3.3.1 Clarification of content for Grade 4

<table>
<tr><th colspan="5">GRADE 4 TERM 1</th></tr>
<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>Mental Mathematics</td><td>Mental calculations involving:
• Addition and subtraction facts for:
- 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
Number range for counting, ordering, comparing and representing, and place value of digits
• Count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and 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 10, 100, 1 000</td><td>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, with smaller number ranges in the mental Mathematics programme.
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 3.
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 10 x 10
• Calculation techniques
- doubling and halving,
- using multiplication to do division,
- multiplying by 10 and 100
- multiplying by multiples 10 and 100
- dividing by 10, 100 and 1 000
- rounding off to the nearest 10 and compensating
- building up and breaking down numbers,
- adding and subtracting units, multiples of 10 and multiples of 100 to/from any 3-digit number
- using the inverse relationship between addition and subtraction</td><td>10 minutes every day</td></tr>
</table>

GRADE 4 TERM 1				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS		**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 • using multiplication and division as inverse operations **Number range for multiples and factors** Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative; associative; and distributive properties of whole numbers	• Number concept - counting: ◊ count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, between 0 and at least 500 ◊ count forwards and backwards in 100s between 0 and at least 1 000 - ordering and comparing up to 3-digit numbers - place value of up to 3-digit 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 (structured and empty) • a number grid • place value cards (flash cards) • counting beads	

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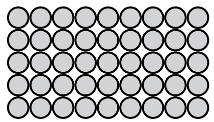
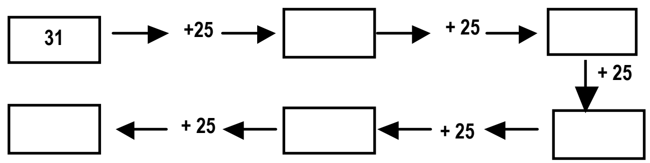
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers:** counting, ordering, comparing, representing and place value of digits	**Number range for counting, ordering, comparing, representing and place value of digits** • Count forwards and backwards in 2s, 3s, 5s,10s 25s, 50s and 100s between 0 and 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 10, 100, 1 000	In Term 1, learners should revise and consolidate work done in Grade 3. The **list on the left is required by the end of the year**. Recommended specifications are provided below. **What is different to Grade 3?** • Rounding off to the nearest **Counting** • Count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and at least 1 000 • 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 4 section of Numbers, Operations and Relationships. - arrays or diagrams of arrays e.g.  - other diagrams for counting e.g. 	**2 hours**

GRADE 4 TERM 1				
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NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers:** counting, ordering, comparing, representing and place value of digits		• 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. **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) • Learners should be given a range of exercises such as: - 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 structured or semi-structured number line, e.g. show which number is halfway between 340 and 350 on a number line - Indicate which of two numbers is greater or smaller e.g. 5 431 or 5 413 - Replace * with <,= or > **Example:** 89 * 98, 109 * 190 • All work developed here can be practised throughout the year in the mental Mathematics programme.	

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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 - 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 diagram or tables. Sometimes learners in the Intermediate Phase 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 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 but learners need to be trained to understand the equivalence. In the Intermediate Phase it is useful to use number sentences as statements of equivalence. Patterns made up of number sentences will assist learners to make sense of and learn the following: • **Patterns in addition and subtraction number bonds for:** - multiples of 10 - multiples of 100 - multiples of 1 000 • **The inverse relationship between addition and subtraction** • **The commutative, associative, and distributive properties** of whole numbers and how we can use these properties to build up and break down numbers when we add and subtract The steps in any calculation are sets of equivalent statements. Exploring, understanding and learning the logic of the equivalent statements by working through patterns made up of number sentences, helps learners to learn calculating techniques. At the start of the year learners can work with number sentences that help them to understand and learn about how to use the commutative and associative properties when calculating whole numbers. This will prepare them for the calculations that follow.	**3 hours**

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PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Number sentences** (introduction to algebraic expressions)		• Using number sentences to help learners understand and use the fact that addition and subtraction are inverse operations 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 - they can use addition to check subtraction calculations - they can use subtraction to check addition calculations - if they add and subtract the same number from a number, the number remains unchanged **Examples:** 58 – 58 = ☐ 264 – 264 = ☐ 304 – ☐ = 304 After completing a number of similar examples, they can be asked to explain what they notice in their own words. Learners are expected to be able to say “When you subtract a number from itself you get zero”. **Further examples:** 37 – 4 + 4 = ☐ 27 + 6 – 6 = ☐ After completing a number of similar examples, the learners can be asked to explain what they notice in their own words. Learners are expected to be able to say “When you add a number and then take away the same number you end with the number you started with”. As an extension of the above calculations, learners can work with pairs of equivalent number sentences, in which the numbers in each pair of addition – subtraction number sentences are the same. • **Using number sentences helps learners develop addition and subtraction techniques** **Examples:** 36+13 = ☐ therefore 49 – 13 = ☐ 261+36 = ☐ therefore 297 – 36 = ☐	

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PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Number sentences** (introduction to algebraic expressions)		After completing a number of similar examples, they can be asked to explain what they notice in their own words. Learners are expected to be able to say “You can use addition to check subtraction”. • **Commutative property of addition** Numbers can be added in any order. **Example:** 29 + 19 = 19 + 26 **Further Examples:** 13 + 49 = ☐ or 49 + 13 = ☐ 36 + 297= ☐ or 297 + 36= ☐ 27 + 94 = ☐ or 94 + 27= ☐ After completing a number of similar examples, they can be asked to explain what they notice in their own words. 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 to make a number sentence true. • **Associative property of addition** The associative property allows numbers to be grouped in different ways when adding more than wo numbers, without it affecting the answer. **Examples:** (31 + 26) + 19= ☐ is the same as 31 +(26+ 19) = ☐ 51 +(13 + 49) = ☐ is the same as (51 + 13) + 49 = ☐ After completing a number of similar examples, they can be asked to explain what they notice in their own words. 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 make a number sentence true. In many calculations where learners break up numbers before adding, they 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. They are using the commutative and associative properties of addition simulteneously. • When learners calculate by rounding off and compensating or filling up to tens or hundreds, they are also changing the way the numbers are grouped, e.g. 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 Since learners do not work with negative numbers yet, learners cannot complete pairs of number sentences with the same numbers but subtracted in different order. Here it is best to use number sentences with True and False. **Examples:** - True or false? 49 – 13 = 13 – 49 - True or false? 297 – 36 = 36 – 297 • **Using number sentences to help learners see and use patterns in addition and subtraction number bonds for:** - 10 - multiples of 10 - multiples of 100 **Examples:** • Ten 3 + 7= ☐ 4 + 6 = ☐ 2 + 8 = ☐ 5 + 5 = ☐ 7 + ☐= 10 4 + ☐= 10 8 + ☐= 10 3 + ☐= 10 10 – 7 = ☐ 10 – ☐= 4 10 – ☐= 6 10 – ☐= 5 • Multiples of 10 13 + 7 = ☐ 14 + 6 = ☐ 12 + 8= ☐ 15 + 5 = ☐ 17 + ☐= 20 1 4 + ☐= 20 8 + ☐= 20 3 + ☐= 20 20 – 7 =☐ 20 – ☐= 4 20 – ☐= 6 20 – ☐= 5 Similar examples can be given for other multiples of such as 30; 40; 50; 60; 70; 80; 90 • Multiples of 100 Similar examples can be given for multiples of 100 such as 200; 300; 400; 500; 600; 700; 800; 900 All concepts and techniques developed here can be practised throughout the year in the mental Mathematics programme.	

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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 to at least 4 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 • using multiplication and division as inverse operations **Properties of whole numbers** Recognize and use the commutative and associative properties of whole numbers **Solving problems** Solve problems in contexts involving whole numbers, including financial contexts	Numbers, operations and relationships make up half the Mathematics that learners do in the Intermediate Phase. Rather than do all the addition and subtraction in one block, it is recommended that learners revisit calculations regularly. In this suggested sequencing of work, learners do addition and subtraction in each term in Grade 4. Eight hours are allocated to addition and subtraction in Term 1. In Term 1, learners should revise and consolidate work done in Grade 3. Learners add and subtract numbers up to 3-digits numbers. **What is different to Grade 3?** Rounding off to the nearest 10 and 100 as a way of estimating answers. **Learners should solve problems in contexts and do context free calculations.** It helps learners to become more confident in and more independent at Mathematics, if they have techniques to: • check their solutions themselves • 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 the answers before calculating. They can round off the numbers involved in the calculations. When adding or subtracting 2-digit numbers, learners can round off to the nearest 10 When adding or subtracting 3-digit numbers, learners can round off to the nearest 100 When adding two numbers that are close to each other e.g. 345 and 340, learners can use doubling as a way of estimating the answers. **Checking solutions** Learners should know that they can • check an addition calculation by subtraction. **Example:** If 96 +48 =144, then 144 – 48 = 96 • check a subtraction calculation by adding. **Example:**144 – 48 = 96, then 96 + 48 = 144 Using the inverse operation to check solutions, is one reason for teaching addition and subtraction simulteneously.	**8 hours**

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NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		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 →R170 + R30 = R200. Veli gets R37 change. **Most calculation techniques that learners use in Grade 4 involve breaking down numbers.** • **Breaking down all numbers according to place value parts to add** **Example**: Calculate 362 + 486 362 + 486 = 300 + 60 + 2 + 400 + 80 + 6 2 + 6 = 8 = 300 + 400 + 60 + 80 + 2 + 6 **OR** and 60 + 80 = 14 = 700 + 140 + 8 and 300 + 400 = 700 = 848 means 362 + 486 = 848 • **Adding on (by breaking down the number to be added)** **Example**: Calculate 362 + 486 362 + 400 → 762 + 80 → 842 + 6 → 848 • **Filling up tens (by breaking down the number to be added).** This can also be called rounding off and compensating**.** **Example:** Calculate 96 + 48 96 + 48 = 96 + 4 – 4 + 48 = 100 + 48 – 4 = 100 + 44 = 144 • **Breaking down both numbers according to place value parts to subtract** **Example:** Calculate 687 – 143 687 – 143 = 600 + 80 + 7 – 100 – 40 – 3 7 – 3 = 4 = 600 – 100 + 80 – 40 + 7 – 3 **OR** and 80 – 40 = 40 = 500 + 40 + 4 and 600 – 100 = 500 = 544 means 687 – 143 = 544	

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NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction		• **Breaking down all numbers according to place value parts 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. **Example**:Calculate: 743 – 684 743 – 684 = 700 + 40 + 3 – 600 – 80 – 4 = 600 + 130 + 13 – 600 – 80 – 4 (Break up 743 into 600 + 130 + 13) = 600 - 600 + 130 – 80 + 13 – 4 = 50 + 9 = 59 • **Subtracting by breaking down the number to be subtracted** **Example:** Calculate 687 – 143 687 – 100 → 587 – 40 → 547 – 3 = 544 **or** 687 – 140 – 3 = 547 – 3 = 544 **Kinds of problems** Summation, increase and decrease, comparison by difference See the description of problem types at the end of the grade notes	

ASSESSMENT:

At this stage learns should have been assessed on:

- 3-digit numbers
- adding and subtracting with 3-digit numbers
- working with number sentences as well as the additive property of 0 and the properties of operations

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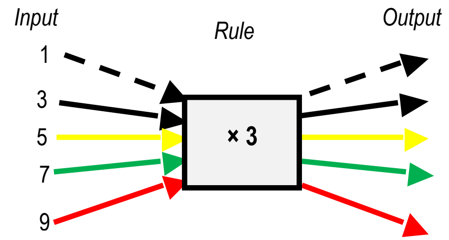
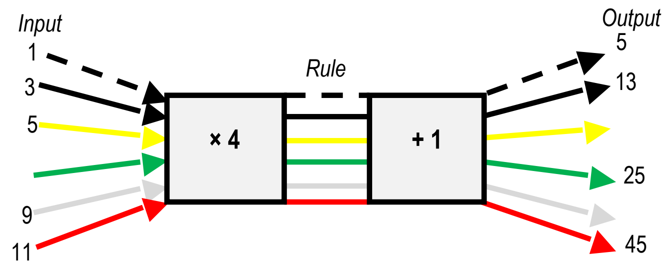
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**	**Concepts, skills and number range for Term 1** **Investigate and extend patterns** • Investigate and extend numeric patterns looking for relationships or rules of patterns: - sequences involving a constant difference or ratio - of learner's 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	**What is different to Grade 3?** In Grade 3 learners copy, extend and describe patterns made with numbers. The descriptions are only verbal. In Grade 4 learners also work with flow diagrams, as a form of input-output diagram. The kinds of patterns become more complex in Grade 4. **Sequences of numbers:** Examples of the above are illustrated in Term 3. For Term 1 the recommendation is to focus on using input-output diagrams, with a focus on developing multiplication tables and the properties of operations. **Patterns given in input-output diagrams** Input-output diagrams are sometimes called function diagrams, function machines or flow diagrams 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 use in the Intermediate Phase 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, the second input produces the second output, etc. **Examples**  	**4 hours**

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<tr>
<td>PATTERNS, FUNCTIONS AND ALGEBRA</td>
<td>2.1
Numeric patterns</td>
<td></td>
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An input-output diagram can allow learners to see or work out the

input values, if the rule and a corresponding output value are given
output values, if the rule and a corresponding input values are given
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 & 5. In Grade 4 it is useful to sometimes include the rule in a table.
Example:
<table>
<tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
<tr><td>x 6</td><td>6</td><td>12</td><td>18</td><td></td><td>30</td><td></td><td></td><td></td><td></td><td>60</td></tr>
</table>
In Term 1 it is recommended that number patterns be 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

the inverse operation between multiplication and division
the multiplication of units by multiples of ten
the associative property with whole numbers and how we can use this property when we multiply by multiples of 10

Using flow diagrams help learners to understand and use the fact that multiplication and division are inverse operations
Learners are not expected to use the expression “inverse operations”. They are expected to know that

they can use multiplication to check division calculations
they can use division to check multiplication calculations

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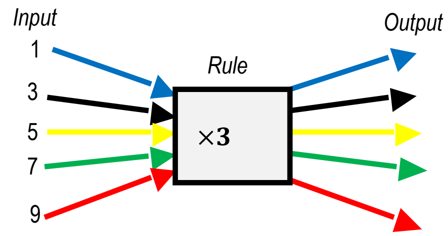
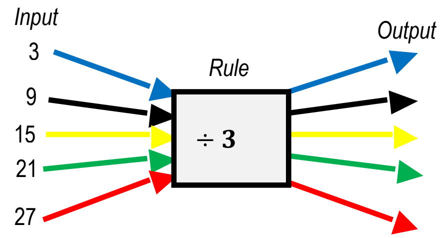
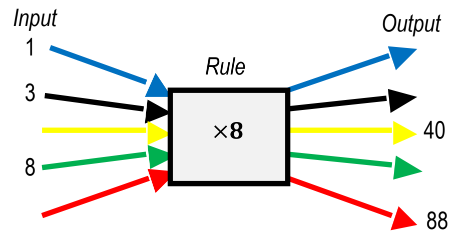
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		**Examples:**   After completing a number of similar examples, learners can be asked to explain what they notice in their own words. If learners write pairs of matching number sentences based on the input and output values in the flow diagrams, they can discuss using multiplication to check division and using division to check multiplication. **Further example** Learners can use the above knowledge to indicate how they could complete the missing input numbers in a flow diagram  Once learners have completed the flow diagram, they can discuss how they found the missing input values from the corresponding output values and rule.	

GRADE 4 TERM 1				
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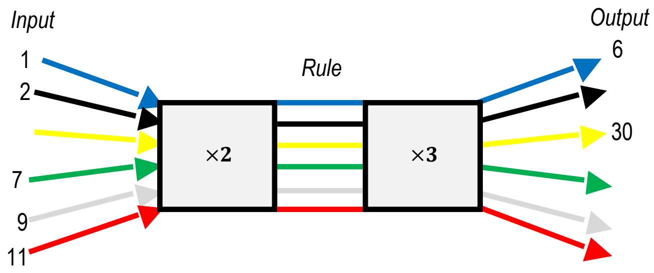
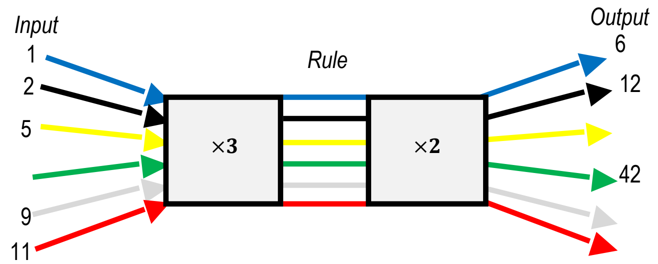
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		**Using flow diagrams to help learners develop multiplication and division techniques** **Associative property** Numbers can be multiplied in any order. **Example**: 11 x (3 x 2) = (11 x 3) x 2   Learners can discuss what they notice when they compare the examples. Learners are not required to know the names of the properties. They are only expected to use them to make calculations easier or use equivalent number sentences.	

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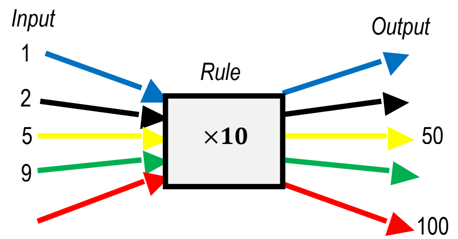
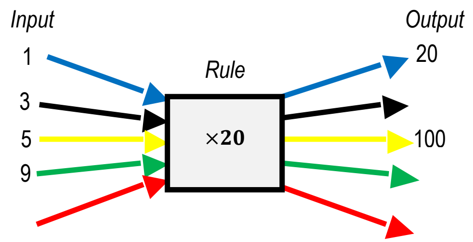
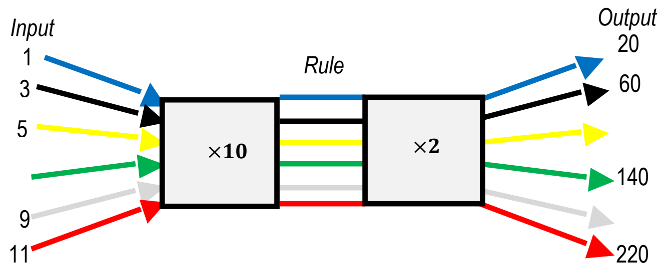
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		**Using flow diagrams to help learners think about and use techniques for multiplying by 10** Learners complete a flow diagram like the one below. They then explain using their own words what they notice about the input and output values  **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.  	

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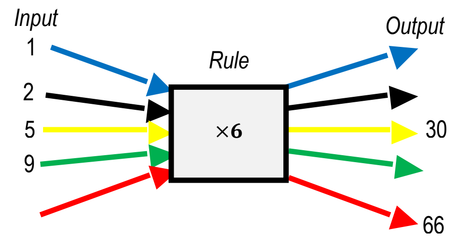
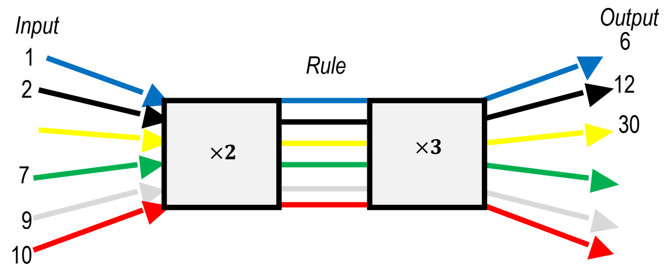
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		Do further examples involving multiplying by other multiples of 10 **Further examples** Let learners compare the flow diagrams below   Learners can then be asked: “What is another way to multiply by 6?” Learners can develop fast mental and written **techniques** based on this. All concepts and calculating techniques developed here can be practised throughout the year in the mental Mathematics programme.	

<table>
<tr><th colspan="5">GRADE 4 TERM 1</th></tr>
<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>Number range for calculations
• Multiplication of at least whole 2-digit by 2-digit numbers
• Division 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
• rounding off and compensating
• doubling and halving
• using a number line
• using addition and subtraction as inverse operations
• using multiplication and division as inverse operations
Number range for multiples and factors
Multiples of 1-digit numbers to at least 100
Properties of whole numbers
Recognize and use the commutative; associative; and distributive properties ofwhole numbers
Solving problems
• Solve problems in contexts involving whole numbers:
- financial contexts
- measurement contexts</td>
<td>Rather than do all the multiplication and division in one time frame, 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, but this is split into 2 different sections.
Learners can first consolidate multiplying 1-digit numbers by numbers up to ten, dividing numbers up to 99 by 1-digit numbers and discover which properties of operations are valid for multiplication and division. In the first section on multiplication and division in Term 1, it is recommended that learners develop and practise multiplication tables.
What is different to Grade 3?
In Grade 3, learners do not learn multiplication tables.
In this section of work Grade 4 learners should
• move from skip counting and repeated addition to seeing the patterns in multiplication tables up to 10 x 10
• learn short cuts and fast techniques for multiplying by one digit numbers and by ten
Once learners have understood the basics of each multiplication table, they should learn it. The tables can be practised in the daily mental Mathematics programme.
Learners should solve problems in contexts and do context free calculations.
Learners can use pictures of grouped objects to count in groups. Learners can also use diagrams of arrays to count in groups. They can then complete tables like the one below.
Example
<table>
<tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th></tr>
<tr><td>x 7</td><td>7</td><td>14</td><td>21</td><td></td><td>35</td><td></td><td></td><td></td><td></td><td>70</td></tr>
</table>
Learners can also use flow diagrams to record multiplication facts.</td>
<td>4 hours</td>
</tr>
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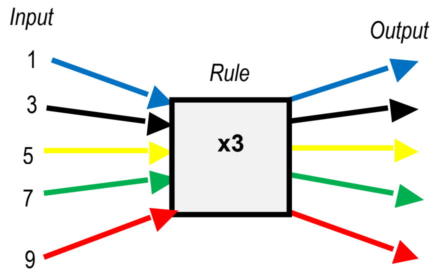
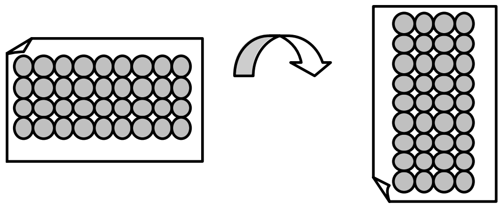
GRADE 4 TERM 1				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication and division	• Solve problems involving whole numbers: - comparing two or more quantities of the same kind (ratio) - comparing two quantities of different kinds (rate) - grouping and equal sharing with remainders	**Example:**  **Commutative property of multiplication** Numbers can be multiplied in any order. **Example:** 3 x 4 = 4 x 3 Learners can be convinced of this by providing them with an array of counters, which can be turned **Example** This array shows 36 counters.  Learners can write a multiplication number sentence for the array before and after it is turned. This allows them to see that 4 x 9 = 9 x 4 Learners can also write division number sentences for the array: 36 ÷ 4 = 9 and 36 ÷ 9 = 4 This helps learners to see that multiplication and division are inverse operations. **Breaking up numbers to multiply** Learners can compare flow diagrams to learn useful ways to break up numbers for multiplying.	

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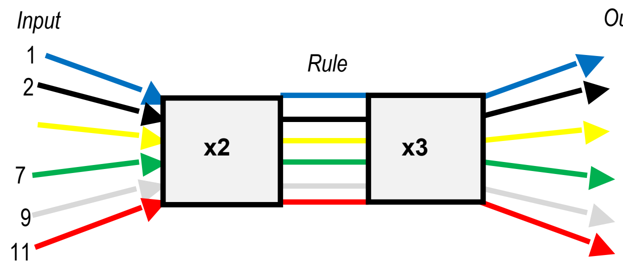
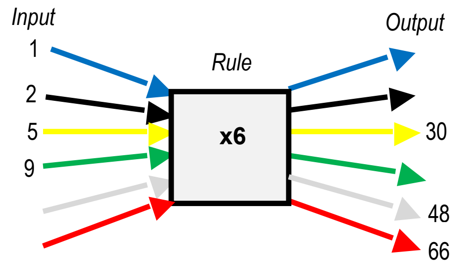
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication and division		**Example:**   Learners can discuss what they notice when they compare the examples. Some easy calculations techniques can be covered in this way □ x 6 = □ x 2 x 3 Multiplying by both 2 and *3,* is the same as multiplying by 6. □ x 8 = □ x 2 x 2 x 2 □ x 9 = □ x 3 x 3 □ x 5 = □ x 10 ÷ 2 Multiplying by 10 and then dividing by 2 is the same as multiplying by 5 **Multiplication and division as inverse operations** It is important that learners understand that they can change any division statement into a multiplication statement. **Example:** 48 ÷ 8 = □ can be changed into □ x 8 = 48 **or** 8 x □ = 48. **Further Examples** 5 x □ = 35 35 ÷ 5 = □ 6 x □ = 24 24 ÷ 6 = □ 8 x □ = 56 56 ÷ 8 = □	

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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		Learners can also use arrays to investigate the relationship between multiplication and division. There are two kinds of problems that result in division. It is important that learners experience both of these, namely • **problems involving sharing**: 6 learners share 32 sweets. How many sweets does each learner get? • **problems involving grouping**: Samkele has one large packet with 32 sweets. How many smaller packets can she make with 6 sweets in each? Some problems and calculations should have a remainder, and some should not. **Kinds of problems** Multiplication as repeated addition, treating groups as units, see the description of problem types at the end of the Grade 4 notes All work developed here can be practised throughout the year in the mental Mathematics programme.	
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 and watches **Reading calendars** **Calculations and problem solving with time include** • Calculation of the number of days between any two dates within the same or consecutive years • Calculation of time intervals where time is given in minutes or hours only **History of time** Knows how time was measured and represented in ancient times	**What is different to Grade 3?** In Grade 3 learners work with analogue and digital clocks using 12-hour format. In Grade 4 learners move onto digital 24-hour format. Once learners have been lernt to tell the time, further practise can take place during mental mathematics time. Learners continue to read calendars. **Calculations and problem-solving with time include** • calculation of the number of days between any two dates within the same or consecutive years • calculation of time intervals where time is given in minutes and/or hours only • calculations should be limited to whole numbers and common fractions Learners should continue to read clocks and tell the time at frequent intervals during the entire year. This can be done during the mental Mathematics time or just before or after break time or before learners go home, or when they come in from a class in another venue.	**6 hours**

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ASSESSMENT: At this stage learners should have been assessed on: • time • multiplying and dividing with single-digit numbers • number patterns				

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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	**What is different to Grade 3?** The following are new in Grade 4 • learners read, interpret, analyse and summarise pie charts, where the information is presented in fractions only • learners read, analyse data represented in word i.e. short paragraphs - the data presented in words should be represented in other forms and then analysed • learners summarise the information in the graph by writing a short paragraph Teachers in the phase should ensure that different topics are chosen for data collection and analysis in each of the grades.	**10 hours**
	5.2 **Representing data**	Draw a variety of graphs to display and interpret data including: • pictographs (one-to-one representation) • bar graphs	**Complete data cycle including making class bar graph: context personal data** The complete data cycle includes asking a question, collecting data, organising data, representing data, analyzing and interpreting data and reporting on the data. The class works through the whole data cycle to make a class bar graph using contexts that relate to themselves, their class, their school or their family. Making a class graph allows you to assess and consolidate the knowledge and skills learners have learned and remembered from Grade 3 e.g. Do they know • where and how to label the graph (graph title)? • where and how to label the axes (axes titles)? • how to place the bars? • how to read the graph? In the first example of the year, you will need to guide learners on how to write a complete paragraph that summarises the data. 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	

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CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
	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 Summarise data verbally and in short written paragraphs	**Analysing graphs** Analyse 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 fraction-form and not percentages • 1 pictograph • 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 **Complete data cycle including drawing bar graph: context environmental data** Work through whole data cycle to create an individual bar graph using an environmental context. Suitable topics include: • how much water is used per family/per household per day • amount and kinds of litter in school playgrounds • amount and kinds of recycling material collected by the school	

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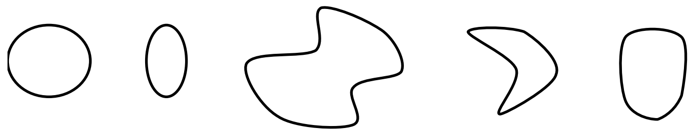
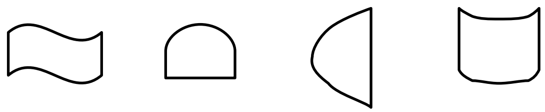
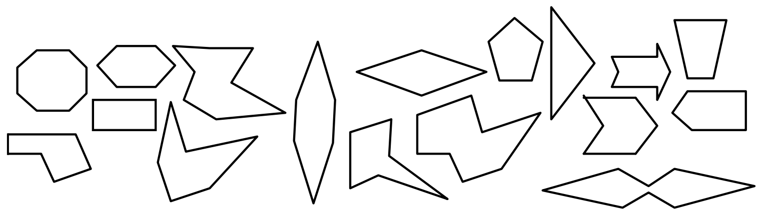
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
SPACE AND SHAPE	**3.1** **Properties of** **2-D shapes**	**Shapes learners need to know and name** • Regular and irregular polygons: - triangles - squares, rectangles - other quadrilaterals - pentagons - hexagons • Circles **The characteristics which learners use to distinguish, describe, sort and compare shapes** • straight and/curved sides • number of sides **Further activities to focus onthe characteristics of shapes** Draw 2-D shapes on grid paper	**What is different to Grade 3?** Pentagons, hexagons and irregular quadrilaterals are new shapes. Learners were not taught to count the number of sides of straight-sided 2-D shapes (polygons) **Shapes and their distinguishing** characteristics There are two ways in which learners distinguish shapes in Grade 4. 1. Check whether the shapes 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, e.g. all the shapes above have curved sides. • *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** of polygons. 	

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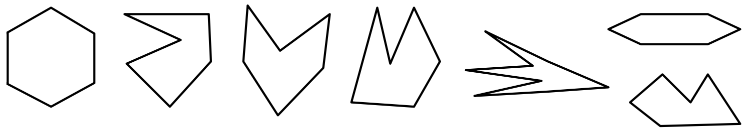
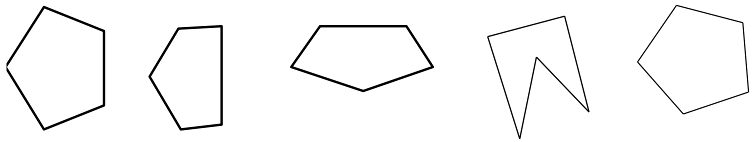
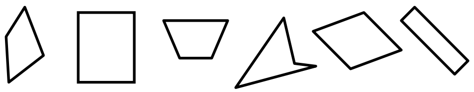
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
SPACE AND SHAPE	**3.1** **Properties of 2-D shapes**		2. When looking at the group of shapes with straight sides, learners group them according to the number of sides. Closed shapes with straight sides are called polygons. **Polygons** A regular polygon is a straight-sided closed shape of which all sides are equal and all 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 hexagon or pentagon. **Examples** of hexagons  **Examples of** pentagons  Learners need to know that all closed shapes with 4 straight sides are called **quadrilaterals.** **Examples** of quadrilaterals.  In Grade 4 learners need to identify and name **squares** and **rectangles**. For other quadrilaterals they use the group name, quadrilateral. Learners should be exposed to a range of different triangles, but are not expected to name types of triangles in Grade 4.	

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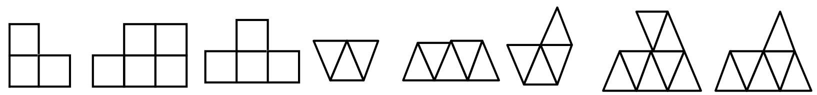
SPACE AND SHAPE	**3.1** **Properties of** **2-D shapes**		**Activities to focus learners on** characteristics **of shapes** Most commercially available sets of 2-D shapes do not show irregular shapes. They are however easy to cut out of cardboard. Learners can draw irregular shapes on grid paper, or if they have geoboards, they can create irregular shapes on geoboards. Learners can also put cut-out card or plastic shapes together to make composite irregular shapes. Some examples are given below. This is further described under transformations.  **Written exercises and recording** Learners should do practical work with concrete apparatus, but they should also do written exercises. In Term 1 learners should be introduced to all the 2-D shapes they need to know. They should learn about the characteristics that they need to use to identify shapes. They should draw 2-D shapes and if they have apparatus create composite shapes or create shapes on geoboards. They should do written exercises involving 2-D shapes.	**5 hours**

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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 2-digit by 2-digit numbers • Division 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 • rounding off and compensating • doubling and halving • using a number line • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative; associative; and distributive properties of whole numbers **Solving problems** • Solve problems in contexts involving whole numbers, including - financial contexts - measurement contexts	This is the second time that learners do multiplication and division in Term 1. Learners should already be familiar with the multiplication tables to 10 x 10 and be able to use these in multiplying and dividing 2-digit numbers In Term 1, learners should revise and consolidate work done in Grade 3 .i.e. • learners multiply at least 2-digit by 2-digit numbers • learners divide at least whole 2-digit by 1-digit numbers **What is different to Grade 3?** Rounding off to the nearest 10, to estimate answers. **Learners should do context free calculations and solve problems in contexts** Remember, that 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 estimate their answers before calculating. They can round off the numbers involved in the calculations. Learners can round off to the nearest 10 when multiplying or dividing with 2-digit numbers **Checking solutions** • Learners should know that they can check a division calculation by multiplying **Example:** If 69 ÷ 3 = 23; then 23 x 3 = 69 • When learners need to check a division calculation with a remainder, they will need to be taught to first multiply and then add the remainder **Example:** If 70 ÷ 3 = 23 remainder 1; then 23 x 3 = 69 therefore 69 + 1=70 • Using the inverse operation to check solutions is one reason for teaching multiplication and division together. Another reason for looking at multiplication and division together is that we almost always use multiplication to solve division. In Grade 4 learners break up numbers to multiply. There are different ways of doing this. Sometimes the numbers involved in the calculation make different methods easier or more difficult. Learners have already seen how to use the associative and commutative properties to make multiplication easier.	**5 hours**

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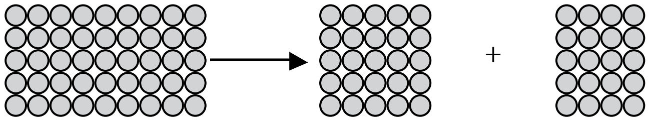
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication and division	• Solve problems involving whole numbers, including - comparing two or more quantities of the same kind (ratio) - comparing two quantities of different kinds (rate) - grouping and equal sharing with remainders	**Multiplication and the distributive property of multiplication over addition/ subtraction** One way for learners to understand how and why the distributive property works, is to break up 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 split the number and then multiply each part separately. **Using factors to multiply** **Example**: Calculate 47 x 6 47 x 6 = 47 x 2 x 3 = 94 x 3 = (90 + 4) x 3 = 90 x 3 + 4 x 3 = 270 + 12 = 282 **Using the distributive property to multiply** Example: 47 x 5 = 40 x 5 + 7 x 5 ---------► (using the distributive property) = 4 x 10 x 5 + 35 = 4 x 5 x 10 + 35 = 200 + 35 = 235	

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NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication and division		**or** 47 x 5 = (50 – 3) x 5 --------▶ (using the distributive property) = 50 x 5 – (3 x 5) = 5 x 5 x 10 – 15 = 250 – 15 = 235 **Dividing** Learners use what they know about multiplication to do division. In the past learners have sometimes been taught to write out the whole times table, which they were encouraged to work out by repeated addition. It is better not to limit learners' division ability to repeated addition. Rather let them work with useful and easily remembered multiplication facts, especially multiples of , and then doubling and halving. **Example** 75 ÷ 4 Learners can write out a **"clue board"** of what they know about multiplying by 4 **Example:** 4 x 10 = 40 4 x 20 = 80 (doubling the first statement) 4 x 5 = 20 (halving the first statement) 4 x 4 = 16 4 x 3 = 12 Learners multiply and then subtract to calculate <table><tr><td>Multiply</td><td>Subtract</td></tr><tr><td>4 x **10** = 40</td><td>75 – 40 = 35</td></tr><tr><td>4 x **5** = 20</td><td>35 – 20 = 15</td></tr><tr><td>4 x **3** = 12</td><td>15 – 12 = 3</td></tr></table>75 ÷ 4 = **10 + 5 + 3** + remainder 3 = 18 remainder **3**	

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NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication and division		Learners should check their calculations by multiplying: 18 x 4 = 72 therefore 72 + 3 = 75. **Kinds of problems** Sharing, grouping, treating groups as units, rate, See the description of problem types at the end of the grade notes	
ASSESSMENT: At this stage learners should have been assessed on: • data handling • 2-D shapes • multiplication and division of 2-digit numbers by 1-digit numbers				
REVISION				**5 hours**

GRADE 4 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 for: - 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 **Number range for counting, ordering, comparing and representing and place value of digits** • Count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and 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 and 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, sometimes with smaller number ranges in the mental Mathematics programme. From Term 2 onwards the number range should be increased towards towards that required by the end of the year. 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 ◊ multiples of 100 ◊ multiples of 1000 - times tables: multiplication of whole numbers to at least 10 x 10 • Calculation techniques - doubling and halving. - using multiplication to do division. - multiplying by and - multiplying by 10, 100 and 1 000. - multiplying by multiples of 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 10, 100 and 1 000. - adding and subtracting of units, multiples of 10 and multiples of 100 to/from any 4-digit number.	**10 minutes every day**

GRADE 4 TERM 2				
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NUMBERS, OPERATIONS AND RELATIONSHIPS	**Mental Mathematics**	**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 • rounding off and compensating • doubling and halving • using a number line • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative, associative, and distributive properties of whole numbers	• **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 4-digit numbers - place value up to 4-digit numbers - building up and breaking down numbers - odd and even numbers - multiples **Recommend techniques** • building up and breaking down numbers • rounding off and compensating • doubling and halving • reciprocal relationship between multiplication and division • inverse relationship between addition and subtraction Some mental Mathematics can be done without apparatus, but it is often useful to do mental Mathematics with apparatus **Recommended apparatus** • numbered or un-numbered numberline • a number grid • place value cards • counting beads	

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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 2s, 3s, 5s, 10s, 25s, 50s, 100s) between 0 and 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 10, 100 and 1 000	**What is different to Term 1?** • Counting number range increased to 10 000 • Rounding off to the nearest 10 and 100 • Number range for place value, ordering, comparing and representing numbers increased to 4 digits. **See notes for Term 1** All work developed here can be practised throughout the year in the mental Mathematics programme.	**1 hour**

GRADE 4 TERM 2				
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 4-digits. **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 • rounding off and compensating • doubling and halving • using a number line • using addition and subtraction as inverse operations **Properties of whole numbers** Recognize and use the commutative and associative properties of whole numbers **Solving problems** Solve problems in contexts involving whole numbers, including financial contexts	**What is different to Term 1?** • In Term 2, learners add and subtract numbers up to 4 digits. • Rounding-off includes rounding off to the nearest 1 000 as a way of estimating answers. **Learners should solve problems in contexts and do context free calculations** Learners continue to • check their solutions themselves by using the inverse operation • judge the reasonableness of their solutions by rounding off numbers and estimating answers. The calculation techniques continue to mostly involve 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 5 362 + 2 486 = 5 000 + 300 + 60 + 2 + 2 000 + 400 + 80 + 6 2 + 6 = 8 =5 000 + 2 000 + 300 + 400 + 60 + 80 + 2 + 6 **OR** and 60 + 80 = 140 =7 000 + 700 + 140 + 8 and 300 + 400 = 700 =7 848 and 5 000 + 2 000 = 7 000 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	**4 hours**

GRADE 4 TERM 2				
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		• **Filling up tens by breaking down the number to be added.** This can also be called rounding off and compensating. Here, compensating means that whatever is added, must be subtracted again so that the statements remain equivalent. **Example** Calculate 2 486 + 48 2 486 + 48 = (2 486 + 14) – 14 + 48 = 2 500 + (48 –1 4) = 2 500 + 34 = 2 534 • **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 **OR** 7 – 3 = 4 = (4 000 – 2 000) + (600 – 100) + (80 – 40) + (7 – 3) and 80 – 40 = 40 = 2 000 + 500 + 40 + 4 and 600 – 100 = 500 **= 2 544** and 4 000 – 2 000 = 2 000 This means that: 4 687 – 2 143 = 2 000 + 500 + 40 + 4 **= 2 544** • **Breaking down all the 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 = (8 000 + 700 + 40 + 3) – 5 000 – 600 – 80 – 4 = (8 000 + 600 + 130 + 13) – 5 000 – 600 – 80 – 4 (breaking up 743 into 600 + 130 + 13) = (8 000 – 5 000) + (600 – 600) + (130 – 80) + (13 – 4) = 3 000 + 0 + 50 + 9 = 3 059	

GRADE 4 TERM 2				
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 → 2 544 **Kinds of problems** Summation, Increase and decrease, comparison by difference; comparison by ratio See the description of problem types at the end of the grade notes	
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2** **Common fractions**	**Concepts, skills and number range for Term 1** **Solving problems** Solve problems in contexts involving fractions, including grouping and equal sharing **Describing and ordering fractions** • Compare and order common fractions of different denominators (halves, thirds, quarters, fifths, sixths, sevenths, eighths) • Describe and compare common fractions in diagram form **Calculations with fractions:** • Recognize, describe and use the equivalence of division and fractions • Addition of common fractions with same denominators **Equivalent forms:** Recognize and use equivalent forms of common fractions (denominators which are multiples of each other)	**What is different to Grade 3?** Sevenths are new. There are different ways to understand fractions. This means that 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. The concept of a fraction should first be developed before learners focus on equivalence and calculating. 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 a 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 a 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	

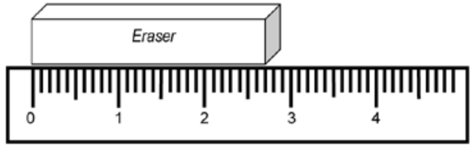
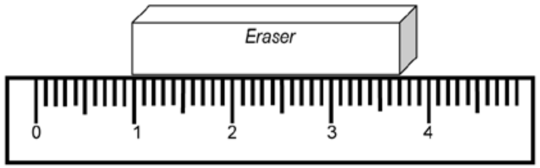
GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2** **Common fractions**		Learners should not only work with one kind of model, because this can limit their understanding of fractions. For example, fractions in diagram forms should include region models (circles and other geometric shapes divided into fraction parts), length models (including number lines) and set models (which show collections of objects). In Term 1 learners should revise and consolidate what they learned about fractions in Grade 3. Learners should solve problems as well as work with apparatus and diagrams involving area, length and set models to ensure that they • understand the relationship between fractions and division i.e. if you share 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 $\frac{1}{2}$ than but less than 1. When naming fraction parts it is useful for learners to rather use the form “3 quarters”. Learners should, through work with apparatus, diagrams and solving problems, learn the new fractions that they will deal with in Grade 4.	**6 hours**

ASSESSMENT:

At this stage learners should have been assessed on:

- 4-digit numbers
- adding and subtracting with 4-digit numbers
- fractions

GRADE 4 TERM 2				
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 contexts related to length Conversions include converting between • millimetres (mm), and centimetres (cm) • centimetres (cm) and metres (m) • metres (m) and kilometres (km) Conversions are imited to whole numbers and fractions	**What is different to Grade 3?** In Grade 3 learners work with non-standard or informal units when measuring. They are introduced to metres and centimetres. They use rulers to measure in centimetres only. In Grade 3 learners use metre sticks or lengths of string to measure in metres. They do not learn that there are 100 cm in 1 m. They do not do conversions between units. In Grade 4 learners work with new measuring instruments. Millimetres and kilometres are introduced and learners do conversions between units. Grade 4 learners need to understand and learn the relationship between metres and centimetres, centimetres and millimetres, metres and kilometres. **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 because: • centimetres are always numbered • there are always 10mm divisions in a centimetre In Grade 4 learners normally record their measurements with rulers as millimetres or centimetres or millimetres and centimetres e.g. the pencil is 11 centimetres and 3 millimetres long. Learners 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 is the same as 2,5, they will also be able to use the decimal 5 in their recording i.e. 2,5cm long. Check that learners know to start measuring from zero, or to subtract the initial measurement from the final measurement.	

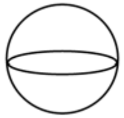
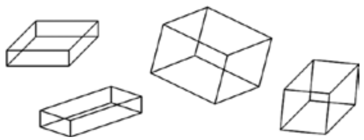
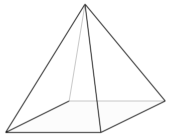
GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
MEASUREMENT	**4.1** **Length**		This is illustrated below. **Example:**  The eraser is 2cm + 7mm or 20mm + 7mm or 27mm long  The eraser is (3cm –1cm) + 7mm = 2cm + 7mm or 20mm + 7mm or 27mm long Once learners have some experience of measuring in each unit, they should estimate before every measurement. It is useful to have everyday referents as comparisons e.g. the width of a door and height of a window are often 1 m, the width of a match is often 1 mm. Tape measures that are longer than 1 m and 2 m 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 4 m and 78 cm, but the tape may only show the number 78. When using the longer measuring tapes, estimation becomes even more important. **Compare and order lengths** up to 4 digits in mm, cm, m, km In Grades R to 2 learners place objects next to each other and discuss which is longer or shorter. In the Intermediate Phase learners need to compare lengths and heights when given 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 that learners have worked with so far in the year, are given below.	**7 Hours**

GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
MEASUREMENT	**4.1** **Length**		**Estimate and calculate using mm, cm, m, km** • rounding numbers up or down to the appropriate unit of length • rounding off to 10, 100, 1 000 • addition and subtraction of up to 4-digit numbers • multiplication of 2-digit by 1-digit numbers • division of 2-digit by 1-digit numbers • add fractions in measurement contexts (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** Include 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 multiplying and dividing by 10; 100 and 1 000. Conversions should be limited to whole numbers and fractions given only as halves, thirds, quarters, fifths, sixths, sevenths, eighths. In Grade 4 learners do not calculate using decimals. When doing division they sometimes have a remainder e.g. 37 ÷ 4 = 9 remainder 1. Similarly when converting between units, they may give their answers in a combination of units e.g. • 35mm = 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	

GRADE 4 TERM 2

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 2-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 • rounding off and compensating • doubling and halving **Number range for multiples and factors** Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative; associative; and distributive properties of whole numbers	**What is different to Term 1?** • In Term 2, learners multiply 2-digit by 2-digit numbers. • Rounding includes rounding off to the nearest 1 000 as a way of estimating answers. **Learners should do context free calculations and solve problems in contexts and do context free calculations** Learners should continue to judge the reasonableness of their solutions e.g. by estimating before calculating, using rounding off to the nearest 10 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** **Example:** Calculate 47 x 45 47 x 45 = 47 x (40 + 5) --------▶ (breaking up one number) =47 x 40 + (47 x 5) --------▶ (using the distributive property) =1 880 + 235 =2 115 **Or** 47 x 45 = 47 x (50 – 5) --------▶ (rounding up and compensating) =47 x 50 – (47 x 5) --------▶ (using the distributive property) =2 350 – 235 =2 115 Checking the reasonableness by rounding off **Example:** 47x45≈47x50≈2 350 (by approximating the multiplicand). 47x45≈50x45≈2 250 (by approximating the multiplier).	

GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Multiplication		**Breaking down numbers into factors to multiply** **Examples**: Calculate a) 47 x 12 = 47 x 2 x 6 = 47 x 2 x 2 x 3 = 94 x 2 x 3 = 188 x 3 = (100 + 80 + 8) x 3 = 300 + 240 + 24 = 564 b) 53 x 45 = 53 x 9 x 5 = 53 x 3 x 3 x 5 = 159 x 3 x 5 = 477 x 5 = (400 + 70 + 7) x 5 = 2 000 + 350 + 35 = 2 385	**6 hours**
		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)	**Kinds of problems** Treating groups as units, rate (see the description of problem types at the end of the Grade 4 notes)	

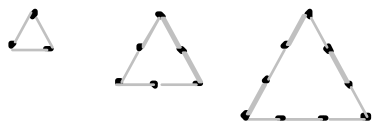
GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
SHAPE AND SPACE	**3.2** **Properties of 3-D objects**	**Objects learners need to know and name** • rectangular prisms • spheres • cylinders • cones • square-based pyramids **characteristics which learners use to distinguish, describe, sort and compare objects** • shapes of faces • flat and curved surfaces **Further activities to focus learners on** characteristics **of objects** Create 3-D models using cut-out polygons	**What is different to Grade 3?** Learners focus on the same 3-D geometrical objects, but in Grade 3 they spoke of • boxes, and in Grade 4 they call these rectangular prisms • ball shapes and in Grade 4 they call these spheres **Objects and their distinguishing** characteristics There are two ways in which learners distinguish 3-D objects in Grade 4. 1. Check whether they have flat or curved surfaces. Three dimensional objects can be grouped as follows: • *Objects with a curved surface only:* **Example:** a sphere  • *Objects with flat and curved surfaces* Cones  Cylinders  • *Objects with only flat surfaces.* In Grade 4 learners only identify and name them. **Examples** rectangular prisms.  pyramids: square- base 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.	**5 hours**

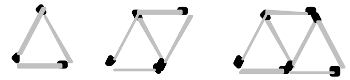
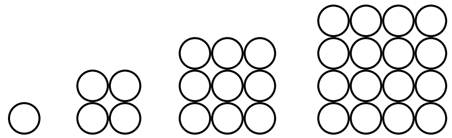
GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
SHAPE AND SPACE	**3.2** **Properties of 3-D objects**		**Making models of 3-D objects** Making 3-D objects by putting together cut-out polygons, helps to focus attention on the shapes of the faces of the 3-D objects. **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 practise interpreting drawings of 3-D objects. They should identify and name 3-D objects in drawings; compare 3-D objects from drawings; identify everyday objects that look like geometric objects e.g. a milk carton looks like a rectangular prism; describe the surfaces of objects when shown drawings of 3-D objects; match the 2-D shapes that have the same shape as the face of 3-D objects.	

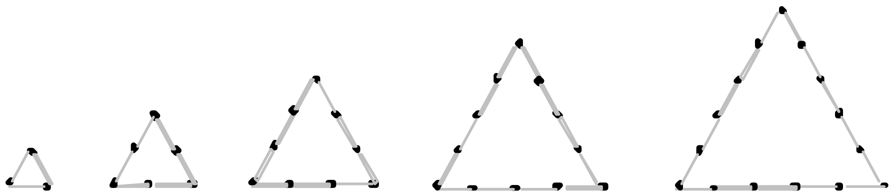
ASSESSMENT:

At this stage learners should have been assessed on:

- length
- multiplying 2-digit numbers by 2-digit numbers
- 3-D objects

GRADE 4 TERM 2				
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	**What is different to Grade 3?** In Grade 3 learners copy, extend and describe patterns made with numbers, objects or drawings The descriptions are only verbal. They also createtheir own patterns. The kinds of patterns become more complex in Grade 4. In Grade 4 learners are introduced to a new way to represent patterns: the input-output flow diagram (some learners may have used this in Foundation Phase, but it is not a specification). 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. 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, in Shape and Space 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. What kinds of geometric patterns should learners work with? • Simple repeating patterns – but this is really more of a focus in the Foundation Phase **Example:** Complete the pattern  • Patterns in which the shapes grow or decrease in different ways. We can describe these patterns by the way they look. - patterns in which the shape keeps its form, but gets larger (or smaller) in each stage. 	**4 hours**

GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
PATTERNS, FUNCTIONS AND ALGEBRA	**2.2** **Geometric patterns**		- patterns in which a shape or part of a shape is added at each stage  In each of the examples above the patterns are made by adding on the same number of matches in each successive shape. In the top pattern 3 matches are added each time. In the second pattern two matches are added each time. Both patterns show number **patterns with a constant difference.** Most geometric patterns learners see in Grade 4, will be patterns with a constant difference**.** They are more likely to get patterns with a constant ratio when working only with number sequences. • 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 - You want learners to describe the relationship between shapes in the sequence or rules in their in own words. To do this, learners need to discuss how they made the pattern or to answer the question “How do I get from one stage in the pattern to the next?” Learners need to have opportunities to see that sometimes changing the form of representation (geometric to verbal or to a flow diagram or to a table) can help them to understand the pattern in different ways. Learners should “translate” these geometric sequences into other forms of expression or representation, namely • verbally describe the pattern • number sequences which can also be recorded in a table form.	

<table>
<tr><th colspan="5">GRADE 4 TERM 2</th></tr>
<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 triangles”
“ Each triangle is bigger than the one before”
Describing how they made the pattern or answering the question “how to I get from one stage to the next?”
“I added one more matchstick to each side of each triangle”
“Each triangle has one more matchstick in each side than the triangle on its left”
Recording the number pattern in a table.
When learners fill in the table like the one shown below, they will see that the number of matchsticks used for each triangle is 3 times the position of the triangle in the sequence. They will see that the rule is triangle number times 3. Learners can then be asked to predict how many matches they will use for triangles they have not built, e.g. 10th, 100th etc.
<table>
<tr><td>Triangle number</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>5</td><td>10</td></tr>
<tr><td>Number of matchsticks</td><td>3</td><td>6</td><td>9</td><td></td><td></td><td></td><td></td></tr>
</table></td><td></td></tr>
<tr><td>SHAPE AND SPACE</td><td>3.3
Symmetry</td><td>Recognize, draw and describe line of symmetry in 2-D shapes</td><td>This should include shapes in which there are more than one line of symmetry.
Drawings of 2-D shapes should include those where the line of symmetry is not necessarily vertical.</td><td>2 hours</td></tr>
</table>

GRADE 4 TERM 2				
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 4 digits. **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 • 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 1-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 the second time that learners work with addition and subtraction with up to 4-digit numbers in Term 2. Learners revise and consolidate what they have done earlier in the term. See previous notes.	**4 hours**

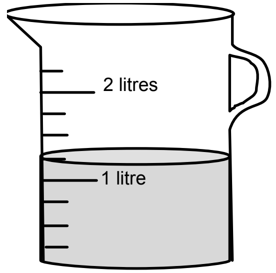
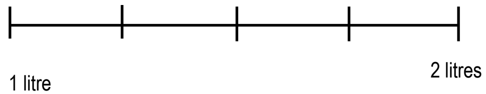
GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Division	**Number range for calculations** • Division of at least whole 3-digit by 1-digit numbers. **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 - rounding off and compensating - doubling and halving - using multiplication and division as inverse operations **Number range for multiples and factors** • Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** • Recognize and use the commutative; associative; and distributive properties of whole numbers **Solving problems** • Solve problems in contexts involving whole numbers - financial contexts - measurement contexts • Solve problems involving whole numbers, including - grouping and equal sharing with remainders	**What is different to Term 1?** In Term 1, learners revise and consolidate work done in Grade 3.i.e. learners divide at least whole 2-digit by 1-digit numbers. In term 2, learners divide 3-digit numbers by 1-digit numbers **Learners should solve problems in contexts and do context free calculations** The following problem types remain important: • sharing, grouping, rate See the description of problem types at the end of theGrade notes Learners continue • to check their solutions themselves, by using multiplication • to judge the reasonableness of their solutions, by estimating before calculating **Dividing** Learners continue to use what they know about multiplication to do division. With all calculations in Grade 4, learners are not encouraged to treat the digits separately, but rather to consider the number as a whole and to keep in mind the value of the parts of the number. In the past Grade 4 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 , Grade 4 learners were encouraged to divide by doing repeated subtraction of the divisor. Most Grade 4 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** 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. Multiply by 5 (halve the multiplying by 10 value). Multiply by 2, 4, 8 (through doubling).	**4 Hours**

GRADE 4 TERM 2				
CONTENT AREA	**TOPICS**	**CONCEPTS AND SKILLS**	**SOME CLARIFICATION NOTES OR TEACHING GUIDELINES**	**DURATION (in hours)**
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Division	- comparing two or more quantities of the same kind (ratio) - comparing two quantities of different kinds (rate)	Filling in other multiples as they need to use them. **CLUE BOARD** 10 x 8 = 80 20 x 8 = 160 30 x 8 = 240 40 x 8 = 320 5 x 8 = 40 6 x 8 = 48 3 x 8 = 24 Learners multiply and then subtract to calculate. **Multiply** / **Subtract** **40** x 8 = 320 / 375 – 320 = 55 **6** x 8 = 48 / 55 – 48 = **7** 375 ÷ 8 = **40** + **6** + remainder **7** = **46** remainder **7** Learners should check their calculations by multiplying: 46 x 8 = 368, and 368 + 7 = 375. 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. Therefore, the answer should lie between 40 and 50.	
ASSESSMENT: At this stage learners should have been assessed on: • dividing 3-digit numbers by 1-digit numbers • adding and subtracting 4-digit numbers • geometric patterns				
REVISION				**4 hours**
Assessment (Half-yearly)				**6 hours**

GRADE 4 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 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 • **Number range for counting, ordering, representing and place value of digits** count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s) between 0 and 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 10, 100 or 1 000. **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	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	**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**	• rounding off and compensating • doubling and halving • using a number line • using addition and subtraction as inverse operations • using multiplication and division as inverse operations **Number range for multiples and factors** Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative; associative; and distributive properties of whole numbers		

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 spoon, measuring cups, measuring jugs **Units** millilitre (ml) , litres (l) **Calculations and problem-solving related to capacity/volume include:** • Solve problems in contexts using capacity • Convert between litres and millilitres, limited to examples of whole numbers and fractions	**What is different to Grade 3?** In Grade 3 learners work with non-standard or informal units when measuring capacity. They also work with litres and millilitres. They do not learn that there are 1 000 millilitres in 1 litre. They do not do conversions between units. They work with measuring cups and measuring spoons. They begin to work with measuring jugs, but only read off measurements where the calibration line is numbered. Grade 4 learners work with new measuring instruments, and convert between units. Grade 4 learners need to • consolidate their sense of how much 1 litre is; • further develop a sense of how much 1 millilitre is; • understand and know the relationship between the two units of capacity; and • read any measurement on a measuring jug i.e. at both numbered and unnumbered calibration lines. **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 for example, only contain a volume of 250 ml. **Measuring capacity/ volume and reading capacity/ volume measuring instruments** Learners find it easy to measure with measuring spoons or measuring cups, because this requires filling them and pouring the contents out. 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 involved. These include • knowing where to stand to read the measuring jug correctly • knowing how to read the numbered gradation lines and to calculate what the unnumbered gradation lines mean. **Learners need to read** • different kinds of measuring jugs • measuring jugs on which the numbered intervals/gradation lines/calibration represent different intervals /amounts • measuring jugs on which there are a different number of un-numbered intervals within each numbered interval.	**6 Hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.3** **Capacity/ volume**		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 An example is given below. Here the numbered gradation lines on the jugs show 1-litre amounts.  Let's think about 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 1 space above 1 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 than with jugs. **Compare capacities** up to 4 digits in ml, l Learners should sequence containers marked in millilitres and / or litres. Here learners need to be able 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.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.3** **Capacity/ volume**		**Recording capacities** Because learners work only 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 on some packaging they can also write half litres in decimal-form. However 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 given below. **Estimate and calculate** using ml, l • rounding numbers up or down to the most appropriate unit of measurement • rounding off to 10, 100, 1 000 • addition and subtraction of up to 4-digit numbers • multiplication 2-digit by 2-digit numbers • division: 3-digit by 1-digit numbers • counting in fractions e.g. $\frac{1}{4}$ litre, $\frac{3}{4}$ litres, 1 litre as they measure with measuring cups hold $\frac{1}{4}$ litre • add fractions in contexts (using only halves, thirds, quarters, fifths, sixths, sevenths and eighths) **Solve problems** relating to capacity Include rate and ratio problems **Convert** between units $ml \leftrightarrow l$ Converting between the units of measurement provides a context for practising multiplying and dividing 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 a half. Remember learners can also state their answers in a combination of units, e.g. 3l and 4ml or 5l and 26ml	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.2** **Common fractions**	**Solving problems** • Solve problems in contexts involving fractions, including grouping and equal sharing **Describing and ordering fractions** • Compare and order common fractions with different denominators (halves; thirds, quarters; fifths; sixths; sevenths; eighths) • Describe and compare common fractions in diagram form **Calculations with fractions** • Addition of common fractions with same denominators • Recognize, describe and use the equivalence of division and fractions **Equivalent forms:** • Recognize and use equivalent forms of common fractions (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 4 notes). • a range of apparatus and diagrams (see notes Term 1) **Equivalent forms** A focus of Term 2 can be on equivalence (which should be developed through problem-solving and working with diagrams and apparatus). The fractions that learners will be assessed on in Grade 4 were stated in Term 1. Learners are not expected to be able to give equivalent fractions in symbolic (number) form without having diagrams which they can refer or without 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. **Comparing and ordering fractions:** Learners should also compare and order fractions either with the aid of diagrams (fractions as shapes or number lines) or through problem contexts or using the two together. **Calculations with fractions:** Calculations with fractions are limited to • making 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 sweets • adding 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. Measurement is an important context through which to develop and consolidate the notion of fractions. If the suggested sequencing in this document is followed then learners will have covered length and capacity already. Length and capacity can be used to develop the concepts of fractions, equivalence, and adding with 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** 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 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and 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 10, 100 or 1 000	See notes in Term 2 All work developed here can be practised throughout the year in the mental Mathematics programme.	**1 hour**

GRADE 4 TERM 3				
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 4 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 **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 done in Term 2. Refer to those notes.	**4 hours**

ASSESSMENT:

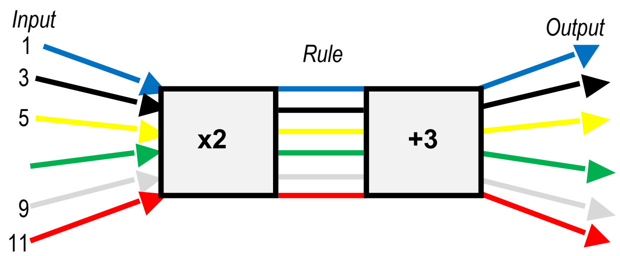
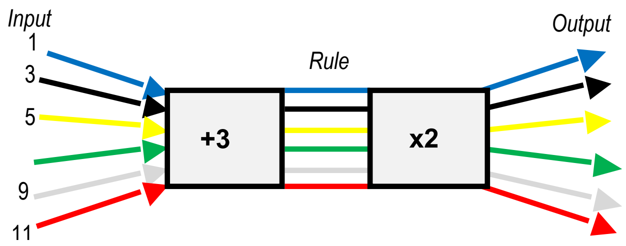
At this stage learners should have been assessed on:

- 4-digit numbers
- adding and subtracting with 4-digit numbers
- fractions
- capacity

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** Match different views of everyday objects Identify everyday objects from different views	This links with the work done in Geography in Map Skills. Learners work with side views, plan views and top views of simple single objects such as a cup, hat, shoe, box, apple. They also work with side views and plan views of a classroom, simple buildings, school fields. The skills of identifying everyday objects and collections of objects can be developed in the Geography lessons and practised in the Mathematics lessons.	**2 hours**
SHAPE AND SPACE	**3.1** **Properties of 2-D shapes**	**Shapes learners need to know and name** • Regular and irregular polygons: - triangles - squares, rectangles, other quadrilaterals - pentagons - hexagons • Circles **Characteristics which learners use to distinguish, describe, sort and compare shapes** • straight and curved sides • number of sides **Further activities to focus on characteristics of shapes** Draw 2-D shapes on grid paper	This is revision and consolidation of work done in Term 1. See notes in Term 1 Learners should do both written exercises and some practical work with apparatus	**4 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 rowspan="3">DATA HANDLING</td><td>5.1
Collecting and organising data</td><td>Collect data using tally marks and tables for recording</td><td rowspan="3">Teachers in this phase should ensure that different topics are chosen for data collection in each of the grades.
The following are new in Term 3 of Grade 4
• learners read, interpret, analyse and summarise pie charts, where the information is presented in fractions only
• learners read, analyse data represented in words i.e. short paragraphs - the data presented in words should be represented in other forms and then analysed
Analysing graphs
Analyse graphs on environmental or socio-economic contexts and answer questions on graphs. Both graphs and questions to be provided by teacher or textbook. Learners should work with at least
• 1 pie graph where the information is given in common fractions and not percentages
• 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</td><td rowspan="3">7 hours</td></tr>
<tr><td>5.2
Representing data</td><td>Draw a variety of graphs to display and interpret data including:
• pictographs (one-to-one representation)
• bar graphs</td></tr>
<tr><td>5.3
Analysing, interpreting and reporting data</td><td>Critically read and interpret data represented in
• words
• pictographs
• bar graphs
• pie charts
Analyse data by answering questions related to data categories
Summarise data verbally and in short written paragraphs</td></tr>
</table>

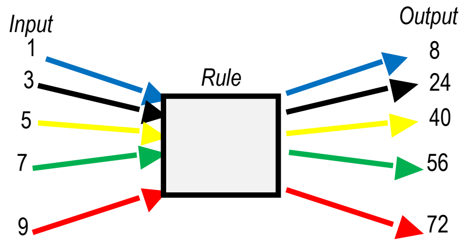
CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
			Data represented in words The data presented in words should be represented in other forms such as tally marks, tables or pictographs and then analysed. **Complete data cycle including drawing pictograph: context personal data** This is can be used as a Maths project for the year. Learners work through whole data cycle to create an individual pictograph 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. **Developing 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 for learners to become aware of factors that can impact on the data. Learners should do at least 1 example. 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.) • comparing data collected at your school to national data from *Census At School* e.g. favourite sports; favourite subjects; transport 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	
ASSESSMENT At this stage learners should have been assessed on: • views • 2-D shapes • data handling (recommended form of assessment: **project**)				

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 • Inverse operation between multiplication and division • Multiplication of units by multiples of ten • 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 multiply in any order, and that they can add in any order. They can compare flow diagrams to see whether order makes a difference when they add and multiply in any order. **Example**   Learners should discuss whether the order of the operations made a difference Once learners have had practice in finding inputs and outputs when the rule is stated, they can be given examples where inputs and outputs 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.	**4 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>PATTERNS, FUNCTIONS AND ALGEBRA</td><td>2.1
Numeric patterns</td><td></td><td>

Example

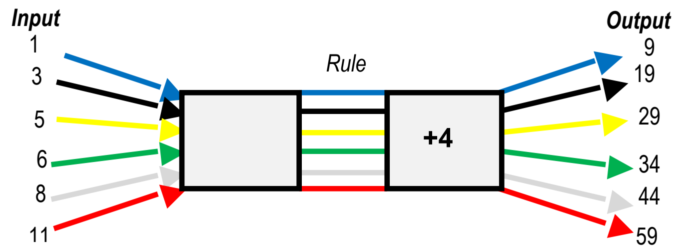
Find the rule



Then they can 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



Sequences of numbers:

In the Intermediate Phase learners extend sequences of numbers. In Grade 4 they work with two kinds of sequences.

1. Sequences involving a constant difference

Examples

a) 2; 4; 6; 8…

b) 18; 16; 14; 12…

In the examples above learners are adding 2 or subtracting 2 to make 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 on a multiple of the number they are adding or subtracting.

</td><td></td></tr>
</table>

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
PATTERNS, FUNCTIONS AND ALGEBRA	**2.1** **Numeric patterns**		**Examples** a) 1; 4; 7; 10……. b) 87; 66; 45; …….. 2. Sequences involving a constant ratio **Example** 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. **Examples** a) 3; 6; 12; 24; ... b) 10; 30; 90; 270; ...	

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 4 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 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative and associative properties of whole numbers **Solving problems** Solve problems in contexts involving whole numbers, including financial contexts	This is further practice of Addition and Subtraction done in Term 2. Refer to those notes	**4 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	**Number range for calculations** Multiplication of at least whole 2-digit by 2-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 • rounding off and compensating • doubling and halving **Number range for multiples and factors** Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative; associative; and distributive properties of whole numbers **Solving problems** Solve problems in contexts 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)	This is further practice of Multiplication done in Term 2. Refer to those notes	**5 hours**

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<tr><td>PATTERNS, FUNCTIONS AND ALGEBRA</td><td>2.3
Number sentences
(introduction to algebraic expressions)</td><td>Number sentences
• Write number sentences to describe problem situations
• Solve and complete number sentences
- by:
- inspection
- trial and improvement
• Check the solution by substitution</td><td>This is a continuation of the work done on 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 (see the notes on problem types at the end of Grade 4) 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. During the second part of the year you can give learners practice in answering multiple choice questions, which is a common format in national systemic tests.
Example using place value
2 000 + □ + 30 + 9 = 2 739
Choose the correct answer
a)7
b) 739
c) 700
d) 2 739
Number sentences can also consolidate the idea of expressing a rule:
For which pairs of numbers can you use the rule ‘multiply the first number by 6 to get the second number’
<table><tr><th>First number</th><th>Second number</th></tr><tr><td>a) 3</td><td>18</td></tr><tr><td>b) 5</td><td>66</td></tr><tr><td>c) 2</td><td>12</td></tr><tr><td>d) 11</td><td>30</td></tr></table>This is done to especially focus learners’ attention on the properties of operations. The examples can focus more on the concept of equivalence.
Example:
Which of the following statements are TRUE?
8 x □ = □ + 8
8 x □ = □ – 8
8 x □ = □ x 8
8 x □ = 7 + □</td><td>3 hours</td></tr>
</table>

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)		**Example:** How much is 14 x 18 less than 15 x 18? a) 1 b) 18 c) 14 d) 15	
SPACE AND SHAPE	**3.4** **Transforma-tions**	**Build composite shapes** Put 2-D shapes together to create different composite 2-D shapes including some shapes with line symmetry. **Tessellations** Pack out 2-D shapes to create tessellating patterns including some patterns with line symmetry. **Describe patterns** Refer to lines, 2-D shapes, 3-D objects and lines of symmetry when describing patterns • in nature • from modern everyday life • our cultural heritage	In this suggested sequencing of Grade 4 Mathematics, transformations are done again inTerm 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. **Build composite shapes** Learners put together 2-D shapes to make composite 2-D shapes. Tangram puzzles are an example of this. Sometimes learners should be instructed to put together 2-D shapes to make composite shapes with a line of symmetry.	**3 hours**
	REVISION			**4 hours**

GRADE 4 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 for: - 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 **Number range for counting, ordering, comparing and representing and place value of digits** • Count forwards and backwards in 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and 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 10, 100 or 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	**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** Use a range of techniques to perform and check written and mental calculations with 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 • using multiplication and division as inverse operations **Number range for multiples and factors** Multiples of 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative, associative and distributive properties of whole numbers		

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 2s, 3s, 5s, 10s, 25s, 50s, 100s between 0 and 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 10, 100 or 1 000.	**See Term 2 notes** All work developed here can be practiced in the Mental Mathematics Programme for the rest of the year	**1 hour**

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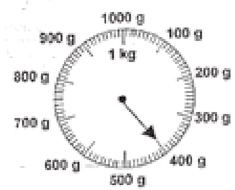
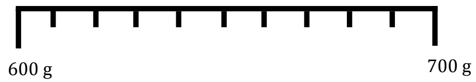
NUMBERS, OPERATIONS AND RELATIONSHIPS	**1.1** **Whole numbers** Addition and subtraction	**Number range for calculating** Addition and subtraction of whole numbers with at least 4 digits. **Calculation techniques** Use a range of techniques to perform and check written and mental calculations of whole 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 **Properties of whole numbers** Recognize and use the commutative and associative properties of whole numbers **Solving problems** Solve problems in contexts involving whole numbers, including financial contexts	This is further practice of addition and subtraction done in Term 2: Refer to those notes	**4 hours**

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 • 3-D objects using mass **Measuring instruments** bathroom scales, kitchen scales and balances **Units** grams (g) and kilograms (kg)	**What is different to Grade 3?** In Grade 3 learners work with non-standard or informal units when measuring mass. They also work with kilograms and grams. They read bathroom scales but only read the mass at the numbered calibration lines. They do not learn that there are 1 000g in 1kg. They do not convert between units. The Grade 4 learners must learn the relationship between the two units. Grade 4 learners need to • consolidate their sense of how much 1kg is • further develop a sense of how much 1g is • understand and know the relationship between grams and kilogram • convert between grams and kilograms • read measurements on scales indicated on both numbered and unnumbered calibration lines. **Reading instruments and measuring mass** Learners need to • estimate mass in grams and kilograms • read the masses stipulated on packaging • read the mass on pictures of kitchen scales (in g & kg) and bathroom scales (in kg) and balance scales (in g & kg) • read the mass on real kitchen scales in (g & kg) and bathroom scales (in kg) and balance scales (in g & kg). Reading the mass on kitchen and bathroom scales involves - knowing where to stand to read the scale correctly - knowing how to read the numbered gradation lines and to calculate what the unnumbered gradation lines mean Learners need to read ◊ different kinds of mass meters ◊ mass meters on which the numbered intervals/ gradation lines / calibration represent different intervals /masses ◊ apparatus which have different numbers of un-numbered intervals within each numbered interval.	**6 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.2** **Mass**	**Calculations and problem-solving with mass include** problems in contexts with mass converting between grams and kilograms limited to examples with whole numbers and fractions	Learners need to 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 lines show 100g intervals: 100g, 200g, 300g, 400g, 500g, 600g, 700g, 800g, 900g, 1 000g  It is sometimes useful to convert the 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 4 digits in grams and kilograms Learners 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 practice skills acquired in Numbers, Operations and Relationships. The skills, operations and number ranges required are given below.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
MEASUREMENT	**4.2** **Mass**		**Calculate and estimate (**using grams and kilograms) • round numbers up or down to the appropriate unit of mass • rounding to 10, 100, 1 000 • addition and subtraction of up to 4-digit numbers • multiplication 2-digit by 2-digit numbers • division: 3-digit by 1-digit numbers • add fractions in context (using only halves, thirds, quarters, fifths, sixths, sevenths and eighths) **Solve problems** relating to mass • include rate especially rands per kilograms and ratio problems e.g. increasing or decreasing the mass of ingredients in a recipe by a set ratio • write number sentences to describe problems **Convert** between units: $g \leftrightarrow kg$ Converting between the units of measurement above provides a context for practising multiplying and dividing 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. When learners do division in Grade 4 the answers may have remainders 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 **Recording masses** Because learners will only work with decimal fractions in Grade 6, they should record masses in • kilograms only e.g. 5kg • grams only e.g. 250g Since learners will be reading half kilograms in decimal form on some packaging, they can also write half kilograms in the decimal form. However this is not a requirement in this grade.	

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SHAPE AND SPACE	**3.2** **Properties of 3-D objects**	**Objects which learners need to know and name** • rectangular prisms • spheres • cylinders • cones • square-based pyramids **The characteristics which learners use to distinguish, describe, sort and compare objects** • shapes of faces • flat and curved surfaces **Further activities to focus learners on charactersistics of objects** Make 3-D models using cut out polygons	This is revision and consolidation of work done in Term 2. See notes in Term 2. Learners should do both written exercises and practical work with apparatus	**4 Hours**

ASSESSMENT:

At this stage learners should have been assessed on:

- 4-digit numbers
- adding and subtracting with 4-digit numbers
- mass
- 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**	**Solving problems** Solve problems in contexts involving fractions, including grouping and equal sharing **Describing and ordering fractions** • Compare and order common fractions with different denominators (halves; thirds, quarters; fifths; sixths; sevenths; eighths) • Describe and compare common fractions in diagram form **Calculations with fractions** • addition of common fractions with the same denominators • recognize, describe and use the equivalence of division and fractions **Equivalent forms** Recognize and use equivalent forms of common fractions with denominators which are multiples of each other	This is revision and consolidation of the concepts developed in Term 3. See Term 3 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 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 • rounding off and compensating • doubling and halving • using multiplication and division as inverse operations **Properties of whole numbers** Recognize and use the commutative, associative, and distributive properties with whole numbers **Solving problems** • Solve problems in contexts involving whole numbers, including - financial contexts - measurement contexts • Solve problems involving whole numbers, including - grouping and equal sharing with remainders - comparing two or more quantities of the same kind (ratio) - comparing two quantities of different kinds (rate)	This is further practice of division of 3-digit numbers by 1-digit numbers done in Term 2. Refer to those notes.	**3 hours**

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	**What is different to Grade 3?** • Area and volume are only measured informally in the Intermediate Phase. Learners are not required to know or apply formulae for the perimeter, area or volume of any shape or objects. • In Grade 3 learners only measured perimeter informally by finding the distance around two-dimensional shapes using string. Learners in Grade 3 are not required to state or write how long a perimeter is. They only show the string length or compare different perimeters by comparing string lengths. • In Grade 4 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, km. Here they add the lengths. In Grade 4 they will also count the lengths of the perimeters by counting the number of sides of square grids on which shapes are drawn. 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 3 learners only investigate areas using tiling. In Grade 4 area measurements continue to be informal, but now learners use both tiling and square grids. Learners 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 length with straight sides where the sides are not all the same - shapes with curved sides • Learners do not work with volume in Grade 3. In Grade 4 learners - count how many cubes or rectangular prisms are used to fill a container - The volume of the container is stated in number of cubes or rectangular prisms such as boxes or blocks - make stacks with cubes or rectangular prisms The volume of the stack is stated in number of cubes or rectangular prisms such as boxes or blocks	**7 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
			- interpret pictures of ◊ stacks made of cubes or rectangular prisms in order to state the volume in terms of the number of cubes or rectangular prisms ◊ containers filled with cubes or rectangular prisms in order 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. 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.	
ASSESSMENT: At this stage learners should have been assessed on: • fractions • division of 3-digit numbers by 1-digit numbers • perimeter, area and volume				
SHAPE AND SPACE	**3.6** **Position and movement**	**Location and directions** Locate position of objects, drawings or symbols on grid using alpha-numeric grid references Locate positions of objects on a map using alpha-numeric grid references	• Cells in a grid are often labelled with a letter and a number e.g. D4; A3; E7. This is called alpha-numeric referencing. This links with the work done in Geography in Map Skills. The skills described below can be developed in the Geography lesson and practised in the Mathematics lesson. • Learners work with alpha-numeric grid references on grids and maps. Locate objects using the grid references. When learners work with grid references they need to learn - to find the cell i.e. to answer questions like “What is in cell B3?” - in which cell an object is i.e. to answer questions like “Where is the cow?”	**2 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
SHAPE AND SPACE	**3.4** **Transforma-tions**	**Build composite shapes** Put 2-D shapes together to make different composite 2-D shapes including some shapes with line symmetry **Tessellations** Pack out 2-D shapes to create tessellating patterns including some patterns with line symmetry **Describe patterns** Refer to lines, 2-D shapes, 3-D objects and lines of symmetry when describing patterns • in nature • from modern everyday life • our cultural heritage	In the suggested sequencing of Grade 4 Mathematics, transformations were done in Term 3. In that term learners focused on building composite shapes including some shapes with line symmetry. In Term 4 learners focus on tessellations and describing patterns in real life. **Tessellations** Learners use 2-D shapes to create tessellation patterns. In Grade 4 these tiling patterns can be made by packing out the tiles. Learners need to identify and describe tessellation patterns. Grade 4 learners are not required to create the patterns by rotating, translating or reflecting a single shape. **Describe patterns** Learners describe patterns by talking about the shapes they see in the pattern e.g. • the pattern I see on the crane is made of straight lines • the pattern we see on the honeycomb looks like a tessellation pattern of hexagons • the pattern I see on the bead bracelet looks like a tessellation pattern of triangles Learners describe patterns by discussing the symmetry of shapes e.g. the butterfly's wings make a symmetrical pattern 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.	**3 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 more examples.	**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** Addition and subtraction	Addition and subtraction of whole numbers with at least 4 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 1-digit numbers to at least 100 **Properties of whole numbers** Recognize and use the commutative and associative properties with whole numbers **Solving problems** in contexts involving whole numbers, including financial contexts	This is further practice of Addition and Subtraction done in Term 2. Refer to those notes	**3 hours**

CONTENT AREA	TOPICS	CONCEPTS AND SKILLS	SOME CLARIFICATION NOTES OR TEACHING GUIDELINES	DURATION (in hours)
DATA HANDLING	**5.1. Probability**	Perform simple repeated events and list possible outcomes for events such as: • tossing a coin • rolling a die	**What is different from Grade 3?** Learners do not work with probability in Grade 3. Everything about probability is new in Grade 4. **Performing simple repeated events** Learners need to perform experiments by tossing a coin or rolling a die. 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). Learners should 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.	**2 hours**
ASSESSMENT: At this stage leaners should have been assessed on: • addition and subtraction with 4-digit numbers • transformations • location • probability				
REVISION				**5 hours**
ASSESSMENT				**6 hours**

Problem type	Additional notes	Examples
Summation	A sum	A man buys cell phones for all his stores. He buys 6 789 black phones, 1 567 brown cell phones and 4 532 red cell phones. How many cell phones did he buy altogether?
	Missing part of a given sum	Farm workers picked 2 345 oranges during the morning. After lunch they picked some more. By the end of the day, they had 6 589 oranges. How many oranges did they pick after lunch?
Increase and decrease	Calculate the result	The price for a container of barley is R8 231. Since some of the barley is ruined, the price is decreased by R3 789. What price does a shop owner pay for the container of barley?
	Calculate the change	A salesman earned R4 328 during November. During December, the amount increased to R7 435. How much more money did he earn during December than in November?
	Calculate the initial value	A farmer struggles to sell some of his sheep. He decreases the original price of one sheep by R1 456. He sells the sheep for R 4 787 each. What was the original price that the farmer wanted for his sheep?
Multiplication as repeated addition		Learners sell sweets during market day. They put 25 sweets in a packet. How many sweets will they need to fill 15 packets?
Grouping	Grouping problems which are solved with division and/or repeated subtraction Answers to problems which have or do not have remainders	A rich company gives boxes of toys to a school. Each box contains 8 toys. How many boxes are needed to pack 375 toys?
	Grouping problems which are solved with multiplication and/or repeated addition. Answers to problems which have or do not have remainders	A school gives 15 bags of soccer balls to a poor school. Each bag contains 45 soccer balls. How many soccer balls does the school give away?
	Grouping problems in an array form Problems solved by division (or repeated subtraction) or multiplication (repeated addition)	A farmer plants 34 rows of apple trees. There are 56 apple trees in each row. How many apple trees are there in total? or A farmer wants to plant 1 904 apple trees. He wants to plant the same number of trees in each of 34 rows. How many apple trees must he plant in each row?
Sharing	Sharing problems solved by division/ repeated subtraction Smaller groups of equal size formed from a given amount. Answers to calculations which have remainders lead to the concept of fractions (common or decimal fractions)	The school shares 174 chocolate cakes equally between 9 hospitals. How many cakes does each hospital get?
Comparison by difference		Zwi collected 6 231 bottles for recycling during the year. She collected 2 879 fewer bottles than a class mate. How many bottles did the classmate collect?
Treating groups as units		You can buy 15 candles for R56. What will you pay for 195 of the same candles?

Problem type	Additional notes	Examples
Rate	Learners calculate the total if given rate per object	One box of chocolates costs R28. How much will 45 boxes of these boxes of chocolate cost?
	Learners calculate the rate per object	The mass of 6 containers of equal size of flour is 234 kg. What is the mass of one of these containers of flour?
	Learners first calculate the rate and then apply it to generate more information	If 9 bowls cost R135, how much will 56 of these bowls cost?
Comparison by ratio		Zwi collected 65 bottles for recycling. Her friend collected twelve times as many bottles as Zwi. How many bottles did the friend collect?
Proportional sharing		Feroza works for 3 hours and Daniel works for 1 hour cleaning homes. Together they are paid R520. How should the money be fairly shared between the two?

Meaning of a fraction	Examples of problems
Part of a whole where the whole is a single object	Susan eats two eighths of a chocolate bar. What fraction of the chocolate bar is left? Show your answer in a drawing.
Part of a whole where the whole is a collection of objects	Five friends share 21 chocolates equally. How many chocolates does each person get?
Relationship	Barry earns a third of what his father earns per hour. If his father earns R267 per hour, how much does Barry earn per hour?
Ratio	$\frac{2}{5}$ of a cup of milk is needed to make one batch of biscuits. How many cups of milk are needed to make 5 batches of these biscuits?
Comparator	Which is the longest? $\frac{2}{3}$ of a metre or $\frac{1}{4}$ of a metre?
Unit of measurement	I need $1\frac{2}{5}$ m material to make a shirt, and I have $\frac{4}{5}$ m. How much material do I still need to buy?
Number	Name two numbers between $4\frac{1}{2}$ and 5
Fractional parts put together to make a whole (iterative)	After a game, 55 athletes get $\frac{1}{2}$ of an orange each. How many oranges are needed for the 55 athletes?