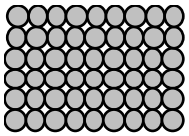
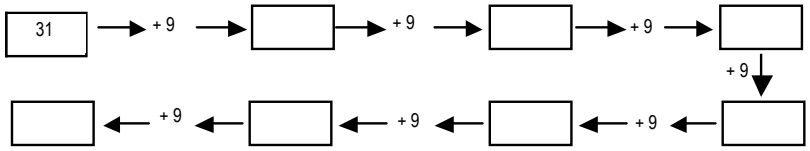
3.3.2 Clarification of content for Grade 5

GRADE 5 TERM 1				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Mental calculations involving**: • Addition and subtraction facts of: - units - multiples of 10 - multiples of 100 - multiples of 1 000 • Multiplication of whole numbers to at least 10 x 10 • Multiplication facts for: - units by multiples of 10 - units by multiples of 100 - units by multiples of 1 000 - units by multiples of 10 000 **Number range for counting, ordering, comparing, and representing numbers and for the place value of digits** • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 4-digit numbers • Represent odd and even numbers to at least 1 000 • Recognize the place value of digits in whole numbers to at least 4-digit numbers • Round off to the nearest 5, 10, 100 and 1 000	The mental Mathematics programme should be developed systematically over the year. Learners should not be asked to do random calculations each day. As learners cover topics and develop calculating techniques in the main part of the lesson, so aspects of these can be incorporated into the mental Mathematics programme. Concepts and skills are developed through the main lesson, and then practised, sometimes with smaller number ranges in the mental Mathematics programme. You can keep the number range lower in Term 1 and increase it during the year. At the start of the year, number ranges and calculations techniques can be based on those developed in Grade 4. The mental Mathematics should systematically develop three aspects of learners' number knowledge • number facts - number bonds: addition and subtraction facts for: ◊ units ◊ multiples of 10 - times tables involving multiplication of whole numbers to at least 10x10 • calculation techniques - doubling and halving - using multiplication to do division - multiplying by 10, 100 and 1 000 - multiplying by multiples or 10, 100 and 1 000, - dividing by 10, 100 and 1 000, - building up and breaking down numbers - rounding off to the nearest 10, 100 and 1 000 and compensating - adding and subtracting of units, multiples of 10, 100, 1 000 to/from any 4-digit number	**10 minutes every day**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including: • estimation • adding and subtracting in columns • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** • Multiples of 2-digit whole numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Properties of whole numbers** • Recognize and use the commutative associative, distributive properties of whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property	• number concept - counting ◊ count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, between 0 and at least 1 000 ◊ count forwards and backwards in 100s between 0 and at least 10 000. - ordering and comparing up to 4-digit numbers - place value for numbers of up to 4-digits - building up and breaking down numbers - odd and even numbers - multiples Some mental Mathematics can be done without apparatus, but it is often useful to do mental Mathematics with apparatus **Recommended apparatus** - a number line - a number grid - place value cards - counting beads	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Counting, ordering, comparing, representing and place value of digits	**Number range for counting, ordering, comparing and representing and place value of digits** • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 4-digit numbers • Represent odd and even numbers to at least 1 000 • Recognize the place value of digits in whole numbers to at least 6-digit numbers • Rounding off to the nearest 5, 10, 100 and 1 000	In Term 1, learners should revise and consolidate work done in Grade 4 • Count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and at least 1 000 • Count forwards and backwards in 100s between 0 and at least 10 000. • Order, compare and represent numbers to at least 4-digit numbers. • Recognize the place value of digits in whole numbers to at least 4-digit numbers. • Round off to the nearest 10 and 100 **Counting** Counting should not only be thought of as verbal counting. Learners should count using apparatus such as • counters • counting beads • number grids • structured, semi-structured and empty number lines • pictures of objects, especially pictures of large numbers of objects that are presented in a grouped or structured way. An example of a picture of objects suitable for counting is provided at the end of the Grade 5 section on Numbers, Operations and relationships. • arrays or diagrams of arrays e.g.  • other diagrams for counting e.g.  Counting should not always start on the first multiple. Nor should it always start on any other multiple e.g. counting in 2s can start from 5 or 27 or 348.	**2 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Counting, ordering, comparing, representing and place value of digits		**Place value** (number range 0 to 999) Learners should be able to break up numbers into hundreds, tens and units using • the number names (number words) • place value or flash cards • expanded notation, Recommended apparatus: place value/flash cards, Dienes blocks **Compare and order** (number range 0 to 999) Here learners should be given a range of exercises, e.g. • Arrange the given numbers below from the smallest to the biggest, or biggest to smallest • Fill in missing numbers in - a sequence - on a number grid • Show a given number on a numbered or un-numbered number line e.g. on a number show line which number is halfway between 1 340 and 1 350. • Indicate which of two numbers is greater or smaller e.g. 5 431 or 5 413. • Replace * with <, = or > e.g. 7 889 * 7 898, 41 09 * 5 190 All work developed here can be practised throughout the year in the mental Mathematics programme.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Number sentences** (introduction to algebraic expressions)	**Number sentences** • Write number sentences to describe problem situations • Solve and complete number sentences by - inspection - trial and improvement • Check the solution by substitution	Writing number sentences can be seen as a way of preparing learners to write algebraic equations. Number sentences can be used to describe problem situations. Number sentences can also be used as an equivalent form of expression to sections of flow diagrams or tables. Sometimes in the Intermediate Phase learners work with number sentences in isolation. However, it is more common for learners to work with number sentences and other forms of representation e.g. problems specified in words, numbers and calculations represented in diagrams (including flow diagrams). Examples of the above should be included at appropriate times throughout the year. Number sentences are also a way of showing equivalence. It seems obvious that what is written on the one side of the equal sign is equal to what is written on the other side. However learners need to be taught that these are equivalent expressions on either side of the equal sign. In the Intermediate Phase it is useful to use number sentences, and patterns made up of number sentences to assist learners to make sense of and learn the following: • The inverse relationship between addition and subtraction • The commutative, associative, and distributive properties with whole numbers and how we can use these properties together with building up and breaking down numbers when we add and subtract • Addition and subtraction facts for: - units - multiples of 10 - multiples of 100 - multiples of 1 000 Exploring, understanding and learning the logic of equivalent statements, by working through patterns made up of number sentences, helps learners to learn calculation techniques. At the start of the year number sentences can be used to help learners understand and use the commutative and associative properties when calculating with whole numbers. This will prepare them for the calculations that they will do early in the first term	**3 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Number sentences** (introduction to algebraic expressions)		**Using number sentences to consolidate learners' understanding of the additive properties of** **Examples:** 63 – 63 = ☐ 742 – 742 = ☐ 7 654 – ☐ = 7 654 After completing a number of similar examples, learners should explain in their own words what they notice. **Further examples:** a) 79 – 4 + 4 = ☐ b) 237 + 6 – 6 = ☐ c) 6 997 + 6 – 6 = ☐ d) 54 + 6 – ☐ = 54 After completing a number of similar examples, learners should explain what they notice in their own words. **Further examples** a) 62 + 5= ☐+ 4 (learners can use the fact that 5 = 4 + 1, so 62 + 1 + 4 = 63+ 4 b) 23 + 7 – ☐ = 22 c) 20 – 12 = ☐+ 12 – 12 **Using number sentences to focus attention on addition and subtraction as inverse operations and to encourage learners to use them in calculations** Subtraction can undo what addition does and addition can undo what subtraction does if you keep the numbers the same. Learners are not expected to use the expression "inverse operations". They are expected to know that • addition can be used to check subtraction calculations • subtraction can be used to check addition calculations **Examples:** 54 – 12 = ☐ therefore 42 + 12 = ☐ 387 – 142 = ☐ therefore 245 + 142 = ☐ 482+ 200 = ☐ therefore 682 – 200 = ☐ 262 + 237 = ☐ therefore 499 – 237 = ☐	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Number sentences** (introduction to algebraic expressions)		After completing a number of similar examples, learners should explain in their own words what they notice **Using number sentences to focus attention on multiplication and division as inverse operations and to encourage learners to use them in calculations** **Examples:** 8 x 9 = ☐ therefore 72 ÷ 9 = ☐ 6 x 7 = ☐ therefore 42 ÷ 7 = ☐ 32 x 3 = ☐ therefore 6 ÷ 3 = ☐ 4 x 1 000 = ☐ therefore 4 000 ÷ 1 000 = ☐ **Using number sentences to consolidate learners understanding of the multiplicative properties of 1** a) 45 x 1 = ☐ b) 8 ÷ 8 = ☐ c) 74 ÷ 74 = ☐ d) 7 654 ÷ 7 654 = ☐ e) ☐÷ 9 = 1 After completing a number of similar examples, learners should explain what they notice in their own words. They are expected to be able to say: “When you divide a number by itself, you get 1”; “When you multiply or divide a number by 1 it remains unchanged”. **Further examples:** a) 63 ÷ 7 x7 = ☐ b) 54 ÷ 6 x 6 = ☐ c) 6 997 ÷ 6x 6 = ☐ After completing a number of similar examples, learners should explain what they notice in their own words. They are expected to conclude: “When you multiply and divide by the same number, you get back to the number you started with”.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Number sentences** (introduction to algebraic expressions)		**Using number sentences to help learners consolidate the commutative and associative properties** **Commutative property** Numbers can be added in any order. **Example:** 26 + 19 = 19 + 26 **Examples:** 16 + 47 = ☐ or 47 + 16 = ☐ 35 + 468 = ☐ or 468 + 35 = ☐ 627 + 67 = ☐ or 67 + 627 = ☐ After completing a number of similar examples, learners should explain in their own words what they notice. Learners are not expected to know the names of the properties of operations e.g. commutative property. They only need to know how to use this property to make their calculations easier or use equivalent statements. **Associative property** The associative property allows numbers to be grouped in different ways when adding more than two numbers without it affecting the answer. **Examples:** (42 + 33) + 18 = ☐ has the same aswer as 42 + (33 + 18) = ☐ 251 + (27 + 49) = ☐ has the same aswer as (251 + 27) + 49 = ☐ After completing a number of similar examples, learners should explain in their own words what they notice. Learners are not expected to know the names of the properties of operations e.g. associative property. They only need to know how to use them to make their calculations easier or to use equivalent statements. In most calculations where learners break up numbers before adding, learners should change the way numbers are grouped. **Example:** • when learners write 349 + 273 = 300 + 200 + 40 + 70 + 9 + 3 they are in effect changing the way the numbers are grouped. • when learners calculate by rounding off and compensating or filling up to tens or hundreds, learners should change the way the numbers are grouped. **Example:** 489 + 27 = 489 + (11 + 16) = (489 + 11) + 16 = 500 + 16 = 516.	

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PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Number sentences** (introduction to algebraic expressions)		**Order of subtraction** When you change the order in which you subtract numbers, the answers will NOT be the same. The commutative property does NOT hold for subtraction. **Example:** 26 – 19 ≠ 19 – 26. Learners do not work with negative numbers yet. It is best to ask whether the number are True and False. **Examples:** True or false? 49 – 13 = 13 – 49 True or false? 297 – 36 = 36 – 297 Similar examples can be given to consolidate learners' understanding of the commutative property of multiplication and also the associative property of multiplication.This can be done using number patterns and flow diagrams. **Addition and subtraction facts for 10** **Example:** a) 10 = 5 + ….. b) 10 – 5 = c) 10 = 9 + ….. d) 10 – 9 = e) 10 = 4 + ….. f) 10 – 4 = **Addition and subtraction facts for 100** **Example:** a) 100 = 50 + ….. b) 100 – 50 = c) 100 = 90 + ….. d) 100 – 90 = e) 100 = 40 + ….. f) 100 – 40 = After learners have completed sets of number sentences like those above, learners should be asked what they notice, how this can help them with calculating and how this can help them to check their answers. Once learners can work easily with pairs of multiples of ten that make up 100, the examples can be extended. **More addition and subtraction facts for 100** **Example:** a) 100 = 54 + ….. b) 100 – 54 = c) 100 = 91 + ….. d) 100 – 91 = e) 100 = 47 + ….. f) 100 – 47 = **Addition and subtraction facts for 1 000** Similar exercises can be set for pairs of numbers that make up	

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NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction	**Number range for calculations** Addition and subtraction of whole numbers with at least 5-digit numbers **Calculation techniques** Using a range of techniques to perform and check written and mental calculations with whole numbers including • estimation • adding and subtracting in columns • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations **Properties of whole numbers** • Recognize and use the commutative, associative and distributive properties with whole numbers • O in terms of its additive property • 1 in terms of its multiplicative property **Solving problems** • Solve problems involving whole numbers, including • financial contexts • measurement contexts	Numbers, operations and relationships make up about half the Mathematics that learners do in the Intermediate Phase. Rather than focus on addition and subtraction once in the year, it is recommended that learners revisit addition and subtraction each term in Grade 5. In Term 1, learners should revise and consolidate work done in Grade 4. Learners add and subtract numbers with up to digits. Learners round off numbers to the nearest 10, 100 where appropriate **Learners should do context free calculations and solve problems in contexts** It helps learners to become more confident in and more independent at Mathematics, if they have techniques • to check their solutions themselves • to judge the reasonableness of their solutions **Judging reasonableness of solutions** Learners should be trained to judge the reasonableness of solutions. One way to do this is to estimate their answers before calculating. They can round off the number involved in the calculations. When adding or subtracting -digit numbers, learners can round off to the nearest When adding two numbers that are close to each other e.g. 3 345 and 3 340 learners can use doubling as a way of estimating their answers. **Checking solutions** Learners should know that they can • check an addition calculation by subtraction. **Example:** If 5 362 + 2 488 = 7 848 then 7 848 – 2 488 = 5 362 • check a subtraction calculation by addion **Example**: If 4 687 – 2 134 = 2 544 then 2 544 + 2 134 = 4 687 Using the inverse operation to check solutions is one reason for teaching addition and subtraction simultaneously. Another reason for doing the two operations at the same time is that when learners solve problems, it is sometimes possible to solve the same problem by doing either addition or subtraction **Example**: Veli's shopping costs R163. He pays with a R200 note. How much change does he get"? Some learners may add on from R163 to get R200 e.g. R163 + R7 = R170 and R170 + R30 = R200. This means Veli gets R37 change.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		For the first part of Grade 5 addition and subtraction techniques are still based on breaking down numbers. As the numbers learners work with get larger, learners may begin to lose track of some numbers when they break up numbers to do calculations. Using brackets is helpful to show grouping of numbers and so helps learners keep track of what they are doing. Since the operations in brackets have to be done first, it removes any confusion about the order of operations. Learners thus do not have to learn rules such as BODMAS if brackets are used routinely to indicate which operations have to be done first. • **Breaking down all numbers according to place value parts to add** **Example:** Calculate 5 362 + 2 486 = 5 000 + 300 + 60 + 2 + 2 000 + 400 + 80 + 6 = 5 000 + 2 000 + 300 + 400 + 60 + 80 + 2 + 6 = 7 000 + 700 + 140 + 8 = 7 848 **OR** 2 + 6 = 8 and 60 + 80 = 140 and 300 + 400 = 700 and 5 000 + 2 000 = 7 000 and 7 000 + 700 + 140 + 8 = 7 848 means 5 362 + 2 486 = 7 848 • **Adding on (by breaking down the number to be added)** **Example:** Calculate 5 362 + 2 486 5 362 + 2 000 → 7 362 + 400 → 7 762 + 80 → 7 6 842 + 6 → 7 848 This may get unwieldy if more than numbers are added • **Filling up tens or hundreds by breaking down the number to be added** This can also be called rounding off and compensating.	

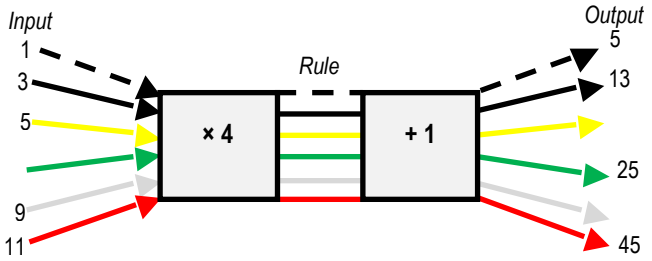
CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		**Example:** Calculate 2 486 + 148 2 486 + 148 = 2 486 + 14 – 14 + 148 = 2 500 + 134 = 2 500 + 100 + 34 = 2 634 This may get unwieldy if more than 2 numbers are added. • **Breaking down both numbers to subtract** **Example:** Calculate 4 687 – 2 143 4 687 – 2 143 = 4 000 + 600 + 80 + 7– 2 000 – 100 – 40 – 3 = (4 000 – 2 000) + (600 – 100) + (80 – 40) + (7 – 3) = 2 000 + 500 + 40 + 4 = 2 544 **OR** 7 – 3 = 4 and 80 – 40 = 40 and 600 – 100 = 500 and 4 000 – 2 000 = 2 000 means 4 687 – 2 143 = 2 544 • **Breaking down all numbers to add using compensation (counterbalance)** Learners cannot subtract 4 from 3 or 80 from 40. Instead of breaking down 743 into 700 + 40 + 3 they will break down 743 into 600 + 130 + 13. Then they can subtract 4 from 13 and 80 from 130. Calculate: 8 743 – 5 684 8 743–5 684=8000+700+40+3–5 000–600–80–4 (**compensate by breaking up 743 into 600 + 130 + 13**) =8000+600+130+13 – 5 000 – 600 – 80 – 4 = 8 000 – 5 000 + 600 – 600 + 130 – 80 + 13 – 4 = 3 000 + 0 + 50 + 9 = 3 059	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		• **Subtracting by breaking down the number to be subtracted** Calculate 4 687 – 2 143 4 687 – 2 000 → 2 687 – 100 → 2 587 – 40 → 2 547 – 3 = 2544 This may get unwieldy if more than 2 numbers are subtracted. • **Using the additive property of zero by compensation to calculate** Calculate 2 696 + 2 387: 2 296+ 2 387=2 296 + 4 – 4+ 2387 =2 300 + 2387 – 4 =2 300 +2 683 = 4 983 This may get unwieldy if more than 2 numbers are added. This method may work better if smaller numbers are added e.g. 2-digit or 3-digit numbers. **Kinds of problems** Summation, Iincrease and decrease, comparison by difference comparison by ratio See the description of problem types at the end of the Grade 5 notes	

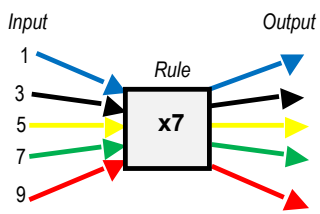
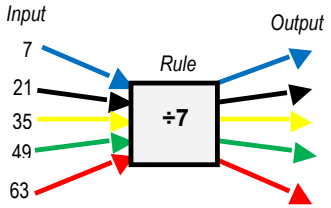
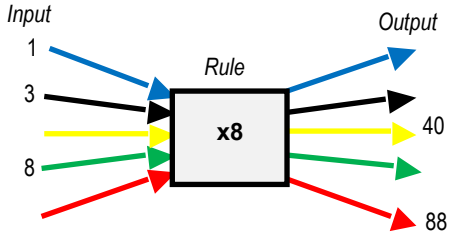
ASSESSMENT:

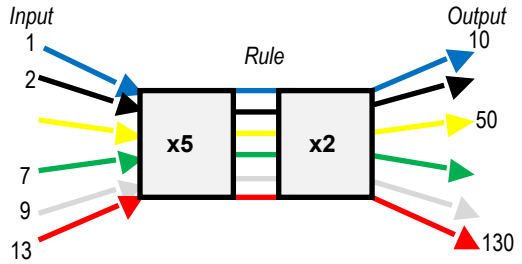
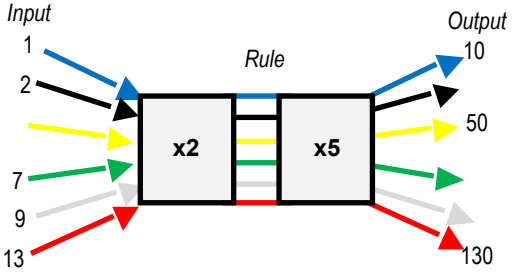
At this stage learners should have been assessed on:

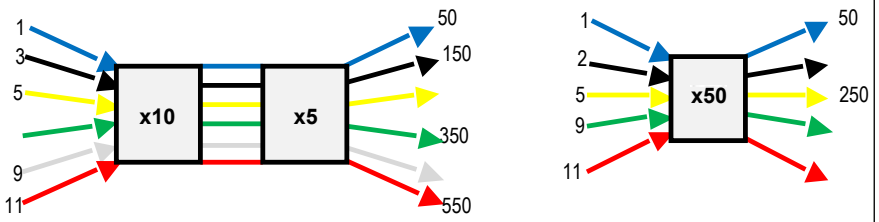
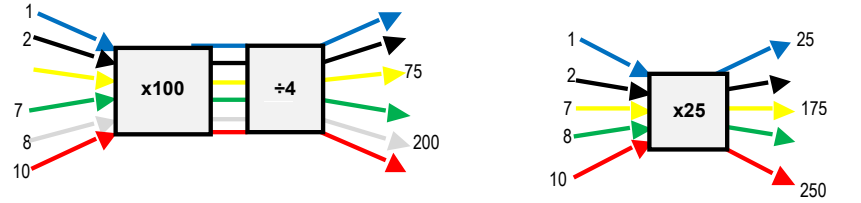
- 4-digit numbers
- adding and subtracting with 4-digit numbers
- working with number sentences

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**	**Investigate and extend patterns** • Investigate and extend numeric patterns looking for relationships or rules of patterns - sequences involving a constant difference or ratio - of learner's own creation • Describe observed relationships or rules in learner's own words **Input and output values** Determine input values, output values and rules for patterns and relationships using flow diagrams **Equivalent forms** Determine equivalence of different descriptions of the same relationship or rule presented • verbally • in a flow diagram • by a number sentence	**Sequences of numbers:** Examples of the above are illustrated in Term 3. **Patterns given in input-output diagrams** Input-output diagrams are sometimes called function diagrams or function machines because they are a way of introducing learners to functional relationships diagrammatically. Functional relationships become very important in the Senior Phase and FET Mathematics. The forms of input-output diagrams that learners in the Intermediate Phase work with most often are Flow diagrams or spidergrams. When using flow diagrams, the correspondence between input and output values should be clear in its representational form i.e. the first input produces the first output values, the second input values produces the second output values, etc. **Example**.  Any input-output diagram can allow learners to see or work out: • the inputs, if the rule is given as well as corresponding output values • the outputs, if the rule is given as well as corresponding input values • the rule, if the rule works for every given input value and its corresponding output value. Tables are a useful way to record patterns in Grades 4 and 5. In Grade 5 it is useful to sometimes include the rule on the table, e.g. **In Term 1** it is recommended that number patterns are used to develop concepts and skills that will be used in multiplication and division. The focus can be on input-output flow diagrams that help learners to understand and learn about	**4 hours**

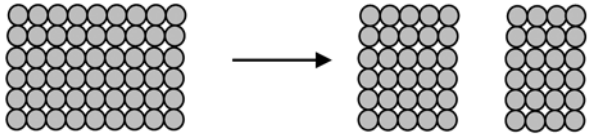
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
x 6	6	12	18		30					60

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		• inverse operation between multiplication and division • multiplication of units by multiples of 10, 100 and 1 000 • the associative property with whole numbers and how we can use this property when we multiply e.g. multiplying by multiples of 10 **Using flow diagrams to focus attention on multiplication and division as inverse operations** Learners are not expected to use the expression “inverse operations”. They are expected to know that • multiplication can be used to do division calculations • multiplication can be used to check division calculations Provide learners with appropriate flow diagrams which they complete and discuss. **Examples:**   After completing a number of similar examples, learners should explain in their own words what they notice. If learners then write pairs of matching number sentences based on the flow diagrams, they can discuss using multiplication to check division and using multiplication to check division. **Further examples** Learners can use the above knowledge to indicate how they could complete the missing input numbers in a flow diagram: 	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		Once learners have completed the flow diagram, they can discuss how they found the missing input numbers from the corresponding output number and rule. This can be consolidated by giving learners pairs of number sentences in which the same numbers are multiplied and divided. **Using flow diagram to help learners develop multiplication and division techniques** **Associative property** Numbers can be multiplied in any order. **Example**:(13 x 5) x 2 = 13 x (5 x 2)   Learners discuss what they notice when they compare the examples. Learners are not required to know the name of the associative property. They are only expected to be able to use it to make calculations easier or use equivalent statements. **Using flow diagrams to help learners think about and use techniques for multiplying by multiples of 10** Learners complete a flow diagram like the one below. They then explain using their own words what they notice when they compare the flow diagrams. They then diiscuss a short way to multiply by	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		***Input*** ***Output*** ***Input*** ***Output***  This can be consolidated by multiplying by other multiples of 10. Similar pairs of flow diagrams can be used, to help learners develop techniques for multiplying by multiples of **Other quick multiplication techniques** can be developed in this way **Examples** ***Input*** ***Output*** ***Input*** ***Output***  Learners can develop fast mental and written techniques based on this. Once learners understand these techniques for multiplying and dividing, further practice can be given in the mental mathematics programme.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1 Whole numbers** Multiplication and division	**Number range for calculations** • multiplication of at least whole -3-digit by 2-digit numbers • division of at least whole 3-digit by 1-digit numbers **Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including: • estimation • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** • Multiples of 2-digit whole numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Properties of whole numbers** • Recognize and use the commutative; associative; distributive properties of whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property	Rather than do all the multiplication and division in one block, it is recommended that learners revisit calculations regularly. In this suggested sequencing of work, learners do multiplication and division in 3 of the 4 terms in Grade 4. Nine hours are allocated to multiplication and division for Term 1. **What is different to Grade 4?** In Term 1, learners revise and consolidate work done in Grade 4 .i.e. • learners multiply at least 2-digit numbers by 2-digit numbers • learners divide at least whole 3-digit by1-digit numbers Learners can recap the properties of multiplication and division and brush up on their skills **Learners should do context free calculations and solve problems in contexts** The following problem types remain important: sharing, grouping, treating groups as units, rate, ratio(see the description of problem types at the end of the Grade 5 notes) Remember, that it helps learners to become more confident in and more independent in Mathematics, if they have techniques • to check their solutions themselves • to judge the reasonableness of their solutions **Judging reasonableness of solutions** Learners should estimate their answers before calculating. They can round off the numbers involved in the calculations. Learners can round off to the nearest when multiplying or dividing with 2-digit numbers **Checking solutions** Learners should know that they can check a division calculation by doing multiplication. **Example:** If 69 ÷ 3 = 23; then 23 x 3 = 69 When learners check a division calculation involving a remainder, they must be taught to first multiply the quotient by the divisor and then to add the remainder **Example:** If 70 ÷ 3 = 23 remainder 1; then 23 x 3 = 69 and 69 + 1 = 70 Using the inverse operation to check solutions is one reason for teaching multiplication and division simulteneously. Another reason for combining multiplication and division is that we almost always use multiplication to solve division problems.	**6 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1 Whole numbers** Multiplication and division	**Solving problems** • Solve problems involving whole numbers, including - financial contexts - measurement contexts • Solve problems involving whole numbers, including: - comparing two or more quantities of the same kind (ratio) - comparing two quantities of different kinds (rate) - grouping and equal sharing with remainders	In Grade 5 learners continue to break up numbers to multiply. There are different ways of doing this. Sometime the numbers involved in the calculation make different methods easier or more difficult. Learners are already able to use the associative and commutative properties to multiply two or more numbers. **Multiplication and the distributive law** One way for learners to understand how and why the distributive property works, is to split arrays and write number sentences to describe the arrays. **Example**  9 x 6 = 5 x 6 + 4 x 6 The distributive law allows you to break down the number and then multiply each part separately. As the numbers learners work with get larger, learners may begin to lose track of some numbers when they break up numbers to do calculations. Using brackets is helpful to show grouping of numbers and so helps learners keep track of what they are doing. Since the operations in brackets have to be done first, it removes any confusion about the order of operations. Learners thus do not have to learn rules such as BODMAS if brackets are used routinely to indicate which operations have to be done first. **Using the distributive property to multiply** 47x 45 47 x (40 + 5) ------→ (breaking up one number) = 47 x40 + 47 x 5 ------→ (using the distributive property) = 1880 + 235 = 2 115 or 47x 50 – 5= 47 x 50– 47 x 5 ------→ (using the distributive property) = 2 350–235 = 2 115	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1 Whole numbers** Multiplication and division		**Example** of checking reasonableness by rounding off 47 x 45 ≈ 47 x 50 ≈ 2 350 by approximating the multiplicand. **or** 54 x 26 ≈ 50 x 45 ≈ 2 250 by approximating the multiplier. **Breaking down numbers into suitable factors to multiply** **Example**: a) Calculate 47 x 12 47 x 12 = 47 x 2 x 6 ------→ (breaking down 12 into its factors) =(47 x 2) x 2 x 3 ------→ (breaking down 6 into its factors) =(94 x 2) x 3 = 188 x 3 =(100 + 80 + 8)x 3 = 300 + 240 + 24 = 564 b) Calculate 53 x 45 53 x 45 = 53 x 9 x 5 ------→ (breaking down 45 into its factors) =(53 x 3) x 3x 5 ------→ (breaking down 9 into its factors) =(159 x 3) x 5 =477 x 5 =(400 + 70 + 7) x 5 = 2 000 + 350 + 35 = 2 385 **Dividing** **Problems** There are two kinds of problems that result in division. It is important that learners experience both of these: • sharing problems: e.g. 6 learners share 32 sweets equally. How many sweets does each learner get.? • grouping: e.g. Samkele has a large packet with 32 sweets. How many smaller packets can she make with 6 sweets each?	

<table>
<tr><th>CONTENT AREA</th><th>TOPICS</th><th>CONCEPTS AND SKILLS</th><th>SOME CLARIFICATION NOTES OR TEACHING GUIDELINES</th><th>DURATION (in hours)</th></tr>
<tr><td>NUMBERS, OPERATIONS AND RELATIONSHIPS</td><td>1.1
Whole numbers
Multiplication
and
division</td><td></td><td>
Some problems and calculations should have a remainder, and some should not.

See the description of problem types at the end of the Grade 5 notes

Learners continue to use what they know about multiplication to do division.

As with Grade 4, learners are not encouraged to treat the digits separately, but rather to consider the number as a whole and to keep the value of the parts of the number in mind. Sometimes in the past, learners were taught to write out the whole times table, which they were encouraged to work out by repeated addition. At other times in the past learners were encouraged to divide by doing repeated subtraction of the divisor. Many learners got lost in the extensive repeated subtraction of the divisor when dividing 3-digit by 1-digit numbers. When dividing 3-digit by 1-digit numbers, it is preferable for learners to work with the easily remembered multiplication facts of multiples of 10 and then doubling and halving. These large groups of numbers can then be subtracted from the number being divided into. In this way learners do fewer subtractions and are more likely to arrive at the correct answer

Example

Claculate 375 ÷ 8

Learners can write out a “clue board” of what they know about multiplying by 8.

• This generally includes multiplying by 10 and multiples of 10
• Multiplying by 5 (halve the multiplying by 10 value).
• Multiplying by 2, 4, 8 (learners get this through doubling).
• Filling in other multiples as they need to use them.

Learners use multiplication and then subtraction to calculate.

<table>
<tr><th>Clue board</th></tr>
<tr><td>10x8 = 80</td></tr>
<tr><td>20x8 = 160</td></tr>
<tr><td>30x8 = 240</td></tr>
<tr><td>40x8 = 320</td></tr>
<tr><td>5x8 = 40</td></tr>
<tr><td>6x8 = 48</td></tr>
<tr><td>3x8 = 24</td></tr>
</table>
<table>
<tr><th>Multiply to get an approximate answer</th><th>Subtract to find the difference</th></tr>
<tr><td>40 x 8 = 320</td><td>375 – 320 = 55</td></tr>
<tr><td>6 x 8 = 48</td><td>55 – 48 = 7</td></tr>
</table>
375 ÷ 8 = 40 + 6 + remainder 7 = 46 remainder 7

Learners should check their calculations by multiplying 46 by 8 and the adding 7.

Example of checking reasonableness by rounding off

With division it makes more sense for learners to round off the dividend to a multiple of the divisor e.g. 400 ÷ 8 = 50 and 320 ÷ 8 = 40. So the answer should lie between 40 and 50.
</td><td></td></tr>
</table>

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.4** **Time**	**Reading time and time instruments** Read, tell and write time in 12-hour and 24-hour formats on both analogue and digital instruments in • hours • minutes • seconds Instruments include clocks, watches and stopwatches **Reading calendars** **Calculations and problem solving related to time include** Calculation of time intervals where time is given in • seconds and/or minutes • minutes and/or hours • hours and/or days • days and/or weeks and/or months • months and/or years • years and/or decades **History of time** Know how time was measured and expressed in ancient times.	**What is different to Grade 4?** Stopwatches are introduced. Learners can either use stopwatches that occur as single instruments, or stopwatches on cell phones or wrist watches. Learners continue to read, record and calculate time in -hour and -hour formats and to work with analogue and digital instruments. This is practised regularly. Once learners have been taught to tell the time, it can be practised during the mental Mathematics section of the lesson, and frequently at other times during the day. Learners continue to read calendars **Calculations and problem-solving related to time** Decades are introduced. Calculations should be limited to whole numbers and fractions.	**6 hours**

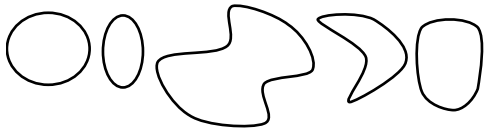
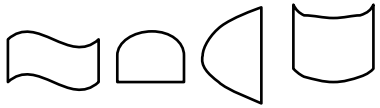
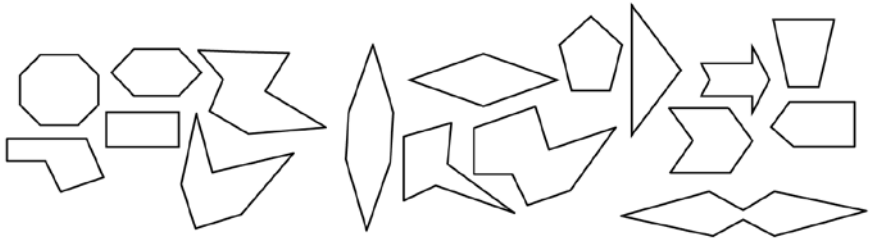
ASSESSMENT:

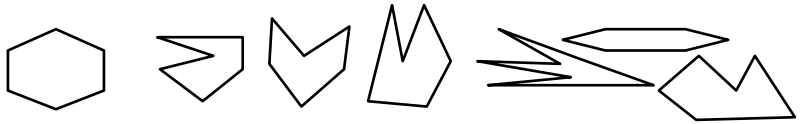
At this stage learners should have been assessed on:

- multiplication (2-digit by 2-digit numbers) and division (3-digit by 1-digit numbers)
- time
- 2-D shapes including identifying right angles

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
DATA HANDLING	**5.1** **Collecting and organising data**	• Collect data using tally marks and tables for recording • Order data from smallest group to largest group	**What is different to Grade 4?** The following are new in Grade 5 • ordering data sets • analyzing data not only according to categories, but also taking into account contexts and sources of data • analyzing ungrouped numerical data sets to find the mode • pictographs which show a many-to-one correspondence • conclusions and predictions when analysing and summarising data Teachers in this phase should ensure that different topics are chosen for data collection and analysis in each of the grades. **Complete data cycle including drawing bar graph: context personal data** The complete data cycle includes asking a question, collecting, organising, representing, analyzing,interpreting data and reporting on the data. Work through whole data cycle to make individual bar graph using contexts that relate to themselves, their class, their school or their family. Suitable topics include: • favourite sports / favourite movies / favourite music / favourite TV programmes / foods or cool drinks/ favourite colours, etc. • models/makes of cars passing the school grounds **Analysing graphs** Analysing graphs on environmental or socio-economic contexts by answering questions on graphs. Both graphs and questions to be provided by teacher or textbook. Learners should work with at least • 2 pie graphs where the information is given in fractions and not percentages • 1 pictograph with a many-to-one representation • 1 bar graph • Suitable topics include • quantities of materials recycled in the town, province, country • quantities of recycling materials collected by schools around the country • sources of lighting and heating in SA • kinds of toilets in SA homes • kinds of homes in SA	**10 hours**
	5.2 **Representing data**	Draw a variety of graphs to display and interpret data including • pictographs (many-to-one correspondence) • bar graphs		
	5.3 **Analysing, interpreting and reporting data**	Critically read and interpret data represented in • words • pictographs • bar graphs • pie charts Analyse data by answering questions related to • data categories • data sources and contexts Summarise data verbally and in short written paragraphs that include • drawing conclusions about the data • making predictions based on the data Examine ungrouped numerical data to determine the most frequently occurring score in the data set (mode)		

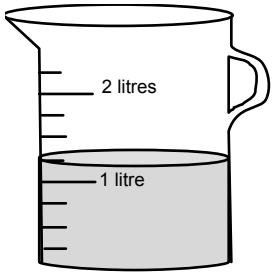
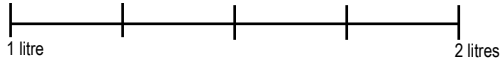
CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
			Drawing pictographs: context socio-economic data **This is recommended as the Maths project for Grade 5** Learners should be given socio-economic data, preferably national or regional, so that the numbers are large. This can be provided as unstructured data, in a paragraph, in a list or in a table or tally. Learners sort and order the data and draw a pictograph with many-to-one representation. They then complete the rest of the data cycle. Suitable topics include: • Facilities at schools in SA • Sources of water for families in SA e.g. piped to house, piped to yard, piped to communal source outside the property, borehole, spring, etc. • what source/sources of lighting for families in SA, e.g. electricity, candles, paraffin, etc. • kinds of homes in SA	
Assessment point Recommended form of assessment: **Project**				

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SPACE AND SHAPE	**3.1** **2-D shapes**	**Shapes learners need to know and name** • Regular and irregular polygons - triangles, squares, rectangles, other quadrilaterals, pentagons, hexagons, heptagons, • Circles • Similarities and differences between squares and rectangles **Characteristics learners use to distinguish, describe, sort and compare shapes** • Straight and / curved sides • Number of sides • Length of sides • Angles: limited to - right angles - angles smaller than right angles - angles greater than right angles **Further activities to focus learners on charatceristics of shapes** Draw 2-D shapes on grid paper **Angles** limited to • right angles • angles smaller than right angles • Angles greater than right angles	**What is different to Grade 4?** • Heptagons are a new shape. • Learners also examine the length of the sides of shapes; so that they can describe the differences between squares and rectangles. • Learners start to focus on angle. In Grade 5 the focus is on right angles. **Shapes and their distinguishing** characteristics There are **four ways** in which learners distinguish shapes in Grade 5. 1. By checking whether they have straight or curved sides. Two dimensional shapes can be grouped as follows: • *Closed shapes with curved sides only*: Examples  The only 2-D shape that has curved sides that learners are expected to name is the circle. They should, however, be exposed to other shapes with curved sides which they are not expected to name • *Closed shapes with curved and straight sides*: Examples  Learners are not expected to name any of these shapes. • *Closed shapes with straight sides only*: Examples  2. When looking at the group of shapes with straight sides, learners group them according to the number of sides. A polygon is a closed shape with only straight sides. Learners are not expected to know the name polygon.	**7 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SPACE AND SHAPE	**3.1** **2-D shapes**		**Polygons** A regular polygon is a straight sided closed shape that has all its sides the same length and all its angles the same size. Learners do not have to know the terms “regular” and “irregular”. Learners should be able to identify polygons according to their number of sides. They need to be able to identify any heptagon, hexagon or pentagon. Examples of heptagons/septagons  Examples of hexagons  **Examples of** pentagons  Learners need to know that all closed shapes with straight sides are called quadrilaterals. They need to be able to identify and name, squares and rectangles, for other quadrilaterals they use the group name, quadrilateral in Grade 5 Examples of quadrilaterals.  Learners should be exposed to a range of different triangles, but are not expected to name types of triangles in Grade 5	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SPACE AND SHAPE	**3.1** **2-D shapes**		3. Learners distinguish shapes by looking at the length of the sides. Learners differentiate between squares and rectangles by looking at the lengths of the sides. However, learners can also discuss the lengths of sides of other shapes e.g. a learner may say that the following shape is a pentagon whose sides are not all the same length  4. Learners distinguish shapes by looking at the size of their angles. Here learners need to know how to identify a right angle (see notes below). They check whether shapes are rectangles or squares by checking whether all their angles are right angles. **Angles** In the Intermediate Phase learners measure angles informally. They do not use protractors or discuss angles in terms of degrees. In Grade 5 learners only need to know what a right angle looks like. All other angles are described as either bigger or smaller than right angles. Learners can be introduced to angles as a **'how much turning has taken place between the arms or sides of the angle'**. Here a right angle is equivalent to a quarter turn or revolution. Learners use informal angle measurers such as the corner of a sheet of paper or a page folded to make a right angle, to check whether shapes or objects have right angles. Learners should first learn characteristics of each shape, before discussing comparisons between shapes. **Activities to focus learners on characteristics of shapes** Most commercially available sets of 2-D shapes do not show irregular shapes. They are however easy to cut out of cardboard. Learners can draw irregular shapes on grid paper or if they have geoboards, they can create irregular shapes on geoboards. Learners can also combine cut-out or plastic shape to create composite irregular shapes Examples  **Written exercises and recording** Learners should do practical work with concrete apparatus but they should also do written exercises.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.3** **Capacity/ Volume**	**Practical measuring of 3-D objects by** estimating measuring recording comparing and ordering **Measuring instruments** measuring spoons, measuring cups, measuring jugs **Units** millilitre (ml) litre (l) **Calculations and problem-solving related to capacity / volume include** solving problems in contexts using capacity/volume converting between litres and millilitres limited to examples with whole numbers and fractions	**What is capacity? What is volume?** **Capacity** is the amount of a substance that an object can hold or the amount of space inside the object. **Volume** is the amount of space that an object occupies. A bottle can have a 1 litre capacity, but it may not be filled to its full capacity. It could for example, only contain a volume of 250ml. In Grade 5 learners work with the same units of capacity that they worked with in Grade 4. They also work with the same measuring instruments. Learners need to: • consolidate their sense of how much 1 litre is • consolidate their sense of how much 1 millilitre is • understand and know the relationship between litres and millilitres. Check whether learners have a sense of which units and instruments are appropriate for measuring which various capacities. For example learners need to know which units to use to state the capacity of • a kettle • a petrol tank • a baby's milk bottle Learners should have a sense of which instruments are appropriate for measuring various capacities. For example they need to know what instruments to use to measure • liquid medicine to give to a baby • milk for a pudding recipe • water to dilute a packet of powdered cool drink **Measuring capacity and reading capacity measuring instruments** Learners find it easy to measure with measuring spoons or measuring cups, because this just requires filling them and pouring out the contents. Measuring with calibrated measuring jugs or other instruments with numbered and un-numbered gradation lines is more difficult. Learners need to be taught the skills of • where to stand to read a measuring jug correctly • how to read the numbered gradation lines and to calculate what the un-numbered gradation lines mean.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.3** **Capacity/ Volume**		Learners need to read • different kinds of measuring jugs • measuring jugs on which the numbered intervals, gradation lines or calibration represent different levels of the content. • measuring jugs on which there are a different number of un-numbered intervals within each numbered interval. Learners need practice with examples in which the numbered intervals are divided into - 2 un-numbered intervals - 4 un-numbered intervals - 5 un-numbered intervals - 10 un-numbered intervals **Example:** Here the numbered gradation lines on the jug shows 1 litre measurement readings. Think of the gradations as a number line.  There are 4 spaces between each litre.  This means that each small space shows 1 000ml ÷ 4 = 250ml The liquid is filled to space above litre i.e. 1 000ml + 250ml = 1 250ml It is sometimes easier and cheaper to get a range of syringes with calibrated gradation lines, than it is to get a range of measuring jugs. Learners will learn the same measurement reading skills if they work with syringes rather than jugs.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.3** **Capacity/ Volume**		**Compare capacities in millilitres and litres** Learners should sequence containers marked in millilitres and litres. Here learners need to translate the decimal numbers on some packaging into fractions e.g. 1,5 litres of cool drink is the same as $1\frac{1}{2}$ litres of cool drink. One should also choose examples that allow learners to realize that the height of a container is not directly proportional to the capacity and that learners need to take into account the diameter of the container. **Recording capacities** Because learners will only work with decimal fractions in Grade 6, they should record capacities as • litres only e.g. 5 litres • millilitres only e.g. 250ml • litres and millilitres together e.g. 2 litres and 80 millilitres • litres and fractional parts of litres e.g. $2\frac{3}{4}$ litres • since learners will be reading half litres in decimal form off some packaging they can also write half litres in the decimal form, but this is not a requirement in this grade. **Calculations (including conversions) and problem-solving** Measurement provides a context in which to practise skills acquired in Numbers, Operations and Relationships. The skills, operations and number ranges required are appropriate for Term 1. By the end of the year the number ranges and operations can be increased to include everything that is covered under *Numbers, Operations and Relationships.* **Estimate and calculate** using millilitres and litres • rounding numbers up or down to the most appropriate unit of capacity • rounding off to10, 100, 1 000 (Doing rounding off when reading measuring instruments can help learners to understand the reasons for rounding up or down) • addition and subtraction of up to 4-digit numbers • multiplication up to 2-digit by 2-digit numbers • division up to 3-digit by 1-digit numbers • add fractions in measurement contexts (using only halves, thirds, quarters, fifths, sixths, sevenths and eighths)	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.3** **Capacity/ Volume**		**Solve problems** relating to capacity including • rate problems (especially price per litre) • ratio problems (e.g. increasing ingredients in a recipe by fixed ratios, or calculations where ingredients are mixed in a fixed ratio e.g. 1 part to 4 parts) **Convert** between units: $ml \leftrightarrow l$ Converting between litres and millilitres provides a context for practising multiplication and dividision by 1 000 . Conversions should be limited to whole numbers and fractions (given only as halves, thirds, quarters, fifths, sixths, sevenths, eighths). Conversions can also include converting the decimal half to the common fraction form of half. In Grade 5 learners do not calculate with decimals. When doing division they sometimes have a remainder e.g. 37 ÷ 4 = 9 remainder 1. Similarly when converting between units they may state their answers in a combination of units e.g. • 3 750 ml = 2 litres and 750millilitres • $4\frac{1}{2}$ litres = 4 500millilitres	
ASSESSMENT: At this stage learners should have been assessed on: • data handling • capacity				
		REVISION		**5 hours**

GRADE 5 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Mental calculations involving**: • Addition and subtraction facts of: - units - multiples of 10 - multiples of 100 - multiples of 1 000 • Multiplication of whole numbers to at least 10 x 10 • Multiplication facts of: - units by multiples of 10 - units by multiples of 100 - units by multiples of 1 000 - units by multiples of 10 000 **Number range for counting, ordering, comparing and representing, and place value of digits** • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 6-digit numbers • Represent odd and even numbers to at least 1 000 • Recognize the place value of digits in whole numbers to at least 6-digit numbers. • Round off to the nearest 5, 10, 100, 1 000	The mental Mathematics programme should be developed systematically over the year. Learners should not simply be asked to do random calculations each day. As learners cover topics and develop calculating techniques in the main part of the lesson, so aspects of these can be incorporated into the mental Mathematics programme: concepts and skills are developed through the main lesson, and then practised with smaller number ranges in the mental Mathematics programme. The mental Mathematics should systematically develop three aspects of learners' number knowledge • number facts - number bonds: addition and subtraction facts of ◊ units ◊ multiples of 10 ◊ multiples of 100 ◊ multiples of 1 000 - times tables up to 10 x 10 • calculation techniques - doubling and halving - using multiplication to do division - multiplying by 10, 100 and 1 000 - multiplying by multiples or 10, 100 and 1 000 - dividing by 10, 100 and 1 000 - building up and breaking down numbers - rounding off and compensating: rounding off to 5, 10, 100 and 1 000 - Adding and subtracting of units, multiples of 10, 100 and 1 000 to/from any 5-digit number • number concept - counting forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and at least 10 000. - ordering and comparing up to 6-digit numbers - place value for up to 6-digit numbers - building up and breaking down numbers - odd and even numbers - multiples - factors	**10 minutes every day**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including: • estimation • adding and subtracting in columns • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** • Multiples of 2-digits whole numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Properties of whole numbers** • Recognize and use the commutative; associative; distributive properties with whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property	Some mental Mathematics can be done without apparatus, but it is often useful to do mental Mathematics with apparatus **Recommended apparatus** • number lines including structured and unstructured number lines • a number grid • place value cards • counting beads	

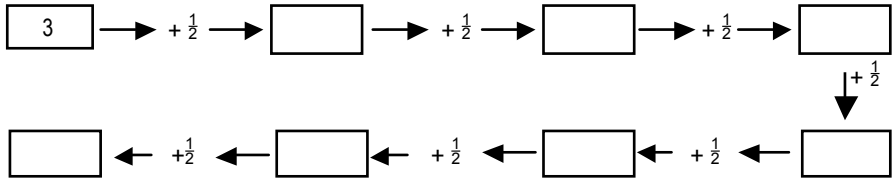
CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Counting, ordering, comparing, representing and place value of digits	Number range for counting, ordering, representing and place value of digits • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 6-digit numbers • Represent odd and even numbers to at least1 000 • Recognize the place value of digits in whole numbers to at least 6-digit numbers. • Rounding off to the nearest 5, 10, 100 or 1000	What is different to Term 1 • counting number range increased – learners count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and at least 10 000. • learners also count in fractions (after the topic of fractions has been covered in the main lesson – see comment in that section about counting in fractions) • Rounding off to the nearest 10, 100, 1 000 • number range for place value, ordering, comparing and representing numbers increased to 6 digits See further notes in Term 1, but be aware that number ranges have increased in Term 2. The increased number ranges are shown in the column on the left. All work learnt here can be practiced throughout the year in the mental Mathematics programme.	**1 Hour**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction	**Number range for calculations** Addition and subtraction of whole numbers with at least 5-digit numbers **Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including: • estimation • adding and subtracting in columns • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations **Properties of whole numbers** • Recognize and use the commutative; associative; distributive properties of whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property **Solving problems** Solve problems involving whole numbers, including the following: • financial contexts • measurement contexts	What is different to Term 1? • In Term 2, learners add and subtract numbers with up to 5 digits. • Rounding off as a way of estimating answers to include rounding off to the nearest 1 000 as well as rounding off to the nearest 10, 100 Learners should solve problems in contexts and do context free calculations As number ranges get larger many learners tend to lose the parts of the number that they break up, when they try to combine again. This is especially the case when more than two 5-digit numbers are being added. It is for this reason that column addition and column subtraction are introduced in Grade 5. In Term 2 one can still encourage learners to expand the numbers as they write them in columns. In Term 1, an option of a column method was provided, but it consisted of putting different place values into different rows. Learners continue to: • check their solutions themselves e.g. by using the inverse operation • judge the reasonableness of their solutions e.g. by rounding off numbers and estimating answers **Example:** Calculate: 56 423 +7 581 +21 479 • Breaking down all the numbers to add Adding in a row (horizontally) 50 000+6 000+400+20+3+7 000+500+80+1+20 000+1 000+400 +70+9 = 50 000+20 000+ 6 000+7 000+1 000+400+500 +4 00+20+ 80 +70+ 3+1+9 = 70 000 + 14 000 + 1 300 + 170 + 14 = 70 000 + 10 000 + 4 000 + 1 000 + 300 + 100 + 70 + 10 + 4 = 80 000 + 5 000 + 400 + 80+ 4 = 85484 The horizontal method may get unwieldy when more than two 5-digit numbers are added. The alternative is to use the expanded vertical method.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		• Expanded vertical method 56 423 = 50 000 + 6 000 + 400 + 20 + + 7 581 = 7 000 + 500 + 80 + 1 + 21 479 = 20 000+ 1 000 + 400 + 70 + 9 70 000+ 14 000 + 1300 + 170 + 10 = 70 000 + 10 000 + 5 000 + 400 + 80+ 4 = 85484 • Adding on (by breaking down the number to be added) Calculate: 56 423 + 7 581 56 423 + 7 000 → 63 423 + 500 → 63 923 + 80 → 64 003 + 1 → 64 004 This tends to work better if only two numbers are added. If a third or fourth number is added, they can be broken up and added one at a time, but the expanded column method is more efficient. • Breaking down all the numbers cording to place value parts to subtract using compensation (counterbalance) **Example**: Calculate: 8 743 – 5 684 8 743 – 5 684 = 8 000 + 700 + 40 + 3 – 5 000 – 600 – 80 – 4 = 8 000 + 600 + 130 + 13 – 5 000 – 600 – 80 – 4 (by breaking up 743 into 600 + 130 + 13) = 8 000 – 5 000 + 600 – 600 + 130 – 80 + 13 – 4 = 3 000 + 0 + 50 = 3 059 • Breaking down numbers and using the expanded column method Calculate: 98 743 – 45 684 Learners cannot subtract 4 from 3 or 80 from 40. Instead of breaking down 743 into 700 + 40 + 3 they will break down 743 into 600 + 130 + 13. Then they can subtract 4 from 13 and 80 from 130.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		600 130 13 9 8 7 4 3 = 90 000+ 8 000 + 700 + 40 + 3 – 4 5 6 8 4 40 000+ 5 000 + 600 + 80 + 4 50 000+ 3 000 + 0 + 50 + 9 = 53 059 • Subtracting by breaking down number to be subtracted Calculate 74 687 – 52 143 74 687 – 50 000→24 687 – 2 000 → 22 687 – 100 → 22 587 – 40 → 22 547 – 3 = 22544 **or** 25 746 – 10 000 – 4 000 – 500 – 30 – 2 = (15 746 – 4 000) – 500 – 30 – 2 = (11 746 – 500) – 30 – 2 = (11 246 – 30) – 2 = 11 216 – 2 = 11 214 This tends to work better if only one number is subtracted from another. If a second or third number is subtracted, they can be broken up and subtracted one at a time, but the expanded column method is more efficient. Problems Summation, increase and decrease, comparison by difference; comparison by ratio See the description of problem types at the end of the grade notes	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2** **Common fractions**	**Concepts, skills and number range** • Describing and ordering fractions • Count forwards and backwards in fractions • Compare and order common fractions to at least twelfths **Calculations with fractions** • Addition of common fractions with the same denominator • Recognize, describe and use the equivalence of division and fractions **Solving problems** Solve problems in contexts involving common fractions, including grouping and sharing **Equivalent forms:** Recognize and use equivalent forms of common fractions with denominators which are multiples of each other.	What is different to Grade 4? • Ninths, tenths, elevenths and twelfths • Learners count in fractions • Subtraction of fractions with the same denominators • Addition and subtraction of mixed numbers • Fractions of whole numbers that result in whole numbers Most of the new work mentioned above can be developed in Terms 3 and 4. However, learners can begin to count in fractions Learners should develop the concept of fractions in a variety of ways. Problem solving contexts can help learners to understand many ways of thinking about fractions. A variety of problems should be given to learners. See the types of fractions problems stated at the end of the grade notes. Learners can also work with apparatus and diagrams. Different diagrams or apparatus develop different ways of thinking about fractions. • Region or area models develop the concept of fractions as part of a whole. If used in particular ways they can also develop the concept of fraction as a measure. Examples of area models include circles cut into fraction pieces (or diagrams of pies), rectangles or other geometric shapes divided into fraction pieces (paper folding), fractions using square or dotty grid paper, geoboards. • Length or measurement models can be used to develop the concept of fractions as part of a whole and if used in particular ways also fraction as a measure. Examples of length models include fraction strips, Cuisenaire rods, number lines. • Set models develop the concept of fraction of a collection of objects (and can lay the basis for thinking about a fraction of a number e.g. $\frac{1}{3}$ of 12) Examples of set models include counters of any kind in different arrangements. Learners should not only work with one kind of model, because this can limit their understanding of fractions. For example fractions in diagram forms should include region model (circles and other geometric shapes divided into fraction parts), length models (including number lines) and set models (which show collections of objects). In Term 2 learners should revise and consolidate what they learned about fractions in Grade 4. This is described below, but learners can also count in fractions.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2** **Common fractions**		Counting in fractions can happen • as learners place down fraction pieces • on the number line • or in number chains like the one shown below.  Learners should solve problems as well as work with apparatus and diagrams (area, length and set models) to ensure that they • understand the relationship between fractions and division i.e. if you share equally amongst 3 learners you will be making thirds • are able to name fractions (terminology like "3 over 4" should be avoided as it tends to encourage learners to think about each fraction as two different numbers, rather than $\frac{3}{4}$ being a number which is greater than $\frac{1}{2}$ but less than 1). Learners should, through work with apparatus, diagrams and solving problems, deal with at least the list of fractions required in Grade 4. This should be extended to include the full range of fractions required in Grade 5. The initial focus on fractions should deal with understanding the concept of a fraction. Once learners have consolidated this they can move on to working with equivalence, then comparing and then calculating with fractions. **Equivalence, comparing and ordering** Equivalence should be approached using apparatus, diagrams or problem contexts. Learners are not expected to be able to give equivalent fractions in symbolic (number) form without having diagrams to which they can refer or a problem context in which to make sense of the equivalence. Once learners are comfortable with equivalence, it is easy for them to compare and order fractions. **Calculations with fractions:** Calculations with fractions in the first term can focus on • making fractions through grouping or sharing which is linked with understanding the relationship between division and fractions e.g. If children share sweets equally, they will each get $\frac{1}{5}$ of the sweets • adding fractions with the same denominators	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2 Common fractions**		Calculations as with other aspects of fractions should be developed either through problem contexts or with the use of apparatus or diagrams. Learners should be given problem contexts in which they need to add fraction parts. Learners should also be given either fraction pieces to count e.g. $\frac{3}{8} + \frac{4}{8}$ can be done by counting out and counting on in eighths with apparatus or by colouring in diagrams or by "hopping" in eighths on a number line.	

ASSESSMENT:

At this stage learners should have been assessed on:

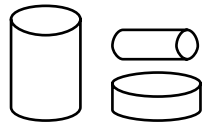
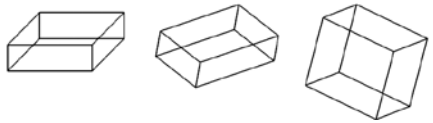
- 6-digit numbers
- adding and subtracting up to 5-digit numbers
- fractions

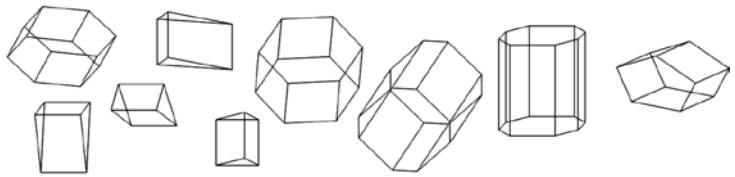
CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.1 Length**	**Practical measuring of 2-D shapes and 3-D objects by:** estimating measuring recording comparing and ordering **Measuring instruments** rulers, metre sticks, tape measures, trundle wheels **Units:** millimetres (mm), centimetres (cm), metres (m), kilometres (km) Calculations and problem-solving related to length Solve problems in context related to length Conversions include converting between any of the following units: millimetres (mm), centimetres (cm), metres (m) and kilometres (km) Conversions limited to whole numbers and fractions	In Grade 5 learners work with the same units of length that they worked with in Grade 4. They also work with the same measuring instruments. Check whether learners have a sense of which units and instruments are appropriate for measuring various lengths, heights and distances Learners should have a sense of which units are appropriate for measuring different lengths. For example, they need to know which units to use to state • the length and width of a desk • the distance to the next town • the length of a nail Learners should have a sense of which instruments are appropriate for measuring different lengths. For example,they need to know which instruments to use to measure: • the length and width of a desk • the length of the classroom • the length of a rugby field Reading instruments for measuring lengths Learners should measure lengths using • rulers (mm, cm) • metre sticks (m) • tape measures (m, cm, mm) • trundle wheels (m) Learners find rulers easy to use for measuring. This is because • centimetres are always numbered • there are always 10mm divisions in a centimetre. Stating and recording length measurements In Grade 5 learners continue to record their measurements using rulers, as millimetres or centimetres or millimetres and centimetres e.g. the pencil is 11 centimetres and 3 millimetres long. They can sometimes record their measurements in centimetres and fractions of centimetres e.g. the eraser is $2\frac{1}{2}\ cm$ long. This is easy to do because on a ruler, the 5th millimetre gradation line is normally longer. Once learners have learned, from reading commercial mass and capacity packaging, that $2\frac{1}{2}$ is the same as 2,5 , they will also be able to use the decimal ',5' in their recording i.e. 2,5cm long.	**7 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.1 Length**		Tape measures that are longer than 1m and 2m should also be used e.g. builder tapes or surveyor tapes can be more than 10 metres. The longer measuring tapes are more difficult to use. Learners cannot only read off the number corresponding with the final measurement. They also need to know for how many metres they have unrolled the tape, e.g, the distance may be 4m and 78cm, but the tape may only show the number 78. When using the longer longer measuring tapes, estimation becomes even more important. **Compare and order lengths up to 6 digits in mm, cm, m, km** In the Intermediate Phase learners need to work with drawings of objects with specified lengths, or written descriptions of objects with specified lengths. At first learners can compare length given in the same units, but once they know how to convert between units, they can compare lengths and heights of objects which are specified in different units **Calculations (including conversions) and problem-solving** Measurement provides a context in which to practise skills acquired in Numbers, Operations and Relationships. The skills, operations and number ranges required are given below. **Estimate and calculate using** • Round numbers up or down to the appropriate unit of length • Rounding off to 5, 10, 100 and1 000 • Addition and subtraction up to 5-digit numbers • Multiplication: 3-digit number by 2-digit number • Division: 3-digit number by 2-digit number • Add common fractions in the context of measurement (using only halves, thirds, quarters, fifths, sixths, sevenths and eighths) By the end of the year the number ranges and operations can be increased to include everything that is covered under *Numbers, Operations and Relationships.* Solve problems relating to distance and length including rate and ratio problems. Conversions between units $mm \leftrightarrow cm$ $cm \leftrightarrow m$ $m \leftrightarrow km$ Converting between the units of measurement above provides a context for practising multiplication and division by 10, 100, 1 000 Conversions should be limited to whole numbers and fractions given only as halves / thirds / quarters / fifths / sixths / sevenths / eighths.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.1 Length**		In Grade 5 learners do not calculate using decimals. When doing division there will sometimes be a remainder in the answer, e.g. 37 ÷ 4 = 9 remainder 1. Similarly when converting between units, answers may be stated in a combination of units e.g. • $35cm$ = $3cm$ and $5mm$ or $3\frac{1}{2}cm$ • $526cm$ = $5m$ and $26cm$ • $2\ 500m$ = $2m$ and $500cm$ • $4\ \frac{1}{2}\ km$ = $4\ 500m$	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1 Whole numbers** Multiplication	**Number range for calculations** Multiplication of at least whole 3-digit by 2-digit numbers **Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including: • estimation • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving **Number range for multiples and factors** • Multiples of 2-digits whole numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Properties of whole numbers** • Recognize and use the commutative; associative and distributive properties with whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property **Solving problems** • Solve problems involving whole numbers, including - financial contexts - measurement contexts • Solve problems involving whole numbers, including comparing two or more quantities of the same kind (ratio)	What is different to Term 1? In Term 1, learners multiply 2-digit by 2-digit numbers. In Term 2, learners multiply 3-digit by 2-digit numbers Learners should do context free calculations and solve problems in contexts Focus on multiples and factors, so that learners' knowledge of multiples and factors can be used in multiplication. Learners should continue to judge the reasonableness of their solutions e.g. by estimating before calculating using rounding off to the nearest 10, 100, 1 000 **Using the distributive property to multiply** 547 x (40 + 5) = 547 x40 + 547 x 5 ⟶ (using the distributive property) = 21 880 + 2 735 = 24 615 **or** 547x (50 – 5) = 547 x 50 – 547 x5 ⟶ (using the distributive property) = 27 350 – 2 735 = 24 615 Using rounding-off to estimate and judge reasonableness of answer 547 x 45 = 547 x 50 ≈ 27 350 Breaking down numbers into factors to multiply Example: Calculate 547 x 42 547 x 42 = 547 x 7 x 6 = 547 x 2 x 3 x 7 = 1 094 x 3 x 7 = 3 282 x 7 = (7 x 3 000) + (7 x 200) + (7 x 80) + (7 x 2) = 21 000 + 1 400 + 560 + 14 = 22 974 Notice that as numbers get larger, learners will tend to use more than one calculating technique at the same time e.g. in the above example the factors of the multiplier are used but the multiplicant is split into place value parts. Kinds of problems Treating groups as units/rate See the description of problem types at the end of the Grade 5 notes	**6 hours**

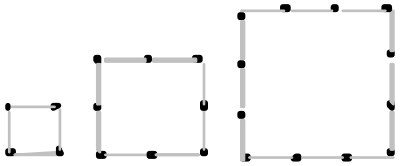
CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SPACE AND SHAPE	**3.2** **Properties of 3-D objects**	Objects learners need to know and name • rectangular prisms and other prisms • cubes • cylinders • cones • pyramids • similarities and differences between cubes and rectangular prisms Charactersistics learners use to distinguish, describe, sort and compare shapes • shape of faces • number of faces • flat and curved surfaces • Further activities to focus learners on charactersistics of objects • make 3-D models using cut out polygons • cutting open boxes to trace and describe their nets	What is different to Grade 4? • cubes are introduced • learners work with prisms as a group for the first time • in the same way that learners distinguish between rectangles and squares, using the lengths of their sides, so they distinguish between cubes and rectangular prisms using the shapes of their faces • learners count the number of faces on 3-D objects and use this as part of their descriptions of objects Objects and their distinguishing charactersistics There are three ways in which learners distinguish 3-D objects in Grade 5 1. By checking whether they have flat or curved surfaces. Three dimensional objects can be grouped as follows: • Objects with a curved surface only: **Example: sphere**  • *Objects with flat and curved surfaces* **Examples:** **cones** **cylinders**   • *Objects with only flat surfaces.* In Grade 5 learners only identify and name **rectangular prisms** **cubes:**  	**6 Hours**

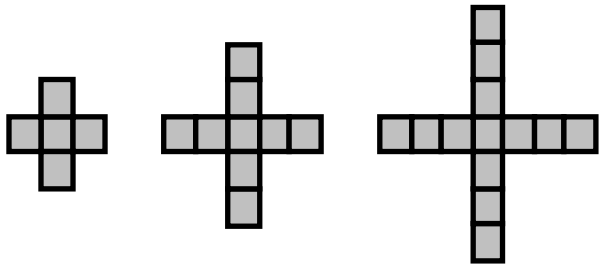
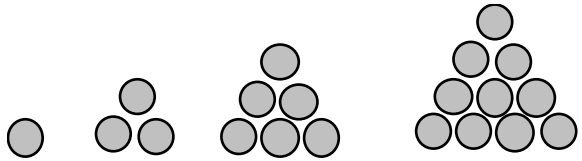
CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SPACE AND SHAPE	**3.2** **Properties of 3-D objects**		**other prisms**  **pyramids:** square based pyramid.  2. When looking at the group of objects with flat surfaces, learners should know that the flat surfaces of a 3-D object are called **faces.** They describe these objects according to the kinds of 2-D shapes that make up the flat surfaces e.g. the faces of a rectangular prism can all be rectangles or some can be squares. Square-based pyramids have one square face and the other faces are triangles. 3. Learners can also look for right angles on the faces of objects. If the object that they are examining has faces with only right angles, then it will be either a cube or a rectangular prism. Further activities to focus learners on characteristics of objects: Learners create 3-D objects by putting together cut-out polygons, which helps to focus attention on the shapes of the faces of the 3-D objects. Learners cut open boxes to make nets. They describe the nets of the boxes. Interpreting drawings of 3-D objects and written exercises Learners need to work with real objects. However they also need to do written exercises on 3-D objects. Interpreting pictures of 3-D objects is more difficult than working with the real objects. Learners should practice interpreting drawings of 3-D objects. They should identify and name 3-D objects in drawings and identify everyday objects that look like geometric objects e.g. a milk carton looks like a rectangular prisms. Describe the surfaces of objects when shown drawing of 3-D objects, match the 2-D shapes that have the same shape as the faces of 3-D objects, match nets of rectangular prisms to the appropriate drawing of rectangular prisms and compare 3-D objects from drawings.	

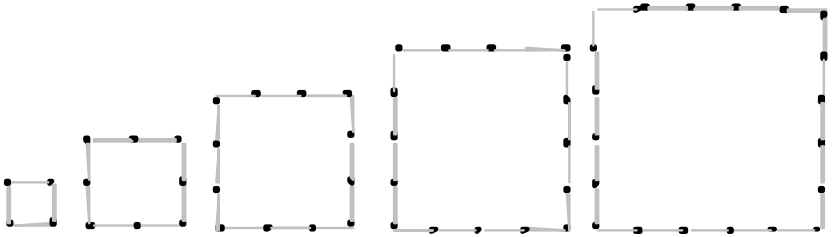
ASSESSMENT:

At this stage learnes should have been assessed on:

- length
- multiplication of up to 3-digit numbers by 2-digit numbers
- 3-D objects

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.2** **Geometric patterns**	**Investigate and extend patterns** • Investigate and extend geometric patterns looking for relationships or rules of patterns - represented in physical or diagram form - sequences involving a constant difference - of learner's own creation • Describe observed relationships or rules in learner's own words **Input and output values** Determine input values, output values and rules for the patterns and relationships using flow diagrams **Equivalent forms** Determine equivalence of different descriptions of the same relationship or rule presented • verbally • in a flow diagram • by a number sentence	In Geometric Patterns in the Intermediate Phase the aim is for learners to get more practice in working with geometric patterns each year. Learners continue to do the activities they did in Grade 4. They just learn to do them more quickly. Learners no longer work with simple repeating patterns. Learners work with patterns that are made from 2-D shapes and 3-D objects or from drawings / diagrams of these shapes and objects. In Patterns, Functions and Algebra we choose geometric patterns that can be re-described using a number pattern, this does not mean that it can't be described in words. In fact the description in words is usually the starting point. In Shape and Space learners also work with visual patterns that are geometric. However they are only required to describe the patterns using the language of geometry and to copy the patterns. While many of these patterns can be described using algebraic expressions, this is beyond the scope of Intermediate Phase learners. Learners show the same patterns in different ways: in a diagram, as a verbal description, as a flow diagram and in a number sentence. Sometimes learners are able to see different aspects of a pattern when they change the form in which the pattern is presented. What kinds of geometric patterns should learners work with? Patterns in which the shapes grow (increase) or decrease in different ways. • patterns in which the shape keeps its form, but gets larger (or smaller) at each stage e.g.  • patterns in which a shape or part of a shape is added at each stage e.g.  In each of the examples above the pattern is made by adding on the same number of matchsticks. In the top pattern four matchsticks are added each time. In the second pattern three matchsticks are added each time. Both number patterns are patterns with a constant difference. Most geometric patterns learners see in Grade 5 will be patterns with a constant difference. They are more likely to get patterns with a constant ratio when working with number sequences.	**4 Hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.2** **Geometric patterns**		The pattern below is also a pattern with a constant difference: four squares are added each time.  Patterns with neither a constant difference nor a constant ratio **Example:**  What should learners do? • Copy and extend the pattern This helps them to understand how the pattern is formed • Describe the pattern in words. Different learners will describe different aspects of the pattern. Learners are required to describe the relationship between shapes in the sequence or rules in own words. To do this, learners need discuss how they made the pattern or be able to answer the question “How do I get from one stage in the pattern to the next?” • Learners need opportunities to see that changing the form of representation from geometric to verbal or to a flow diagram or to a table can sometimes help them to understand the pattern. Learners should “translate” these geometric sequences into other forms of expression or representation namely by: - verbal description of the pattern - flow diagrams or input –output diagrams - number sequences which can be recorded in a table form.	

<table>
<tr><th>CONTENT AREA</th><th>TOPICS</th><th>CONCEPTS AND SKILLS</th><th>SOME CLARIFICATION NOTES OR TEACHING GUIDELINES</th><th>DURATION (in hours)</th></tr>
<tr><td>PATTERNS, FUNCTIONS AND ALGEBRA</td><td>2.2
Geometric patterns</td><td></td><td>Example:
Extending the pattern:
 
Describing the pattern in own words
“It is a pattern of squares”
“ Each square is bigger than the one before”
Describing how they made the pattern or answering the question “How did you get from one stage to the next?”
“I added one more matchstick to each side of each square”
“Each square has one more matchstick in each side than the square to the left of it”
Recording the number pattern in a table
When learners fill in a table like the one below, they can see that the number of matchsticks used for each square is 4 times the position number of the square.
Learners can then be asked to predict how many matches they will use for squares they have not built e.g. 10th, 100th , etc,
<table><tr><td>Square’s position number</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>10</td></tr><tr><td>Number of match sticks</td><td>4</td><td>8</td><td>12</td><td></td><td></td><td></td><td></td></tr></table></td><td></td></tr>
<tr><td>SPACE AND SHAPE</td><td>3.3
Symmetry</td><td>Recognize, draw and describe lines of symmetry in 2-D shapes</td><td>This should include shapes in which there is more than one line of symmetry.
Drawings of 2-D shapes where the line of symmetry is not necessarily vertical.</td><td>2 hours</td></tr>
</table>

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Division	**Number range for calculations** Division of at least whole 3-digit by 2-digit numbers **Calculation techniques** Use a range of techniques to perform and check written and mental calculations with whole numbers including • estimation • building up and breaking down numbers • using multiplication and division as inverse operations **Number range for counting, ordering and representing, and place value of digits** • Recognize the place value of digits in whole numbers to at least 6-digit numbers. • Round off to the nearest 10, 100, 1 000 **Number range for multiples and factors** • Multiples of 2-digit numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Multiplication facts** • Units by multiples of 10 • Units by multiples of 100 **Properties of whole numbers** • Recognize and use the commutative; associative; and distributive properties of whole numbers • 1 in terms of its multiplicative property	What is different to Term 1? In Term 1, learners revised and consolidated work done in Grade 4, i.e.learners divided at least whole 3-digit by 1-digit numbers. In term 2, learners divide 3-digit numbers by 2-digit numbers. Learners should do context free calculations and solve problems in contexts. The following problem types remain important: sharing, grouping and rate (see the description of problem types at the end of the Grade 5 notes) Learners continue to: • check their solutions themselves, by using multiplying • judge the reasonableness of their solutions, by estimating before calculating. Dividing Learners continue to use what they know about multiplication to do division. Focus on multiples and factors, so that learners' knowledge of multiples and factors can be used in division. Learners should continue to be given problems with and without remainders. Learners are still not encouraged to treat the digits separately, but rather to consider the number as a whole and to keep the value of the parts of the number in mind. Sometimes in the past learners were taught to write out a whole times table, which they were encouraged to work out by repeated addition. At other times in the past learners were encouraged to divide by doing repeated subtraction of the divisor. Many learners got lost in the extensive repeated subtraction of the divisor when dividing 3-digit by 2-digit numbers. When dividing 3-digit by 2-digit numbers, it is preferable for learners to work with the easily remembered multiplication facts of multiples of 10 and then doubling and halving. These large groups of numbers can then be subtracted from the number being divided into. In this way learners do fewer subtractions and are more likely to arrive at the correct answer.	**8 hours**

<table>
<tr><th>CONTENT AREA</th><th>TOPICS</th><th>CONCEPTS AND SKILLS</th><th>SOME CLARIFICATION NOTES OR TEACHING GUIDELINES</th><th>DURATION (in hours)</th></tr>
<tr><td>NUMBERS, OPERATIONS AND RELATIONSHIPS</td><td>1.1
Whole numbers
Division</td><td>Solving problems
Solve problems in contexts involving whole numbers, including financial contexts
Solve problems involving whole numbers, including
• comparing two or more quantities of the same kind (ratio)
• comparing two quantities of different kinds (rate)
• grouping and equal sharing with remainders</td><td>Example
442 ÷ 17
Learners can write out a “clue board” of what they know about multiplying by 17. While they do not know the 17 times table, they do know 17 x 10 and how to use this to get multiples of 17 x 10 .
Learners find 17 x 5 by halving 17 x 10
Learners use doubling to find 17 x 2; 17 x 4; 17 x 8.
Lerners fill in other multiples as they need to use them e.g.
<table><tr><th>Clue board</th></tr><tr><td>10 x 17 = 170</td></tr><tr><td>20 x 17 = 340</td></tr><tr><td>30 x 40 = 510</td></tr><tr><td>5 x 17 = 85</td></tr><tr><td>2 x 17 = 34</td></tr><tr><td>3 x 17 = 51</td></tr><tr><td>6 x 17 = 102</td></tr></table>
Learners usemultiply and then subtract to calculate by approximation.
<table><tr><td>Multiply to get an approximate answer</td><td>Subtract to find the difference</td></tr><tr><td>20 x 17 = 340</td><td>442 – 340 = 102</td></tr><tr><td>6 x 17 = 102</td><td>102 – 102 = 0</td></tr></table>
442 ÷ 17 = 20 + 6 = 26
Learners should check their calculations by multiplying:
26 x 17 = (26 x 10) + (26 x 7)
= 260 + 182
= 422</td><td></td></tr>
<tr><td colspan="4">REVISION</td><td>3 hours</td></tr>
<tr><td colspan="4">ASSESSMENT (Half yearly)</td><td>6 hours</td></tr>
</table>

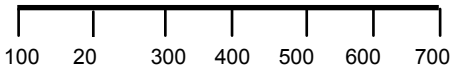
GRADE 5 TERM 3				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Mental calculations involving**: • Addition and subtraction facts of - units - multiples of 10 - multiples of 100 - multiples of 1 000 • Multiplication of whole numbers to at least 10 x10 • Multiplication facts of - units by multiples of 10 - units by multiples of 100 - units by multiples of 1 000 - units by multiples of 10 000 **Number range for counting, ordering, comparing and representing and place value of digits** • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 6-digit numbers • Represent odd and even numbers to at least 1 000. • Recognize the place value of digits in whole numbers to at least 6-digit numbers. • Rounding off to the nearest 5, 10, 100 and 1 000	The mental Mathematics programme should be developed systematically over the year. Learners should not simply be asked to do random calculations each day. As learners cover topics and develop calculating techniques in the main part of the lesson, so aspects of these can be incorporated into the mental Mathematics programme. Concepts and skills are developed through the main lesson, and then practised, sometimes with smaller number ranges in the mental Mathematics programme. See further notes in Term 1 and Term 2, but be aware that number ranges have increased. The increased number ranges are shown in the column on the left.	**10 minutes every day**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including • estimation • adding and subtracting in columns • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** • Multiples of 2-digits whole numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Properties of whole numbers** • Recognize and use the commutative; associative; distributive properties of whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property		

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2** **Common fractions**	**Describing and ordering fractions:** • count forwards and backwards in fractions • compare and order common fractions to at least twelfths **Calculations with fractions:** • addition and subtraction of common fractions with same denominator • addition and subtraction of mixed numbers • fractions of whole numbers which result in whole numbers • recognise, describe and use the equivalence of division and fractions **Solving problems** Solve problems in contexts involving common fractions, including grouping and sharing **Equivalent forms**: Recognize and use equivalent forms of common fractions with denominators which are multiples of each other	Learners should develop the concept of fractions in a variety of ways, including • a range of problem-solving contexts (see the types of fractions problems stated at the end of the Grade 5 notes). • a range of apparatus and diagrams (see notes in Term 1) Learners are not expected to be able to give equivalent fractions in symbolic (number) form without having diagrams to which they can refer or a problem context in which to make sense of the equivalence. It is recommended that fraction strips or fraction walls are provided when learners are formally assessed on equivalence. Once learners are comfortable with equivalence, it is easy for them to compare and order fractions. **Calculations with fractions:** Learners continue to • make fractions through grouping or sharing which is linked with understanding the relationship between division and fractions e.g. If 5 children share sweets equally, they will each get $\frac{1}{5}$ of the sweetss • add fractions with the same denominators Calculations as with other aspects of fractions should be developed either through problem contexts or with the use of apparatus or diagrams. Learners should be given problem contexts in which they need to add fraction parts. Learners should also be given either fraction pieces to count e.g. $\frac{3}{8} + \frac{4}{8}$ can be done by counting out and counting on in eighths with apparatus or by colouring in diagrams or by "hopping" in eighths on a number line. Learners are also expected to: • find fractions of whole numbers which result in whole numbers e.g. what is $\frac{1}{4}$ of 24? If learners have worked with drawings of collections of objects, and they know the relationship between division and fractions, this can be done without learning a rule or method. Learners can simply draw 24 objects and then make 4 equal groups • subtract fractions with the same denominators • add and subtract mixed numbers It is not expected that learners know rules for simplifying fractions or for converting between mixed numbers and fraction forms. Learners should	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2 Common fractions**		know from working with equivalence, when a fraction is equal to or greater than **Examples** The examples below are illustrated without contexts, but could equally arise in a problem situation. $2\frac{3}{5} + 3\frac{4}{5} = 5\frac{7}{5} = 5 + \frac{5}{5} + \frac{2}{5} = 6\frac{2}{5}$ Similarly with subtraction, learners can first subtract the whole numbers, and then use equivalence and compensation to complete the calculation. $6\frac{3}{5} - 2\frac{4}{5} = 4 + \frac{3}{5} - \frac{4}{5} = 3 + \frac{5}{5} + \frac{3}{5} - \frac{4}{5} = 3\frac{4}{5}$ Measurement is an important context through which to develop and consolidate the concept of fractions. If the suggested sequencing in this document is followed then learners will alredy have covered length and capacity. Length and capacity can be used to develop the concepts of fractions, equivalence, and adding with fractions.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.2** **Mass**	**Practical measuring of 3-D objects by** estimating, measuring, recording, comparing and ordering **Measuring instruments** bathroom scales, kitchen scales and balances **Units** grams (g) and kilograms (kg); **Calculations and problem-solving related to mass include** Solve problems in contexts related to mass Converting between grams and kilograms limited to examples with whole numbers and fractions	In Grade 5 learners work with the same units of mass as they did in Grade 4. They also work with the same measuring instruments. Learners need to • consolidate their sense of how much 1kg is • consolidate their sense of how much 1g is • understand and know the relationship between kilograms and grams. Learners should have a sense of which units are appropriate for measuring different masses. For example they need to know which units to use to state the mass of • a cow • a baby • flour for baking a cake Learners should understand which instruments are appropriate for measuring different masses. For example they need to know which instruments to use to measure • their own mass • the mass of flour for baking a cake **Reading instruments and measuring mass** Learners need to • estimate mass in grams and kilograms, including being able to match objects to the appropriate unit of measurement before measuring them • choose, with reasons, the most appropriate scale to use for particular objects from a range of scales provided • read kitchen scales in g and kg and bathroom scales in kg and balances in g and kg This includes reading the mass on real scales balances and pictures of scales. The skills involved include - knowing where to stand to read the scale correctly - knowing how to read the numbered gradation lines and to calculate what the un-numbered gradation lines mean. Learners need to read - different kinds of measuring apparatus - apparatus in which the numbered intervals, gradation lines or calibration represent different intervals.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.2** **Mass**		- apparatus in which there are a different numbers of un-numbered intervals within each numbered interval. Learners need practice using examples in which the numbered intervals are divided into: - 2 un-numbered intervals - 4 un-numbered intervals - 5 un-numbered intervals - 10 un-numbered intervals **Example** Here the numbered lines show 100g intervals: 100g; 200g; 300g; 400g; 500g; 600g; 700g; It is sometimes useful to convert a circular dial into a number line for learners    There are 10 spaces between each 100g. Each 100g interval has been divided into 10 smaller spaces. This means that each un-numbered interval shows 100g ÷ 10 = 10g **Compare masses** with up to 6-digits in grams and kilograms. If learners have not done this in previous grades, they should sequence containers marked in grams and kilograms. Here learners need to be able to translate the decimal numbers on some packaging into fractions e.g. 2,5kg of flour is the same as 2 $\frac{1}{2}$ kg of flour. One should also choose examples that allow learners to realize that the size of a container or the volume it contains is not directly proportional to the mass. Some substances have a greater density than others. **Calculations (including conversions) and problem-solving** Measurement provides a context in which to practise skills acquired in Numbers, Operations and Relationships.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.2** **Mass**		**Estimate and calculate** using grams and kilograms. • Rounding up or down to the most appropriate unit of measurement addition and subtraction with up to 5-digit numbers • Rounding off to 5, 10, 100, 1 000. Doing rounding off when reading measuring instruments can help learners to understand the reasons for rounding up or down • Multiplication of 3-digit by 2-digit • Division of 3-digit by 2-digit • Add and subtract common fractions and mixed numbers with same denominator (using only halves, thirds, quarters, fifths, sixths, sevenths , eighths, ninths, tenths, elevenths and twelfths) • Determine fractions of whole numbers that result in whole numbers **Solve problems** relating to mass including rate (especially rands per kilogram) and ratio problems e.g. increasing or decreasing the mass of ingredients in a recipe by a set ratio **Convert between units:** $g \leftrightarrow kg$ Converting between the units of measurement provides a context for practising multiplying and dividing by 1 000. When learners do division in Grade 4 a remainder may result e.g. 115 ÷ 25 = 4 remainder 15. Similarly when converting grams to kilograms learners may get part of the answer in kilograms and state the remaining part in grams e.g. 4 250g = 4kg and 250g Conversions should be limited to whole numbers and fractions given only as halves / thirds / quarters / fifths / sixths / sevenths / eighths. Conversions can also include converting the decimal half to the common fraction form of half. **Recording mass** Because learners will only work with decimal fractions in Grade 6, they should record masses as • kilograms only e.g. 5kg • grams only e.g. 250g • kilograms and grams together e.g. 3 kilograms and 45 grams • kilograms and fractional parts of kilograms e.g. 2 $\frac{3}{4}$ kilograms • since learners will be reading half kilograms in decimal form off some packaging they can also write half kilograms in the decimal form, but this is not a requirement in this grade.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Counting, ordering, comparing, representing and place value of digits	**Number range for counting, ordering, comparing, representing and place value of digits** • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 6-digit numbers • Represent odd and even numbers to at least 1 000 • Recognize the place value of digits in whole numbers to at least 6-digit numbers • Round off to the nearest 5, 10, 100 or 1000	See further notes in Term 1, but be aware that number ranges have increased. The increased number ranges are shown in column 3 on the left and summarised in Term 2 notes, clarifications and teaching guidelines. All work developed here can be practised throughout the year in the mental Mathematics programme.	**1 hour**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1 Whole numbers** Addition and subtraction	**Number range for calculations** • Addition and subtraction of whole numbers with at least 5-digit numbers **Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including: • estimation • adding and subtracting in columns • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations **Properties of whole numbers** • recognize and use the commutative, associative and distributive properties with whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property **Solving problems** Solve problems involving whole numbers, including: • financial contexts • measurement contexts	This is further practice of Addition and Subtraction with up to 5-digit numbers done in Term 2. Refer to those notes. You can revise the expanded column method shown below. Learners can then begin to use the traditional column methods. Learners continue to: • check their solutions themselves e.g. by using the inverse operation • judge the reasonableness of their solutions e.g. by rounding off numbers and estimating answers • **Expanded vertical column method to add** 56 423 = 50 000 + 6 000 + 400 + 20 + 3 + 7 581 = 7 000 + 500 + 80 + 1 + 21 479 = 20 000 + 1 000 + 4 00 + 70 + 9 Total = 70 000 + 14 000 + 1 300 + 170 + 14 = 70 000 + 10 000 + 5 000 + 400 + 80 + 4 = 85 484 • **The vertical column method to add.** 1 1 1 5 6 4 2 3 + 7 5 8 1 6 4 0 0 4 • The **expanded column method to subtract** Calculate: 74 687 – 52 143 Learners cannot subtract 4 from 3 or 80 from 40. Instead of breaking down 743 into 700 + 40 + 3 they will break down 743 into 600 + 130 + 13. Then they can subtract 4 from 13 and 80 from 130. 600 130 13 98 743 = 90 000 + 8 000 + 700 + 40 + 3 – 45 684 = 40 000 + 5 000 + 600 + 80 + 4 Total = 50 000 + 3 000 + 0 + 50+ 9 = 53 059	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		• **The vertical column method to subtract** $\begin{array}{r} 2\ 5\ 7\ 4\ 6 \\ -1\ 4\ 5\ 3\ 2 \\ \hline 1\ 1\ 2\ 1\ 4 \end{array}$ **Or** $\begin{array}{r} {\scriptstyle 8\ \ 6\ \ 13\ \ 13} \\ 8\ 7\ 4\ 3 \\ -5\ 6\ 8\ 4 \\ \hline 3\ 0\ 5\ 9 \end{array}$	
ASSESSMENT: At this stage learners should have been assessed on: • fractions • mass • addition and subtraction of up to 5-digit numbers				

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SHAPE AND SPACE	**3.5 Viewing objects**	**Position and views** Link the position of viewer to views of single everyday objects, collections of everyday objects or scenes from everyday life	**What is different to Grade 4?** • In Grade 4 learners matched different views of single everyday objects. • In Grade 5 learners work with views of single everyday objects or collections of everyday objects. They match views of the object or objects with the position of the viewer. **Position and views** Learners are presented with multiple views of an everyday object or collection of everyday objects or scenes from everyday life, as well as positions of viewers in relation to the object or objects. They match each view with a viewer or viewpoint. Everyday objects often have more irregular surfaces than geometric objects e.g. compare a teapot to a sphere or a person to a cube. This makes it easier to identify views and viewpoints of everyday objects.	**5 hours**
SPACE AND SHAPE	**3.1 Properties of 2-D shapes**	**Shapes learners need to know and name are** • regular and irregular polygons - triangles, squares, rectangles, other quadrilaterals, pentagons, hexagons, heptagons, • circles • similarities and differences between squares and rectangles **Characteristics learners use to distinguish, describe, sort and compare shapes** • Straight and / curved sides • Number of sides • Length of sides • Angles: limited to - right angles - angles smaller than right angles - angles greater than right angles **Further activities to focus learners on characteristics of shapes** Draw 2-D shapes on grid paper **Angles** limited to • right angles • angles smaller than right angles • angles greater than right angles	This is revision and consolidation of the work done in Term 1: see Term 1 notes. Learners should continue to do practical work with concrete apparatus, but they should also continue to do written exercises.	**4 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SHAPE AND SPACE	**3.4 Transformations**	**Use transformations to create composite shapes** Create composite 2-D shapes including shapes with line symmetry by tracing and moving a 2-D shape by • rotation • translation • reflection **Use transformations to create tessellations** Make tessellated patterns including some patterns with line symmetry by tracing and moving 2-D shapes by • rotation • translation • reflection **Describe patterns** Refer to lines, 2-D shapes, 3-D objects and /or lines of symmetry and/ or rotations and/or reflections and/or translations when describing patterns	In this suggested sequencing of Grade 5 Mathematics, transformations are done in Terms 3 and 4. For Term 3 learners can focus on building composite shapes. In Term 4 learners can focus on tessellations and describing patterns in the world. **What is different to Grade 4?** • In Grade 4 learners create composite shapes by placing 2-D shapes next to each other. In Grade 5 learners trace and move a 2-D shape using reflections, rotations and translations to draw composite shapes. • In Grade 4 learners create tessellations by packing out shapes. In Grade 5 learners trace and move a 2-D shape using reflections, rotations and translations to draw tessellations. **Use transformations to create composite shapes** Learners use a 2-D shape as a template which they trace and move by reflecting, translating and rotating to create composite shapes. Some of the new shapes drawn should have lines of symmetry. Learners describe how they moved the shape to create the pattern using the words “rotation, translation and reflection”	**3 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.5 Temperature**	**Practical measuring of temperature by** estimating, measuring, recording, comparing and ordering **Measuring instruments** thermometers **Units** degrees Celsius (°C) **Calculations and problem-solving related to temperature** Solve problems in contexts involving to Temperature Calculate temperature differences limited to positive whole numbers	**Measuring temperature is a new topic in Grade 5 Mathematics and Geography.** Learners need to develop a sense of how hot or cold things are when described in degrees Celsius. This can be achieved through learning common temperature referents e.g. • the freezing point of pure water is 0°C • the boiling point of pure water is 100°C • the average normal human body temperature is 37 0°C • the daily environmental temperatures. **Reading temperature measurement** Learners should read temperatures on pictures of thermometers. Where possible learners should read temperatures on real thermometers. **Reading calibrated capacity measuring instruments** Reading analogue thermometers requires learners to read the temperature on numbered and un-numbered gradation lines. In thermometers designed to read the environmental temperatures the unnumbered gradation lines often refer to whole degrees. In thermometers designed to read human body temperature the unnumbered gradation lines often refer to fractions of degrees. **Recording and reporting on temperature measurements** Learners should record and report on temperature measurements they have read off thermometers in whole numbers. This may involve rounding up or down. They can also record and report temperatures by using fraction notion. **Calculations and problem-solving related to temperature** Calculations and problem-solving involvingtemperatures should be limited to positive whole numbers and fractions (although learners in Grade 5 work with halves, thirds, quarters, fifths, sixths, sevenths, eighths, ninths, tenths, elevenths and twelfths, with temperature calculations it makes sense to use tenths, quarters and halves)	**2 hours**

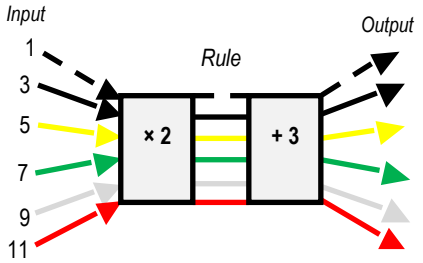
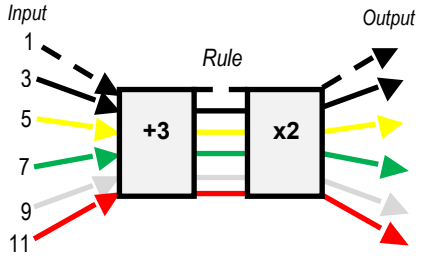
ASSESSMENT:

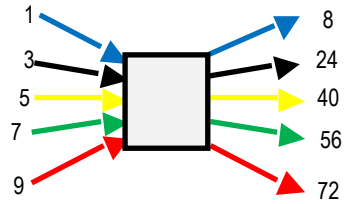
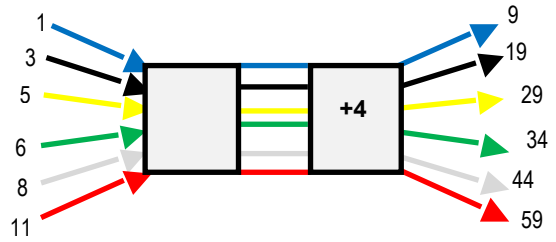
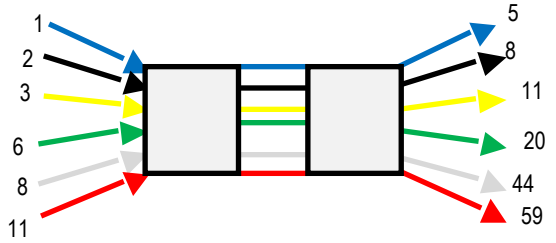
At this stage learners should have been assessed on:

- views
- tranformations- making composite shapes by rotating, translating and reflecting
- temperature

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
DATA HANDLING	**5.1** **Collecting and organising data**	• collect data using tally marks and tables for recording • order data from smallest group to largest group	**What is different to Grade 4?** The following are new in Grade 5 • ordering data sets • analyzing data not only according to categories but also taking into account contexts and sources of data • analyzing ungrouped numerical data sets to find the mode • pictographs which show many-to-one correspondence • conclusions and predictions when analysing and summarising data Teachers in this phase should ensure that different topics are chosen for data collection and analysis in each of the grades. **Analysing graphs** Analysing graphs on environmental or socio-economic contexts by answering questions on graphs. Both graphs and questions to be provided by the teacher or textbook. Learners should work with at least • 1 pictograph with many to one correspondence • 1 bar graph **Suitable topics include** • quantities of materials recycled in the town, province, country • quantities of recycling materials collected by schools around the country • sources of lighting and heating in SA • kinds of toilets in SA homes • kinds of homes in SA **Develop critical analysis skills** Learners compare graphs on the same topic, but where data has been collected from different groups of people, at different times, in different places or in different ways. Here learners will be able to discuss the differences between the graphs. The aim is also for learners to become aware of factors that can impact on the data. Learners can summarize the findings of their comparison in a paragraph. Examples could include: • comparing data about cars that pass the school at different times or comparing data about cars that pass different venues (busy and quiet areas, poorer and richer areas etc)	**9 hours**
	5.2 **Representing data**	**Draw a variety of graphs to display and interpret data including:** • pictographs with a many-to-one representation • bar graphs		
	5.3 **Analysing, Interpreting and reporting data**	**Critically read and interpret data represented in** • words • pictographs • bar graphs • pie charts **Analyse data by answering questions related to:** • data categories • data sources and contexts **Summarise data verbally and in short written** paragraphs that include • drawing conclusions about the data • making predictions based on the data		

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
			• comparing data collected at your school to national data from '*Census At School* e.g. favourite sports; favourite subjects; transport to school; time taken to get to school; type of dwelling; access to goods and services at home • comparing data collected from girls and boys e.g. favourite sports, favourite movies, favourite school subjects • comparing rainfall each month for a town in summer and winter rainfall areas Learners should do at least 1 example in which they compare graphs. **Complete data cycle: context personal data** The complete data cycle includes asking a question, collectin, organising, representing, analyzing and interpreting data and reporting on the data. Choose a different topic to Term 1. Work through the whole data cycle to make an individual bar graph using contexts that relate to themselves, their class, their school or their family. Suitable topics include: • favourite sports / favourite movies / favourite music / favourite TV programmes / foods or cool drinks/ favourite colours, etc. • heights of learners in class • mass of learners in class • shoe size of learners in class • average time taken to get from home to school • number of people staying in homes of learners in the class **Analyse ungrouped numerical data using measures of central tendency** Learners determine the mode of ungrouped numerical data sets. Suitable topics include: • heights of learners in the class • mass of learners in the class • shoe size of learners in the class • average time taken to get from home to school • number of people staying in the homes of learners in the class • temperatures for a month	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**	**Investigate and extend patterns** • Investigate and extend numeric patterns looking for relationships or rules of patterns - sequences involving a constant difference or ratio - of learner's own creation • Describe observed relationships or rules in learner's own words **Input and output values** Determine input values, output values and rules for patterns and relationships using flow diagrams. **Equivalent forms** Determine equivalence of different descriptions of the same relationship or rule presented • verbally • in a flow diagram • by a number sentence	In Term 1 learners worked with flow diagrams in order to learn about • multiplication and division as inverse operations • multiplication of units by multiples of ten, 100, 1 000 • the associative property with whole numbers and how we can use this property when we multiply **Flow diagrams** are further developed in this term. Learners also work with number sequences. It is useful for learners to be given examples which continue to focus on the properties of operations. For example, learners have seen that they can multiple in any order, and that they can add in any order. They can contrast flow diagrams to see whether order makes a difference if they add and multiply. **Example**   Learners should discuss whether the order of the operations made a difference. Once learners have had practice in finding input values and output values when the rule is stated, they can be given examples where input values and output values are provided but no rule is given. At first these can be flow diagrams in which there is a "one stage rule" i.e. add or subtract or multiply or divide.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		**Example** Determine the rule  Work with examples which have a two stage rule e.g. multiply and then add, where one stage is left out **Example** Determine the rule  **Example where learners have to find a rule with two parts** Determine the rule  **Sequences of numbers:** In the Intermediate Phase learners extend sequences of numbers. In Grade 5 they look at three kinds of sequences: • sequences involving a constant difference • sequences involving a constant ratio	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		• sequences without a constant difference or ratio Some examples of patterns with a constant difference • 2; 4; 6; 8……. • 18; 16; 14; 12 …….. In the above examples learners are adding 2 or subtracting 2 to create the pattern. Learners may describe it as a pattern of counting on or counting back in twos. Learners should also be given examples which do not start with a multiple of the number they are adding to or subtracting from. Two examples are given below. • 1; 4; 7; 10……. • 87; 66; 45; …….. Examples of patterns with a constant ratio • 1 600; 800; 400; …… • In the above example learners are dividing by 2. All the numbers in the sequence are multiples of 2. Learners should also be given examples in which the numbers in the sequence are not multiples of the number they are multiplying or dividing by e.g. 3; 6; 12; 24 …… 10; 30; 90; 270; …… Examples of patterns without a constant difference or ratio 3; 7; 12; 18; 0; 2; 6; 12; 24 1, 4; 9; 16; 25; ……..	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication	**Number range for calculations** Multiplication of at least whole 3-digit by 1-digit numbers **Calculation techniques** Use a range of techniques to perform and check written and mental calculations of whole numbers including • estimation • building up and breaking down numbers **Number range for counting, ordering, representing and place value of digits** • Recognize the place value of digits in whole numbers to at least 6-digit numbers. • Round off to the nearest 10, 100 or 1 000 **Number range for multiples and factors** • Multiples of 2-digit numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Multiplication facts for** • units by multiples of 10 • units by multiples of 100 **Properties of whole numbers** • Recognize and use the commutative, associative and distributive properties with whole numbers • 1 in terms of its multiplicative property	This is further practice of multiplication done in Term 2. Refer to those notes	**7 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication	**Solving problems** Solve problems in contexts involving whole numbers, including financial contexts Solve problems involving whole numbers, including • comparing two or more quantities of the same kind (ratio) • comparing two quantities of different kinds (rate)		
ASSESSMENT: At this stage learners should have been assessed on: • data handling • number patterns • multiplication to at least 3-digits by 2-digits				
REVISION				**3 hours**

GRADE 5 TERM 4				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Mental calculations involving**: • Addition and subtraction facts of - units - multiples of 10 - multiples of 100 - multiples of 1000 • Multiplication of whole numbers to at least 10 x 10 • Multiplication facts for - units by multiples of 10 - units by multiples of 100 - units by multiples of 1000 - units by multiples of 10 000 **Number range for counting, ordering, comparing and representing, and place value of digits** • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 6-digit numbers • Represent odd and even numbers to at least 1 000 • Recognize the place value of digits in whole numbers to at least 6-digit numbers • Rounding off to the nearest and 5, 10, 100 and 1000	See the notes in Term 2, but be aware that number ranges have increased. The increased number ranges are shown in the column on the left. The mental Mathematics programme should be developed systematically over the year.	**10 minutes every day**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**Calculation techniques** Using a range of techniques to perform and check written and mental calculations of whole numbers including: • estimation • adding and subtracting in columns • building up and breaking down numbers • using a number line • rounding off and compensating • doubling and halving • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** • Multiples of 2-digits whole numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Properties of whole numbers** • Recognize and use the commutative, associative and distributive properties with whole numbers • 0 in terms of its additive property • 1 in terms of its multiplicative property		

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Counting, ordering, comparing, representing and place value of digits	**Number range for counting, ordering, comparing and representing, and place value of digits** • Count forwards and backwards in whole number intervals up to at least 10 000 • Order, compare and represent numbers to at least 6-digit numbers • Represent odd and even numbers to at least 1 000. • Recognize the place value of digits in whole numbers to at least 6-digit numbers • Round off to the nearest and 5, 10, 100 and 1000	See further notes in Term 1, but be aware that number ranges have increased. The increased number ranges are shown in the column 3 on the left and summarised in Term 2. Notes clarifications and teaching guidelines. All work dealt with here can be practised throughout the year in the mental Mathematics programme.	**1 hour**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction	**Number range for calculating** Addition and subtraction of whole numbers of at least 5 digits. **Calculation techniques** Use a range of techniques to perform and check written and mental calculations of whole numbers including • estimation • building up and breaking down numbers • rounding off and compensating • doubling and halving • using a number line • using addition and subtraction as inverse operations **Number range for multiples and factors** Multiples of 2-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative and associative properties with whole numbers **Solving problems** Solve problems in contexts involving whole numbers, including financial contexts.	This is further practice of addition and subtraction with 5-digit numbers done in Terms 2 and 3.Refer to those notes in both these terms.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SPACE AND SHAPE	**3.2** **Properties of 3-D objects**	**Objects learners need to know and name:** • Rectangular prisms and other prisms • Cubes • Cylinders • Cones • Pyramids • Similarities and differences between cubes and rectangular prisms **Characteristics learners use to distinguish, describe, sort and compare shapes** • Shape of faces • Number of faces • Flat and curved surfaces **Further activities to focus learners on characteristics of objects** • Create 3-D models using cut-out polygons • Cutting open boxes to trace and describe their nets	This is further practice of 3-D objects done in Term 2. Refer to the notes in Term 2	**5 hours**

ASSESSMENT:

At this stage learners should have been assessed on:

- addition and subtraction of 5-digit numbers
- 3-D objects

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2** **Common fractions**	**Describing and ordering fractions** • Count forwards and backwards in fractions • Compare and order common fractions to at least twelfths **Calculations with fractions** • Addition and subtraction of common fractions with the same denominator • Addition and subtraction of mixed numbers • Fractions of whole numbers which result in whole numbers • Recognize, describe and use the equivalence of division and fractions **Solving problems** Solve problems in contexts involving common fractions, including grouping and sharing **Equivalent forms**: Recognize and use equivalent forms of common fractions with denominators which are multiples of each other.	This is further practice of fractions done in Term 3. Refer to those notes. In Term 4 length, capacity and mass can be used as contexts for fractions.	**5 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1 Whole numbers** Division	**Number range for calculations** Division of at least whole 3-digit by 2-digit numbers. **Calculation techniques** Use a range of techniques to perform and check written and mental calculations with whole numbers including • estimation • building up and breaking down numbers **Number range for counting, ordering and representing, and place value of digits** • Recognize the place value of digits in whole numbers to at least 6-digit numbers • Round off to the nearest and 10, 100, 1 000 **Number range for multiples and factors** • Multiples of 2-digit numbers to at least 100 • Factors of 2-digit whole numbers to at least 100 **Multiplication facts** • Units by multiples of 10 • Units by multiples of 100 **Properties of whole numbers** • Recognize and use the commutative; associative and distributive properties with whole numbers • 1 in terms of its multiplicative property	This is further practice of division of 3-digit numbers by 2-digit numbers done in Term 2. Refer to those notes.	**7 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1 Whole numbers** Division	**Solving problems** Solve problems in contexts involving whole numbers, including financial contexts. Solve problems involving whole numbers, including • comparing two or more quantities of the same kind (ratio) • comparing two quantities of different kinds (rate) • grouping and equal sharing with remainders		

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.6** **Perimeter, area and volume**	**Perimeter** Measure perimeter using rulers or measuring tapes **Measurement of area** Find areas of regular and irregular shapes by counting squares on grids in order to develop an understanding of square units **Measurement of volume** Find volume/capacity of objects by packing or filling them in order to develop an understanding of cubic units	Learners are not required to know or apply formulae for the perimeter, area or volume of any shape or objects in the Intermediate Phase. Area and volume are only measured informally in the Intermediate Phase. Grade 5 learners practise and consolidate what they have learned about perimeter, area and volume in Grade 4. In Grade 5 learners measure the perimeters of shapes and spaces with rulers and measuring tapes. They are required to state and record this measurement in standard units: mm, cm, m. They are also required to work from drawings in which side lengths are specified in mm, cm, m or km. Here they add the lengths. At times in Grade 5 they will also count the lengths of the perimeters by counting the number of sides of the square grids. Here learners need to know that the diagonal distances between corners of a grid square are longer than the vertical or horizontal distances between corners of a grid square. In Grade 5 area measurements continue to be informal. Learners continue to count how many grid squares the shape covers. The area is stated in number of grid squares. Shapes should include • regular shapes with straight sides where the sides are all the same length • irregular shapes with straight sides where the sides are not all the same length • shapes with curved sides In Grade 5 learners continue to • count how many cubes or rectangular prisms they use to fill a container - the volume of the container is stated in number of cubes or rectangular prisms (boxes or blocks) • make stacks with cubes or rectangular prisms - the volume of the stack is stated in number of cubes or rectangular prisms (boxes or blocks) • interpret pictures of - stacks made of cubes, rectangular prisms so that they are able to state the volume in terms of the number of cubes or rectangular prisms - containers filled with cubes, rectangular prisms so that they are able to state the volume in terms of the number of cubes or rectangular prisms **What is capacity? What is volume?** **Capacity** is the amount of substance that an object can hold or the amount of space inside the object. **Volume** is the amount of space that an object occupies. So a bottle can have a 1 litre capacity, but it may not be filled to its full capacity, it could e.g., only contain a volume of 250ml.	**7 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
ASSESSMENT: At this stage learners should have been assessed on: • fractions • division of up to 3-digit numbers by 2-digit numbers • area, perimeter and volume				

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SHAPE AND SPACE	**3.6** **Position and movement**	**Location and directions** Locate position of objects / drawings/ symbols on grid using alpha-numeric grid references Locate positions of objects on a map using alpha-numeric grid references Follow directions to trace a path between positions on a map	Cells in a grid are often labelled with a letter and a number e.g. D4; A3; E7. This is called alpha-numeric referencing. **What is different to Grade 4?** • In Grade 4 learners located positions on grids and maps using alpha-numeric references • In Grade 5 learners follow directions to trace a path between positions on a map with a grid **Location and directions** In Geography in Grade 4, Term 1, learners give directions using left, right and landmarks. In Term 2 of Grade 4 and Term 2 of Grade 5 they also use pair of compasses directions. Learners draw on the work done on alpha-numeric grids in Geography and Mathematics in Grade 4 and the work done involving directions in Grade 4 & 5 Geography, when they find positions and follow directions on grids and maps. The work is developed in Geography and practised in Mathematics.	**2 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SHAPE AND SPACE	**3.4** **Transformations**	**Use transformations to make composite shapes** Make composite 2-D shapes including shapes with line symmetry by tracing and moving a 2-D shape in one or more of the following ways: • by rotation • by translation • by reflection **Use transformations to make tessellations** Make tessellated patterns including some patterns with line symmetry by tracing and moving 2-D in one or more of the following ways: • by rotation • by translation • by reflection **Describe patterns** Refer to lines, 2-D shapes, 3-D objects, lines of symmetry, rotations, reflections and translations when describing patterns.	In the suggested sequencing of Grade 5 Mathematics, transformations have already been done in Term 3. In that term learners focused on building composite shapes including some shapes with symmetry. In Term 4 learners extend this to focus on tessellations and describing patterns in the world. **What is different to Grade 4?** In Grade 4 learners make tessellations by packing out shapes. In Grade 5 learners trace and move a 2-D shape using reflections, rotations and translations to draw tessellations **Use transformations to make tessellations** Learners use 2-D shapes to make tessellation patterns. In Grade 4 these tiling patterns can be made by packing out the tiles. Grade 5 learners are required to make the patterns by rotating, translating of reflecting a single shape. Learners trace and move a 2-D shape to draw the pattern. Learners need to identify and describe tessellation patterns **Describe patterns** Learners describe patterns of the shapes they see and how they would move that shape if they wanted to continue the pattern e.g. • the pattern I see on the honeycomb looks like a tessellation pattern of hexagons. I can make this pattern by translating a hexagon. • the pattern I see on the bead bracelet looks like a tessellation pattern of triangles. I can make this pattern by reflecting a triangle Learners identify symmetry in patterns e.g. symmetry in Ndebele mural art Learners often find patterns easier to describe, once they have copied or made the patterns. It is useful to link the process of making or copying patterns with the descriptions of patterns from nature, modern everyday life and our cultural heritage. Often the geometrical process you use to make a copy of the pattern is not the same as the original process used to make the pattern. Bees do not tessellate with hexagons to make a honeycomb, but if learners tessellate with a hexagon, they can make a pattern that looks similar to the pattern they see in the honeycomb.	**4 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.2** **Geometric patterns**	**Investigate and extend patterns** • Investigate and extend geometric patterns looking for relationships or rules of patterns: - represented in physical or diagram form - sequences involving a constant difference or ratio - of learner's own creation • Describe observed relationships or rules in learner's own words **Input and output values** Determine input values, output values and rules for the patterns and relationships using flow diagrams **Equivalent forms** Determine equivalence of different descriptions of the same relationship or rule presented • verbally • in a flow diagram • by a number sentence	This is consolidation of what was done in Term 2. See notes in Term 2. In Term 4 learners should just do moreexamples.	**2 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.3** **Number sentences** (introduction to algebraic expressions)	**Number sentences** • Write number sentences to describe problem situations • Solve and complete number sentences by: - inspection - trial and improvement • Check solution by substitution	This is a continuation of the work done with number sentences in Term 1. In this term learners are given practice in writing number sentences to describe problem situations. Learners have the opportunity to practise a mixture of all problem types that they have encountered so far during the year. At some point they are asked to write a number sentence to describe the problem. As before number sentences are used to develop the concept of equivalence, but they can also relate to all aspects of number work covered during the year. If learners have not had experience answering multiple choice questions, give them some examples in this second half of the year as it is a common format used in external systemic tests. Number sentences can also consolidate the idea of expressing a rule. For which pairs of numbers does the rule **"multiply the first number by and thensubtract to get the second number**" apply? (a) 16 ✧ 2 (b) 5 ✧ 38 (c) 38 ✧ 5 (d) 3 ✧ 22 Term 1 we used number sentences to focus learners' attention on the properties of operations. Since learners have been using these properties, the examples can focus more on the notion of equivalence. Some examples are provided below: **Examples** focusing on the properties of operations Which of the following statements is TRUE? (a) 9 x ☐ = ☐+ 9 b) 9 x ☐ = ☐ 9 (c) 9 x ☐ = ☐ x 9 (d) 9 x ☐ = 9 + ☐ How much is 24 x 17 less than 25 x 17? (a) 1 (b)17 (c) 25 (d) 45 Choose the correct answer: (26 x 39) + (26 x 1) = (a) 26 x 27 (b) 400 (c) 26 x 4 (d) 26 x 40 Which of the statements below is equivalent to 15 x (4 x 9)? (a) (15 x 4) x 9 (b) 15 x 2 x 2 x 3 x 3 (c) (15 x 4) + (15 x 9) (d) (10 – 1)(15 x 4)	**3 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
DATA HANDLING	**5.2** **Probability**	Perform simple repeated events and list possible outcomes for events such as • tossing a coin • rolling a die • spinning a spinner Count and compare the frequency of actual outcomes for a series of trials up to 20 trials.	**Performing simple repeated events** Learners need to perform experiments by tossing a coin, rolling a die, or spinning a spinner. Doing experiments with a coin is easier than with a die because the coin can only have two outcomes (heads or tails), while rolling the die can have 6 outcomes (numbers1 - 6). The spinner can have any number of outcomes, depending on number of divisions made on the spinner. Learners must first list the possible outcomes before doing the experiments. They should learn how to record the results of their experiments in a table using tally marks. They then count how many times heads or tails, or each number, or colour on a spinner, occurs in 20 trials. If learners do this in groups, the results from all the groups can be collated. They can then compare the number of outcomes that occur as the number of trials increase.	**2 hours**
REVISION				**4 hours**
ASSESSMENT				**6 hours**

Problem type	Additional notes	Examples
Summation	A sum	A farmer sells fruit to several stores in his city. He sold 13 789 pears, 35 278 apples and 24 678 oranges in one month. How much fruit did he sell in one month?
	Missing part of a given sum	Farm workers picked 42 345 pears during the morning. After lunch they picked some more. By the end of the day, they had picked 16 589 pears. How many pears did they pick after lunch?
Increase and decrease	Calculate the result	The price for a container of beans is R65 231. Some of the beans are ruined and the price is decreased by R14 789. What is the price of the container of beans now?
	Calculate the change	A salesman earned R34 328 during November. During December, the amount earned increased to R47 435. How much more money did he earn during December tha in November?
	Calculate the initial result	A farmer struggled to sell his farm. He decreased the original price of his farm by R10 456. He sold the farm for R 85 787. What was the original price that the farmer wanted for his farm?
Grouping	• Grouping problems that are solved with division and/or repeated subtraction • Answers to problems have or do not have remainders	A shop gives boxes of toys to a poor school. Each box contains 48 toys. If there are 875 toys, how many boxes are needed? or A company gives 35 bags of soccer balls to a soccer club. If there are 315 soccer balls, how many balls are there in a bag?
	• Grouping problems that are solved with multiplication and/or repeated addition • Answers to problems have or do not have remainders	A school gave 45 boxes of toys to an orphanage. Each box contains 548 toys. How many toys did the school donate?
	• Grouping problems in an array form • These problems can be solved with division (or repeated subtraction) or multiplication (repeated addition)	On a farm there are 134 rows of tomatoes. Each row has 56 tomato plants. How many tomato plants are there in total?
Sharing	• Sharing problems can be solved with division/repeated subtraction • Smaller groups of equal size are formed from a given amount • Answers to calculations that have remainders can lead to the concept of common fractions. See Grade 4 example.	A farmer shares 654 apples equally between 45 shops. How many apples does each shop get? How many apples are left over?
Comparison by difference		Joey and Tana each own a srapyard. Joey's scrapyard sold 65 346 car parts in a year. Tana's scrapyard should sell 34 968 more car parts in a year to equal Joey's number of car parts sold. How many car parts has Tana sold so far?

Problem type	Additional notes	Examples
Treating groups as units		25 candles cost R236. How much will 375 of the same candles cost?
Rate	Learners calculate the total if given rate per object	One box of sweets costs R48. How much will 135 of the same boxes of sweets cost?
	Learners calculate the rate per object	The mass of 12 same-sized bags of sugar is 300 kg. What is the mass of 1 bag of sugar?
	Learners first calculate the rate and then apply it to generate more information	If 16 small tables cost R720, how much will 124 of the same small tables cost?
Comparison by ratio		Joey bought 240 metres of wire to fence his farm. This is 15 times more than Peter bought. How much wire did Peter buy?
Proportional sharing		Feroza works for 7 hours and Jamie for 6 hours at the fast food restaurant. Together they are paid R975. How should the money be shared fairly to reflect the number of hours worked by each one?

Meaning of the fraction	Examples of problems
Part of a whole where the whole is a single object	Susan eats $\frac{1}{3}$ of a chocolate cake. Another $\frac{1}{4}$ is given away. How much cake is left over?
Part of a whole where the whole is a collection of objects	A wall has 124 panels. A painter paints $\frac{1}{3}$ of these panels. How many panels has he painted? How many panels must still be painted? Or Sue uses $\frac{2}{3}$ of an apple to make a cake. If she has 30 apples, how many cakes can she bake?
Relationship	The daughter earns a quarter of what her father earns per hour. If her father earns R267 per hour, how much does the daughter earn?
Ratio	The recipe says that for every 2 cups of sugar, $\frac{1}{4}$ cup of butter is needed. If 50 cups of sugar are used; how many cups of butter are needed?
Comparator	What is the longest? $\frac{6}{9}$ metres or $\frac{2}{3}$ metres of a strip of material?
Unit of measurement	How many $\frac{1}{3}$ of a metre is there in $5\frac{2}{3}$ metre?
Number	Give a number that is greater than $3\frac{2}{3}$, but less than $3\frac{11}{12}$
Fractional parts put together to make a whole (iterative)	35 children get cool drink. If each child gets $\frac{2}{11}$ of a bottle of cool drink, how many bottles are needed to serve all the children?