



KINGDOM OF CAMBODIA
NATION RELIGION KING

**MINISTRY OF EDUCATION, YOUTH AND
SPORT**

BASIC EDUCATION CURRICULUM

MATHEMATICS
GRADES 1 – 9

INTRODUCTION

Mathematics is a crucial part of everyday life, at home, in the community and in the workplace. It is a reasoning and creative activity that provides a way of solving problems in both specialist areas and in many everyday activities. Because the ability to use mathematics effectively is such an important part of being an effective contributor to society, the study of Mathematics is included in each year of Basic Education, with particular emphasis to the development of basic mathematics competence in the first three years of primary school.

In the Basic Education Curriculum, Mathematics is taught from a base of concrete experience in order to enable learners to themselves construct abstract mathematical objects and ideas.

Mathematics is organized in four strands:

- Number
- Measurement
- Geometry
- Patterns and Algebra.

In addition, there is a particular focus in Mathematics on develop the generic skill of Reasoning.

The purpose of the Mathematics curriculum is to ensure that students develop an appreciation of how mathematics is used, an enjoyment of the reasoning and problem-solving capacities that the study of mathematics develops and competence in the fundamental tools of mathematics.

In Number, students develop their understanding of the concept of number and competence in using mental and written strategies for solving problems.

In Measurement, students learn to identify and quantity different attributes of objects so that they can be compared and ordered. They learn to use both formal and informal units and a range of measuring tools.

In Geometry, students learn about the features, properties and representation of two dimensional shapes and three-dimensional objects

In Patterns and Algebra, students develop their understanding of relationships between numbers and the use of symbols to communicate these relationships.

Through their study of the content of each strand and through the study of Reasoning students develop their capacity to think and work mathematically and to apply their knowledge to solve routine and non-routine problems.

Students study the following number of lessons per week of Mathematics in Basic Education:

• Grades 1 – 3	7
• Grade 4	6
• Grades 5 – 6	6
• Grades 7 – 9	6

MATHEMATICS GRADES 1 - 3

Students study Mathematics for 7 lessons per week in Grades 1 – 3.

Through the study of Mathematics in Grades 1 – 3 students develop the foundational skills and knowledge they need to be able to use mathematical skills and processes.

The focus of Mathematics on Grades 1 – 3 is on developing problem-solving skills, ensuring students are able to use mental arithmetic with multiples of numbers up to 10 and applying their knowledge in everyday situations.

Students use place value to compare, order, read and write whole numbers up to five digits. They are introduced to the four operations and use a variety of mental and written strategies in applying the operations to solve problems.

They perform simple calculations with money.

Students develop their understanding of the use of informal units and the value of formal units of measurement of length, weight and volume.

They learn to tell the time and to describe the features of a range of different shapes and objects.

Students are introduced to surveys and the collection and recording of data.

They begin to develop their understanding of number patterns and reasoning skills.

MATHEMATICS GRADES 4 - 6

Students study Mathematics for 6 lessons per week in Grades 4 – 6.

Through the study of Mathematics in Grades 4 – 6, students develop their awareness of how mathematics is used in their own and other communities. There is a particular emphasis on having students develop their capacity to apply their skills and knowledge to different problems. Students develop their understanding that there are often different ways to solve problems and emphasis is placed on having students explain their chosen approach to solving particular problems.

In Number, students increase their confidence in dealing with whole numbers of any size and in applying mathematical operations to numbers in fractional and decimal form. They recognise prime numbers, rename fractions and identify, devise and extend number patterns based on the multiplication and division of whole numbers, and the addition and subtraction of fractional numbers. They automatically recall multiplication and division facts, and choose and use a range of written and mental strategies to solve problems.

In Measurement, they use a variety of measuring instruments with particular attention to the degree of exactness required in making and recording measurements.

In Geometry, students use correct language to describe the features of figures and objects and distinguish between different physical attributes such as perimeter and area.

In Statistics, students use lists, tables and graphs to classify, display, summarise and interpret data.

In Algebra and Patterns, students develop their understanding of number patterns and the properties of operations and then begin to transfer understanding of these concepts from collections of specific instances to general expressions. They are introduced to the use of pro-numerals in number sentences.

MATHEMATICS GRADE 1 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> • Demonstrate understanding of numbers by matching numerals with objects and quantities • Read, count and write whole numbers up to 100 in Khmer notation
	<ul style="list-style-type: none"> • Compare whole numbers up to 100 using terms including less than, more than and equal to in words and signs (<, >, =)
	<ul style="list-style-type: none"> • Count down whole number by one from 20 to zero
	<ul style="list-style-type: none"> • Identify the value of each digit in two digit numbers (10s, 1s)
	<ul style="list-style-type: none"> • Give examples of how number and counting are used in everyday life, for example, reading and writing and comparing own age and age of family members and friends
	<ul style="list-style-type: none"> • Order five whole numbers, up to 100, in order from smallest to largest and vice-versa
	<ul style="list-style-type: none"> • Use ordinal numbers to tenth to describe order in everyday example, (e.g. queues, races)
	<ul style="list-style-type: none"> • Use different strategies, including mental arithmetic, to solve simple problems by: <ul style="list-style-type: none"> ○ adding whole numbers where the sum does not exceed 20 ○ subtracting two whole numbers where the first term is less than 20 and the second term is one digits ○ using understanding of commutative properties of addition (e.g. $3 + 2$ is the same as $2 + 3$) • Use symbols for addition, subtraction and equals (+, - and =) to express simple problems
	<ul style="list-style-type: none"> • Recognise halves and quarters of shapes and quantities
	<ul style="list-style-type: none"> • Use role play to demonstrate buying, selling and changing with R50 and R100 bank notes
MEASUREMENT	<ul style="list-style-type: none"> • Give simple examples of use of measurement in everyday life • Compare lengths of two everyday objects using terms like longer, shorter and equal • Weigh and compare weights of everyday objects using non-standard units and words like heavier, lighter. • Measure and compare capacity of everyday objects using non-standard units and words like more than, less than.
	<ul style="list-style-type: none"> • Use models or drawings of clocks to tell time in hours • Name days of week and months of year
GEOMETRY	<ul style="list-style-type: none"> • Identify and draw points and straight, curved zigzag lines • Identify and draw 2D shapes with up to 4 sides using rulers and circles using round objects.
	<ul style="list-style-type: none"> • Identify features of familiar 2D objects (for example, squares and circles) and 3D objects (for example, cubes and spheres) • Identify simple geometric shapes and their features using geometric language like squares, triangles, circles and rectangles
	<ul style="list-style-type: none"> • Trace geometric shapes following given points or models
STATISTICS	<ul style="list-style-type: none"> • Collect, sort and match everyday objects into categories • Use pictures to record data
PATTERNS AND ALGEBRA	<ul style="list-style-type: none"> • Produce a pattern using shapes, colours, sizes
REASONING	<ul style="list-style-type: none"> • Make a decision about how to approach a one-step problem (for example, using pictures, mental arithmetic, manipulating objects)

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 3.

MATHEMATICS GRADE 1 UNIT

Unit 1: Sorting (10 hours)	TX page/s
<ul style="list-style-type: none"> Classify objects into different groups according to different characteristics (e.g. blue dots and red dots, short sticks and long sticks, black shirts and white shirts) 	10
<ul style="list-style-type: none"> Compare size of groups 	
<ul style="list-style-type: none"> Ask questions that can be answered by classifying (for example, Which are the blue dots in this pile of dots?) 	10-12

Unit 2: Position (7 hours)	TX page/s
<ul style="list-style-type: none"> Use everyday language to describe the position of one object in relation to another (e.g. the dot is inside the circle, the dot is outside the circle) 	5-7
<ul style="list-style-type: none"> Use everyday language to describe position of self in relation to other objects (I am next to the table; I am far from the tree) 	5-7
<ul style="list-style-type: none"> Follow simple directions involving direction (e.g. take two steps forward and one step backward) 	

Unit 3: Counting 1 – 5 (10 hours)	TX page/s
<ul style="list-style-type: none"> Show understanding of concept of number by matching whole numbers from 1 to 5 with real objects and vice-versa 	13-17
<ul style="list-style-type: none"> Automatically recognise numbers in dot patterns from 1 to 5 	13-17
<ul style="list-style-type: none"> Make and recognise different dot patterns for same number 	
<ul style="list-style-type: none"> Count forwards from 1 to 5 from any given number 	
<ul style="list-style-type: none"> Count backwards from 5 to 1 from any given number 	
<ul style="list-style-type: none"> Ask questions that can be answered by counting numbers from 1 to 5 (e.g. How many fingers can you see?) 	20

Unit 4: Patterns (7 hours)	TX page/s
<ul style="list-style-type: none"> Identify, complete and make regular patterns using geometric shapes, colors, sizes 	65
<ul style="list-style-type: none"> Describe a repeating pattern in terms of number (eg, ★□; ★□;★□ is a '2' pattern; ○◆○; ○◆○; ○◆○ is a '3' pattern) 	66

Unit 5: Counting from 0 to 10 (10 hours)	TX page/s
<ul style="list-style-type: none"> Show understanding of number by matching whole numbers from 1 to 10 with real objects and vice-versa 	32-38
<ul style="list-style-type: none"> Recognise dot patterns numbers instantly from 1 to 10 	32-38
<ul style="list-style-type: none"> Make and recognise different dot patterns for same number 	
<ul style="list-style-type: none"> Read and show understanding by drawing matching objects or dot patterns for numbers 0 – 10 	32-38
<ul style="list-style-type: none"> Write symbol and understand the meaning of zero 	18
<ul style="list-style-type: none"> Count forwards from 1 to 10 from any given number 	
<ul style="list-style-type: none"> Count backwards from 10 to 1 from any given number 	
<ul style="list-style-type: none"> Ask questions that can be answered by counting numbers from 0 to 10 	13-17 32-34 47

Unit 6: Representing from 0 to 10 (10 hours)

	TX page/s
• Give examples of how numbers are used in everyday life	
• Recognise dot patterns numbers instantly up to 9	32-38
• Use terms 'more than' and 'less than' to compare numbers between 1 and 10	9
• Use 5 as a reference in describing numbers from 1 to 10 (eg seven is two more than 5;)	
• Write numerals from 1 to 10 correctly in Khmer notation along a number line	13-17 32-34 47

Unit 7: Introducing addition and subtraction up to 10 (14 hours)

	TX page/s
• Combine and add to different groups of objects to show understanding of addition	21-22 25
• Separate and take away from different groups of objects to show understanding of subtraction	23-24
• Make and compare groups of objects to show understanding of equal numbers	35-38
• Use adding to and taking away from groups of objects to solve simple problems (e.g. how many oranges are left if we take away 2?)	40,42,44
• Create combinations for numbers to 10 (e.g. Here are 3 chairs. How many more to make 5?)	47

Unit 8: Whole numbers and value of digits up to 99 (15 hours)

	TX page/s
• Count forwards or backwards by ones from a given two digit numbers	
• Name numbers before and after a given number	
• Write two digit numerals correctly in Khmer notation	47-48 71,73 88
• Demonstrate understanding of concept of 'ones' and 'tens' by modeling two-digit numbers using objects to represent tens and ones	89
• State the value of digits in two digit numbers (e.g. in 37, 3 represents 3 lots of 10; 7 represents 7 lots of ones)	90
• Read and write in Khmer notation own age, age of friends and family members	

Unit 9: Picture graphs (20 hours)

	TX page/s
• Collect, group and record groups of objects in picture form to represent numbers.	

Unit 10: Whole numbers from 1 to 20 (10 hours)

	TX page/s
• Count forwards or backwards by ones from 1 to 20 from any given number.	
• Write numerals from 11 to 20 correctly in Khmer notation	48
• Estimate number of objects in a group and count to check	
• Use 5 and 10 as references in describing numbers from 11 to 20 (eg 13 is 3 more than 10)	48

Unit 11: Order and compare whole numbers (14 hours)	TX page/s
• Compare two digit numbers according to size from 10 to 99, using terms including less than and more than	
• Express relationship between two numbers using < and > symbols	50,79
• Using a number line, place five whole numbers, up to 100, in ascending and descending order according to size	
• Identify, complete and make simple number patterns (e.g. 15, 14, 13, or , 8, 10, 12)	
Unit 12: Ordinal numbers (7 hours)	TX page/s
• Understand connection between cardinal and ordinal numbers	80
• Use ordinal numbers from first to tenth to express order in everyday examples (e.g. queues, races)	80
Unit 13: Parts (7 hours)	TX page/s
• Divide objects (eg sticks, pieces, of paper, piece of fruit) into two equal parts	
• Give example of the use of the term 'half' in everyday situations	
• Identify when two parts of an object are not halves	
Unit 14: Addition with one-digit numbers (14 hours)	TX page/s
• Solve simple problems by finding the number of two sets of real objects put together where the sum does not exceed 9	39-40 42
• Give examples from everyday life of when this kind of addition might be used	40
• Express addition operations in Khmer notation using + and = symbols to represent addition and equality	21,39
• Perform addition operations on numbers less than 10 using mental, written (including number line) and object manipulation strategies	21,39,40
• Demonstrate understanding of simple commutative properties for addition (e.g. 3 + 2 is the same as 2 + 3)	
Unit 15: Subtraction with single-digit numbers (14 hours)	TX page/s
• Solve simple problems by finding the number that results when one set of real objects is removed from a larger set with up to 10 members	42
• Give examples from everyday life of when this kind of subtraction might be used	42,44
• Express subtraction operations in Khmer notation using – and = symbols.	42
• Perform subtraction operations on numbers less than 10 using mental, written (including number line) and object manipulation strategies	23,41,42
Unit 16: Addition and subtraction on whole numbers up to 20 (14 hours)	TX page/s
• Solve simple problems by: <ul style="list-style-type: none"> ○ finding the number that results when two sets of real objects are put together where the sum is up to 20 ○ finding the number that results when one set of real objects is removed from a larger set with up to 20 members 	52-56 60-61 54-56 62-63
• Use mental, written and object manipulation strategies to solve simple problems by	52-53

performing addition and subtraction operations on numbers up to 20.	56,60-61
• Find the number that results when zero is added to or subtracted from a whole number	25-26
• Check answers by repeating processes	

Unit 17: Currency (7 hours)

TX
page/s

• Understand that R50 and R100 notes represent different value	
• Use role play to demonstrate buying, selling and changing R50 and R100 notes	

Unit 18: Measurement of length (8 hours)

TX
page/s

• Give examples of use of measurement of length in everyday life	
• Compare lengths by placing objects side-by-side and aligning one end	28
• Show understanding of length by ordering objects (eg paper, sticks, pencil, ruler...) according to length	29
• Use everyday language to describe length (e.g. long, short, tall, high, the same)	1,4,9
• Use non-standards measures to compute and compare lengths	29-31
• Measure and compare length of everyday objects using non-standard units (for example, fingers, hands, lengths of string, sticks)	29-31
• Asks questions involving measurement of length (e.g. Who is taller?)	28-29

Unit 19: Measurement of weight (hours)

TX
page/s

• Describe everyday objects in terms of weight (e.g. hard to lift, easy to push)	57-58
• Use non-standards measures on simple scales to compute and compare weight of everyday objects	58-59
• Estimate weight by hand to compare weight of everyday objects using vocabulary including heavier, lighter and equal to.	57
• Use estimation of weight by hand and check measurement of weight by using simple scales to sort objects according to weight	57

Unit 20: Measurement of capacity (8 hours)

TX
page/s

• Using non-standard measures (for example, cupped hands, plastic bottles) compare capacity of different everyday containers (for example, the capacity of the cup is less than that of the bucket) using vocabulary including 'less than' and 'more than')	67
• Express capacity using everyday language (e.g. full, empty, about half-full)	
• Determine the number of small containers (for example, matchboxes) that can fit into larger ones (cardboard box).	

Unit 21: Measurement of time (10 hours)

TX
page/s

• Relate events according to time of day (morning, afternoon, night)	81-83
• Sequence events in time (e.g. First I read the book , then I make exercise)	
• Name days of the week and months of year in order	84
• Read hours of time from analogue clock	

Unit 22: Points, lines and shapes (14 hours)

TX

	page/s
• Identify straight and curved edges of objects	45
• Draw points, straight, curved and zigzag lines	45
• Sort two-dimensional shapes according to features including size and shape	
• Name simple geometric shapes (square, rectangles, triangles and circles)	64
• Use fingers and arms to make two dimensional shapes (e.g. triangles, circles)	
• Trace simple geometric shapes using one face of three-dimensional objects (e.g. glass, matchbox)	66
• Compare area of two-dimensional shapes of same kind by placing one on top of the other	


Unit 23: Three-dimensional geometric shapes (14 hours)

TX
page/s

• Identify and describe the shapes of common three-dimensional objects (books, balls, boxes) using everyday language including straight, curved, flat, round	
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Unit 24: Fractions (14 hours)

TX
page/s

• Use pictures to show $\frac{1}{2}$ and $\frac{1}{4}$ of regular objects, for example:		
• Divide collections of objects into approximate $\frac{1}{2}$ and $\frac{1}{4}$		

MATHEMATICS GRADE 2 LEARNING OUTCOMES

STRAND	LEARNIGN OUTCOMES
NUMBER	<ul style="list-style-type: none"> • Read, count and write whole numbers up to 1,000 in Khmer and Arabic notation and in words.
	<ul style="list-style-type: none"> • Compare whole numbers up to 1,000 using terms including less than, more than and equal to in words and signs (<, >, =)
	<ul style="list-style-type: none"> • Add up and count down whole numbers from 0 to 100 by adding 2, 3, 4, 5 and 10 at a time. • Identify odd and even whole numbers
	<ul style="list-style-type: none"> • Identify the value of each digit in three digit numbers (100s, 10s, 1s)
	<ul style="list-style-type: none"> • Give examples of how number and counting are used in everyday life, for example, house numbers and street numbers.
	<ul style="list-style-type: none"> • Order five whole numbers, up to 1,000, in order from smallest to largest and vice-versa
	<ul style="list-style-type: none"> • Use ordinal numbers to one hundredth describe order in everyday examples.
	<ul style="list-style-type: none"> • Use different strategies, including mental arithmetic, to solve simple problems by: <ul style="list-style-type: none"> ○ adding two whole numbers where the sum does not exceed 1,000 ○ subtracting two whole numbers where the first term is less than 1,000 and the second term is two digits ○ multiplying whole numbers where the first term is two digits and the second term is 2, 3, 4, 5 or 10 ○ dividing two digit whole numbers by 2, 3, 4, 5 and 10 • Use multiplication and division symbols (\times and \div) to express simple problems • Use mental arithmetic to calculate additional and subtraction of whole numbers in multiples of 5 up to 50 • Recall and use multiplication tables up to 5 x 10.
	<ul style="list-style-type: none"> • Use $\frac{1}{2}$ and $\frac{1}{4}$ to represent halves and quarters
	<ul style="list-style-type: none"> • Use role play to demonstrate buying, selling and changing with notes up to R1,000 notes
MEASUREMENT	<ul style="list-style-type: none"> • Measure and compare lengths of everyday objects to determine length in metres (eg heights of people, width and length of room, fields) • Weigh and compare weights of everyday objects to determine weight (mass) in kilograms (eg rice, fruit, cement) • Measure and compare everyday objects to determine capacity in litres (eg water, kerosene).
	<ul style="list-style-type: none"> • Use clock to tell hour and half-hour times • Use calendar to tell day and date in the year
GEOMETRY	<ul style="list-style-type: none"> • Identify and draw lines and segments
	<ul style="list-style-type: none"> • Identify the following simple 3D shapes in daily life: cube, cuboid, cylinder.
	<ul style="list-style-type: none"> • Compare size of geometric shapes using pictorial representations.
STATISTICS	<ul style="list-style-type: none"> • Work in groups to observe a simple survey and collect data from two sources
	<ul style="list-style-type: none"> • Construct simple picture graphs to record different data sets (one represent one, one represents 10, one represents 100)
PATTERNS AND ALGEBRA	<ul style="list-style-type: none"> • Supply missing elements in a pattern according to its shape, sizes and numbers
REASONING	<ul style="list-style-type: none"> • Decide ways to approach a problem by using four operations

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 3.

MATHEMATICS GRADE 2 CONTENT

Unit 1: Three-digit numbers (21 hours)	TX page/s
<ul style="list-style-type: none"> Find examples of use of three digit numbers in everyday life (e.g. R500 for food items) 	76-88, 14,19
<ul style="list-style-type: none"> Read and count everyday examples of up to three digit numbers used in everyday life (e.g. house and street numbers, telephone numbers). 	
<ul style="list-style-type: none"> Demonstrate understanding of concept of 'ones', 'tens' and 'hundreds' by modeling three-digit numbers in multiples of ten using objects to represent tens and hundreds 	4
<ul style="list-style-type: none"> State the value of each digit in three digit numbers (e.g. in 862, 8 represents 8 lots of hundreds, 6 represents 6 lots of tens, 2 represents 2 lots of ones) 	4
<ul style="list-style-type: none"> Identify odd and even numbers 	6
<ul style="list-style-type: none"> Count forwards or backwards by one from any given three-digit number 	29,39
<ul style="list-style-type: none"> Identify number before and after any three digit number 	
<ul style="list-style-type: none"> Place any five whole three digit numbers in order from smallest to largest and vice versa 	9
<ul style="list-style-type: none"> Compare whole numbers up to 1,000 using terms including less than, more than and equal to in words and signs (<, >, =) 	8
<ul style="list-style-type: none"> Count forwards or backwards by tens, starting with a multiples of ten (e.g. 60, 50, 40 ...) and starting with a non-multiple of ten (eg 183, 193, 203 ...) 	
<ul style="list-style-type: none"> Make largest and smallest number given any three digits 	
<ul style="list-style-type: none"> Write three digit numerals correctly in Khmer notation 	1-2
<ul style="list-style-type: none"> Round three digit numbers to the nearest 10 and nearest hundred 	
<ul style="list-style-type: none"> Use ordinal numbers to one hundredth to describe order in everyday examples 	7

Unit 2: Addition of two-digit numbers (20 hours)	TX page/s				
<ul style="list-style-type: none"> Use the terms 'add', 'plus', 'equals', 'is equal to' when describing an operation of addition 	10-11				
<ul style="list-style-type: none"> Recall addition facts for numbers up to 20 					
<ul style="list-style-type: none"> Use different strategies, including mental arithmetic, to solve simple addition problems, including: <ul style="list-style-type: none"> Counting on from larger number to find total of two numbers Split and group numbers to 5 and 10 (eg to calculate $5 + 7$: to calculate $7 + 4$: <table style="margin-left: 40px; border: none;"> <tr> <td style="padding-right: 20px;">$5 + 5 + 2 =$</td> <td>$7 + 3 + 1 =$</td> </tr> <tr> <td>$10 + 2 = 12$</td> <td>$10 + 1 = 11$</td> </tr> </table> Using number lines to add two two-digit numbers. 	$5 + 5 + 2 =$	$7 + 3 + 1 =$	$10 + 2 = 12$	$10 + 1 = 11$	10-15
$5 + 5 + 2 =$	$7 + 3 + 1 =$				
$10 + 2 = 12$	$10 + 1 = 11$				
<ul style="list-style-type: none"> Construct and solve simple problems that can be solved using addition of two digit numbers Explain strategies used to solve problems 					

Unit 3: Subtraction of two-digit numbers (20 hours)	TX page/s
<ul style="list-style-type: none"> Use the terms 'take away', 'minus', 'equals', 'is equal to' when describing an operation of subtraction 	12

<ul style="list-style-type: none"> Choose and use most appropriate strategies, including mental arithmetic, to solve simple subtraction problems, including: <ul style="list-style-type: none"> Counting back from a number to find the number remaining Counting on or back to find the difference between two numbers Using related addition and subtraction number facts to 20 (eg $12 + 3 = 15$ so $15 - 12 = 3$) Using split strategy (e.g. to work out $79 - 33$: $70 + 9 - 30 - 3 = 70 - 30 + 9 - 3 = 40 + 6 = 46$) Using number lines to subtract two two-digit numbers, eg $73 - 34$ 	12, 13 15,17
<ul style="list-style-type: none"> Construct and solve simple problems that can be solved using subtraction of two digit numbers Explain strategies used to solve problems 	

Unit 4: Money (7 hours)

	TX page/s
<ul style="list-style-type: none"> Use face value of notes up to R1,000 to sort, order and count money 	78-79
<ul style="list-style-type: none"> Use role play to demonstrate buying 	81-83

Unit 5: Arabic/Hindu notation 1 - 10 (10 hours)

	TX page/s
<ul style="list-style-type: none"> Using riel notes up to R1,000 as models, read and write whole numbers of 1, 2, 5 and 10, and zero, in Arabic/Hindu notation 	5
<ul style="list-style-type: none"> Read and write whole numbers 1 – 10 in Arabic/Hindu notation 	
<ul style="list-style-type: none"> Read and write three digit whole numbers in Arabic/Hindu notation. 	5

Unit 6: Arabic/Hindu notation: two and three digit numbers (20 hours)

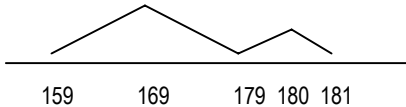
	TX page/s
<ul style="list-style-type: none"> Read and write two digit whole numbers in Arabic/Hindu notation 	
<ul style="list-style-type: none"> Read and write three digit whole numbers in Arabic/Hindu notation. 	

Unit 7: Introduction to multiplication (20 hours)

	TX page/s
<ul style="list-style-type: none"> Use repeated addition to demonstrate concept of multiplication (e.g. 5 groups of 4 is the same as $4 + 4 + 4 + 4 + 4$) 	31-36
<ul style="list-style-type: none"> Count by 2s, 3s, 4s, 5s and 10s 	32
<ul style="list-style-type: none"> Recall and use multiplication tables up to 5 to solve simple problems (eg how much is 4 lots of 3?) 	
<ul style="list-style-type: none"> Use objects to show that, for example, 3 groups of 2 is the same as 2 groups of 3 	36

Unit 8: Addition of two and three-digit numbers (20 hours)

	TX page/s
<ul style="list-style-type: none"> Use estimation and rounding strategies to estimate sum of addition of two and three-digit numbers 	

<ul style="list-style-type: none"> Use different strategies, including mental arithmetic, to solve simple addition problems using two and three digit numbers: <ul style="list-style-type: none"> Using jump strategies on number lines (e.g. to calculate $159 + 22$: add 20 to 159 and add 2 more)  <ul style="list-style-type: none"> Use split strategies (e.g. to work out $23 + 35$: $20 + 30 + 3 + 5 = 50 + 3 + 5 = 58$) Use number patterns to extend number facts (e.g. to solve $500 + 200$: $5 + 2 = 7$ so $500 + 200 = 700$) 	11
<ul style="list-style-type: none"> Construct and solve simple problems that can be solved using addition of two digit numbers Explain strategies used to solve problems 	

Unit 9: Fractions (10 hours)

TX
page/s

<ul style="list-style-type: none"> Show and describe halves and quarters of a whole object and a collection of objects Read and write fraction notation for half ($\frac{1}{2}$), quarter ($\frac{1}{4}$) and three-quarter ($\frac{3}{4}$) 	
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Unit 10: Number patterns and sequences (8 hours)

TX
page/s

<ul style="list-style-type: none"> Continue, create and describe number patterns that increase or decrease Determine a missing element in a number pattern Use the equals sign to mean 'is the same as' rather than as part of an operation (e.g. $4 + 5 = 5 + 4$; $0 + 4 = 4$; $1 + 3 = 4$; $2 + 2 = 4$) 	
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Unit 11: Introduction to division [without remainder] (10 hours)

TX
page/s

<ul style="list-style-type: none"> Model division by sharing a collection of objects into equal groups or rows Give everyday examples of where division can be used Model division as repeated subtraction (e.g. to work out 10 divided by 2 we see how many times we can take 2 away from 10) Recognise and use the symbol \div to represent operation of division 	39-42 42-44 39-42 43-45
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Unit 12: Addition of three-digit numbers using columns (10 hours)

TX
page/s

<ul style="list-style-type: none"> Use estimation and rounding strategies to estimate sum of addition of two three-digit numbers Use columns to solve simple addition problems involving two three digit numbers where the sum does not exceed 1,000 and no carry over of place value is required e.g. $134 +$ 	
<ul style="list-style-type: none"> Construct and solve simple problems that can be solved using addition of three digit numbers 	
<ul style="list-style-type: none"> Explain strategies used to solve problems 	

Unit 13: Addition of three-digit numbers using columns and place value (10 hours)	TX page/s
<ul style="list-style-type: none"> Use estimation and rounding strategies to estimate sum of addition of two three-digit numbers 	
<ul style="list-style-type: none"> Use columns to solve simple addition problems involving two three digit numbers where the sum does not exceed 1,000 and carry over of place value is required e.g. $\begin{array}{r} 134+ \\ 287 \\ \hline \end{array}$ 	
<ul style="list-style-type: none"> Construct and solve simple problems that can be solved using addition of three digit numbers Explain strategies used to solve problems 	

Unit 14: Subtraction of two digit from three digit numbers (20 hours)	TX page/s
<ul style="list-style-type: none"> Use estimation and rounding strategies to estimate result of subtraction of two from three-digit numbers 	
<ul style="list-style-type: none"> Explain and use different strategies, including mental arithmetic, to solve simple subtraction problems using two and three digit numbers, for example: <ul style="list-style-type: none"> Using jump strategies on number lines (e.g. to work out $135 - 22$: subtract 20 from 135 and subtract 2 more) <div style="text-align: center;"> </div> Using split strategies (e.g. to work out $35 - 23$: $35 - 20 = 15$, $15 - 3 = 12$) Use number patterns to extend number facts (e.g. to solve $500 - 200$: $5 - 2 = 3$ so $500 - 200 = 300$) 	12,17 18,19
<ul style="list-style-type: none"> Construct and solve simple problems that can be solved using subtraction of two digit numbers from three digit numbers. Explain strategies used to solve problems 	

Unit 15: Measurement of length (7 hours)	TX page/s
<ul style="list-style-type: none"> Make and use measures using non-standard units (e.g. length of paper with markers of finger lengths as units) 	
<ul style="list-style-type: none"> Explain the need for formal units of measurement of length 	
<ul style="list-style-type: none"> Use meter lengths to measure and record everyday lengths 	20-22

Unit 16: Measurement of weight (7 hours)	TX page/s
<ul style="list-style-type: none"> Explain the need for formal unit of measurement of mass 	47-48
<ul style="list-style-type: none"> Use kilograms to measure and record mass of everyday objects 	48-49
<ul style="list-style-type: none"> Estimate weight to nearest kilogram of everyday objects 	

Unit 17: Measurement of capacity (7 hours)	TX page/s
<ul style="list-style-type: none"> Make and use measures using non-standard units (e.g. plastic bottle marked off at levels made when two cups are added) 	
<ul style="list-style-type: none"> Estimate and then check capacity of different containers using non-standard 	

measures	
<ul style="list-style-type: none"> Explain the need for formal units of measurement of capacity 	
<ul style="list-style-type: none"> Use liter containers lengths to measure and record capacity of different containers to nearest half-liter 	90-92

Unit 18: Measurement of time (7 hours)

TX
page/s

<ul style="list-style-type: none"> Estimate duration of events using informal units (e.g. how many times do you clap your hands while a student walks across the room?) 	
<ul style="list-style-type: none"> Use and explain meaning of terms 'hour', 'minute' and 'second' 	69-71
<ul style="list-style-type: none"> Read hours and half-hours of time from analogue clock 	71
<ul style="list-style-type: none"> Name and order the months of the year, and recall how many days are in each month 	66-67
<ul style="list-style-type: none"> Use calendar to tell day and date 	66-67

Unit 19: Two-dimensional shapes (14 hours)

TX
page/s

<ul style="list-style-type: none"> Draw lines to make new shapes 	
<ul style="list-style-type: none"> Identify lines and segments in given geometric shapes 	
<ul style="list-style-type: none"> Compare size of geometric shapes using pictorial representations. 	

Unit 20: Three-dimensional geometric shapes (10 hours)

TX
page/s

<ul style="list-style-type: none"> Identify and name common three dimensional shapes including cubes, cuboids and cylinders 	
<ul style="list-style-type: none"> Identify two-dimensional shapes as faces of three-dimensional objects 	26
<ul style="list-style-type: none"> Represent three dimensional objects by making simple drawings and models (e.g. from clay or cardboard) 	

Unit 21: Data (14 hours)

TX
page/s

<ul style="list-style-type: none"> Ask appropriate questions that can be answered by gathering and recording easily accessible data (e.g. What is the favorite color of most children in the classroom?) 	84-89
<ul style="list-style-type: none"> Work in groups to conduct a simple survey to obtain data from two sources (eg number of motos/people that pass on a road between particular times) 	
<ul style="list-style-type: none"> Represent data in simple picture graphs 	

Unit 22: Patterns (10 hours)

TX
page/s

<ul style="list-style-type: none"> Supply missing elements in patterns based on shapes, sizes and numbers 	1-3
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Unit 23: Number words(4 hours)

TX
page/s

<ul style="list-style-type: none"> Write whole numbers up to 1000 in words 	
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MATHEMATICS GRADE 3 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> • Read, count, write, order and compare whole numbers up to 10,000 in Khmer and Arabic notation, using terms including less than, more than and equal to in words and signs (<, >, =).
	<ul style="list-style-type: none"> • Identify the value of each digit in five digit numbers (10,000s, 1,000s, 100s, 10s, 1s)
	<ul style="list-style-type: none"> • Use knowledge of whole numbers to read and write accurately everyday numerical information including house numbers, street numbers, telephone numbers, licence plate numbers and years.
	<ul style="list-style-type: none"> • Use different strategies, including mental arithmetic, to solve simple problems: <ul style="list-style-type: none"> ○ add and subtract whole numbers where each number is up to 10,000. ○ multiply and divide whole numbers up to 3 digits by 1 digits. ○ recall and use multiplication tables up to 10 x 10.
	<ul style="list-style-type: none"> • Use pictures and items to identify fractions from 1/10 to 1. • Find simple fractions of whole numbers (e.g. half of 20, quarter of 12)
	<ul style="list-style-type: none"> • Use currency for buying, selling and changing up to R10,000.
MEASUREMENT	<ul style="list-style-type: none"> • Measure and compare everyday objects to determine: <ul style="list-style-type: none"> ○ length in metres, decimetres or Terks, and centimetres ○ weight (mass) in kilograms, grams and Kham ○ capacity in litres or millilitres • Carry out addition and subtraction operations on common units of measurement.
	<ul style="list-style-type: none"> • Read the time in hours and minutes from an analogue clock and a digital clock. • Read a simple timetable accurately.
GEOMETRY	<ul style="list-style-type: none"> • Construct triangles by using rulers and angle squares
	<ul style="list-style-type: none"> • Use the following terms to describe 2D shapes: base, sides, length, width, top, height, diagonal.
	<ul style="list-style-type: none"> • Identify the area of rectangles and squares using pictorial representations. • Calculate the perimeters of triangles, squares and rectangles
STATISTICS	<ul style="list-style-type: none"> • Work in groups to construct a simple survey and collect data from up to three sources.
	<ul style="list-style-type: none"> • Interpret and construct picture graphs.
PATTERNS AND ALGEBRA	<ul style="list-style-type: none"> • Find patterns from given examples and supply missing elements in a pattern. (eg $\triangle O \square$; $\triangle O \square$; $\triangle \dots$).
REASONING	<ul style="list-style-type: none"> • Decide ways to approach a two step problem, by using four operations

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 3.

MATHEMATICS GRADE 3 UNITS

Unit 1: Four digit numbers (28 hours)	TX page/s
<ul style="list-style-type: none"> Find examples of use of four digit numbers in everyday life (e.g. R1,000 for buying cakes) 	
<ul style="list-style-type: none"> State value of each digit in four digit numbers (eg in the number 4,745 4 represents 4 lots of thousands, 7 represents 7 lots of hundreds, 4 represents 4 lots of 10 and 5 represents 5 lots of ones) 	2-3
<ul style="list-style-type: none"> Compare any four digit numbers using symbols < and > 	
<ul style="list-style-type: none"> Order a set of four digit numbers in ascending and descending order 	4-5
<ul style="list-style-type: none"> Make the largest and smallest number given any four digits 	
<ul style="list-style-type: none"> Identify the number before and after a given 2, 3 or 4 digit number 	
<ul style="list-style-type: none"> Read and write house numbers, street numbers, telephone numbers, license plate numbers and years 	6-7
<ul style="list-style-type: none"> Write four digit numbers correctly in Khmer and Arabic notation and in words 	2
<ul style="list-style-type: none"> Round four digit numbers to the nearest ten, hundred and thousand 	

Unit 2: Addition of four digit numbers (28 hours)	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic and written strategies to solve problems involving addition of two, three and four digit numbers including <ul style="list-style-type: none"> Jump strategy (to solve $23 + 35$: $23 + 30 = 53$, $53 + 5 = 58$) Ordering (to solve $16 + 8 + 4$, change order to $16 + 4 = 20 + 8 = 28$) Use of number lines Recording mental arithmetic strategies Use of formal written algorithm and knowledge of place value to solve problems involving addition of two, three and four digit numbers, for example: $\begin{array}{r} 145 + 3489 + \\ \underline{349} \quad \underline{2956} \end{array}$ 	8-9, 13-14
<ul style="list-style-type: none"> Create and solve one and two-step problems using addition of four digit numbers Explain strategies used to solve problems 	

Unit 3: Subtraction of four digit numbers (28 hours)	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic strategies to solve problems involving subtraction of two, three and four digit numbers including <ul style="list-style-type: none"> Number patterns ($5 - 3 = 2$, so $500 - 300 = 200$) Rounding (to solve $248 - 53$: $250 - 50 = 200$, $200 - 2 = 198$, $198 - 3 = 195$) Use of number lines Recording mental arithmetic strategies Use of formal written algorithm and knowledge of place value to solve problems involving subtraction of two, three and four digit numbers, for example: $\begin{array}{r} 723 - 4587 - \\ \underline{194} \quad \underline{1643} \end{array}$ 	10-11, 15-17
<ul style="list-style-type: none"> Create and solve one and two-step problems using subtraction of four digit numbers 	

<ul style="list-style-type: none"> Explain strategies used to solve problems 	
Unit 4: Money (14 hours)	TX page/s
<ul style="list-style-type: none"> Use role play to demonstrate buying, selling and changing using the four operations 	82-85
<ul style="list-style-type: none"> Change different denominations of riel bank notes (e.g. change a R1,000 note into R100, R200 and R500 notes) 	80-81
Unit 5: Multiplication of single digit whole numbers and 10 (10 hours)	TX page/s
<ul style="list-style-type: none"> Use mental strategies to recall multiplication tables up to 10×10 (for example, $7 \times 9 = 9 \times 7$) 	44
<ul style="list-style-type: none"> Count by 3s, 4s, 6s, 7s, 8s, 9s using skip counting 	
<ul style="list-style-type: none"> Use different mental strategies to multiply a one-digit number by a multiple of 10. For example, to solve 3×20: <ul style="list-style-type: none"> Repeated addition ($20 + 20 + 20 = 60$) Using knowledge of place value ($3 \times 2 \text{ tens} = 6 \text{ tens} = 60$) 	44
<ul style="list-style-type: none"> Create and solve problems using multiplication of single digit whole numbers and 10 Explain strategies used to solve problems 	
Unit 6: Multiplication of two and three digit whole numbers by single digit numbers (28 hours)	TX page/s
<ul style="list-style-type: none"> Use different written and mental strategies to multiply two and three digit numbers by a single digit. For example, to solve 3×23: <ul style="list-style-type: none"> Repeated addition ($20 + 20 + 20 + 3 + 3 + 3 = 60 + 3 + 3 + 3 = 69$) Using knowledge of place value ($3 \times 2 \text{ tens} + 3 + 3 + 3 = 6 \text{ tens} + 3 + 3 + 3 = 60 + 3 \times 3 \text{ ones} = 69$) 	
<ul style="list-style-type: none"> Create and solve problems using multiplication of two and three-digit whole numbers by single digit whole numbers Explain strategies used to solve problems 	
Unit 7: Division of two digit whole numbers by single digit numbers (20 hours)	TX page/s
<ul style="list-style-type: none"> Use different mental strategies to use multiplication facts to divide two digit numbers by one digit numbers, in problems that include a remainder. For example, to solve $17 \div 4$: $4 \times 4 = 16 + 1 = 17$. Answer: 4 and 1 remainder 	
<ul style="list-style-type: none"> Determine factors for a given number (e.g. factors of 8 are 1, 2, 4 and 8) 	
Unit 8: Fractions (10 hours)	TX page/s
<ul style="list-style-type: none"> Show and describe fractions from $\frac{1}{10}$ to 1 using drawings and collections of objects 	20
<ul style="list-style-type: none"> Explain the terms 'numerator' and 'denominator' 	
<ul style="list-style-type: none"> Compare fractions with denominators of 2, 4 and 8 	20
Unit 9: Measurement of length (10 hours)	TX page/s
<ul style="list-style-type: none"> Describe one centimeter as one hundredth of a meter, 1 m equal to 10 decimeter or turk and identify that $100 \text{ cm} = 1 \text{ meter}$ or $100 \text{ cm} = 100 \text{ Hun}$ 	22

• Estimate, measure and compare lengths of everyday objects using meters, decimeters or Turks and centimeters or 100 Hun	23-24
• Convert between meters, decimeters or turks and centimeters or 100 Hun	24
• Construct and solve one and two-step problems using addition and subtraction of common units of measurement.	

Unit 10: Measurement of weight (mass) (10 hours)

	TX page/s
• Using arms, identify objects that are more than, less than and about the same as one kilogram	
• Measure the weight of everyday objects using scales in kilograms, kham and grams	40
• Identify that 10 kham equals one kilogram	40
• Identify that 1000 grams equals one kilogram	40
• Identify that 100 grams equals one kham	40
• Convert between kilograms, khams and grams	41-42
• Construct and solve one and two-step problems using addition and subtraction of common units of weight.	

Unit 11: Measurement of volume and capacity (10 hours)

	TX page/s
• Identify everyday uses of liters and milliliters as measures	76
• Identify that 1000 milliliters equals one liter	76
• Use eye-dropper or small spoons to measure our liquids in milliliters	
• Convert between liters and mililiters	
• Measure overflow when different objects are placed in full containers of water	
• Construct and solve one and two-step problems using addition and subtraction of common units of volume or capacity.	

Unit 12: Measurement of time (25 hours)

	TX page/s
• Associate the numerals 3, 6 and 9 with 15, 30 and 45 minutes and the terms quarter-past, half-past and quarter-to	
• Read analogue clocks to the minute (e.g. 'the time is 6.37', or 'the time is 12 minutes to 4')	66
• Read a simple timetable	68

Unit 13: Two dimensional geometric shapes (10 hours)

	TX page/s
• Distinguish between regular (sides all same length) and irregular (sides different length) shapes	26
• Use measurement to describe features of some geometric shapes (e.g. sides of a square are the same length, opposite sides of a rectangle are the same length)	27-29
• Use the following terms to describe 2D shapes: base, sides, length, width, top, height, diagonal.	
• Use common materials such as straws to create a range of shapes of three and four lengths	
• Construct triangles by using rulers and angle squares	

• Measure and find the perimeter of a range of triangles, squares and rectangles.	
• Show the area of a range of rectangles and squares by using pictorial representations of small squares.	

Unit 14: Three dimensional geometric shapes (10 hours)

TX
page/s

• Make simple sketches of pyramids, cones and cylinders to show objects with different depths.	
• Make models or 'unpack' and remake common solids (e.g. matchbox, CD box) to show how flat shapes can be folded into solids	

Unit 15: Language of chance (10 hours)

TX
page/s

• Use everyday language to describe chance (e.g. I am sure it will happen; It might happen; I don't think it will happen)	
• Compare familiar events (e.g. afternoon rain, sun rise) and rate them on a scale of more or less likely to happen	

Unit 16: Patterns (10 hours)

TX
page/s


• Find patterns from given examples and supply missing elements in a pattern (eg $\Delta \square$; $\Delta \square$; $\Delta \dots$)	
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Unit 17: Data (11 hours)

TX
page/s

• Gather and record data from up to three different sources through simple surveys	
• Organise and present data in simple picture graphs	86-89

MATHEMATICS GRADE 4 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> • Read, count, write and order whole numbers, up to 100,000, in Khmer and Arabic notation and numbers with decimal fractions to one decimal place
	<ul style="list-style-type: none"> • Compare whole numbers up to 100,000, using terms including less than, more than and equal signs (<; >; =) • Make the largest and smallest number given any 6 digits
	<ul style="list-style-type: none"> • Identify the value of each digit (100,000s; 10,000s; 1,000s; 100s; 10s; 1s) • Round whole numbers to the nearest 10, 100 and 1000 when estimating
	<ul style="list-style-type: none"> • Select and apply mental, written and calculator strategies to solve simple problems: <ul style="list-style-type: none"> ○ Add two whole numbers where the sum does not exceed 100,000 ○ Subtract two whole numbers where the first term is less than 100,000 ○ Add and subtract decimals with the same number of decimal places up to one decimal places ○ Multiply whole numbers of up to: <ul style="list-style-type: none"> - 4 digits by 1 digit - 3 digits and second number is 2 digit ○ Divide whole numbers of up to 4 digits by 1 digit number and 10
	<ul style="list-style-type: none"> • When solving problem, use estimation strategies to check addition, subtraction, multiplication, and division of whole numbers (e.g. $1438 + 129$ is about the same as $1400 + 130$)
	<ul style="list-style-type: none"> • Identify equivalent fractions less than 1 with denominators 2, 4 and 8 • Compare and order fraction with the same denominator, from smallest to largest and vice-versa.
MEASUREMENT	<ul style="list-style-type: none"> • Use role play to demonstrate buying and selling in order to calculate profit and loss. • Recognise that $1\text{km} = 1000\text{m}$ and $1\text{cm} = 10\text{mm}$ • Use standard measuring instruments and read scales to the nearest gradation to determine: <ul style="list-style-type: none"> ○ Length from kilometres to millimetres (e.g. wood, roads) ○ Capacity from litres and millilitres (e.g. medicine, cooking oil) ○ Weight (mass) from kilograms to grams (e.g. vegetables, rice and meat) ○ Time from hours to seconds
	<ul style="list-style-type: none"> • Change units of time measurement (e.g. 30 minutes = half-an-hour) • Add and subtract units of time
GEOMETRY	<ul style="list-style-type: none"> • Sketch and give simple definitions of square, triangles, rectangles and circles • Recognise right angle lines and parallel lines in everyday life • Draw right angle lines and parallel lines using square and straight rulers • Give definition of an angle and a degree, and identify elements of angles • Use protractors to measure degrees of angles
STATISTICS	<ul style="list-style-type: none"> • Use tally sheets and common counting symbols to group data (e.g. ) • Record data in simple table form
ALGEBRA AND PATTERNS	<ul style="list-style-type: none"> • Supply missing elements in a pattern according to shape, numbers, using addition and subtraction • Complete simple addition and subtraction number sentences with missing elements (eg $3 + \square = 7$; $7 - \square = 3$)
REASONING	<ul style="list-style-type: none"> • Ask and show thinking to answer the question, 'What is the best way to find a solution to this problem'?

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 6.

MATHEMATICS GRADE 4 UNITS

Unit 1: Five digit numbers (10 hours)

	TX page/s
<ul style="list-style-type: none"> Give examples of use of five-digit whole numbers in everyday life (e.g. R50,000 for purchasing items) 	
<ul style="list-style-type: none"> State value of each digit in five-digit whole numbers (e.g. in 52,018 5 represents lots of ten thousands, 2 represents lots of thousands, 0 represents lots of hundreds, 1 represents lots of tens and 8 represents lots of ones) 	
<ul style="list-style-type: none"> Read and write correctly five digit whole numbers in Khmer and Arabic notation and in words 	
<ul style="list-style-type: none"> Compare whole numbers up to 100,000, using terms less than, more than, equal to and the following symbols: <, > and = 	
<ul style="list-style-type: none"> Order five-digit whole numbers from smallest to largest and vice-versa 	
<ul style="list-style-type: none"> Make the smallest and largest numbers possible given any five digits 	
<ul style="list-style-type: none"> Round five digit numbers to the nearest ten, hundred and thousand 	

Unit 2: Addition of five digit numbers (15 hours)

	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic to solve problems involving addition of three, four and five digit numbers (where the sum does not exceed 100,000) 	
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to add two three, four and five digit whole numbers (where the sum does not exceed 100,000), for example: $\begin{array}{r} 3470+ \\ 1218 \\ \hline \end{array} \qquad \begin{array}{r} 7649+ \\ 2513 \\ \hline \end{array}$ 	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check addition of two five digit numbers (where the sum does not exceed 100,000). 	
<ul style="list-style-type: none"> Use calculator to solve problems involving addition of three, four and five digit numbers (where the sum does not exceed 100,000). 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving addition of three, four and five digit numbers (where the sum does not exceed 100,000). 	

Unit 3: Subtraction of five digit numbers (XX hours)

	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic to solve problems involving subtraction of three, four and five digit numbers (where the first term does not exceed 100,000) 	
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to subtract two three, four and five digit whole numbers (where the first term does not exceed 100,000), for example: $\begin{array}{r} 5643- \\ 2189 \\ \hline \end{array} \qquad \begin{array}{r} 1287- \\ 638 \\ \hline \end{array}$ 	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check subtraction problems (where the first term does not exceed 100,000). 	
<ul style="list-style-type: none"> Use calculator to solve problems involving subtraction of three, four and five digit numbers (where the first term does not exceed 100,000). 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving subtraction of three, four and five digit numbers (where the first term does not exceed 100,000). 	

Unit 4: Multiplication of two, three and four digit numbers by one digit numbers(13 hours)	TX page/s
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<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to multiply two three, four and five digit whole numbers by one digit, with and without carry-over (where the product does not exceed 100,000), for example: $\begin{array}{r} 3672x \\ \underline{\quad 3} \end{array}$ $\begin{array}{r} 1287x \\ \underline{\quad 8} \end{array}$ 	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check multiplication problems involving multiplication of two, three and four digit numbers by one digit numbers (where the product does not exceed 100,000). 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems multiplication of three digit numbers by one digit numbers (where the product does not exceed 100,000). 	

Unit 5: Multiplication of three digit numbers by two digit numbers(10 hours)	TX page/s
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<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to multiply three digit whole numbers by two digit numbers, with and without carry-over (where the product does not exceed 100,000), for example: $\begin{array}{r} 210x \\ \underline{\quad 32} \end{array}$ $\begin{array}{r} 897x \\ \underline{\quad 64} \end{array}$ 	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check multiplication problems involving multiplication of three digit numbers by two digit numbers (where the product does not exceed 100,000). 	
<ul style="list-style-type: none"> Use calculator to solve problems involving multiplication of three digit numbers by two digit numbers (where the product does not exceed 100,000). 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems multiplication of three digit numbers by two digit numbers (where the product does not exceed 100,000). 	

Unit 6: Division of three and four digit numbers by one digit numbers(15 hours)	TX page/s
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<ul style="list-style-type: none"> Use mental arithmetic and written strategies, including multiplication, to divide three and four digit numbers by one digit numbers and ten, with and without remainder 	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check division problems involving division of three and four digit numbers by one digit numbers 	
<ul style="list-style-type: none"> Use calculator to solve problems involving division of three and four digit numbers by one digit numbers. 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving division of three and four digit numbers by one digit numbers. 	

Unit 7: Fractions (11 hours)	TX page/s
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<ul style="list-style-type: none"> Compare fractions with the same denominators 	36-37
<ul style="list-style-type: none"> Identify equivalent fractions less than 1 with denominators of 2, 4 and 8 	
<ul style="list-style-type: none"> Order fractions with the same denominator from smallest to largest and vice-versa. 	36-37

Unit 8: Currency (10 hours)	TX page/s
<ul style="list-style-type: none"> Identify, order and count bank notes up to R10,000 	
<ul style="list-style-type: none"> Use role plays to demonstrate buying and selling and simple calculations of profit and loss. 	

Unit 9: Decimals (14 hours)	TX page/s
<ul style="list-style-type: none"> Give examples of how decimals are used in everyday life (e.g. Sok's height is 1.50m) 	
<ul style="list-style-type: none"> State value of each digit in numbers with one decimal place (e.g. in the number 35.6, 3 represents lots of tens, 5 represents lots of ones and 6 represents lots of 1/10s) 	61
<ul style="list-style-type: none"> Order numbers with one decimal place from smallest to largest and vice-versa. 	63

Unit 10: Addition of decimals (15 hours)	TX page/s
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to solve problems involving addition of numbers with one decimal place, for example: $\begin{array}{r} 3.4 + 3.7 + \\ \underline{1.2} \quad \underline{2.5} \end{array}$ 	64-66

Unit 11: Subtraction of decimals (15 hours)	TX page/s
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to solve problems involving subtraction of numbers with one decimal place, with and without carry-over for example: $\begin{array}{r} 2.5 - 4.2 - \\ \underline{1.3} \quad \underline{2.8} \end{array}$ 	67-69

Unit 12: Measurement of length (8 hours)	TX page/s
<ul style="list-style-type: none"> Identify that 1km is equal to 1000m 	85
<ul style="list-style-type: none"> Identify that 1cm is equal to 1mm 	84
<ul style="list-style-type: none"> Select and use most appropriate unit of measurement to describe and measure a range of everyday distance and objects (e.g. distance from village to village, length of pencil) 	85

Unit 13: Measurement of weight (8 hours)	TX page/s
<ul style="list-style-type: none"> Choose and use appropriate units of weight to measure on simple scales everyday objects in kilograms, grams and Kham 	


Unit 14: Measurement of volume (8 hours)	TX page/s
<ul style="list-style-type: none"> Choose and use appropriate units of volume to measure out using calibrated measures everyday liquids in liters and milliliters 	

Unit 15: Measurement of time (15 hours)	TX page/s
<ul style="list-style-type: none"> Choose and use appropriate units of time to measure everyday events in hours, minutes and seconds 	
<ul style="list-style-type: none"> Convert time from hours to minutes and from minutes to seconds and vice-versa 	55
<ul style="list-style-type: none"> Add and subtract units of time (for example, 2h 30min + 1h 45min, 3h 10min - 1h 05min) 	56-57

Unit 16: Shapes (10 hours)	TX page/s
<ul style="list-style-type: none"> Sketch and give simple definitions of squares, triangles, rectangles and circles 	

Unit 17: Angles (10 hours)	TX page/s
<ul style="list-style-type: none"> Give definition of an angle and a degree, and sketch and identify elements of angles 	14-15
<ul style="list-style-type: none"> Explain in everyday language the meaning of the term 'right angle', and identify examples of right angles in everyday life 	
<ul style="list-style-type: none"> Use a square to draw right angles, and label the elements of right angles 	
<ul style="list-style-type: none"> Use a protractor to accurately measure angles, including right angles 	16-17

Unit 18: Parallel lines (6 hours)	TX page/s
<ul style="list-style-type: none"> Explain in everyday language the meaning of the term 'parallel lines', and identify examples of parallel lines in everyday life 	
<ul style="list-style-type: none"> Draw parallel lines using a square and straight ruler 	

Unit 19: Data (10 hours)	TX page/s
<ul style="list-style-type: none"> Use tally sheets and common counting symbols to group data, e.g.  	
<ul style="list-style-type: none"> Record data in simple table form 	

Unit 20: Patterns (10 hours)	TX page/s
<ul style="list-style-type: none"> Continue number patterns that increase or decrease 	
<ul style="list-style-type: none"> Supply missing elements in a pattern according to shape, numbers, using addition and subtraction 	

- | | |
|---|--|
| <ul style="list-style-type: none">• Complete simple addition and subtraction number sentences with missing elements (e.g. $3 + \square = 7$; $7 - \square = 3$) | |
|---|--|

MATHEMATICS GRADE 5 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> • Read, count, write, order and compare whole numbers not exceeding 7 digits and numbers with decimal fractions to two decimal places. • Identify examples of use of large numbers in everyday life (eg population counts, money)
	<ul style="list-style-type: none"> • Read, write, order and compare fractions and mixed numbers
	<ul style="list-style-type: none"> • Round decimal numbers to the nearest whole number
	<ul style="list-style-type: none"> • Select and apply mental, written and calculator strategies to solve simple problems: <ul style="list-style-type: none"> ○ Multiply and divide whole numbers up to 4 digits by 2 digits ○ Add, subtract, multiply and divide whole numbers using two kinds of brackets ○ Add and subtract decimal numbers with two decimal places ○ Multiply decimals up to two decimal places by single digit whole numbers
	<ul style="list-style-type: none"> • Use ratio to show relative size of two quantities • Use : symbol to express ratio • Simplify ratios to smallest terms
	<ul style="list-style-type: none"> • Use mental arithmetic to recognise numbers that can be divided by 2, 3 and 5 without remainders
	<ul style="list-style-type: none"> • Explain percentages as parts of 100 and use % symbol to represent percentage • Select and apply mental, written and calculator strategies to solve problems: <ul style="list-style-type: none"> ○ Add and subtract fractions with the same denominator ○ Rename common fractions (less than one) as decimals and percentages and vice-versa ○ Simplify common fractions as far as possible ○ Multiply and divide fractions by whole numbers ○ Convert mixed numbers to improper fractions and vice-versa
	<ul style="list-style-type: none"> • Calculate average costs • Convert prices into different currencies
MEASUREMENT	<ul style="list-style-type: none"> • Convert length, weight, capacity from smallest to largest unit and vice-versa • Write the relationship between volume and weight measurement for some everyday items (e.g. water, rice) • Use decimal knowledge to record measurements (e.g. 1,500mm = 1.5m) • Carry out four operations using units of measurement
	<ul style="list-style-type: none"> • Read and express accurately time in analogue, digital, 12 and 24 hour representations • Interpret a simple scale bar on a map and use the map to calculate the distance between places. • Use a given scale to mark a given distance on a map.
GEOMETRY	<ul style="list-style-type: none"> • Name acute, right, obtuse and straight angles and construct angles using rulers and protractors • Define and sketch right-angled, isosceles and equilateral triangles • Use line segment notation to label lines and shapes and express geometric relationships • Use objects and compasses to construct and label circles using the following terms: radius, centre, diameter and circumference.
STATISTICS	<ul style="list-style-type: none"> • Construct and interpret data shown in tables, line graphs, bar graphs and simple pie charts • Calculate averages (mean) in everyday contexts (e.g. temperatures, number of students in class).
ALGEBRA AND PATTERNS	<ul style="list-style-type: none"> • Find patterns from given examples and supply missing elements in a given pattern • Complete simple number sentences using four operations with missing elements (eg $3 \times \square = 21$; $21 \div \square = 7$)
REASONING	<ul style="list-style-type: none"> • Explain how an answer was obtained and compare own method/s of solution with those of another

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 6.

MATHEMATICS GRADE 5 UNITS

Unit 1: Seven digit numbers (8 hours)

	TX page/s
<ul style="list-style-type: none"> Give examples of use of seven-digit whole numbers in everyday life 	
<ul style="list-style-type: none"> Read and write seven-digit whole numbers in Khmer and Arabic notation and words 	1-2
<ul style="list-style-type: none"> Compare whole numbers up to one million, using terms like more than, less than, equal to and the following symbols: $<$, $>$ and $=$ 	5-6
<ul style="list-style-type: none"> Order five-digit whole numbers from smallest and largest and vice-versa 	5-6

Unit 2: Multiplication of four-digit whole numbers by two-digit numbers (11 hours)

	TX page/s
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to multiply four-digit whole numbers by two-digit numbers, with and without carry-over (where the product does not exceed 100,000), for example: $\begin{array}{r} 2434x \\ \underline{12} \end{array}$ $\begin{array}{r} 7654x \\ \underline{47} \end{array}$ 	
<ul style="list-style-type: none"> Use calculator to solve problems involving multiplications of four-digit whole numbers by two-digit whole numbers 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving multiplication of four-digit whole numbers by two-digit whole numbers Compare methods of solution 	

Unit 3: Division of three and four digit numbers by two digit numbers(11 hours)

	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic to identify numbers that can be divided by 2, 3 and 5 without remainders 	
<ul style="list-style-type: none"> Use mental arithmetic and written strategies, including multiplication, to divide three and four digit numbers by two digit numbers and ten, with and without remainder. 	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check division problems involving division of three and four digit numbers by two digit numbers. 	
<ul style="list-style-type: none"> Use calculator to solve problems involving division of three and four digit numbers by two digit numbers. 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving division of three and four digit numbers by one digit numbers. Compare methods of solution 	

Unit 4: Using brackets to carry out four operations (8 hours)

	TX page/s
<ul style="list-style-type: none"> Follow rules of curved bracket use in number sentences to solve simple problems. For example: $7 + (4 - 2) = ?$ 	
<ul style="list-style-type: none"> Follow rules of curved and square bracket use in number sentences to solve simple problems. For example, $16 + (4 \times [8 + 13]) = ?$ 	

Unit 5: Fractions (8 hours)	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic and written strategies to solve problems involving addition and subtraction of fractions with the same denominators 	
<ul style="list-style-type: none"> Convert fractions less than 1 to decimals and vice-versa 	

Unit 6: Multiplication of fractions by single-digit whole numbers (8 hours)	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic and written strategies to solve problems involving multiplication of fractions by single-digit whole numbers 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving multiplication of fractions by single-digit whole numbers. 	
<ul style="list-style-type: none"> Compare methods of solution 	

Unit 7: Division of fractions by whole numbers (9 hours)	TX page/s
<ul style="list-style-type: none"> Simplify fractions as far as possible 	
<ul style="list-style-type: none"> Use mental arithmetic and written strategies to solve problems involving division of fractions by single-digit whole numbers 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving division of fractions by single-digit whole numbers. 	
<ul style="list-style-type: none"> Compare methods of solution 	

Unit 8: Mixed numbers (8 hours)	TX page/s
<ul style="list-style-type: none"> Give examples of how mixed numbers are used in everyday life (e.g. I would like 1 $\frac{1}{2}$ kilos of rice) 	
<ul style="list-style-type: none"> Read and write mixed numbers 	82
<ul style="list-style-type: none"> Compare mixed numbers, using terms like more than, less than, equal to and the following symbols: $<$, $>$ and $=$ 	
<ul style="list-style-type: none"> Order mixed numbers, from the smallest to the largest and vice-versa 	
<ul style="list-style-type: none"> Compare and order mixed numbers and fractions 	

Unit 9: Decimal numbers (9 hours)	TX page/s
<ul style="list-style-type: none"> State value of each digit in numbers with two decimal places (e.g. in the number 35.64, 3 represents lots of tens, 5 represents lots of ones, 6 represents lots of $\frac{1}{10}$s and 4 represents lots of $\frac{1}{100}$s) 	97
<ul style="list-style-type: none"> Read and write numbers with 2 decimal places 	96
<ul style="list-style-type: none"> Order numbers with two decimal places from smallest to largest and vice-versa 	98
<ul style="list-style-type: none"> Round off decimals with two decimal places to the nearest whole number 	99

Unit 10: Addition of numbers with two decimal places (10 hours)	TX page/s
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to add two numbers with two decimal places, for example: 	102

$\begin{array}{r} 13.56+ \\ 15.73 \\ \hline \end{array}$	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check addition problems involving addition of two numbers with two decimal places. 	
<ul style="list-style-type: none"> Use calculators to solve problems involving addition of two numbers with two decimal places. 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving addition of two numbers with two decimal places Compare methods of solution 	104-105

Unit 11: Subtraction of numbers with two decimal places (10 hours)

	TX page/s
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to subtract two numbers with two decimal places, for example: $\begin{array}{r} 53.07- \\ 16.19 \\ \hline \end{array}$ 	103
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check subtraction problems involving addition of two numbers with two decimal places. 	
<ul style="list-style-type: none"> Use calculators to solve problems involving subtraction of two numbers with two decimal places. 	
<ul style="list-style-type: none"> Construct and show thinking to solve problems involving subtraction of two numbers with two decimal places Compare methods of solution 	

Unit 12: Multiplication of numbers with two decimal places (10 hours)

	TX page/s
<ul style="list-style-type: none"> Use formal written algorithm and knowledge of place value to multiply numbers with one or two decimal places by a whole number of up to four digits, for example: $\begin{array}{r} 24.75x \\ \underline{354} \end{array}$ 	
<ul style="list-style-type: none"> Use estimation, including rounding of numbers, to check problems involving multiplication of numbers with one or two decimal places with whole numbers. 	
<ul style="list-style-type: none"> Use calculators to solve problems involving multiplication of numbers with one or two decimal places with whole numbers. 	
<ul style="list-style-type: none"> Construct and solve problems involving multiplication of numbers with one or two decimal places with whole numbers. Compare methods of solution 	

Unit 13: Ratio and percentage (12 hours)

	TX page/s
<ul style="list-style-type: none"> Explain the meaning of a ratio between two quantities 	112-113
<ul style="list-style-type: none"> Write ratios using the : symbol 	112-113
<ul style="list-style-type: none"> Simplify ratios as far as possible 	
<ul style="list-style-type: none"> Write and explain percentages as part of 100 and use % symbol to express percentage. 	116
<ul style="list-style-type: none"> Explain percentages of amounts other than 100 	120-121

Unit 14: Currency (9 hours)TX
page/s

• Calculate average costs measured over a period of time	
• Use mental arithmetic and a range of written strategies to calculate currency exchange rates used in everyday life.	

Unit 15: Measurement of length (10 hours)TX
page/s

• Use knowledge of decimal place value to convert length measurements of different units and record measurements, for example, kilometers to meters and vice versa.	
• Show thinking to solve problems involving the use of the four operations with units of length.	

Unit 16: Measurement of weight (8 hours)TX
page/s

• Use knowledge of decimal place value to convert weight measurements of different units and record measurements, for example, kilograms to grams and vice versa.	
• Show thinking to solve problems involving the use of the four operations with units of weight.	
• Compare methods of solution	

Unit 17: Measurement of capacity (8 hours)TX
page/s

• Use knowledge of decimal place value to convert capacity measurements of different units, for example, liters to milliliters and vice-versa.	
• Show thinking to solve problems involving the use of the four operations with units of weight.	
• Identify the relationship between volume and weight for some everyday items (for example, one liter of water weights one kilogram)	

Unit 18: Time (8 hours)TX
page/s

• Read and express accurately time in analogue, digital, 12 and 24 hour representations	
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Unit 19: Plane figures and scale (11 hours)TX
page/s

• Interpret a simple scale bar on a map and on a globe.	
• Interpret a simple scale bar on a map and use the map to calculate the distance between places.	
• Use a given scale to mark a given distance on a map.	

Unit 20: Line and angles (12 hours)TX
page/s

- | | |
|---|--|
| • Use line segment notation to label lines and shapes and express geometric relationships | |
| • Identify types of angles (acute, right, obtuse and straight) and construct angles using rulers and protractors. | |

Unit 21: Triangles (9 hours)TX
page/s

- | | |
|---|----------------|
| • Define and sketch right angled, equilateral and isosceles triangles | |
| • Construct a triangle knowing: <ul style="list-style-type: none"> ○ the length of one side and two angles ○ the length of two of its sides and one angle | 36-37
38-39 |

Unit 22: Circles (9 hours)TX
page/s

- | | |
|--|--|
| • Use shapes and compasses to construct and label circles, using the following terms: radius, center, diameter and circumference | |
|--|--|

Unit 23: Statistics (12 hours)TX
page/s

- | | |
|--|-------|
| • Construct and interpret data shown in tables, line graphs, bar graphs and simple pie charts | 56-61 |
| • Calculate averages (mean) in everyday contexts (e.g. temperatures, number of students in class). | |

Unit 24: Algebra and patterns (10 hours)TX
page/s

- | | |
|---|--|
| • Find patterns from given examples and supply missing elements in a given pattern | |
| • Complete number sentences with missing elements using the four operations (e.g. $3 \times \square = 21$; $21 \div \square = 3$) | |

MATHEMATICS GRADE 6 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> • Read, count, write, order and compare whole numbers of any size and numbers with decimal fractions to three decimal places.
	<ul style="list-style-type: none"> • Convert fractions greater than 1 to mixed numbers and vice-versa
	<ul style="list-style-type: none"> • Round decimal numbers of up to 3 decimal places to the nearest hundredth and tenth
	<ul style="list-style-type: none"> • Select and apply mental, written and calculator strategies to solve simple problems: <ul style="list-style-type: none"> ○ Divide decimals of up to two decimal places by whole numbers ○ Multiply and divide decimal numbers up to 2 decimal places by decimal numbers up to two decimal places ○ Add and subtract decimal numbers with different numbers of decimal places
	<ul style="list-style-type: none"> • Calculate simple ratios and direct proportions (eg 2 people need 4 cups of water so 6 people need 12) • Construct problems that require use of simple ratio and direct proportion to solve
	<ul style="list-style-type: none"> • Identify prime numbers • Distinguish between prime and composite numbers by finding number of factors • Identify smallest and greatest common factor for two whole numbers
	<ul style="list-style-type: none"> • Select and apply mental, written and calculator strategies to solve problems: <ul style="list-style-type: none"> ○ Find equivalent fractions and common factors ○ Use four operations with fractions and mixed numbers ○ Convert simple fractions to percentages and vice-versa ○ Express one quantity as a percentage of another ○ Interpret and explain use of fractions, decimals and percentages in everyday contexts (e.g. $\frac{3}{4}$ hour = 45 minutes, 50% sale = $\frac{1}{2}$ price) ○ Explain relative percentages (e.g. how 50% of 6 = 3 but 10% of 40 = 4)
	<ul style="list-style-type: none"> • Calculate profit and loss, and write and verify receipts • Calculate simple interest payments on monthly and annual loans
MEASUREMENT	<ul style="list-style-type: none"> • Demonstrate how objects with different shapes can have the same volume • Demonstrate the relationship between volume and capacity through activities that show a cube of side 10cm displaces 1 litre of water • Find the volume of solids made up of unit cubes • Recognise what is meant by a square metre, and that one hectare = 10,000 square metres • Check accuracy of household bills (e.g. electricity and water) by multiplying consumption figures by unit costs
	<ul style="list-style-type: none"> • Carry out the four operations on units of time.
	<ul style="list-style-type: none"> • Calculate travel times using average speeds and distances • Use given formula to calculate distance, average speed and time
GEOMETRY	<ul style="list-style-type: none"> • Use rulers and compasses to draw equilateral triangles and angles of 60° and 90° • Make models of prisms, cones, pyramids and cylinders • Use line segment notation to sketch and measure the perimeter of triangles, squares and rectangles • Find, by counting squares, the area of triangles, squares and rectangles • Find the relationship between the lengths of the sides and the perimeter for squares, rectangles and equilateral and isosceles triangles
STATISTICS	<ul style="list-style-type: none"> • Determine an appropriate scale for a line or bar graph • Construct questions that can be answered by data in a table or graph
ALGEBRA AND PATTERNS	<ul style="list-style-type: none"> • Use letters to represent numbers in simple expressions • Find the value of simple algebraic expressions using substitution methods involving addition and subtraction (e.g. $3 + b = ?$; $8 - b = ?$ where b is 4).
	<ul style="list-style-type: none"> • Simplify simple algebraic expressions using addition and subtraction method (e.g. $4x + 2x = ?$)
REASONING	<ul style="list-style-type: none"> • Explain a short chain of reasoning used to approach and solve a problem that involves an analysis of data through the selection and use of mathematical techniques

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 6.

MATHEMATICS GRADE 6 UNITS

Unit 1: Whole numbers of any size (8 hours)	TX page/s
<ul style="list-style-type: none"> Give examples of use of whole numbers larger than one million in everyday life (e.g. population of Cambodia) 	
<ul style="list-style-type: none"> Read, count, write, compare and order whole numbers larger than one million 	1

Unit 2: Decimals to three places (8 hours)	TX page/s
<ul style="list-style-type: none"> Identify the value of each digit in numbers with up to three decimal places 	48-49
<ul style="list-style-type: none"> Read, count, write, compare and order any numbers with up to three decimal places. 	46-47

Unit 3: Addition of decimal numbers (9 hours)	TX page/s
<ul style="list-style-type: none"> Add decimal numbers with different numbers of decimal places (up to three decimal places) 	54-55
<ul style="list-style-type: none"> Use mental arithmetic, written strategies, calculators and estimation to create and solve problems and check answers related to addition of decimals (up to three decimal places) 	56
<ul style="list-style-type: none"> Explain reasoning used in choice of approach to solving problems 	

Unit 4: Subtraction of decimal numbers (9 hours)	TX page/s
<ul style="list-style-type: none"> Subtract decimal numbers with different numbers of decimal places (up to three decimal places) 	54-55
<ul style="list-style-type: none"> Use mental arithmetic, written strategies, calculators and estimation to create and solve problems and check answers related to subtraction of decimals (up to three decimal places) 	56
<ul style="list-style-type: none"> Explain reasoning used in choice of approach to solving problems 	

Unit 5: Multiplication of decimal numbers (10 hours)	TX page/s
<ul style="list-style-type: none"> Multiply decimal numbers with different numbers of decimal places (up to three decimal places) 	57-58
<ul style="list-style-type: none"> Use mental arithmetic, written strategies, calculators and estimation to create and solve problems and check answers related to multiplication of decimals (up to three decimal places) 	62-63
<ul style="list-style-type: none"> Explain reasoning used in choice of approach to solving problems 	

Unit 6: Division of decimal numbers (10 hours)	TX page/s
<ul style="list-style-type: none"> Divide decimal numbers with different numbers of decimal places (up to two decimal places) 	59
<ul style="list-style-type: none"> Use mental arithmetic, written strategies, calculators and estimation to create and solve problems and check answers related to multiplication of decimals (up to two decimal places) 	62-63
<ul style="list-style-type: none"> Explain reasoning used in choice of approach to solving problems 	

Unit 7: Ratio, proportion and percentage (10 hours)

	TX page/s
<ul style="list-style-type: none"> Use pictures and real objects to demonstrate ratio of quantities (e.g. ratio of squares to circles is 3 : 4 □□□ : ○○○○ ○) 	
<ul style="list-style-type: none"> Read and write given ratio of two numbers in notation and words correctly (e.g. 5 : 9 is 'five to nine') 	98-99
<ul style="list-style-type: none"> Convert simple fractions to percentages and vice-versa 	102
<ul style="list-style-type: none"> Find simple ratios (e.g. if two people need 4 cups of water, how many cups to six people need?) 	100-101
<ul style="list-style-type: none"> Use different written strategies to calculate percentages, for example to work out 20% of 120: <ul style="list-style-type: none"> Convert percentage to decimals: 20% = 0.2, then $0.2 \times 120 = 24$ Convert percentage to fractions: 20% = $20/100 = 2/10$, then $2/10 \times 120 = 24$ 	103-104
<ul style="list-style-type: none"> Use calculators to solve problems that include calculation of percentage 	
<ul style="list-style-type: none"> Construct and solve problems that involve simple ratios and direct proportions, and explain reasoning 	

Unit 8: Factors and multiples (12 hours)

	TX page/s
<ul style="list-style-type: none"> Explain the concept of prime numbers 	
<ul style="list-style-type: none"> Find the greatest common factor of two whole numbers, and show reasoning 	
<ul style="list-style-type: none"> Find least common multiple of two whole numbers 	

Unit 9: Addition of fractions with different denominators (9 hours)

	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic and written strategies to find common denominators and identify equivalent fractions to solve problems involving addition of fractions with different denominators 	
<ul style="list-style-type: none"> Construct and solve problems that involve addition of fractions with different denominations, and explain reasoning 	

Unit 10: Subtraction of fractions with different denominators (9 hours)

	TX page/s
<ul style="list-style-type: none"> Use mental arithmetic and written strategies to find common denominators and identify equivalent fractions to solve problems involving subtraction of fractions with different denominators 	
<ul style="list-style-type: none"> Construct and solve problems that involve subtraction of fractions with different denominations, and explain reasoning 	

Unit 11: Multiplication of fractions by fractions (9 hours)

	TX page/s
<ul style="list-style-type: none"> Show how to multiply and divide simple fractions by simple fractions 	
<ul style="list-style-type: none"> Construct and solve problems that involve multiplication and division of simple fractions by simple fractions, and explain reasoning 	

Unit 12: Addition of mixed number (12 hours)

	TX page/s
<ul style="list-style-type: none"> Use a range of strategies, including mental arithmetic and written strategies, to 	24-27

solve problems involving mixed number addition	
• Construct and solve problems that involve mixed number addition, and explain reasoning	32

Unit 13: Subtraction of mixed number (12 hours)

TX
page/s

• Use a range of strategies, including mental arithmetic and written strategies, to solve problems involving mixed number subtraction	30-31
• Construct and solve problems that involve mixed number subtraction, and explain reasoning	32

Unit 14: Multiplication of mixed number (12 hours)

TX
page/s

• Use a range of strategies, including mental arithmetic and written strategies, to solve problems involving mixed number multiplication	34-39
• Construct and solve problems that involve mixed number multiplication, and explain reasoning	44

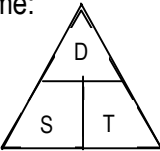
Unit 15: Division of mixed number (13 hours)

TX
page/s

• Use a range of strategies, including mental arithmetic and written strategies, to solve problems involving mixed number division	40-43
• Construct and solve problems that involve mixed number division, and explain reasoning	44

Unit 16: Average speed, distance and time (10 hours)

TX
page/s

<ul style="list-style-type: none"> Use the following illustration to determine formulae to calculate average speed, traveling time and distance using everyday contexts, where D = distance, S = average speed and T = time: $D = S \times T$ $S = D \div T$ $T = D \div S$ 	
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Unit 17: Lines and angles (8 hours)

TX
page/s

• Use rulers and compasses to draw and bisect lines	
• Use rulers and compasses to draw angles of 60° and 90°	82

Unit 18: Triangles (8 hours)

TX
page/s

• Use ruler and compass to construct right angled triangles, equilateral triangles and isosceles triangles	
• Recognise that the sum of the angles in any triangle is 180°	

Unit 19: Perimeter and area of shapes (XX hours)

	TX page/s
• Use line segment notation to sketch and measure the perimeter of triangles, squares and rectangles	
• Find, by counting squares, the area of triangles, squares and rectangles	
• Find the relationship between the lengths of the sides and the perimeter for squares, rectangles and equilateral and isosceles triangles	

Unit 20: Solids (7 hours)

	TX page/s
• Make models of prisms, cones, pyramids and cylinders	120

Unit 21: Statistics (8 hours)

	TX page/s
• Determine an appropriate scale for a line or bar graph	
• Construct questions that can be answered from data in a table or graph	
• Create and solve problems using all or some of four operations and analysis of data	
• Explain a short chain of reasoning used to approach and solve a problem that involves an analysis of data through the selection and use of mathematical techniques	

Unit 22: Algebra (8 hours)

	TX page/s
• Use letters to represent numbers in simple expressions	
• Find the value of simple algebraic expressions using substitution methods involving addition and subtraction (e.g. $3 + b = ?$; $8 - b = ?$ where b is 4).	
• Simplify simple algebraic expressions using addition and subtraction method (e.g. $4x + 2x = ?$)	

MATHEMATICS GRADE 7 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> • Compare, order and carry out four operations with positive and negative integers, decimals and fractions to solve a range of problems • Solve problems using the four rules for calculations with whole numbers, decimals and fractions, including correct ordering of operations and use of three kinds of brackets
	<ul style="list-style-type: none"> • Round off decimal numbers to a specified level of accuracy (eg the nearest hundredth)
	<ul style="list-style-type: none"> • Use square powers to express positive integers • Recall and use perfect squares and square roots of numbers up to 100, and use $\sqrt{\quad}$ symbol to represent squares
	<ul style="list-style-type: none"> • Solve problems involving more complex direct ratios and proportions
	<ul style="list-style-type: none"> • Solve simple consumer arithmetic problems involving calculation of simple interest and discount rates (eg loan of money, sale of goods, commissions)
	<ul style="list-style-type: none"> • Express one quantity as a percentage of another (e.g. 5 girls out of 50 students is 10%)
MEASUREMENT	<ul style="list-style-type: none"> • Select appropriate metric units for measuring quantities and rates (e.g. height of trees in meters, volume of medicine in millilitres) to solve problems
	<ul style="list-style-type: none"> • Convert the standard metric units of length, mass, capacity and time to larger and smaller units
	<ul style="list-style-type: none"> • Carry out the four operations using units of time (hours, minutes and seconds)
GEOMETRY	<ul style="list-style-type: none"> • Make sketches of the following shapes and find and use formulae to find the areas of triangles, squares and rectangles. • Show and recognise that the sum of the angles in any triangle is 180° • Show and recognise that each exterior angle of a triangle is equal to the sum of the two opposite interior angles • Solve problems by calculating unknown angles using angle properties of triangles • Construct and label triangles from given data (two sides and the angle made by those sides) • Bisect an angle using ruler and compass • Construct parallels and perpendiculars and angles of 90°, 60°, 45°, 30° using rulers and compasses only
	<ul style="list-style-type: none"> • Make, compare, describe and name three dimensional objects
	<ul style="list-style-type: none"> • Use symbols for common geometric terms (eg angle, ray, etc.)
	<ul style="list-style-type: none"> • Identify axes of symmetry of simple two-dimensional geometric figures in a plane
	<ul style="list-style-type: none"> • Use formulae to find the circumference, radius, diameter and area of circles
	<ul style="list-style-type: none"> • Find the area of a sector of a circle with a given angle and radii.
	<ul style="list-style-type: none"> • Define and find congruent shapes
	<ul style="list-style-type: none"> • Use number line from 0 – 1 to express probability and to demonstrate understanding that 0 – 1 represents the limits of probability
STATISTICS	<ul style="list-style-type: none"> • Express concept of probability using fractions, decimals and percentage
	<ul style="list-style-type: none"> • Produce data tables and interpret data presented in more complex tables
	<ul style="list-style-type: none"> • Display and compare two sets of univariate data in graph form (e.g. bar graphs)
ALGEBRA AND PATTERNS	<ul style="list-style-type: none"> • Express information provided in words in simple equations and inequalities using $>$; $<$ and $=$ signs (e.g. the sum of two numbers must be between 6 and 20 becomes $6 < x + y < 20$)
	<ul style="list-style-type: none"> • Solve simple linear equations with one unknown
	<ul style="list-style-type: none"> • Identify and use the laws of indices for positive integers
REASONING	

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 9.

MATHEMATICS GRADE 7 UNITS

Unit 1: Positive and negative integers (18 hours)	TX page/s
• Use the properties of four operations in calculation of positive and negative integers	
• Use mathematical notation (< ; > ; = ; ≤ ; ≥ ; ≠) to compare positive and negative integers	
• Identify absolute value of positive and negative integers	48
• Use four operations to solve problems involving integers of any size	
• Find largest and smallest common factors of sets of integers	16-18
• Use commutative, distributive and associative properties of integers to complete calculations involving addition and subtraction	8-11

Unit 2: Fractions and decimals (16 hours)	TX page/s
• Round off decimal numbers to a specified level of accuracy	
• Compare and order fractions and decimals	21-22
• Convert fractions to decimals and vice-versa	35-37
• Use four operations to solve problems involving fractions and decimals	
• Use commutative, distributive and associative properties of integers to complete calculations involving addition and subtraction of decimals and fractions	
• Use greatest and lowest common factors to factorise and simplify fractions	

Unit 3: Square roots and square powers (10 hours)	TX page/s
• Explain and use square power notation to express positive integers	3-4
• Explain and use square root notation ($\sqrt{\quad}$) to express positive integers as perfect square roots	3-4
• Recall and use perfect squares and square roots of numbers up to 100	

Unit 4: Ratio and proportion (8 hours)	TX page/s
• Express one quantity as a ratio of another	
• Solve more complex problems involving direct ratio and proportion	42-44

Unit 5: Percentage (6 hours)	TX page/s
• Express one quantity as a percentage of another	33
• Solve simple consumer problems involving calculation of percentages such as interest, commission and discounts.	34

Unit 6: Measurement (8 hours)	TX page/s
• Select appropriate metric units for measuring distances, quantities and rates and use the four operations to solve problems	

• Convert the standard metric units of length, mass, capacity and time to larger and smaller units.	112
• Carry out the four operations with units of time (hours, minutes and seconds)	

Unit 7: Geometric symbols (16 hours)

	TX page/s
• Use a range of geometric symbols (including line segment notation and angle notation) to express properties of different plane figures	102-104 109,119
• Carry out the four operations with properties of plane figures to solve problems.	110-113

Unit 8: Angles (12 hours)

	TX page/s
• Construct angles of 90° ; 60° ; 45° ; 30° using only rulers and compasses	
• Construct parallel lines using only rulers and compasses	146-149

Unit 9: Two-dimensional shapes (20 hours)

	TX page/s
• Show and recognise that the sum of angles in any triangle is 180°	167
• Construct and label squares, rectangles and triangles from given data (two sides and the angle formed by those sides)	162-164
• Show and recognise that each exterior angle of a triangle is equal to the sum of the two opposite interior angles	167-168
• Solve problems by calculating unknown angles using angle properties of triangles	171-173
• Define and find congruent and similar shapes	

Unit 10: Perimeter and area (12 hours)

	TX page/s
• Find and use formulae to calculate the circumference and area of square, rectangles and triangles	174-178

Unit 11: Circles (12 hours)

	TX page/s
• Use formulae to find the circumference, radius, diameter and area of circles	188
• Find the area of a segment of a circle with a given radii and angle formed by those radii	

Unit 12: Symmetry (6 hours)

	TX page/s
• Identify axes of symmetry of simple two-dimensional geometric figures	

Unit 13: Solid shapes (16 hours)

	TX page/s
• Name, make, sketch, compare and describe three dimensional shapes	195

• Makes sketches and find the surface area of cubes, cuboids and cylinders	196-200
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Unit 14: Probability (12 hours)

TX
page/s

• Use number line from 0 – 1 to express probability and to demonstrate understanding that 0 and 1 represent the limits of probability	
• Express the concept of probability using fractions, decimals and percentages	

Unit 15: Bar graphs and pie charts (16 hours)

TX
page/s

• Produce data tables and interpret data presented in more complex tables	93
• Construct bar graphs and pie charts from given and gathered data sets	94-101
• Construct double column graphs to display and compare two sets of univariate data in graph form	

Unit 16: Algebraic expressions (16 hours)

TX
page/s

• Identify and use the laws of indices with positive integers	
• Use a range of strategies to simplify algebraic expressions, for example: <ul style="list-style-type: none"> ○ Add and subtract the same bases (e.g. $x + x = 2x$; $3x - x = 2x$) ○ Multiply and divide the same bases (e.g. $x \cdot x = x^2$; $\frac{2x}{x} = 2$) ○ Grouping e.g. $(2x + 1) + (x + 3) = (2x + x) + (3 + 1) = 3x + 4$ 	72-82

Unit 17: Algebraic equations (12 hours)

TX
page/s

• Express information provided in words in simple equations	83
• Solve problems involving first degree equation with one unknown	84-99
• Construct double column graphs to display and compare two sets of univariate data in graph form	

Unit 18: Algebraic equalities (12 hours)

TX
page/s

• Express information provided in words in simple inequalities using $>$, $<$ and \leq ; \geq signs	
• Solve properties of simple inequalities to solve problems	

MATHEMATICS GRADE 8 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> Compare, order and carry out four operations with positive and negative integers, square and cubic powers, decimals and fractions to solve a range of problems
	<ul style="list-style-type: none"> Give common fraction equivalents of terminating and recurring decimals (e.g. $0.375 = \frac{3}{8}$; $\frac{1}{3} = 0.33\dots$)
	<ul style="list-style-type: none"> Use degrees up to the power of 5 to express positive integers (e.g. $5^2 = 25$; $3^5 = 243$) Express numbers in scientific notation ($A \times 10^n$ where $1 \leq A < 10$) where n is an integer Apply index laws to simplify arithmetic expressions Use cubic roots to express positive integers
	<ul style="list-style-type: none"> Calculate direct and inverse proportions to solve problems (e.g. if 6 workers take 12 days to complete a task, how many days would 9 workers take?)
	<ul style="list-style-type: none"> Solve consumer arithmetic problems including successive discounts, discounts by rate, simple interest rates and profit and loss expressed as a percentage
	<ul style="list-style-type: none"> Correctly interpret statements of percentage change (e.g. a 200% increase, 10% decrease) and express as a numeric value Convert quantities expressed as ratios to percentages and fractions (e.g. if the cement, sand, gravel ratio in concrete is 1:4:5, then 10% of the mixture is cement, and $\frac{2}{5}$ of the mixture is sand)
	<ul style="list-style-type: none"> Select measurement units appropriate for measuring quantities by ratio or percentage (e.g. an oil/petrol mix of 4% oil)
MEASUREMENT	<ul style="list-style-type: none"> Relate and convert length, area and volume units (e.g. hectares to square kilometres, m^3 to cm^3)
	<ul style="list-style-type: none"> Calculate time differences between Cambodia and different countries around the world
	<ul style="list-style-type: none"> Make sketches and give simple definitions of the following shapes: trapeziums, parallelograms and rhombuses and examples of regular and irregular polygons (eg hexagons, octagons) Find and use formulae to find the areas of trapeziums, parallelograms and rhombuses. Construct and label simple quadrilaterals from given data Calculate unknown angles using angle properties of parallelograms Calculate unknown angles formed with parallel lines cut by a transversal
GEOMETRY	<ul style="list-style-type: none"> Sketch and find the surface area of cubes, cuboids and cylinders
	<ul style="list-style-type: none"> Draw accurate scale diagrams of two-dimensional shapes to investigate properties that changes when shapes are enlarged/reduced and properties that stay the same
	<ul style="list-style-type: none"> Demonstrate simple circle properties using lines of symmetry, chords and arcs
	<ul style="list-style-type: none"> Apply rules for proving that triangles are congruent, and use congruence conditions of triangles to find unknown lengths of sides and sizes of angles of triangles
STATISTICS	<ul style="list-style-type: none"> Estimate the probability of an event on the basis of repeated trials of a simple experiment (eg repeated tossing of dice) Make predictions on the basis of samples
	<ul style="list-style-type: none"> Find mean, median and mode from simple data sets and distinguish the purpose of each
	<ul style="list-style-type: none"> Construct histograms from given data
ALGEBRA AND PATTERNS	<ul style="list-style-type: none"> Simplify, expand and manipulate simple algebraic expressions (equations and inequations) Find common factors of algebraic expressions Apply index laws to simplify algebraic expressions Construct the graph of the line $y = ax + b$ (where a and b are integers) Identify and use with algebraic expressions the law of indices for degrees up to the power of 5
REASONING	

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 9.

MATHEMATICS GRADE 8 UNITS

Unit 1: Rational numbers (8 hours)

	TX page/s
• Explain the term and identify examples of rational numbers.	
• Compare and order rational numbers	
• Carry out four operations to solve problems involving rational numbers	

Unit 2: Powers (10 hours)

	TX page/s
• Explain and illustrate the concept of square and cubic powers of positive integers	1
• Compare and order square and cubic powers of positive integers	
• Explain and illustrate the concept of square and cubic powers of positive integers where the index is a negative integer	4-5
• Carry out four operations involving numbers expressed as square and cubic powers to solve problems	
• Use degrees up to the power of 5 to express positive integers	2
• Express numbers with powers in scientific notation ($A \times 10^n$ where $1 \leq A < 10$ and n is an integer)	7
• Apply index laws to simplify expressions containing square and cubic powers	6

Unit 3: Square and cubic roots (10 hours)

	TX page/s
• Explain the concept of square and cubic roots	8-9
• Use calculator to find square roots of positive integers	10-11
• Apply index laws to simplify expressions containing square and cubic roots of positive integers	10-11

Unit 4: Decimal numbers (8 hours)

	TX page/s
• Identify and recall fractions that convert to recurring decimals	
• Convert fractions to decimals and vice-versa	
• Solve problems involving decimals	

Unit 5: Proportion (8 hours)

	TX page/s
• Explain and calculate examples of direct proportion and inverse proportion	
• Construct and solve problems involving direct and inverse proportion	

Unit 6: Percentage (14 hours)

	TX page/s
• Explain concept of loan, discount rate and simple interest	
• Calculate amount to be repaid on a simple loan of a fixed sum with a given interest	

rate	
• Calculate amount to be loaned to generate a set return based on a fixed simple interest rate	
• Find and express profit and loss as a percentage of costs	
• Construct and solve problems involving simple interest rates, discount rates, profit and loss.	

Unit 7: Percentage variance (8 hours)

TX
page/s

• Identify and interpret percentage variance	
• Solve problems involving percentage variance	
• Convert quantities expressed as ratios into quantities expressed as percentages and fractions	

Unit 8: Measurement (10 hours)

TX
page/s

• Select appropriate units to measure quantity by ratio or percentage	
• Solve problems involving uniform motion and mixture	
• Convert volume and area from the smaller to larger units and vice-versa	
• Solve problems involving volume and area measurements	

Unit 9: Time (6 hours)

TX
page/s

• Calculate time differences between Cambodia and different countries around the world	
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Unit 10: Angles (10 hours)

TX
page/s

• Explain, illustrate and give the properties of complimentary, supplementary and vertically-opposite angles	
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Unit 11: Parallel lines and right angles (14 hours)

TX
page/s

• Construct parallel lines using ruler and set square	
• Use the properties of perpendicular lines and parallel lines cut by a transversal to solve problems	

Unit 12: Shapes (14 hours)

TX page/s

• Sketch, define and identify the properties of trapeziums, parallelograms and rhombuses	183,194,203-204
• Find and use formula to calculate the area of a rectangle	
• Use properties of parallelograms to find unknown angles	183-185

Unit 13: Circles (12 hours)	TX page/s
<ul style="list-style-type: none"> Demonstrate simple circle properties using lines of symmetry, chords and arcs 	228-235
Unit 14: Triangles (14 hours)	TX page/s
<ul style="list-style-type: none"> Identify examples of properties of interior and exterior angle bisectors in a triangle Apply rules for proving that triangles are congruent Use congruence conditions of triangles to find unknown lengths of sides and sizes of angles of triangles 	172-174 133-143 140-143
Unit 15: Scale drawings (10 hours)	TX page/s
<ul style="list-style-type: none"> Draw accurate scale diagrams of two-dimensional shapes to investigate properties that changes when shapes are enlarged/reduced and properties that stay the same 	
Unit 16: Solids (10 hours)	TX page/s
<ul style="list-style-type: none"> Sketch and find the surface area of cubes, cuboids and cylinders 	
Unit 17: Probability (8 hours)	TX page/s
<ul style="list-style-type: none"> Estimate the probability of an event on the basis of repeated trials of a simple experiment (for example, repeated tossing of a dice) 	
Unit 18: Algebraic expressions (16 hours)	TX page/s
<ul style="list-style-type: none"> Identify and use with simple linear algebraic expressions the law of indices for degrees up to the power of 5 	
<ul style="list-style-type: none"> Simplify, expand and solve simple linear algebraic expressions with one unknown , including use of index laws 	20-22
<ul style="list-style-type: none"> Find common factors of simple lineaar algebraic expressions by grouping and using distributive properties 	45-48
Unit 19: Graphs (8 hours)	TX page/s
<ul style="list-style-type: none"> Sketch and label graph axes to show x and y axes 	
<ul style="list-style-type: none"> Construct the graph of the line $y = ax + b$ where a and b are integers 	81-82
Unit 20: Polynomials (16 hours)	TX page/s
<ul style="list-style-type: none"> Explain and give examples of the term 'polynomial'. 	17-18
<ul style="list-style-type: none"> Carry out four operations on simple polynomials 	19-30

Unit 21: Rational fractions (14 hours)

	TX page/s
• Explain and give examples of rational fractions	57
• Carry out four operations using rational fractions	58-69

MATHEMATICS GRADE 9 LEARNING OUTCOMES

STRAND	LEARNING OUTCOMES
NUMBER	<ul style="list-style-type: none"> Compare, order and carry out four operations with integers, square and cubic powers and perfect square and cubic roots, decimals and fractions to solve a range of more complex problems
	<ul style="list-style-type: none"> Identify rational and irrational numbers, and use a calculator to find approximate values of irrational numbers, including square roots
	<ul style="list-style-type: none"> Apply knowledge of rates to make calculations in a variety of contexts (e.g. hourly normal and overtime rates of pay to calculate wages; distance travelled by boat according to rate of current or wind)
	<ul style="list-style-type: none"> Solve more complex problems involving rates, ratios and percentages Convert from one rate to another to compare and order (e.g. metre per second to kilometre per hour) Use mental arithmetic strategies to calculate simple percentages of quantities
MEASUREMENT	<ul style="list-style-type: none"> Convert selected standard metric units to imperial measures and vice versa (e.g. kilograms to pounds; grams to ounces; inches to centimetres)
GEOMETRY	<ul style="list-style-type: none"> Establish sum of exterior angles and sum of interior angles for regular and irregular polygons
	<ul style="list-style-type: none"> Use formulae to find the surface area and volume of cubes, cuboids, cylinders, pyramids, cones and spheres
	<ul style="list-style-type: none"> Draw accurate scale drawings to find unknown lengths
	<ul style="list-style-type: none"> Use geometric terms and some properties of circles to solve problems (e.g. a tangent to a circle is perpendicular to the radius at the meeting point on the circumference)
	<ul style="list-style-type: none"> Define and find similar shapes Identify relationship between surface area and volume of two similar shapes Apply rules for proving that triangles are similar, and use similar conditions of triangles to find unknown lengths and sides and sizes of angles of triangles Find side, hypotenuse and height lengths of right angles triangles using Pythagoras' theorem or using similar triangle
STATISTICS	<ul style="list-style-type: none"> Use examples of data sets on long-run frequencies (e.g. weather data) to estimate probabilities Calculate simple probabilities of single events
	<ul style="list-style-type: none"> Find mean, median and mode from frequency distribution tables
	<ul style="list-style-type: none"> Construct frequency tables for grouped data
	<ul style="list-style-type: none"> Construct a graph showing the range and median from a given set of data
ALGEBRA AND PATTERNS	<ul style="list-style-type: none"> Use formulae to find mid-point, distance and gradient on a number plane Simplify and expand simple algebraic expressions, including simple algebraic fractions Solve a system of first degree equations with two unknowns (e.g. if person A buys 2kg of fish and 6kg of rice for R29,000, and person B buys 1kg fish and 1kg rice for R11,600, what is the cost of fish per kg) Solve linear equations, including those involving fractions, with one unknown and none in the denominator (e.g. $\frac{x-2}{12} = 6$)
REASONING	<ul style="list-style-type: none"> Develop a problem in a real life situation and develop a solution using a range of mathematical techniques

NOTE: Learning Outcomes in bold are Curriculum Standards intended to be achieved by most students by the end of Grade 9.

MATHEMATICS GRADE 9 UNITS

Unit 1: Rational numbers (12 hours)	TX page/s
• Compare and order rational numbers, including perfect square and cubic roots	
• Carry out four operations to solve more complex problems involving rational numbers	

Unit 2: Irrational numbers (16 hours)	TX page/s
• Explain the term and identify examples of irrational numbers	
• Compare and order irrational numbers	
• Carry out four operations to solve problems involving irrational numbers	7-8
• Use calculator to estimate approximate value of irrational numbers	

Unit 3: Percentage and ratio (12 hours)	TX page/s
• Use mental arithmetic to calculate simple percentages	
• Solve consumer problems involving calculation of percentage, for example: <ul style="list-style-type: none"> ○ loan repayments at simple fixed interest rates ○ discounts ○ taxes 	
• Solve more complex problems involving uniform motion and mixtures (e.g. distance travelled by boat according to rate of current or wind)	
• Convert one rate to another to compare and order (for example, meters per minute to kilometers per hour)	

Unit 4: Measurement (6 hours)	TX page/s
• Convert selected standard metric units to imperial measures and vice-versa (for example, inches to centimeters, kilograms to pounds)	

Unit 5: Polygon (8 hours)	TX page/s
• Define and sketch regular and irregular polygons	
• Find the sum of the interior and exterior angles of polygons	

Unit 6: Circles (20 hours)	TX page/s
• Use geometric notation to show the position of: <ul style="list-style-type: none"> ○ a line in relation to a circle ○ one circle in relation to another circle 	
• Define and draw tangents	
• Explain and show the properties of tangents that meet with radii	

<i>Extension</i>	
<ul style="list-style-type: none"> Solve problems involving the properties of circles 	

Unit 7: Pythagoras' Theorem (16 hours)	TX page/s
<ul style="list-style-type: none"> Explain, with the use of illustrations, Pythagoras' Theorem 	
<ul style="list-style-type: none"> Test theorem with a range of triangles 	
<ul style="list-style-type: none"> Use and apply Pythagoras' Theorem to solve problems 	

Unit 8: Similar triangles (20 hours)	TX page/s
<ul style="list-style-type: none"> Define and find similar shapes 	191-192
<ul style="list-style-type: none"> Use similar conditions of triangles to find unknown lengths of sides and sizes of angles in triangles 	193-198

Unit 9: Solids (20 hours)	TX page/s
<ul style="list-style-type: none"> Use formulae to find the surface area and volume of cubes, cuboids, cylinders, pyramids, cones and spheres 	
<ul style="list-style-type: none"> Identify the relationship between the surface area and volume of two similar shapes or solids 	

Unit 10: Probability (16 hours)	TX page/s
<ul style="list-style-type: none"> Calculate simple probabilities of single events 	135-137
<ul style="list-style-type: none"> Use examples of data sets on long-run frequencies (for example, weather data) to estimate probabilities 	
<i>Extension</i>	138-139
<ul style="list-style-type: none"> Calculate <i>addition</i> probability of compounded independent events 	

Unit 11: Frequency distribution (18 hours)	TX page/s
<ul style="list-style-type: none"> Design simple surveys, collect data and construct histogram and bar charts 	155-156
<ul style="list-style-type: none"> Design surveys to collect group data and construct frequency tables and frequency polygons 	157-158
<ul style="list-style-type: none"> Interpret histograms, bar charts, frequency tables and frequency polygons 	

Unit 12: Averages (16 hours)	TX page/s
<ul style="list-style-type: none"> Find mean, median and mode from grouped data and frequency distribution tables 	168-171
<ul style="list-style-type: none"> Construct a graph showing the range and median from a given set of data 	

Unit 13: First degree equations with one unknown (12 hours)	TX page/s
• Solve first degree equations with one unknown, including powers and square and cubic roots	22-26
• Solve more complex problems involving first degree equations with one unknown	27-29

Unit 14: System of first degree equations with two unknowns (14 hours)	TX page/s
• Solve first degree equation systems with two unknowns using: <ul style="list-style-type: none"> ○ Graphs ○ Substitutions and elimination strategies 	34-36
• Solve problems involving systems of first degree equations with two unknowns	46-48

Unit 15: Number planes (10 hours)	TX page/s
• Use formulae to find mid-point, distance and gradient on a number plane	90-99

Unit 16: Graph of linear equations (12 hours)	TX page/s
• Construct the graph of the line $y = ax + b$ (where a and b are integers)	104-106
• Use formulae to find the gradient of a line	