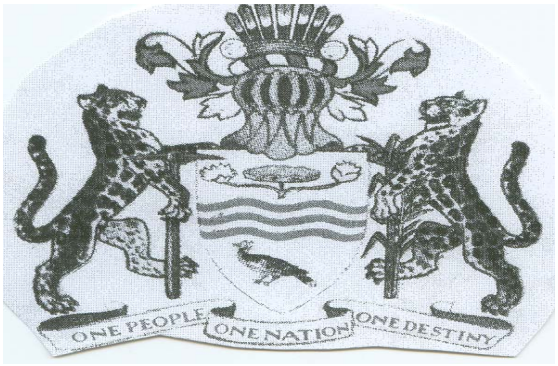


MINISTRY of EDUCATION

SECONDARY SCHOOL MATHEMATICS

LEVEL 8

CURRICULUM GUIDE

Foreword

It is acknowledged that thorough planning is essential for effective teaching and learning. Such planning is even more critical today when one considers the limited resources, both human and material, which are available.

The Ministry of Education, through the Secondary School Reform Project (SSRP), has developed curriculum materials that have been designed to improve the quality, equity and efficiency of secondary education. The curriculum materials include Levels 7-9 curriculum guides and teachers' guides for Language Arts, Mathematics, Science, Social Studies, Reading and Practical Activities for Science. These materials have been tested in secondary-age schools nationwide and are considered useful in providing teachers with a common curriculum framework for planning, monitoring and evaluating the quality of teaching and learning. The curriculum materials also provide a basis for continuous student assessment leading to the National Third Form Examination (NTFE).

The initial draft curriculum materials have been subjected to evaluation, by respective Heads of Departments, from all ten Administrative Regions and Georgetown and they have been subsequently revised to reflect the views expressed by teachers.

The revised curriculum materials are now published as National Curriculum documents to provide consistency and support for teachers in the process of planning for an effective delivery of the curriculum. All secondary teachers must ensure that they make good use of these curriculum materials so that the quality of teaching and learning can be improved in all schools.

Ed Caesar
Chief Education Officer

PREFACE

This is the Revised Curriculum Guide for Level 8. This document fulfils the objective of making **Mathematics** accessible to all students at Level 8. Hence teachers of Level 8 students should make a conscious effort to see how best they could utilize the ideas contained to plan for instruction. This document can serve as a focal point for departmental and regional subject committee meetings, where methodologies and strategies for both teaching and assessing are deliberated on. Lessons should be delivered in an environment in which there is opportunity for active and creative participation by both students and teacher. This Guide has a direct focus on an integrated approach to curriculum delivery, in which the teacher is not unduly restricted by the subject content. The student's total development as a person should be of foremost concern to the teacher.

In the curriculum process, feedback is a necessary condition for change and improvement, and I would urge all of our mathematics teachers to provide such feedback to the curriculum staff as they visit to provide support that will enhance your classroom teaching.

Mohandatt Goolsarran
Head
Curriculum Development and Implementation Unit
National Centre for Educational Resource Development
September 2002

ACKNOWLEDGEMENTS

The following persons were involved in writing and revising the Level 8 Curriculum Guide:

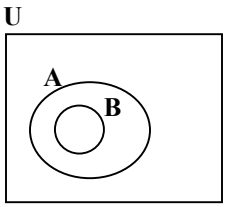
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CONTENTS

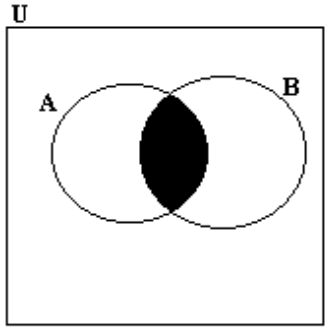
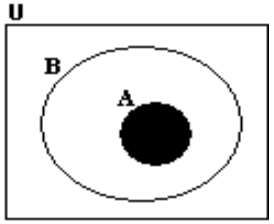
	PAGE
Sets	1
Number Theory 1	10
Computation	17
Measurement	20
Algebra 1	28
Number Theory 2	34
Geometry 1	40
Relations & Functions	46
Statistics	49
Geometry 2	59
Algebra 2	62
Consumer Arithmetic	64

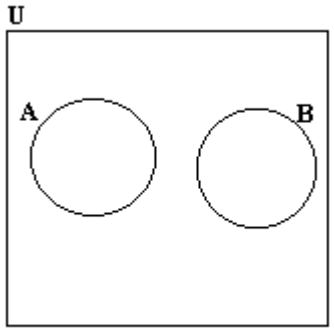
SETS

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Subsets of a Set	Use appropriately the symbol for subset. Construct subsets of a given set.			Enjoy writing down the subsets of a set.	The symbol that represents **'is a subset of'** is $\subset$., e.g. If A = {odd numbers} and B = {1, 3, 5} Then B $\subset$ A. Subsets of a set, e.g. A = {a, b, c} Subsets of A are: {a, b, c}, {a}, {b}, {c}, {a, b}, {a, c}, {b, c}, $\varnothing$. Every set is a subset of itself. The empty set is a subset of every set. The number of subsets that can be obtained from a set bears a relationship to the number of elements contained in the set. This relationship can be stated as number of subsets = 2^n, where n represents the number of elements of the given set.	Using the symbol "$\subset$" to represent subset of a set. Writing down all the subsets of a given set.	Can students : • use the symbol "$\subset$" to represent subset of a set? • write down all subsets of a given set?	Social Studies, e.g. collecting, classifying and identifying subsets of given groups.

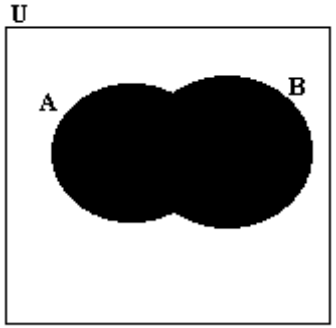
Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Draw a Venn diagram to show subsets.			Appreciate neatness in drawing a Venn diagram.	The Venn diagram below shows subsets.  B is a subset of A. $B \subset A$	Drawing Venn diagrams to show subsets.	• draw a Venn diagram to show subsets? Do students appreciate neatness in drawing a Venn diagram?	

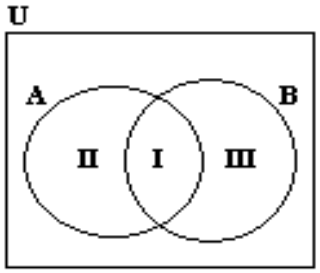
Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Intersection of sets		List the elements in the intersection of two sets.			If two sets contain common elements, then they intersect. Example: If A = {1, 2, 3, 4} and B = {2, 4} Then $A \cap B = \{2, 4\}$ The commutative and associative properties hold for the intersection of sets. Commutative Property: $A \cap B = B \cap A$ Associative Property: $A \cap (B \cap C) = (A \cap)B \cap C$	Listing the elements in the intersection of two sets.	Can students list the elements in the intersection of two sets?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Draw a Venn diagram to show the intersection of two sets.			.	The intersection of two sets can be shown as the shaded region on the Venn diagram below:  If $A \subset B$, then $A \cap B = B$. This can be shown by the shaded region on the Venn diagram below.  	Drawing Venn diagrams to show the intersection of two sets.	• draw Venn diagrams to show the intersection of two sets.	Social Studies, e.g. identifying commonalities in two sets of specimen.

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
				Enjoy drawing Venn diagrams to show the intersection of two sets	Sets that do not intersect are said to be disjoint, e.g.  		Do students enjoy drawing Venn diagrams to show the intersection of two sets?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Union of Sets		List the elements in the union of two sets.			When two sets are joined together, the union of the two sets is the set containing all the elements in both sets. Example: If A = {1, 2, 3, 5} and B = {2, 4} Then A ∪ B = {1, 2, 3, 4, 5} The commutative and associative properties hold for the union of sets. Commutative Property: A ∪ B = B ∪ A Associative Property: A ∪ (B ∪ C) = (A ∪ B) ∪ C	Listing the elements in the union of two sets.	Can students list the elements in the union of two sets?	Social Studies, e.g. types of families forming a union through marriage. Integrated Science: combining elements, e.g. hydrogen and oxygen combined give water, H_2O .

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
	Draw a Venn diagram to show the union of two sets.				The union of two sets can be shown as the shaded region on the Venn diagram below: 	Drawing Venn diagrams to show the union of two sets.	Can students draw Venn diagrams to show the union of two sets?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
				Enjoy drawing Venn diagrams to show the union of two sets.	 In the Venn diagram above, Region I represents elements belonging to A and B. Region II represents elements belonging to A only. Region III represents elements belonging to B only. $A \cup B = I + II + III$		Do students enjoy drawing Venn diagrams to show the union of two sets?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Interpret mathematical statements written symbolically and vice versa.				Interpretation of mathematical statements written symbolically and vice versa. Examples: $A \subset B$ or $A \cap B = A$ can be stated in words as: set A is included in set B or set A intersection set A is equal to set A. If G = {Guyanese} D = {Chinese doctors} Then $G \cup D$ can be stated in words as: Guyanese doctors that are Chinese..	Interpreting mathematical statements written symbolically and vice versa.	Can students interpret mathematical statements written symbolically and vice versa.	
Venn Diagrams	Draw Venn diagrams to describe a logical situation. Use Venn diagrams to solve problems.			Practice solving problems by use of Venn diagrams.	Venn diagrams are used to represent sets and their relationships. Problems involving the use of Venn diagrams	Drawing Venn diagrams to describe logical situation. Using Venn diagrams to solve problems.	Can students draw Venn diagrams to describe a logical situation?: Do students practice solving problems by use of Venn diagrams? **Unit Test**	

NUMBER THEORY 1

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
The Set of Rational Numbers		Identify the set of rational numbers.			The set of rational numbers include: • common fractions • improper fractions • exact and recurring decimals • the integers	Showing on chart examples of the set of rational numbers.	Can students: • identify the set of rational numbers?	
		List subsets of the set of rational numbers.				Listing subsets of the set of rational numbers.	• list subsets of the set of rational numbers?	
	Arrange rational numbers in order of size.				The use of equivalent fractions to determine which fraction is bigger. Examination of the parts of rational numbers in a given set of rational numbers as a quick way to determine which one is bigger or smaller or equal.	Arranging rational numbers in order of size.	• arrange rational numbers in order of size?	Environmental Education, e.g. comparing the proportion of Guyana covered by savannahs and rainforests.

<table>
<tr><th rowspan="2">Topic</th><th colspan="4">Objectives</th><th rowspan="2">Content</th><th rowspan="2">Activities/ Materials/ Strategies</th><th rowspan="2">Evaluation</th><th rowspan="2">Areas of Integration</th></tr>
<tr><th>Skills</th><th>Knowledge</th><th>Understanding</th><th>Attitude</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Appreciate the need to differentiate between rational numbers in terms of size.</td><td></td><td></td><td>Do students appreciate the need to differentiate between rational numbers in terms of size?</td><td></td></tr>
<tr><td>Base Ten</td><td></td><td>List the base ten symbols.

Identify place value of digits in a numeral.</td><td></td><td></td><td>The base-ten system is sometimes called the decimal system. It involves ten symbols. These are: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Place value is the value of a specific digit in a number. In the base-ten system any number can be placed digit by digit in columns. E.g.

<table><tr><th>T</th><th>H</th><th>T</th><th>O</th></tr><tr><td>10^3</td><td>10^2</td><td>10^1</td><td>10^0</td></tr><tr><td>3</td><td>4</td><td>7</td><td>5</td></tr></table>
Each digit in the number 3475 has a unique place value. The place value of 3 is Thousands. This corresponds to 3×10^3.</td><td>Listing base ten symbols.

Showing students examples of the place value of digits in numerals.</td><td>Can students:

• list the symbols used in base ten?

• identify the place value of digits in a numeral?</td><td></td></tr>
</table>

<table>
<tr><th rowspan="2">Topic</th><th colspan="4">Objectives</th><th rowspan="2">Content</th><th rowspan="2">Activities/ Materials/ Strategies</th><th rowspan="2">Evaluation</th><th rowspan="2">Areas of Integration</th></tr>
<tr><th>Skills</th><th>Knowledge</th><th>Understanding</th><th>Attitude</th></tr>
<tr><td></td><td></td><td>Write numbers in expanded form and vice versa.</td><td></td><td>Appreciate the importance of place value.</td><td>A number can be expanded by using powers of ten, .e.g.

$3475 = 3 \times 10^3 + 4 \times 10^2 + 7 \times 10^1 + 5 \times 10^0$
$= 3000 + 400 + 70 + 5$
$= 3475$</td><td>Writing numbers in expanded form and vice versa</td><td>Can students write numbers in expanded form and vice versa?

Do students appreciate the importance of place value?</td><td></td></tr>
<tr><td>Base-Two System</td><td></td><td></td><td>Convert numbers from base-two to base-ten and vice versa.</td><td></td><td>The base-two system has two symbols. These are 0 and 1. The base-two system is also called the binary system. It has place value headings that are all powers of two.

<table><tr><td>2^3</td><td>2^2</td><td>2^1</td><td>2^0</td></tr><tr><td>1</td><td>0</td><td>1</td><td>1</td></tr></table>
The base-ten number for $1011_{two} = 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$
$= 8 + 0 + 2 + 1$
$= 11_{ten}$</td><td>Small group activities:

Converting given numbers from:

• base-two to base-ten.</td><td>Can students convert numbers from

• base-two to base-ten?</td><td>Electricity, e.g. the on or off states in an electric circuit.</td></tr>
</table>

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
					Conversion of a base-ten number to a base-two number, e.g. 2 | 27 2 | 13 R 1 2 | 6 R 1 2 | 3 R 0 2 | 1 R 1 2 | 0 R 1 $27_{ten} = 11011_{two}$	• base-ten to base-two.	• base-ten to base-two?	
			Add numbers in base-two.		Addition of numbers in base-two, e.g. 1011 1101 1111 100111_{two}	Small group activities: • adding given numbers in base-two.	Can students: • add numbers in base-two?	
					Subtraction of numbers in base-two, e.g. 11101 10110 111_{two}	• subtracting given numbers in base-two.	• subtract numbers in base-two?	

<table>
<tr><th rowspan="2">Topic</th><th colspan="4">Objectives</th><th rowspan="2">Content</th><th rowspan="2">Activities/ Materials/ Strategies</th><th rowspan="2">Evaluation</th><th rowspan="2">Areas of Integration</th></tr>
<tr><th>Skills</th><th>Knowledge</th><th>Understanding</th><th>Attitude</th></tr>
<tr><td>Base Five</td><td></td><td></td><td>Convert numbers from base-five to base-ten and vice versa.</td><td></td><td>The base-five system has two symbols. These are 0, 1, 2, 3, 4. It has place value headings that are all powers of five.
<table><tr><td>5^3</td><td>5^2</td><td>5^1</td><td>5^0</td></tr><tr><td>3</td><td>2</td><td>4</td><td>1</td></tr></table>
The base-ten number for $3241_{five} = 3 \times 5^3 + 2 \times 5^2 + 4 \times 5^1 + 1 \times 5^0 = 375 + 50 + 20 + 1 = 446_{ten}$

Conversion of a base-ten number to a base-five number. E.g.
5 | 446
5 | 89 R 1
5 | 17 R 4
5 | 3 R 2
5 | 0 R 3
$446_{ten} = 3241_{five}$.</td><td>Small group activities:

Converting given numbers from

• base-five to base-ten?

• base-ten to base-five?</td><td>Can students:

• convert numbers from:

• base-five to base-ten

• base-ten to base-five?</td><td></td></tr>
</table>

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
			Add numbers in base-five. Subtract numbers in base five.		Addition of numerals in base-five, e.g. $\begin{array}{r} 123 \\ 342 \\ \underline{423} \\ 1443_{five} \end{array}$ Subtraction of numbers in base-five, e.g. $\begin{array}{r} 1020 \\ \underline{342} \\ 123_{five} \end{array}$	Adding numbers in base five. Subtracting numbers in base-five.	Can students: • add numbers in base-five? • subtract numbers in base five?	
Base-Eight System			Convert numbers from base-eight to base-ten and vice versa.		The base-eight-system has eight-symbols. These are 0, 1, 2, 3, 4, 5, 6, 7. The base-two system is also called the octal system. It has place value headings that are all powers of eight. $\begin{array}{\|c\|c\|c\|c\|} \hline 8^3 & 8^2 & 8^1 & 8^0 \\ \hline 1 & 5 & 7 & 2 \\ \hline \end{array}$ The base-ten number for $1572_{eight} = 1 \times 8^3 + 5 \times 8^2 + 7 \times 8^1 + 2 \times 8^0 = 512 + 320 + 56 + 2 = 890_{ten}$	Small group activities: Converting given numbers from: • base-eight to base-ten.	Can students convert numbers from: • base-eight to base ten?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
					Conversion of a base-ten number to a base-eight number, e.g. 8 | 890 8 | 111 R 2 8 | 13 R 7 8 | 1 R 5 0 R 1 $890_{ten} = 1572_{eight}$	• base-ten to base-eight.	• base-ten to base-eight?	
				Appreciate the need for number systems other than base-ten.			Do students appreciate the need for number systems other than base-ten?	
			Add numbers in base-eight.		Addition of numbers in base-eight, .e.g. 1527 3426 4235 11412_{eight}	Adding numbers in base-eight.	Can students: • add numbers in base-eight?	
			Subtract numbers in base-eight.		Subtraction of numbers in base-eight, .e.g. 1720 1342 356_{eight}	Subtracting numbers in base-eight.	• subtract numbers in base eight? **Unit Test**	

COMPUTATION

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Currency Conversion			Change currency from one form to another.	Appreciate the need for currency conversion.	Basic operations with simple proportion to calculated currency conversion involving Guyana, Canadian, Eastern Caribbean, Jamaican, Trinidad & Tobago, United Kingdom, United States and other currencies. E.g. If US$1.00 = G$190 Then US$10.00 = G$190 × 10 = $19 000	Changing currency from one form to another.	Can students change currency from one form to another? Do students appreciate the need for currency conversion?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Rounding Numbers (Approximation)			Round off numbers in order to have approximate figures from given data.		The rounding off of whole numbers to the nearest 10, 100, 1000, …	Demonstrating the rounding off of whole numbers, .e.g. when we round off 435 to the nearest hundred, it becomes 400 because 435 is nearer 400 than to 500.	Can students round off: • whole numbers to the nearest 10, 100, 1000, …?	
					The rounding off of decimals to 1, 2, 3, …, places.	Similarly, 1.27 to one decimal place becomes 1.3 because the second place after the decimal point is more than 5.	• decimals to 1, 2, 3, …, places?	
				Accept the need for the rounding off of whole numbers and decimals.			Do students accept the need for the rounding off of whole numbers and decimals?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Standard Form	Express very large or very small numbers in standard form.			Accept the use of standard form to represent very large or very small numbers.	A number expressed in the form: $\mathbf{a} \times 10^{n}$, where **a** represents a number between 1 and 10 and **n** an integer, is said to be in standard form.	Demonstrating the expression of very large or very small numbers in standard form. For example: (i) 170 000 = 1.7×10^{5} (ii) 0.000 072 = 7.2×10^{-5}	Can students express very large or very small numbers in standard form? Do students accept the use of standard form to represent very large or very small numbers?	
Ratio			Express ratios as fractions in their simplest form.	Accept the use of ratios in comparisons and the need for sharing.	Expression of a ratio as a fraction, e.g. 80:100 becomes $\frac{80}{100} = \frac{4}{5}$	Expressing ratios as fractions in their simplest form.	Can students express a ratio as a fraction in its simplest form? Do students accept the use of ratios in comparisons and the need for sharing?	Agriculture Science, e.g. the application of an herbicide in a given ratio mixture per hectare.

MEASUREMENT

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Circumference of a Circle		Identify the symbol π. Recall the values used for π.			Identification of π. Values used for π are 3.14, 3.1416 or $3\frac{1}{7}$.	Displaying the symbol π. Project in which students discover an approximate value for π, e.g. • have students collect five or more circular objects, e.g. milk tin, fruit juice tin, etc. • using measuring tape or string and ruler/metre stick to measure the circumference of the tops of the objects, then the diameter.	Can students: • identify the symbol π? • recall the values used for π?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
				Willingness to participate in group projects		• listing the following on a table: - object - circumference - diameter - answers for the circumference divided by the diameter. Discussion: How does the measurement of the circumference compare to the measurement of the diameter? Is it twice as large? Is it three times as large or more than three times as large? What is the value of π (pi)?	Are students willing to participate in group projects?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
		Identify the formula for finding the circumference of a circle.			Circumference is the outside edge of a circle. Its length can be found by measurement or can be calculated by formula. Circumference = $\pi \times$ diameter $C = \pi d$ or $C = 2\pi r$, where r is the radius of the circle. $r = \frac{C}{2\pi}$	Displaying on chart the formula for finding the circumference of a circle.	Can students : • identify the formula that is used to calculate the circumference of a circle?	
	Solve problems involving the calculation of the circumference of a circle.					Solving problems involving the calculation of the circumference of a circle.	• solve problems involving the calculation of the circumference of a circle?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Area of Parallelogram		Identify the formula for finding the area of a parallelogram.	Calculate the area of parallelograms.		Area of parallelogram = base × perpendicular height.	Displaying chart showing formula for finding the area of a parallelogram. **Discussion:** A parallelogram is formed from two congruent triangles. What are the properties of the parallelogram? How can the area of the parallelogram be found using the two congruent triangles? Using graph paper or popsicle sticks to adjust the shape of a parallelogram into that of a rectangle and vice versa. Finding the area of the rectangle and the parallelogram and comparing results.	Can students: • identify the formula for finding the area of a parallelogram? • calculate the area of parallelograms?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
						Calculating the area of a parallelogram using each side as a base and respective height.		
				Enjoy doing activities involving the calculation of the area of parallelograms.			Do students enjoy doing activities involving the calculation of the area of parallelograms?	
	Solve problems involving the calculation of the area of parallelograms.					Solving problems involving the calculation of the area of parallelograms?	Can students solve problems involving the calculation of the area of parallelograms?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Area of Composite Shapes.		Recognise composite shapes.			A composite shape is a shape that is made up of many different parts. For example:  **Composite Shape**	Small group activities: • making composite shapes. • identifying each part used to make up a composite shape.	Can students: • recognise composite shapes?	
			Calculate the area of composite shapes.		Calculation of the areas of composite shapes.	• finding the area of each part and adding to find the total area of the composite shape. • using graph paper to make shapes, forming composite shapes and calculating areas. • calculating the area of shapes with different parts.	• calculate the area of composite shapes?	
				Willingness to participate in group activities.			Are students willing to participate in group activities?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Scales and Distances		Recognise enlarged and reduced. scales.			**Enlarged scale** – E.g. 1 cm on drawing represents 1 km in reality. **Reduced scale** – E.g. 1 m on drawing represents 1 cm in reality.	Demonstrating examples of enlarged and reduced scales.	Can students: • recognise enlarged and reduced scales?	
			Express a scale as a ratio and then as a Representative Fraction.		A scale of 1 cm to 250 000 cm can be written as 1:250 000. This means that 1 cm on a drawing represents 250 000 cm in reality. Such a scale has a Representative Fraction of $\frac{1}{250000}$. Representative Fraction (RF) = $\frac{\text{Size on drawing}}{\text{Actual size}}$ Both numerator and denominator of the fraction must be expressed in the same units.	Expressing a scale as a ratio and then as a Representative Fraction.	• express a scale as a ratio and then as a Representative Fraction?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Use scales to represent lengths or distances.			Accept the use of scales to represent lengths and distances.	The use of scales to represent lengths or distances.	Small group activities: • drawing simple plans using given scales. • making models using appropriate scales, .e.g. a model of a desk, table, etc.	• use scales to represent lengths or distances? Do students accept the use of scales to represent lengths and distances? **Unit Test**	Art and Craft, .e.g. making articles in which the scale of the article with respect to the model (original) is 1:6..

ALGEBRA 1

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Algebraic Expressions		Write down the coefficient of an algebraic term.			A coefficient is the number in front of a letter in an algebraic term, e.g. in the algebraic term 4a, 4 is the coefficient of a.	Writing down the coefficient of algebraic terms.	Can students: • write down the coefficient of an algebraic term?	
		Write down the factors of an algebraic term.			All algebraic terms have two or more factors, e.g. the factors of 5a are 1, 5 a and 5a.	Writing down the factors of algebraic terms.	• write down the factors of an algebraic term?	
		State the degree of a polynomial.			The degree of a polynomial is the highest power that the variable is raised in the algebraic expression, e.g. the degree of the polynomial $x^3 + 4x^2 + x + 1$ is 3. In the case of a multivariable polynomial, the degree is found by adding the highest index of each variable, e.g. the degree of the polynomial $5x^2y^3 + 4xy^2 + y$ is 5.	Stating the degree of polynomials.	• state the degree of a polynomial?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Binary Operations		Identify a binary operation.			A binary operation refers to a clearly defined computational process that can be carried out on two elements at a time, e.g. $a * b = 2a - b$	Displaying examples of binary operations.	• identify a binary operation.	
	Extract the rule that governs an operation.				In the operation $a * b = 2a - b$, $*$ is the symbol of the operation and **b** is the term that comes after the symbol of the operation. Then $2a - b$ means $2 \times a - b$.	Extracting the rule that governs an operation	• extract the rule that governs an operation?	
	Apply the rule that governs a binary operation				Application of the rule that governs a binary operation. Commutative and Associative properties of binary operations.	Discussion: commutative and associative properties of binary operations. Working examples of binary operations on the chalk board. Students working similar examples. Students may also be asked to describe a binary operation of their own and use it on different pairs of values.	• apply the rule that governs a binary operation	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	.	Identify problem situations that require the application of binary operations.				Identifying problem situations that require the application of binary operations.	Can students identify problem situations that require the application of binary operations?	
Laws of Indices		State the base and index of an algebraic term. State the laws of indices.			The index of a number or variable is the power, to which it is raised, e.g. in 4^2, x^2, the power or index is 2. The '4' and 'x' are referred to as the base. When multiplying, the powers are added, e.g. $a^6 \times a^2 = a^8$. When dividing, the powers are subtracted, e.g. $a^6 \div a^2 = a^4$. When raising a power to another power, the powers are multiplied e.g. $(a^4)^2 = a^8$.	Stating the base and index of an algebraic term. Working exercises involving the laws of indices. Deducing that: $x^\circ = 1$ $x^1 = \frac{1}{x}$	Can students: • state the base and index of an algebraic term? • state the laws of indices.	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Removal of Brackets	Apply the rule governing the removal of brackets.		Multiply terms in brackets by a multiplier.		Distribution of multiplication over addition and subtraction when brackets are removed in an algebraic expression, .e.g. $a(\boldsymbol{x} + y) = a\boldsymbol{x} + ay$ $a(\boldsymbol{x} - y) = a\boldsymbol{x} - ay$ Each term inside the brackets must be multiplied by the term immediately outside the brackets. The term outside the brackets is called the multiplier. In the case where the multiplier is negative, e.g. $-a(\boldsymbol{x} + y) = -a\boldsymbol{x} - ay$ $-a(\boldsymbol{x} - y) = a\boldsymbol{x} + ay$ The signs in the brackets are changed when the brackets are removed.	Multiplying terms in brackets by a multiplier. Discussing and working exercises involving the application of the rule governing the removal of brackets.	Can students multiply terms in brackets by a multiplier?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
				Appreciate the order of performing operations.			Do students appreciate the order of performing operations?	
Expanding Algebraic Expressions	Use the distributive law to simplify algebraic expressions.			Willingness to participate in group discussions.	Multiplication of a binomial by a binomial, .e.g. $(x + 2)(x + 3) = x(x + 3) + 2(x + 3)$ Each term of the first bracket serves as a multiplier for the terms in the second bracket. By the distributive law the product is: $x^2 + 3x + 2x + 6 = x^2 + 5x + 6$	Discussion and working of examples on chalkboard. Students work similar examples for reinforcement.	Can students Use the distributive law to simplify algebraic expressions? Do students demonstrate a willingness to participate in group discussions?	
Simplifying Algebraic Fractions		Recognise algebraic fractions			Algebraic fraction, e.g. $\frac{x}{3}+\frac{5x}{6}$	Displaying examples of algebraic fractions.	Can students recognise algebraic fractions?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
			Simplify algebraic fractions.		In addition and subtraction of algebraic fractions, the LCM of the denominators is first obtained, e.g. $\frac{x}{3}+\frac{5x}{6}=\frac{2(x)+(5x)}{6}$ $=\frac{7x}{6}$ Factors and multiples of algebraic terms. LCM of a set of algebraic terms. Fractions with like denominators Fractions with unlike denominators. Addition and subtraction of algebraic fractions.	Discussion and working examples on the chalkboard. Explaining the concept of the term as a product of factors. Finding the LCM of two and three terms. Simplifying fractional quantities.	Can students simplify algebraic fractions?	
				Willingness to work individually on tasks.			Do students demonstrate a willingness to work individually on tasks?	

NUMBER THEORY 2

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
Mathematical Laws		State the commutative law. State the associative law.			The commutative law. Examples: $8 + 12 = 12 + 8$ $8 \times 12 = 12 \times 8$ The order in which we add or multiply numbers does not matter. The result is always the same. The operations of addition and multiplication satisfy the commutative law. The associative law. Examples $(8 + 12) + 2 =$ $8 + (12 + 2)$ $(8 \times 12) \times 2 =$ $8 \times (12 \times 2)$ The order in which we add or multiply numbers in groups of two does not affect their sum or product. The operations of addition and multiplication satisfy the associative law.	Discussion on the commutative law with examples. Stating the commutative law. Discussion on the associative law with examples. Stating the associative law.	Can students state the: • commutative law? • associative law?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
		State the distributive law. Identify social situations in which mathematical laws can be observed.			The distributive law. Examples: $(4 \times 5) + (4 \times 3) = 4 \times (5 + 3) = 4(5 + 3)$ $(4 \times 5) - (4 \times 3) = 4 \times (5 - 3) = 4(5 - 3)$ Multiplication distributes over addition and subtraction.	Discussion on the distributive law with examples. Stating the distributive law. Discussing and identifying social situations in which mathematical laws can be observed.	Can students state the distributive law? Can students identify social situations in which mathematical laws can be identified?	
Closure Property		Identify the closure property.			Closure property: A set of numbers is closed under an operation, if when the operation is applied to any two numbers of a set the result is another member of the set, e.g. if we add two whole numbers, the result is a whole number.	Discussion: • The closure property with examples. •The reason why closure is necessary in a mathematical system.	Can students identify the closure property?	

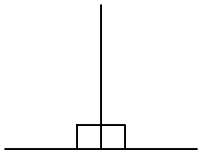
Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
				Aware of the difference between closed and open operations.	Laws of closure as related to: • whole numbers • natural numbers • integers • rational numbers	Are students aware of the difference between closed and open operations?		
Addition and Subtraction of Rational Numbers			Add directed numbers.		Addition of directed numbers. Examples: (+4) + (+ 5) = (+9) (-5) + (-4) = (-8) When we add two directed numbers with the same sign, the sign of the result is the same as that of the directed numbers added.	Demonstration: adding directed numbers using: - the number line - semi circles, etc. Small group activities: • adding directed numbers.	Can students add directed numbers?	

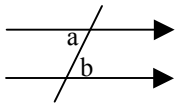
Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
			Subtract directed numbers.	Enjoy adding and subtracting directed numbers	Subtraction of directed numbers. Examples: (+9) – (3) = (+6) (-9) – (+3) = (-6) (-9) – (-3) = (-6)	Demonstration: subtracting directed numbers using: - the number line - semi circles, etc. Small group activities: • subtracting directed numbers.	Can students subtract directed numbers? Do students enjoy adding and subtracting directed numbers?	

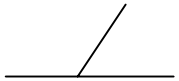
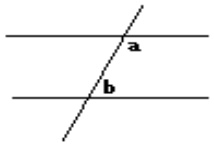
Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Multiplication of Directed Numbers			Multiply a directed number by a directed number.	Enjoy multiplying directed numbers.	A positive number multiplied by a positive number gives a positive number. Examples: $(+2) \times (+6) = (+12)$ $2a \times 6b = 12ab$ A negative number multiplied by a negative number gives a positive number. Examples: $(-2) \times (-6) = (+12)$ $(-2a) \times (-6b) = (+12ab)$ A positive number multiplied by a negative number gives a negative product. Examples: $(-2) \times (+6) = (-12)$ $(+2) \times (-6) = (-12)$	Small group activity: • Multiplying a directed number by a directed number.	Can students multiply a directed number by a directed number? Do students enjoy multiplying directed numbers?	

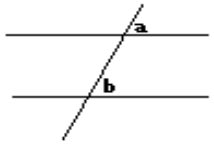
Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Division of Directed Numbers			Divide directed number by a directed number.		Division of directed numbers. Examples: $(+6) \div (+2) = \frac{(+6)}{(+2)} = (+3)$ $(-6) \div (-2) = \frac{(-6)}{(-2)} = (+3)$ $(+6) \div (-2) = \frac{(+6)}{(-2)} = (-3)$ $(-6) \div (+2) = \frac{(-6)}{(+2)} = (-3)$ Division of numbers with unlike signs give a negative quotient.	Small group activities: • Dividing a directed number by a directed number.	Can students divide a directed number by a directed number?	
				Enjoy dividing a directed number by a directed number.			Do students enjoy dividing a directed number by a directed number?	
		Identify social situations in which the use of directed numbers is of significance.				Discussing and identifying social situations in which the use of directed numbers is of significance.	Can students identify social situations in which the use of directed numbers is of significance?	

GEOMETRY 1

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Perpendicular Lines	Draw perpendicular lines.	Identify perpendicular lines.			Two lines are perpendicular when they are at right angles to each other. E.g. 	Displaying examples of perpendicular lines. Drawing perpendicular lines.	Can students: • identify perpendicular lines? • draw perpendicular lines?	Technical Drawing, e.g. drawing perpendicular lines.
Parallel Lines	Draw parallel lines.	Identify parallel lines.			Two lines are parallel when the perpendicular distance between them is always the same. E.g. 	Displaying examples of parallel lines. Drawing parallel lines.	• identify parallel lines? • draw parallel lines.	Technical Drawing, e.g. drawing parallel lines.

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Alternate Angles	Find the size of alternate angles.	Identify alternate angles.		Appreciate finding the size of alternate angles.	When a transversal cuts two parallel lines, alternate angles sometimes called **Z** angles are formed. E.g.  In the figure above, **a** and **b** are alternate angles. Alternate angles between pairs of parallel lines are equal.	Displaying examples of alternate angles. Finding the size of alternate angles.	Can students: • identify alternate angles? • find the size of alternate angles? Do students appreciate finding the size of alternate angles?	

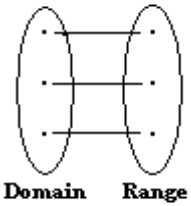
Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
		Identify supplementary angles.			If the sum of two angles is 180°, then the angles are called supplementary angles. E.g.  The two angles in the figure above add up to 180°.	Displaying examples of supplementary angles. Discussing situations in which supplementary angles occur.	Can students identify supplementary angles?	
Co-interior angles		Identify co-interior angles in parallel and non parallel situations.			When a transversal cuts a pair of lines, the angles that are formed between the lines are called co-interior or U angles. E.g.  In the figure above, **a** and **b** are co-interior angles. Co-interior angles are supplementary only if they are formed between parallel lines.	Displaying examples of co-interior angles Discussing situations in which co-interior angles occur.	Can students identify co-interior angles?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
			Find the size of co-interior angles.	Appreciate finding the size of co-interior angles.		Having students find the size of co-interior angles.	Can students find the size of co-interior angles? Do students appreciate finding the size of co-interior angles?	
Corresponding angles		Identify corresponding angles.			When a transversal cuts a pair of parallel lines, the angles that are in similar or corresponding positions above or below the parallel lines are called corresponding angles. E.g.  In the figure above, **a** and **b** are corresponding angles. Corresponding angles are always equal.	Displaying examples of corresponding angles Discussing situations in which corresponding angles occur.	Can students identify corresponding angles?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
			Find the size of corresponding angles.	Appreciate finding the size of corresponding angles.		Having students find the size of corresponding angles.	Can students find the size of corresponding angles? Do students appreciate finding the size of corresponding angles?	
Construction of Triangles	Construct triangles.			Enjoy constructing triangles.	Construction of triangles.	Small group activities: Constructing triangles given the length of: • three sides. • two sides and the size of the included angle. • one side and size of two angles.	Can students construct triangles? Do students enjoy constructing triangles?	Technical Drawing, e.g. constructing various types of triangles.

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Construction of Parallelograms	Construct Parallelograms.			Enjoy constructing parallelograms.	The construction of parallelograms.	Small group activities: Constructing parallelograms given: • the length of three sides. • the length of two sides and the size of the included angle.	Can students construct parallelograms? Do students enjoy constructing parallelograms? **Unit Test**	Technical Drawing, e.g. constructing parallelograms

RELATIONS & FUNCTIONS

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
The Many-to One and One-to-One Relations.		Identify a function.			A function is a special kind of a relation in which one and only arrow leaves each member of the domain. E.g.  In a set of ordered pairs {(0, 1), (1, 3), (1, 4)}, the first element "1" is paired with two different elements of the range, namely 3 and 4. The relation is not a function. In a set of ordered pairs {(1, 2), (2, 3), (3, 4)}, each first element namely 1, 2 and 3 has one image. Hence the set is a function. A set of ordered pairs is a function if no first element is repeated.	Observing several arrow diagrams and determining which are functions and which are not. Discussion: determining whether a given set of ordered pairs is a function.	Can students: • identify functions? • determine whether a set of ordered pairs is a function?	
	Determine whether a set of ordered pairs is a function.							

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Draw the graph of functions.			Enjoy drawing the graph of functions.	Graph of functions	Drawing the graph of functions.	Can students draw the graph of functions? Do students enjoy drawing the graph of functions?	
			Write down the set of ordered pairs from a graph.			Writing down the set of ordered pairs from graphs.	Can students: • write down the set of ordered pairs from a given graph?	
			Write equations of lines parallel to the ***x***-axis.		y = k represents the equation of lines parallel to the ***x***-axis, where k is a constant.	Writing the equation of lines parallel to the ***x***-axis.	• write the equation of lines parallel to the ***x***-axis?	
			Write equations of lines parallel to the y-axis.		***x*** = k represents the equation of lines parallel to the y-axis, where k is a constant.	Writing the equation of lines parallel to the y-axis.	• write the equation of lines parallel to the y-axis?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Shade the region on a co-ordinate plane that is represented by inequalities.					Shading the region on a co-ordinate plane that is represented by inequalities.	Can students shade the region on a co-ordinate plane that is represented by an inequalities? **Unit Test**	

STATISTICS

<table>
<tr><th rowspan="2">Topic</th><th colspan="4">Objectives</th><th rowspan="2">Content</th><th rowspan="2">Activities/ Materials/ Strategies</th><th rowspan="2">Evaluation</th><th rowspan="2">Areas of Integration</th></tr>
<tr><th>Skills</th><th>Knowledge</th><th>Understanding</th><th>Attitude</th></tr>
<tr>
<td>Frequency Tables</td>
<td>Construct a frequency table from a given set of data.</td>
<td>Recognise the format of frequency tables.</td>
<td></td>
<td></td>
<td>Frequency table: a table in which the frequency is shown. E.g.

<table>
<tr><th>Score</th><th>Tally</th><th>Frequency</th></tr>
<tr><td>4</td><td>1111</td><td>4</td></tr>
<tr><td>5</td><td>~~1111~~</td><td>5</td></tr>
</table>

Construction of frequency tables.</td>
<td>Displaying examples of frequency tables.

Small group activities:

• Planning and collecting information.

• Recording data.

• Reporting on frequencies of values.

• Constructing frequency table.

Discussion on ways to arrive at frequencies of values, e.g. counting occurrences, writing down values and how often they occur.</td>
<td>Can students recognise the format of frequency tables?</td>
<td></td>
</tr>
</table>

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
				Enjoy constructing frequency tables.			Do students enjoy constructing frequency tables?	
Line Graphs		Recognising situations in which line graphs can be applied.			Line graphs pictorially represent trends and patterns in which change can be clearly shown. E.g. change in temperature and growth; population increase or decrease.	Displaying examples of line graphs. Collecting examples of line graphs from magazines, newspapers, etc.	Can students recognise situations in which line graphs can be applied.	
				Appreciate the value of line graphs.			Do students appreciate the value of line graphs?	
	Draw line graphs.					Small group activities: • Collecting data, e.g. population of school over a period of time. • Constructing line graphs. • Displaying work done to class for analysis.	Can students draw line graphs.	Social Studies e.g. drawing the line graph of population growth or decrease during a given period.

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Use line graphs to solve problems.			Enjoy drawing line graphs.	Interpolation: estimating intermediate values. Extrapolation: extending the line to estimate future trends or development.	Using line graphs to answer simple questions on trends and patterns.	Do students enjoy drawing line graphs? Can students use line graphs to solve problems?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Averages: Mean, Median, Mode			Find the mean given a set of scores.	Appreciate calculating the mean given a set of scores	The arithmetic mean is another name for the average of a set of scores. The mean can be found by dividing the sum by the number of scores. E.g. the mean of 2, 4, 8 and 10 is $\frac{24}{4} = 6$ Mean = Sum of scores ÷ Number of scores	Manipulating sets of concrete objects to find the mean, e.g. three sets of corks with each set having 10, 11, and 9 corks. Establishing one set of the three sets and then re-distributing to form three equivalent sets. Finding the mean from a given set of scores, say 10, 11 and 9 by adding all the scores and dividing by 3. Collecting information and finding the mean. Comparing means to determine the greatest levels of performance and lowest levels of performance.	Can students find the mean given a set of scores? Do students appreciate calculating the mean given a set of scores?	

<table>
<tr><th rowspan="2">Topic</th><th colspan="4">Objectives</th><th rowspan="2">Content</th><th rowspan="2">Activities/ Materials/ Strategies</th><th rowspan="2">Evaluation</th><th rowspan="2">Areas of Integration</th></tr>
<tr><th>Skills</th><th>Knowledge</th><th>Understanding</th><th>Attitude</th></tr>
<tr>
<td></td><td></td><td></td><td>Find the mean from a frequency table.</td><td>Appreciate finding the mean from a frequency table.</td>
<td>Calculation of the mean from a frequency table follows the same principles as calculating the mean from a set of scores, that is, the sum of all scores divided by the number of scores.
E.g.
<table>
<tr><th>Balls</th><th>f</th><th>f × n</th></tr>
<tr><td>3</td><td>2</td><td>6</td></tr>
<tr><td>4</td><td>3</td><td>12</td></tr>
<tr><td>6</td><td>4</td><td>24</td></tr>
<tr><td>9</td><td>1</td><td>9</td></tr>
<tr><td>Total</td><td>10</td><td>51</td></tr>
</table>
Mean = $\frac{\sum fx}{\sum f}$
= $\frac{51}{10}$
= 5.1</td>
<td>Small group activities:
• Collecting data.
• Constructing frequency tables.
• Calculating the mean from data on frequency tables.</td>
<td>Do students appreciate finding the mean from a frequency table?</td>
<td></td>
</tr>
</table>

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitude				
Median			Find the median from a given set of data.	Select the median from a given set of data.	The median of a set of numbers is the middle one, after the numbers have been arranged in an ascending or descending order. Examples: - The median of 7, 9, 10, 3, 6, 8, 4 is 7 - The median of 7, 9, 10, 3, 8, 4 is 7.5	Small group activities: • Arranging a set of numbers in ascending or descending order of size (magnitude) • Identifying the middle number when there is an odd number of numbers. The middle number is the median. • Identifying the middle number when there is a even number of numbers. The mean of the two middle numbers identified is the mean.	Can students: • find the median of a set of data. • select the median from a given set of data?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Mode			Find the mode from a given set of data.		The mode of a set of data values is the number in the set that appears the most often. E.g. the mode of 2, 2, 3, 3, 3, 4, 5 is 3. A set of numbers can have more than one mode as long as the number appears more than once. In the data set 2, 2, 3, 3, 4, 5, the mode is 2 and 3. We can also say that the data set is binomial. If no number appears more than once, then the data set has no mode.	Finding the mode from a given set of data. Making decisions concerning the mode. For example, what size of shoes would you order most for sale if the mode is size 8?	Can students: • find the mode from a given set of data?	
		Recognise when the mode is used as a measure of central tendency.				Discussing situations in which the mode of a set of data is more useful than the mean.	• recognise when the mode is used as a measure of central tendency.	
	Distinguish among the averages: mean, median and mode.						• distinguish among the averages: mean , median and mode?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
				Select the median and mode from a given set of data.			Can students select the median and mode from a given set of data?	
Bar Graphs		Recognise bar graphs.			Bar graphs	Displaying examples of bar graphs.	Can students: • recognise bar graphs?	
	Construct bar graphs.				Construction of bar graphs.	Small group activities: • constructing bar graphs vertically and horizontally.	• construct bar graphs?	Social studies, e.g. constructing a bar graph to show world population growth during a given period.
				Enjoy constructing bar graphs.			Do students enjoy constructing bar graphs.	
	Use bar graphs in problem solving.					Collecting examples of bar graphs and using same for interpretation and discussion.	Can students use bar graphs in problem solving?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Pie Charts		Recognise pie charts.			Pie charts	Displaying examples of pie charts.	Can students recognise pie charts?	
	Construct pie charts.				Construction of pie charts. When constructing a pie chart, the smallest angle should be drawn first, then the next smallest angle and so on, in order to compensate for small errors that may occur while drawing the angles	Small group activities: • Finding the total to be represented. • Drawing a circle to represent the total. • Calculating the fractional parts of the circle that are allocated to various purposes. • Finding the size of the angle in degrees of each sector of the circle by multiplying each fractional part by 360°. • Using ruler and protractor to draw the angle for each sector.	Can students construct pie charts?	Social Studies, e.g. drawing a pie chart to represent students from five regions.

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Use pie charts in problem solving.			Enjoy constructing pie charts.	In order to read a pie chart, it is necessary to know the angle of each sector.	• Labelling each sector. • Drawing the pie chart using calculated sector angles. Interpreting and discussing pie charts.	Do students enjoy constructing pie charts? Can students use pie charts in problem solving? **Unit Test**	

GEOMETRY 2

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Axes of Symmetry	Sketch pictures about axes of symmetry.	Identify the axes of symmetry of common objects.		Enjoy sketching pictures or objects about axes of symmetry.	Axes of symmetry: Whenever you fold a shape over so that one half fits exactly on top of the other half, it is said to have an axis of symmetry.	Small group activities: • Folding shapes • Identify the axis of symmetry on objects such as books, capital letters, oranges, etc. • Tracing the axis of symmetry on given diagrams. • Sketching pictures or objects that are balanced about an axis of symmetry.	Can students: • identify the axis of symmetry on common shapes? • sketch pictures or objects that are balanced about an axis of symmetry? Do students enjoy sketching pictures or objects about axes of symmetry.	Art, e.g. sketching pictures or objects that have symmetry.

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Reflection in a line		Identify the line of reflection.			A mathematical reflection is a drawing of an original shape on the opposite side of the line of reflection or mirror line. When reflection is carried out the: - distance between the object and the line of reflection and the image and the line of reflection are the same. - line joining the object and the image is perpendicular to the line of reflection. - object and its image are on opposite sides of the mirror line.	Displaying pictures, shapes, etc., which shows the line of reflection.	Can students: • identify the line of reflection?	
	Draw lines of reflection					Drawing the line of reflection on symmetrical shapes..	• draw the line of reflection?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Draw the image of shapes after reflection in a line. Find the co-ordinates of the vertices of the image of a shape after reflection in the ***x***-axis and y-axis.			Enjoy carrying out reflections in the ***x***-axis and y-axis.	Reflection of a point (***x***, y) in the x-axis is (***x***, -y) Reflection of a point (***x***, y) in the y-axis is (-***x***, y)	Drawing the image of shapes after reflection in a line. Small group activities: • Plotting the co-ordinates of the vertices of a shape on a co-ordinate plane. • Finding the images of the co-ordinates of the vertices of a shape after reflection in the ***x***-axis and y-axis.	Can students draw the image of shapes after reflection in a line? Do students enjoy carrying out reflections in the ***x***-axis and y-axis. **Unit Test**	

ALGEBRA 2

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Common Factors		Identify common factors of terms in an algebraic expression.			Common factors are the factors that are common to the terms in an algebraic expression. E.g. in 4a + 5ab, **a** is the common factor of the expression.	Discussing examples on chalkboard and then having students do similar ones.	Can students identify the common factor of terms in an algebraic expression?	
	Use the distributive law to factorise simple algebraic expressions.				The factorisation of an algebraic expression involves the identification of the common factor(s) and the use of the distributive law. Example: 4a + 5ab = a(4 + 5b) The factors of 4a + 5ab are **a** and **(4 + 5b)**	Using the distributive law to factorise algebraic expressions.	Can students use the distributive law to factorise simple algebraic expressions?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Factorisation by Grouping			Factorise expressions of the form: $ax + bx + ay + by$	Practice factorising algebraic expressions.	Factorisation of expressions by grouping. E.g. $6a^2 - 4a + 6a - 4 =$ $6a(a + 1) - 4(a + 1) =$ $(6a - 4)(a + 1)$	Using the distributive law to factorise algebraic expressions.	Can students factorise expressions by grouping? Do students practice factorising algebraic expressions? **Unit Test**	

CONSUMER ARITHMETIC

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Profit and Loss			Calculate profit.		Profit = Selling Price – Cost Price	Simulating buying and selling situations. Visiting the market, vendors, shops, etc, to observe how profit is calculated and added to buying price to give selling price. Calculating profit.	Can students: • calculate profit?	Agriculture Science, e.g. calculate the profit on the sale of produce..
			Calculate loss.		Loss = Cost Price – Selling Price	Discussion on how loss can be incurred. Reporting outcomes of simple transactions.	• calculate loss?	
			Differentiate between profit and loss.				• differentiate between profit and loss?	
	Solve problems involving profit and loss.					Solving problems involving profit and loss.	• solve problems involving profit and loss?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Percent Profit	Solve problems involving percent profit.		Calculate percent profit when cost price and profit are given.	Discuss situations involving percent profit.	Percent profit = $\frac{\text{Pr}\,ofit}{CP} \times 100\%$	Small group activities: • Using formula to calculate percent profit. • Discussing situations involving percent profit. • Project: Starting a business; suggesting cost price, selling price and expected percent profit. Solving problems involving percent profit.	Can students: • calculate percent profit? • solve problems involving percent profit?	Agriculture Science, e.g. calculating percent profit on the sale of produce.

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Percent Loss	Solve problems involving percent loss.		Calculate percent loss when cost price and selling price are given.	Discuss situations involving percent loss.	Percent Loss = $\frac{Loss}{CP} \times 100\%$	Small group activities: • Using formula to calculate percent loss. • Discussing situations involving percent loss. Solving problems involving percent loss.	Can students: calculate percent loss? Do students discuss situations involving percent loss? Can students solve problems involving percent loss?	
Simple Interest			Calculate simple interest.		SI = $\frac{PRT}{100}$, where SI represents Simple Interest. P the principle, R the Interest Rate and T the Time. Rearrangement of the formula to find P, R and T: $P = \frac{SI}{RT} \times 100$ $R = \frac{SI}{PT} \times 100$	Discussing savings, loans and interest. Calculating simple interest.	Can students calculate simple interest?	

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
	Apply formula to solve problems involving simple interest.				T = $\frac{SI}{PR} \times 100$	Applying the simple interest formula to solve problems involving simple interest.	Can students solve problems involving the application of the simple interest formula?	
Calculating Amount	Solve problems involving the calculation of amount.		Calculate amount.		A = P + I, where A represents the amount, P the Principal and I the Interest. Rearrangement of the formula to find Principal and Interest: P = A – I I = A – P	Calculating amount. Solving problems involving the calculation of amount.	Can students: • calculate amount?. • solve problems involving the calculation of amount. **Unit Test**	