sample of 30 students from the school records. Pupils interview these students to find out their preferences, parents' occupation, mode of transport. Pupils organise and summarize data collected from interview. Pupils present data on bar graph and discuss same. Given raw scores, pupils use statistical skills to interpret same, e.g., answer questions on mode, etc. Present data and discuss.

PIECHART	4. Interpret piechart	Interpretation:
		- relative size of each sector
		- rank order sectors (e.g. largest, smallest, etc.)
		- interpretation of data represented
			W.I. cricket team played 40 matches. Display the results shown on a pie chart.
			Find out how many matches were lost.
			Present pie charts displaying
			    - personal budget
			    - personal time management of activities
			    - results of games
			    - favourite T.V. shows, etc.
			Pupils required to comment on the information displayed.

MEAN/AVERAGE (Single score)	5. Calculate mean/average	Sum given scores Divide this sum by number of scores	Calculate mean/average from given scores as well as from data collected by pupils. Discuss the importance of the mean/average through problem situations (e.g. Father changes his mind and decides to give each child the same amount of money. How much should he give each child?) Pupils to compile class statistical manual e.g. age, average age, etc.

TOPICS	OBJECTIVES			INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

GEOMETRY
 	
SOLIDS
Cube
Cuboid
Cylinder
Sphere
Pyramid including cone
	1.	a.	Review properties of solids	Use of:
				- analysis
				- deduction
				- problem solving strategies
					Given a set of solids pupils can be asked to.-
					    - Construct solids congruent to a given solid
					    - Draw pictorial representation of solids.
					
					Given a list of properties, pupils can be asked to name the solid(s) which has/have the properties.
					Given a set of examples and non-examples of nets. explain why some represent nets and others do not.

		b.	Differentiate among the nets of various solids		
	2.	a	Identify and draw nets of pyramids, including cone	Composition of shapes in net Arrangement of shapes in net	Presented with different types of pyramids (square-based. rectangular-based and triangular-based) and cut-off plane shapes. pupils can be asked to:- - arrange cut-outs in patterns, and determine which arrangements will fold into a pyramid.
		b.	Construct pyramid from their faces		Given plane or grid paper. pupils can be asked to:- - draw outlines of pyramids and test (by folding) to see if they represent nets Given examples and non-examples of nets of pyramids students can pick out which one represent nets. Extend activity for cones. Differentiate between parallel and perpendicular lines.

STANDARD FIVE

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

PLANE SHAPES	3. Describe the properties of plane shapes (polygons)	Parallel sides
		Equal sides
		Right angles
		[Name of polygons with more than four sides not to be emphasized]
			Sort shapes using:
			    - one criterion e.g., parallel sides, equal sides, right angles
			    - more than one criterion
			
			Discuss common properties of a set. List properties of common shapes.
			Use geo-board, geo-paper, geo-strips, grids (square and triangular to create a plane shape given a property list. Shapes with 'indented' (concave) sides can be discussed.
			
			Make a four-sided figure with:
			    - no equal sides
			    - no right angles
			    - four right angle
			    - opposite sides parallel

TRIANGLES	4. Identify and name isosceles, equilateral and right-angled triangles	Naming triangles by:
		  - relationship between sides
		  - type of angles
		Matching name with triangle
			Presented with a set of triangles (scalene, isosceles, equilateral) pupils can be asked to:-
			
			    - sort by number of equal sides (none, two, three)
			    - name sets using isosceles, equilateral, neither isosceles nor equilateral
			
			Ask pupils to sort by type of angle:
			    - find triangles with one right angle
			    - find triangles with no right angles
			    - name sets as right-angled triangles and non-right-angled triangles
			
			Challenge pupils to investigate whether a triangle can;
			    - have more than one right angle
			    - be right-angled and equilateral

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
TRIANGLES (cont'd)			Use geo-boards, geo-paper and geo-strips to make different types of triangles. Pupils can be asked to construct: - a set of congruent triangles - a set of different triangles - a right-angled isosceles triangle
	5. Deduct the relationship between the size of the angle and the length of the side opposite the angle	Largest side opposite the largest angle. Smallest side opposite the smallest angle	Pupils can be asked to draw triangles in which all three sides are of different lengths. They can: - identify the largest and smallest angle - identify the largest and smallest side of the triangle - collaborate with other pupils to discover the relationship between the size of the angle and the length of the side opposite the angle
ISOSCELES AND EQUIATERAL TRIANGLES	6. Deduct that equal sides are opposite equal angles	Equal angles are opposite equal sides	Using geo-boards, geo-strips, geo-paper or plain paper, have pupils construct triangles with: - two equal sides - three equal sides
			Use angle testers or folding or measuring to investigate the relationship between the lengths of the sides for: - equilateral triangles - isosceles triangles
TRANSFORMATION (plane shapes)	7. a. Use slides, flips and turns to create plane shapes and patterns	Composition of shapes, patterns. Language: Slide Flip Turn	Experiment with movements such as sliding, flipping or turning to make two new shapes. Example: Flip a right-angled triangle to make an isosceles triangle Turn an isosceles triangle to make a hexagon Describe the movement made. Make complex patterns (e.g. kaleidoscope) by flipping, sliding or turning an arrangement of plane shapes. Experiment by designing gift paper, fabric, etc.

TOPICS		OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
TRANSFORMATION (cont'd)	b.	Predict the new position of a shape after a: - flip about a line - turn 1/4. 1/2, 3/4 about a point - slide, given the distance and direction	Performing movements Describing movements	Experiment with mirrors to predict new positions of complex shapes including letters) when flipped about horizontal, vertical or oblique lines. Perform simple turns and observe changes in position and orientation of shapes. Perform simple slides given distance and direction moved. Describe movement using appropriate geometric language.
	c.	Perform combinations of slides, flips and turns to create new shapes and patterns	Composition of shapes Analysis of movements	Provide pupil with a plane figure to be used as a template and grid paper. Invite pupils to make successive movements (repetitions combinations) to create new shape or a pattern (e.g. use an isosceles right-angled triangle to make a square). Describe movements. Use complex shapes and perform movements to create designs for decorations. Mount a display of pupils' work.

SYMMETRY	8.	State number of lines of symmetry in polygons	Symmetrical polygons
			    - location of lines of symmetry
			    - number of lines of symmetry
			 Non-symmetrical polygons
				Given cut-outs of irregular polygons such as rhombus, scalene isosceles right-angled triangles" parallelogram and trapezium, pupils are encouraged to:-
				    - investigate line symmetry using mirrors
				    - experiment to identify lines of symmetry through paper folding
				    - draw lines of symmetry in shapes
				    - construct summary chart.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
ANGLES	9. a. Construct an instrument to measure angles – paper protractor	Idea of a unit Size of the unit (multiple or 10 or 15 degrees) Structure of protractor	Presented with coloured paper (or markers) pupils can be asked to: - stick sectors together to make a protractor - colour sectors **4 units (45º each)**　　　　　　**6 units (30 º each)**
	b. Use paper protractor to measure angles	Placing protractor in correction position - establish zero - count units - record measurement	Construct a paper protractor using smaller units e.g., ten degree sectors. Measure angles by counting the number of units that completely cover the angle. Record the result, approximately where necessary.
	c. Estimate the size of an angles using units on the paper protractor	Predict size Verify size by measuring	Presented with angles of various sizes, students can be asked to: - estimate the size of the angle using units used previously on the paper protractor - verify their result by measuring or by using angle testers.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
NUMBER			
FOUR OPERATIONS	1. Perform the four basic operations on numbers	Revision of basic facts for all operations	Create opportunities for mental computation, approximation and estimation skills.
		Application of four operations to solving multi-step problems	Have pupils solve problems involving the application of more than one operation.
		Selection of appropriate computational method to arrive a result	Set up situations where pupils can select and rationalism the use of computational methods from mental mathematics, estimation, paper and pencil and calculators, and check the reasonableness of results.
FRACTIONS	2. Multiply two fractions	Revision of previous work done on fractions Multiplying two proper fractions. Deriving the algorithm for multiplying fractions Applying algorithm to multiplying any two fractions (proper, improper, mixed numbers)	Using area models with wholes of the same size, have pupils derive the result of multiplying two proper fractions Example: ½ x ¼ by placing one model over the other, the result can be obtained. Using more examples of proper fractions pupils can tabulate results and make generalisation. Apply algorithm to multiplication of improper fractions and mixed numbers. Create number stories involving multiplication of fractions and solve by applying algorithm.
	3. Divide two fractions	Divide a fraction by a whole number Connecting division with multiplication	Using real situations, allow pupils to use models to divide a fraction by a whole number. Provide graded practice to allow pupils to build a table and look for a pattern-dividing fraction by fractions.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
FRACTIONS (cont'd)			Have pupils construct oral and written reports describing the relationship between the division operation and the multiplication operation and vice versa. Allow pupils to interpret the answer in relation to the problem.
DECIMAL	4. Multiply two decimals	Revision of multiplication of fractions Revision of reading decimal numbers on place value chart and converting to fractional form Multiplying decimals by a whole number and by powers of 10 Multiplying decimals by decimals	To multiply decimals by a whole number, have pupils convert the decimal to a base ten fraction, then multiply. Example: $0.8 \times 7 = {}^8/_{10} \times 7 = {}^{56}/_{10} = 5.6$ $0.14 \times 10 = {}^{14}/_{100} \times 10 = {}^{14}/_{100} \times 10 = {}^{14}/_{10} = 1\,{}^4/_{10} = 1.4$ Using decimal fractions, create decimal products (e.g. 0.6×0.2) and have pupils convert decimals to fractions, multiply fractions, and then express answers as a decimal. Example: $0.6 \times 0.2 = {}^6/_{10} \times {}^2/_{10} = {}^{12}/_{100} = 0.12$ $0.13 \times 0.1 = {}^{13}/_{100} \times {}^1/_{10} = {}^{13}/_{1000} = 0.013$ Using a set of varied examples, allow pupils to make a generalization from observing patterns. Given two decimal numbers, allow pupils to predict the number of placers in the product. Verify answers using calculators.
	5. Express a fraction as a decimal	Connecting division to fractions (e.g., $3 \div 4 = \frac{3}{4}$) Division of two whole numbers, answer Less than 1 Terminating decimals Recurring decimals Decimal palces	Using standard size linear models of wholes and parts have pupils find solutions of division problems and express result as a fraction. $1 \div 2 = 1/2$ $2 \div 3 = 2/3$ For the example $2 \div 3$, have pupils measure out a strip of two units long, fold (or cut) into 3 equal parts. Name the part by matching with the whole.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
DECIMALS (cont'd)			Pupils can be given the opportunity to predict the fraction that will arise from other division situations. Allow discussion and reversal so that fractions can be expressed as division statements e.g., ¾ = 3 ÷ 4
			Have pupils write whole numbers as decimals with no tenths and hundredths (3 = 3.00). Set up division using recording charts with tenths, hundredths. ¾ = 3 ÷ 4 = 4 ⌐ 3 . 0 0 = 0.75
			Provided graded practice to include decimals which will not terminate, and have pupils apply approximation skills to round off answers. Use calculators and computers to explore recurring decimals and to solve problems involving metric measures and money.
	6. Divide two decimals	Revision of equivalent fractions Revision of multiplying decimals by powers of 10 Writing decimal division sentence in fractional form	Revision algorithm for obtaining equivalent fractions. Extend to include base ten fractions. Example: $^4/_5 =$
			Provide pupils with practice in converting decimal numbers to whole numbers by multiplying by powers of 10. Example: $0.02 \text{ x } = 2$
		Converting decimal divisors to whole numbers	Have pupils convert decimal division sentences into fractions form Example: $3.6 \div 0.02 = {}^{36}/_{002}$
		Performing division using whole number divisors	Pupils can find the factor that when multiplied by the division will make it a whole number, then transform the problem to: $\dfrac{3.6}{0.04} = \dfrac{3.6 \text{ x } 100}{0.04 \text{ x } 100} = \dfrac{360}{}$

TOPICS		OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
(cont'd)				Extend and develop to include decimal dividends in the transformed fraction. Apply division algorithm as usual, using tenths, hundredths, etc.
FRACTIONS, DECIMAL AND PERCENT	7.	Make connections among decimals, fractions and percent	Revision of concept of percent Relating percent to decimals Revision of conversion of fractions to decimals and vice versa	Allow pupils to build a chart showing the equivalence of fractions to decimals to percents. Have pupils discuss means of converting from one form to another. Provide situations where pupils can develop competence in working in any of the three forms and where they can select the most appropriate form to use in a given situation. Use problem situations in which all these forms are applied and allow pupils to use calculators to arrive at solutions.
PERCENT	8.	Solve problems involving percent	Revision of percent of a Quantity Calculating what percent one quantity is of another Calculating whole quantity given parts expressed as percent Calculating parts of quantities, given another part, expressed as a percent	In revising percent of a quantity, discuss situations where percent is used in the real world. Allow pupils to solve problems involving calculating interest on loans and investments (no formula required) VAT, discount and problems in measurement. Review problems of the type: What fraction of 12 is 4? What percent of 12 is 4? Use unitary method to solve problems involving percent, when the whole is not given. Have pupils explore and use the function key '0/0' on the calculator.

STANDARD FIVE

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

UNEQUAL SHARING	9. Perform unequal sharing of quantities	Revision of equal sharing (division)
		Comparison of quantities
		- additive
		- multiplicative
			Provide situations where pupils can use appropriate language to compare two quantities.
			Use set or linear models to represent two quantities.
			
			Example:
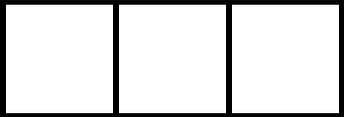			
			A B
			
			Strip A is shorter than strip B by 3 units.
			Strip A is one-half the length of strip B.
			Strip B is longer than strip A by 3 units.
			Strip B is twice as long as strip A.
			
			For each of the above comparative statements, investigate:
			  - which strip is used as the base of the comparison
			  - what operation (+, x) is used to describe the comparison

STANDARD FIVE

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

MONEY	1. Use money in economic situations:
	   a. Gain and loss percent
	   b. Discounts
	   c. Taxes
		Percentages:-
		- cost price
		- selling price
		- gain or loss
		- sale prices
		- regular prices
		- value added tax
			Develop activities which will involve the pupils in real life situations
			Example: shopping, trading, tourism, agriculture, small business ventures, construction trades etc.
			
			Use these situations for investigations, data collection, projects, etc.
			
			Use calculators to check answers.

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

MEASUREMENT
 	
LINEAR MEASURE
	1. Calculate:-
	    a. circumference
	    b. diameter
	    c. radius of circle
	    d. perimeter of compound
	        shapes
		Use of the formula $C = D \times 3\frac{1}{7}$ to calculate:-
		- circumference of circle; semi-circle
		- diameter
		- radius
		
		Identifying boundaries
		Devising method of calculating perimeter
			Use problems from real life situations that involve finding the circumference; diameter or radius of circle.
			
			Allow students to create compound shapes, then find perimeter of the shapes. Discuss compound shapes and students' findings.
			Create activities where pupils will be required to use conservation of perimeter in problem situations.

	2. Solve problems in linear measure/perimeter	Application of problems solving strategies Problems involving knowledge/skills covered at lower levels	Create situations where pupils solve the same problem using different strategies.

AREA	3. Calculate:-
	    a. area of triangle using
	        formula
	
	    b. area of compound shapes
	
	    c. solve problems involving
	        area
		Formula for calculating area of triangle
		
		Analysis of compound shapes to identify simple shapes
		
		Shapes with equal perimeters can have different areas and vice versa
		
		Differently shaped figures can have the same areas
			Allow students to create compound shapes using the square, rectangle, circle, triangle.
			
			Discuss shapes and strategies to be used to calculate areas.
			
			Create shapes of equal perimeter. Calculate areas of shapes created and compare findings.
			
			Through practical activities demonstrate conservation of area.

STANDARD FIVE

TOPICS	OBJECTIVES			INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
VOLUME/CAPACITY	4.	a.	Relate capacity to volume	Application of problem solving strategies. Problems involving knowledge/skills covered at lower levels	Using real life situations create problems in which pupils can Investigate and solve using concepts in volume and capacity.
		b.	Solve problems involving volume and capacity	Problems involving relationship between liters and cubic centimeters	Identify problems involving mass/weight. Discuss strategies for solving these problems.
WEIGHT/MASS	5.		Solve problems associated with weight/mass	Application of problem solving strategies Problems involving knowledge/skills covered at lower levels	Choose another strand of mathematics (e.g. money and create a problem involving weight/mass). Discuss problem and strategies for solving.
TIME	6.	a.	Establish relationship between subunits for time	Seconds, minutes, hours and days etc. Application of problem solving strategies	Encourage students to build table of time relationships:-
		b.	Solve problems involving time and other related concepts	Problems involving knowledge/skills covered at lower levels	60 seconds = 1 minute 60 minutes = 1 hour 24 hours = 1 day 7 days = 1 week Allow children to solve routine and non routine problems involving time and distance; money and time.

STANDARD FIVE

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES

STATISTICS
 	
REVIEW OF GRAPHS
 	
DISPLAY OF DATA
	1. Review of picturechart, pictograph, blockgraph, bargraph and piechart.
	
	2. Use statistical data to solve problem
		Interpretation of graphs.
		
		Problem formulation:
		- statement of problem
		- what is being investigated
		
		Data collection:
		- questionnaire
		- checklist
		
		Organising data:
		- arrays in ascending or descending order
		- frequency tables
		
		Selection of most appropriate graph for displaying data
		
		Presenting report on findings
			Use problem-solving activities.
			Pupils collect data using simple questionnaire:
			
			Example: Here are 4 secondary schools:
			    Jordan High •
			    Iere High •
			    Hillview High •
			    Fatima High •
			Tick ONE school of your choice
			
			Pupils determine the numbers choosing each school by tallying. Summarise data in frequency table.
			Example A.
			
			| School
				Freq.

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Jord	4
Iere	10
Hillview	11
Fatima	0	

TOPICS	OBJECTIVES	INSTRUCTIONAL FOCUS	SUGGESTED ACTIVITIES
			Example B: Project: Pupils interview parents to find out number of children in each family. Raw data collected can be ordered by pupils. Example: 1,0, 2, 2, 3, 6, 3, 4, 3, 5, 6, 1, 2, 2, 3, 3, 3, 4, 5, 6, 6 Data is now displayed in a frequency table No. of children in family | Freq. 0 | 1 1 | 1 2 | 2 3 | 3 4 | 1 5 | 1 6 | 2 Pupils choose the most appropriate graphical method (e.g. piechart, bargraph, pictograph) to display data. Pupils give reasons for choosing graphical method. Possible outcomes: aesthetic reasons, accuracy, simple to draw, etc.
MEAN/MODE	3. Calculate mean and mode	Mean and mode	Discuss the importance of the mean and mode.
		Problem solving	Problem: An engine consumes 45 litres of fuel on Monday, 40 on Tuesday, 45 on Wednesday, 42 on Thursday and 38 on Friday. Q1: What is the cost of running the engine for 5 days if 1 litre cost $1.50? Q2: How much do you think it will cost to run this machine for another day?

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