MATHEMATICS
NUMBER CONTINUUM

Learning Continuum for Number

Overall Expectations for Phase 1 - Number

Learners will understand that numbers are used for many different purposes in the real world. They will develop an understanding of one-to-one correspondence and conservation of number, and be able to count and use number words and numerals to represent quantities.

Overall Expectations for Phase 2 - Number

Learners will develop their understanding of the base 10 place value system and will model, read, write,estimate, compare and order numbers to hundreds or beyond. They will have automatic recall of addition and subtraction facts and be able to model addition and subtraction of whole numbers using the appropriate mathematical language to describe their mental and written strategies. Learners will have an understanding of fractions as representations of whole-part relationships and will be able to model fractions and use fraction names in real-life situations.

Overall Expectations for Phase 3 - Number

Learners will develop the understanding that fractions and decimals are ways of representing whole-part relationships and will demonstrate this understanding by modelling equivalent fractions and decimal fractions to hundredths or beyond. They will be able to model, read, write, compare and order fractions, and use them in real-life situations. Learners will have automatic recall of addition, subtraction, multiplication and division facts. They will select, use and describe a range of strategies to solve problems involving addition, subtraction, multiplication and division, using estimation strategies to check the reasonableness of their answers.

Overall Expectations for Phase 4 - Number

Learners will understand that the base 10 place value system extends infinitely in two directions and will be able to model, compare, read, write and order numbers to millions or beyond, as well as model integers. They will develop an understanding of ratios. They will understand that fractions, decimals and percentages are ways of representing whole-part relationships and will work towards modelling, comparing, reading, writing, ordering and converting fractions, decimals and percentages. They will use mental and written strategies to solve problems involving whole numbers, fractions and decimals in real-life situations, using a range of strategies to evaluate reasonableness of answers.

N-Y2		Nursery	Kindergarten	Year 1	Year 2
Place Value of Whole Numbers		• Recite number names in order to 10, • Recognise numerals up to 10. • Compare and order numerals up to 10. • Recognise groups of 0-5 objects without counting. (subitising) • Match numeral and quantity correctly with some numbers to10. • Compare groups of objects, more and less. • Count objects accurately. (1-1 correspondence)	• Place Value of Whole Numbers: • Recite number names in order to 20. • Read and write numerals up to 20. • Compare and order numerals up to 20. • Count objects accurately. (1-1 correspondence) • Match numeral and quantity correctly 1-10. • Find one more and one less than a group of objects and a given number. • Recognise groups of 0-10 objects without counting. (subitising)	• Say, read and write numerals up to 99. • Compare (<,>,=) and order numerals up to 99. • Explain the value of each digit in a 2 digit number. • Demonstrate place value of 2 digit numbers in a variety of ways (eg. unifix cubes, base 10, abacus,). • Explain the expanding form of 2 digit numbers (eg. 97 = 90 + 7). • Explain the relationship between the place value positions in 2 digit numbers (eg. 4 tens = 40, 10 ones = 1 ten). • Write numbers to 10 in word form. • Read, write and use ordinal numbers up to 'tenth' and symbols (eg: 1st, 2nd, 3rd) • Recognise groups of 0-10 objects without counting (subitising)	• Say, read and write numerals up to 999. • Compare (<,>,=) and order numerals up to 999. • Explain the value of each digit in a 3 digit number. • Count forwards and backwards by 10 for any given number up to 999. (PF) • Demonstrate place value of 3 digit numbers in a variety of ways (eg. abacus, base 10). • Explain the expanding form of 3 digit numbers (eg. 897 = 800 +90 + 7). • Explain the relationship between the place value positions in 3 digit numbers (eg. 10 ones = 1 ten, 40 tens = 400). • Write numbers to 20 in word form.
Vocabulary		• Digit • Number • Total • All together • Counting on, • Counting back • More • Less • **Equals:** Answer, Makes	• Digit • Number • Total • All together • Counting on, • Counting back • More • Less • **Equals:** Answer, Makes	• More/Greater than • Fewer/Less than • Number sentence • Digit • Number • Value • **Equals:** Answer, Makes	• Predict/think.. • Greater than • Less than • Number sentence • Digit • Number • Value
Pattern & Function (see also P&F related to Problem Solving)			• Create, describe and extend simple patterns with objects.	• Understand the properties and associated number patterns of odd and even numbers to 20. • Explore the relationship between addition and subtraction (eg. fact families). • Identify and continue number patterns skip counting in 2s, 5s and 10s. • Count forwards and backwards in 1s and 10s using a 100 chart. (PF)	• Understand the properties and associated number patterns of odd and even numbers. • Explore the relationship between addition and subtraction (eg. fact families). • Follow and describe rules for number patterns and analyse patterns to make predictions and problem solve. • Create and extend number patterns, for example skip counting. (eg. 6, 9, 12 _, _, _,). • Use the vocabulary of comparing and ordering for balancing number sentences (eg 3 + 5 = 10 - ?).
Vocabulary					
Addition	**Mental Strategies**		• Use vocabulary of addition in practical experiences. • Use manipulatives and visual representations to add single digit numbers, e.g. loose parts, number • lines, tens frame. • Explore number bonds to 5.	• Using 10s frames to show a visual representation of how numbers are added. (eg 13 = 10 + 3). • Automatically recall number bonds to 5 and work on and calculate numbers bonds to 10. • Know doubles to 10 and apply to solve simple problems. **For mental strategy development:** • Using jump strategy to count up in 1s from the largest number on a number line. (Explicit within strategies)	• Use tidy tens strategy with a two digit and 1 digit number with written recording. • Automatically recall number bonds to 10 and calculate number bonds to 20. . • Use doubles and near doubles using the compensation strategy with numbers to 10. (eg 8 + 9 = 8 + 8 + 1) **For mental strategy development:** • In written form, use the jump strategy to mentally add a 1 digit number to a 2 digit number or pairs of 2 digit numbers using

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				● In written form, use the jump strategy to mentally add a 1 digit number to a 2 digit number using standard and open number lines.	standard and open number lines.
	Written Strategies			● Write a linear number sentence using the addition and equal sign. ● Identify key vocabulary in word problems and solve 1 step addition calculations.	● Independently write a linear addition number sentence. ● Use vertical column addition to add 2 digit numbers without regrouping. ● Appropriately set out vertical column addition calculations and add starting at the ones column. ● Identify key vocabulary in word problems and solve 1 step addition calculations.
Vocabulary			● I estimate… ● Number sentence ● Digit ● Number ● Total ● All together ● Plus (for the symbol) ● Counting on, ● **Equals:** Answer, Makes	● Total ● All together ● Plus (for the symbol) ● Counting on	● Total ● All together ● Plus (for the symbol) ● Counting on
Subtraction	**Mental Strategies**		● Use vocabulary of subtraction in practical experiences. ● Use manipulatives and visual representations to takeaway single digit numbers, e.g. loose parts, number lines, tens frame.	● Understand and use vocabulary associated with subtraction. ● Understand that subtraction must start with the largest number. **For mental strategy development:** ● With visual scaffolding, use a number line to calculate simple subtraction problems. ● Identify key vocabulary in word problems and solve 1 step subtraction calculations ● using manipulatives.	● Understand and use vocabulary associated with subtraction. ● Understand and explain why subtraction must start with the largest number. ● Mentally subtract within 10. **For mental strategy development:** ● In the written form, use a standard and open number lines to subtract. ● With visual scaffolding, mentally subtract a 1 digit number from a 2 digit number using 'tidy tens' (eg. 12 - 3 is the same as 12-2-1).
	Written Strategies				● Independently write a linear subtraction number sentence. ● Use vertical column method to subtract 2 digit numbers without regrouping. ● Appropriately set out vertical column subtraction calculations and subtract starting at the ones column. ● Identify key vocabulary in word problems and solve 1 step subtraction calculations.
Vocabulary			● Take away ● Minus (for the symbol) ● Counting back ● Less ● **Equal:** Answer, makes	● Take away ● Minus (for the symbol) ● Counting back ● Difference between	● Take away ● Minus (for the symbol) ● Counting back ● Difference between
Multiplication	**Mental Strategies**			● Use pictures, and manipulatives to demonstrate an understanding that multiplication is equal grouping. ● Recognise and explain that multiplication is repeated addition.	● Use pictures, arrays, number lines and manipulatives (<20 objects) to demonstrate an understanding that multiplication is equal grouping. ● Recognise and explain that multiplication is repeated addition. (PF)

					• Solve 1 step word problems with multiplication using drawings and manipulatives.
	Written Strategies				
Vocabulary				• Lots/Groups of	• Multiply • Lots/Groups of • Times • Arrays
Division	**Mental Strategies**			• Model and explain the concept of sharing into equal groups using manipulatives. • Use pictures, and manipulatives (<12 objects) to model division as equal groups.	• Model and explain the concept of sharing into equal groups using manipulatives. • Use pictures, arrays, number lines and manipulatives (<20 objects) to model division as equal groups. • Solve 1 step word problems with division using drawings and manipulatives.
	Written Strategies				
Vocabulary				• Sharing • Equal groups • Lots/Groups of	• Lots/Groups of • Equal
Fractions			• In practical experiences demonstrate an understanding of half.	• Identify parts as equal or unequal. • Understand a fraction is an equal part of a whole. • Demonstrate an understanding of ½ and ¼ of a whole. • Demonstrate an understanding of ½ and ¼ of a group.	• Understand and explain that fractions are an equal part of a whole. • Demonstrate an understanding by drawing and shading ½, ⅓, ¼, ⅛ of objects. • Use manipulatives to demonstrate ½, ⅓, ¼ of a group. • Compare and order ½, ⅓, ¼, ⅛ using visual representations.
Vocabulary			• Share • Half • Whole	• Share • Divide (NOT division) • Half • Whole • Quarter • '(Parts) Out of …'	
Place Value of Decimals					
Vocabulary					
Pattern and Function (see also P&F-related to number)	**Problem Solving Strategies**			• Identify key words in a question or statement. • Construct a number sentence. • Use a variety of mathematical language to describe operations and processes. • Distinguish between relevant and irrelevant information in a question. • Understand, explain, use and apply the following strategies to assist problem solving: • Draw pictures to represent information given in a problem to assist with finding a solution. • Use or create models to assist with solving problems. • Check solutions for their reasonableness with teacher guidance	• Identify key words in a question or statement. • Construct a number sentence. • Use a variety of mathematical language to describe operations and processes. • Distinguish between relevant and irrelevant information in a question. • Understand, explain, use and apply the following strategies to assist problem solving: • Draw pictures to represent information given in a problem to assist with finding a solution. • Use or create models to assist with solving problems. • Check solutions for their reasonableness with teacher guidance.

Y3-Y6		Year 3	Year 4	Year 5	Year 6
Place Value of Whole Numbers		• Say, read and write numerals up to 9 999. • Compare (<,>,=) and order numerals up 9 999. • Explain the value of each digit in a 4 digit number. • Count forwards and backwards by 10 and 100s for any given number up to 9,999. (PF) • Demonstrate place value of 4 digit numbers in a variety of ways. (eg. number line, abacus, base 10). • Explain the expanding form of 4 digit numbers. (eg. 3,897 = 3,000+ 800 +90 + 7). • Explain the relationship between the place value positions in 4 digit numbers (eg. 10 ones = 1 ten; 40 tens = 400). • Explain how many 10s in 100s (eg. How many 10s in 400). • Write numbers to 100 in word form.	• Say, read and write numerals up to 99,999. • Compare and order numerals up 99, 999. • Explain the value of each digit in a 5 digit number. • Count forward and backwards in multiples of 10s from any number. • Demonstrate place value of 5 digit numbers in a variety of practical ways. (eg. number line, abacus, base 10). • Explain the expanding form of 5 digit numbers. (eg 14532 = 10 000 + 4000 + 500 +30 + 2). • Explain the relationship between the place value positions with reference to '10 times bigger' or ' 10 times smaller'. • Explain how many 10s in 100, 1000 or their multiples (eg. How many 10s in 400). • Find the mid-point multiples of 10 (eg Midpoint of 40 and 50 = 45) • Estimate accurately the position of a number on a number line. eg 13375 on a number line demarcated into thousands. • Round numbers to the nearest 10 and 100.	• Say, read and write numerals up to 999,999. • Compare (<,>,=) and order numerals up 999,999. • Count forwards and backwards in powers of 10, for any given number up to 999,999. (eg. count backwards in 10,000s from 542,003). (PF) • Explain the place value of each digit for numbers up to 1,000,000. • Demonstrate place value of 6 digit numbers on a numberline. • Explain the expanded form of 6 digit numbers, saying the value of each digit. (eg. 142,867 = 100,000 + 40,000 + 2,000 + 800 + 60 + 7). • Know how many tens and hundreds are in a 4 digit number. (eg. 3,400 is 34 hundreds). • Round any whole number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000	• Say, read and write numeral up to 9,999,999. • Compare (<,>,=) and order numerals up 9,999,999. • Explain the value of each digit in a 7 digit number. • Count forwards and backwards in powers of 10 for any given number up to 9,999,999. (eg. Count forwards in 10,000s from 743,245). (PF) • Demonstrate place value of 7 digit numbers on a numberline. • Explain the expanding form of 7 digit numbers. (eg. 6,453,897 = 6,000,000 + 400,000 + 3,000 + 800 +90 + 7). • Know how many ten, hundreds, thousands are in a 5 digit number. (eg. 33,400 is 334 hundreds). • Compare and order negative numbers on a number line. • Count backwards and forwards with negative whole numbers, including through zero.
Vocabulary		• digit • numeral • expanded form • standard form • rounding • mid-points and benchmarks • approximating • place value • place value columns • place value grid. • Ten Thousands - Thousands - Hundreds - Tens - Ones	• digit • numeral • expanded form • standard form • rounding • mid-points and benchmarks • approximating • place value • place value columns • place value grid. • Ten Thousands - Thousands - Hundreds - Tens - Ones	• digit • numeral • expanded form • rounding • approximating • place value • Hundred Thousands, Ten Thousands - Thousands - Hundreds - Tens - Ones • partition	• digit • numeral • expanded form • rounding • mid-points and benchmarks • approximating • place value • place value columns • place value grid. • Ten Thousands - Thousands - Hundreds - Tens - Ones • integers, negative numbers • base ten system
Place Value of Decimals	**Decimal Numbers**		• Recognise and explain that a decimal is a part of a whole. • Say, read and write decimals to 1 dp. • Understand and explain that a tenth can be represented as a fraction or in terms of it's place value as 0.1 • Identify the image of a tenth to it's written fraction form (1/10) to it's decimal form (0.1) and to the written fraction word (one tenth) and relate to the place value chart. • Order tenths on a number line. • Count forwards and backwards in tenths as fractions and decimal notations. • Give a number that is 1/10 more or 1/10 less on a decimal number line (Eg. 1/10 more	• Say, read and write decimals up to 2dp. • Compare (<,> =) and order decimals up to 2dp. • Count forwards and backwards in 10ths and 100ths. (PF) • Identify and understand visual representations (100 grid) of 10ths and 100ths and relate to a place value chart • Understand the relationship between decimal place value columns and their corresponding fraction. • Say the number 0.1 more, 0.1 more from any number. (PF) • Say the number 0.01 more, 0.01 less from any number. (PF)	• Say, read and write decimals up to 3dp. • Compare (<,> =) and order decimals up to 3dp. • Count forwards and backwards in thousandths, hundredths, tenths. (PF) • Say the number 0.1 more, 0.1 more from any number. (PF) • Say the number 0.01 more, 0.01 less from any number. (PF) • Round to the nearest whole number from a decimal number. • Round to the nearest tenth and hundredth. • Identify the image of a thousandth to it's written fraction form (1/1000), to it's decimal form (0.001), and to the written fraction word

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			than 0.5 = 0.6.		(one thousandth), and relate to the place value chart.
			• Express numbers to 1 dp place in the expanded form (eg. 43.2 = 40 + 3 + 2/10) • Automatic recall of common fractions ½ = 0.5 Explain that ½ = 5/10 • Round numbers with 1 dp to the nearest whole number. **Application:** • Round money to the nearest dollar. Eg $5.65 rounds to $6.00 • Recognise, convert and use halves and tenths, and decimal numbers within measurements when solving problems. (eg. Know that 1/2 metre = 0.5 m = 50 cm or 1/10 km = 0.1 km = 100 metres)		
Vocabulary			• tenths, hundredths, • decimal point • place value column • place value chart • decimal number • to 1 decimal place • part of a whole	• tenths, hundredths, • decimal point • place value • greater than • less than • place Value chart • part of a whole	• decimal • decimal point • tenth, hundredth, thousandth • base ten system • part whole • part of
Pattern & Function (see also P&F related to Problem Solving)		• Identify any number as odd and even numbers and explain why. • Explain the relationship between multiplication and division. • Recognise and explain that multiplication is repeated addition. • Follow and describe rules for number patterns and analyse patterns to make predictions and problem solve. • Create and extend number patterns, for example skip counting. (eg. 21, 28, 35 _, _, _,). • Use the vocabulary of comparing and ordering for balancing number sentences (eg 3 + 5 = 2 x ?).	• Use knowledge of properties of odd and even number to make predictions. (eg. Odd + Odd = Even) • Skip count in multiples of 50s and 20s. • Understand the associative properties of addition and subtraction. (concepts not using the terms.) • Recognise and explain the relationship between the place value columns. • Use understanding of operations to balance number sentences '(eg 3 + 5 = 2 x ?) • Order positive and negative numbers on a number line in the context of temperature and coordinates • Recognise and explain the relationships and rules within a 1-step number sequence or pattern rule.(eg. describe the pattern: 3, 7, 11, 15,). • Use and explain a rule or a relationship between numbers to generate or continue a number sequence.	• Solve missing number problems using balanced number sentences e.g. 5 x ? = 25 - 5 • Understand the Associative Law as regrouping and apply this rule when solving calculations mentally e.g. 24 x 5 = (12 x 2) x 5 = (12 x 5) x 2 = 60 x 2 = 120 • Identify multiples and common multiples of numbers e.g. a common multiple of 15 and 10 = 60 • Identify factors and common factors e.g. 3 is a common factor of 30 and 15 • Introduce prime numbers as a number with only two factors • Identify and continue arithmetic number patterns with whole numbers, fractions and decimals. • Identify a term to term rule that is a reliable predictor for a pattern. • Follow a simple rule to generate more numbers in a sequence. • Explore specific number sequences (squares, cubes, triangular)	• Interpret negative numbers in context. • Calculate temperature fall or rise across zero (with an emphasis on place value of integers). • Identify multiples and lowest common multiple (LCM). • Identify factors and highest common factors (HCF). • Know prime numbers up to 100. • Understand squared and cubed numbers in context of area and volume. • Identify and continue number patterns and geometric patterns. • Record a position to term rule that is a reliable predictor for a pattern. • Generalise, represent and complete patterns.
Vocabulary		• sequence • relationship connections • odd and even • repeated addition • repeated subtraction • balance • equal • unequal • number sentence • zero	• sequence • relationship connections • odd and even • repeated addition • repeated subtraction • balance • equal • unequal • number sentence • positive numbers	• sequence (arithmetic and geometric) • balance • term • position • factor / common factor • multiple / common multiple • number sentence • positive numbers • negative numbers • prime • > = <	• integers, negative numbers • multiple, lowest common multiple • factor, highest common factor • factor tree • prime number • squared numbers • cubed numbers • function • sequence, path, term, pattern • predictor • constant

		• > = <	• negative numbers • zero • > = < • square numbers (related to area)		• formula, rule • tenths, hundredths, • decimal point • place value column • place value chart • decimal number • to 1 decimal place
Addition	**Mental Strategies**	• Mentally use tidy tens strategy with a two digit and 1 digit number. • Mentally automatically recall and use number bonds to 20. • Understand the relationship between the number bonds to 10 and adding multiples of 10. (eg 3 + 7 = 10 therefore 30 + 70 = 100) • Mentally use doubles and near doubles using the compensation strategy with numbers to 20. • (eg 14 + 15 = 14 + 14 + 1) **For mental strategy development:** • In the written form, use the Split strategy to mentally add pairs of 2 or 3 digit numbers without regrouping. • In the written form, use the Jump strategy to mentally add pairs of 2 or 3 digit numbers using a number • line. • Adding using jump and split strategies in written form up to 3 digits.	• Use and apply understanding of vocabulary associated with addition to written and verbal problems. • Recall, understand and use Number Bonds to 100. • Use number bonds in mental addition calculations (eg. 37 + 23). • Understand the relationship between number bonds to 20 and adding multiples of 10 and 100 (eg. 13+7=20 therefore 130 + 70=200). • Mentally use knowledge of 'tidy tens' numbers when using the Jump strategy to add numbers. • Create addition and subtraction 'Fact Families'. • Mentally use the Split strategy to add pairs of 2 digit numbers . • Reorder lists of numbers to make tidy numbers to assist with addition. (eg. 12 + 19 + 3 + 8 + 1 = (12 + 8) + (19 + 1) + 3 **For mental strategy development:** • In the written form, use the Split strategy to mentally add pairs of 2 or 3 digit numbers. • In the written form, use the Jump strategy to mentally add pairs of 2 or 3 digit numbers using an open number line. • In the written form, use models such as 'number trees' and 'bar models' to assist use of split strategy to add 2 or 3 digit numbers.	• Recall, understand and use Number Bonds to 1000. • Choose from a broad range of mental strategies to solve problems involving whole numbers • Use split strategy when adding numbers with up to 4 digits. • Use jump strategy when adding numbers with up to 4 digits. • Use rounding and compensating strategy when adding numbers with up to 4 digits. • Use split strategy when adding numbers up to 1dp. • Use jump strategy when adding numbers up to 1dp. • Use tidy numbers strategy when adding numbers up to 1dp. • Use rounding and compensating strategy to add numbers up to 1dp. • Use reversibility to solve addition problems of whole numbers and decimal numbers with 'missing numbers' in the calculation. **For mental strategy development:** • In written form, use split strategy to add decimal numbers up to 2dp. • In written form, use jump strategy to add decimal numbers up to 2dp. • In written form, use tidy numbers to add numbers up to 2dp. • In written form, use rounding and compensating to add numbers up to 2dp.	• Choose efficient strategy to solve problems (agility of understanding numbers and which strategy is most suitable). Learners may not be proficient in using all strategies but have a repertoire to choose from. • Use split strategy when adding numbers in the ten thousands and thousands respectively. • Use jump strategy when adding numbers in the ten thousands and thousands respectively. • Use rounding and compensating strategy when adding numbers in the ten thousands and thousands respectively. • Find a difference between two negative or positive numbers using a number line. • Use split strategy when adding numbers up to 2dp. • Use jump strategy when adding numbers up to 2dp. • Use tidy numbers strategy when adding numbers up to 2dp. • Use rounding and compensating strategy when adding numbers up to 2dp. • Use reversibility strategy to solve addition problems of whole numbers and decimal numbers. **For mental strategy development:** • In written form, use split strategy when adding decimal numbers up to 3dp. • In written form, use jump strategy when adding decimal numbers up to 3dp. • In written form, use tidy numbers strategy when adding numbers up to 3dp. • In written form, use rounding and compensating strategy when adding numbers up to 3dp.
	Written Strategies	• Use vertical column addition to add 3 digit numbers with regrouping • Identify key vocabulary in word problems and solve 1 step addition calculations. • Use and apply appropriate addition strategies with 2 and 3 digit numbers in problem solving situations.	• Use written Vertical column addition using regrouping numbers using 3 and 4 digit numbers. • Use and apply appropriate addition strategies with 3 and 4 digit numbers in problem-solving situations. • Use rounding to assess the reasonableness of solutions to addition problems.	• Use a written strategy (vertical column) to add numbers including regrouping numbers across zeros using up to 5 digits • Use a written strategy (vertical column) to add decimal numbers, including tenths and hundredths e.g. 75.7 + 92.05	
Vocabulary		**Operation Vocabulary:** • addition • plus	**Operation Vocabulary:** • addition • plus	**Operation Vocabulary:** • subtract • minus • decrease	**Operation Vocabulary** • addition • plus • total

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		• total • sum • altogether • increase by • greater than • more than **Strategy Vocabulary:** • number bonds • tidy numbers • reorder • split strategy • jump strategy • vertical column method **Process Vocabulary:** • partition a number = splitting a number • exchange • regroup **Models and Tools:** • Number trees • Bar models • Tidy numbers • Addition + subtraction fact families • Number sentence	• total • sum • altogether • increase by • greater than • more than **Strategy Vocabulary:** • number bonds • tidy numbers • reorder • split strategy • jump strategy • vertical column method **Process Vocabulary:** • partition a number = splitting a number • exchange • regroup **Models and Tools:** • Number trees • Bar models • Tidy numbers • Addition + subtraction fact families • Number sentence	• less than • fewer than **Strategy Vocabulary:** • Jump strategy • split strategy • compensation strategy • 'tidy numbers' • reversibility • 'inverse' • Vertical column method **Process Vocabulary:** • exchange • regroup	• sum • altogether • increase by • greater than • more than • difference • partition **Strategy Vocabulary:** • number bonds • tidy numbers • reorder • split strategy • jump strategy • vertical column method • rounding and compensating strategy **Process Vocabulary:** • partition a number = splitting a number • exchange • regroup **Models and Tools:** • Number line • Number trees • Bar models • Tidy numbers • Addition + subtraction fact families • Number sentence • Equation
Subtraction	**Mental Strategies**	• Understand and use vocabulary associated with subtraction. • Mentally use subtraction within 20. **For mental strategy development:** • Use and apply appropriate subtraction strategies with 3 and 4 digit numbers in problem solving situations. • Subtract using the jump strategy up to 3 digits using an open number line. • With visual scaffolding, mentally subtract a 2 digit number from a 2 digit number using 'tidy tens' (eg. 21 - 13 is the same as 21 - 1 - 10 - 2).	• Understand and use vocabulary associated with subtraction. • Use number bonds in mental subtraction of 2 digit calculations. • Mentally subtract numbers from 100 using number bond knowledge (eg. 100 - 27 = 73). • Understand and explain that subtraction is the reverse operation to addition. • Understand that the significance of the order of the numbers in a subtraction calculation. • Reorder lists of numbers to make 'tidy numbers' to assist with subtraction (eg. 56 - 48 = [(56 - 6) - 2] - 40 **For mental strategy development:** • In the written form, subtract 3 digit numbers using the jump strategy on an open number line. • In the written form. subtract 2 digit numbers using the jump strategy using 'tidy tens'.	• Choose efficient strategy to solve problems (agility of understanding numbers and which strategy is most suitable). • Use jump strategy to subtract numbers numbers with up to 4 digits • Use rounding and compensating strategy to subtract numbers with up to 4 digits. • Use reversibility (counting on) strategy to subtract numbers which are close together. • Use tidy numbers strategy when subtracting numbers up to 1dp. **For mental strategy development:** • In written form, use jump strategy to subtract numbers up to 1dp. • Use reversibility (counting on) to subtract numbers with up to 4 digits. • Use rounding and compensating strategy to subtract numbers up to 1dp. • In written form, use tidy numbers strategy when subtracting numbers up to 1dp.	• Choose efficient strategy to solve problems (agility of understanding numbers and which strategy is most suitable). Learners may not be proficient in using all strategies but have a repertoire to choose from. • Use jump strategy when subtracting numbers in the ten thousands and thousands respectively. • Use rounding and compensating strategy when subtracting numbers in the ten thousands and thousands respectively. • Use equal additions strategy when subtracting numbers in the ten thousands and thousands respectively. • Use jump strategy when subtracting numbers up to 2dp. • Use tidy numbers strategy when subtracting numbers up to 2dp. • Use rounding and compensating strategy when subtracting numbers up to 2dp. • Use equal additions strategy when subtracting numbers up to 2dp. • Use reversibility strategy to solve subtraction problems of whole numbers and decimal numbers. **For mental strategy development:** • In written form, use jump strategy when subtracting decimal numbers up to 3dp.

		Column A	Column B	Column C	Column D
					• In written form, use tidy numbers strategy when subtracting numbers up to 3dp. • In written form, use rounding and compensating strategy when subtracting numbers up to 3dp.
	Written Strategies	• Use vertical column method to subtract 3 digit numbers. • Regrouping in subtraction but not across zeros (eg. 243-178). • 1 step problem solving with subtraction.	• Use and explain vertical column method for subtraction of 4 digit numbers, using regrouping. • Use the vertical column method to subtract 3 and 4 digit numbers across zeros. • (eg. 500 - 156 =.....) • Use and apply subtraction strategies in problem-solving situations using 4 digit numbers in one and 2 step • written problems. • Use rounding to assess the reasonableness of solutions to subtraction problems.	• Use a written strategy (vertical column) to subtract numbers including regrouping across zeros • • Use a written strategy (vertical column) to subtract decimal numbers e.g. in the context of money	
Vocabulary		**Operation Vocabulary**: • subtract • take away • minus • decrease • less than • fewer than • difference • how many left **Strategy Vocabulary**: • Jump strategy • Vertical column method **Process Vocabulary**: • exchange • regroup **Models and Tools Vocabulary**: • 'tidy tens' (multiples of 10 to bridge) • number sentences • Addition + Subtraction fact families	**Operation Vocabulary**: • subtract • take away • minus • decrease • less than • fewer than • difference • how many left **Strategy Vocabulary**: • Jump strategy • Vertical column method **Process Vocabulary**: • exchange • regroup **Models and Tools Vocabulary**: • 'tidy tens' (multiples of 10 to bridge) • number sentences • Addition + Subtraction fact families	**Operation Vocabulary:** • subtract • minus • decrease • less than • fewer than • difference between **Strategy Vocabulary:** • Jump strategy • rounding and compensating • reversibility (counting on) • Vertical column method **Process Vocabulary:** • exchange • regroup	**Operation Vocabulary:** • subtract • take away • minus • decrease • less than • fewer than • difference • how many left • partition **Strategy Vocabulary:** • Jump strategy • Round and compensating strategy • Vertical column method • Equal addition strategy **Process Vocabulary:** • exchange • regroup **Models and Tools Vocabulary:** • 'tidy tens' (multiples of 10 to bridge) • number sentences • equation • Addition + subtraction fact families
Multiplication	**Mental Strategies**	• Use pictures, arrays, number lines and manipulatives to demonstrate an understanding of multiplication. • Recognise and explain that multiplication is repeated addition. (PF) • Recognise the commutative property of multiplication (eg. 2x5=10 5x2=10). • Using fact families to explain the relationship between multiplication and division. • Use doubling as a strategy to solve multiplication problems. (2 x 4 = 8 so 4 x 4 = 16). • Use automatic recall of facts in the 2, 3, 5, and	• Use pictures, arrays, models and manipulatives to explain the concept of multiplication. • Use automatic recall of facts in the 2, 3, 4, 5 , 6, 9 and 10 multiplication tables. • Use known facts to solve unknown facts. (eg: knowing 6 x 5, be used can work out to 7 x 5) • Recognise and apply 'Fact Families' of multiplication + division to solve problems. (PF) • Multiply whole numbers by 10 and 100. • Mentally double 2 digit numbers where the ones and tens are 5 or lower (eg. 24 x 2 = 48).	• Understand and automatically recall all multiplication and division facts in the 2 to 12. - (7x and 8x tables introduced in Year 5). • Multiply numbers including decimals numbers by 10, 100, and 1,000. • Multiply whole numbers by a multiple of ten (eg. 40 x 7 = 4 x 7 x 10 and 50 x 200 = 10,000) • Use split strategy to multiply 3 digits by 1 digit number mentally (eg. 142 x 3 = (100 x 3) + (40 x 3) + (2 x 3) • Use rounding and compensating strategy to multiply numbers mentally, x 9, 11, 99, 101 • Double any 2 digit number	• Choose an efficient strategy to solve problems (agility of understanding numbers and which strategy is most suitable). Learners may not be proficient in using all strategies but have a repertoire to choose from. • Use split strategy to multiply a single digit number by a number with a decimal (eg. 5 x 2.3). • Use rounding and compensating strategy to multiply a single digit number by a number with a decimal (eg. 5 x 2.3). • Use split strategy to multiply 2 digits by 2 digit numbers up to 20, (eg. 25 x 15).

		10 multiplication tables. - Solve 1 step word problems with multiplication. - Use their knowledge of grouping to solve multiplication problems. **For mental strategy development:** - Recognise the pattern for multiplying by 10 and 100. (PF)	- Demonstrate how square numbers are formed in context of area, - Recognise and find factors and multiples of numbers in known multiplication tables. **For mental strategy development:** - In the written form, use 'doubling' to assist with mental multiplication (eg. 9 x 8 = (9 x 4) doubled. - In the written form, use the split strategy to mentally multiply 2 digit by 1 digit numbers [eg. 23 x 2 = (20 x 2) + (3 x 2). - In the written form, double 2 digit numbers in which the 'ones' place value digit is higher than 5 (eg. 17 x 2). - Choose and use mental strategies to solve real life multiplication problems.	- Use 'doubling' to assist with mental multiplication. (eg. 9 x 8 = (9 x 4) doubled. - Use known facts to assist with mental multiplication (e.g. 14 x 3 = (14 x 2) + 14	- Use doubling and halving / trebling and thirding to multiply up to 2 digits by 2 digit numbers. - Use split strategy to multiply 3 digits by a multiple of ten up to 100 (eg. 326 x 20 =). - Use rounding and compensating strategy to multiply 3 digits by a multiple of ten up to 100 (eg. 326 x 20 =).
	Written Strategies	- Use and explain the grid method to multiply a 2 or 3 digit numbers by a single digit from a known multiplication table. - Use the vertical column method to multiply a 2 or 3 digit numbers by a single digit from a known multiplication table. - Use multiplication strategies to solve written problems.	- Use and explain the grid method to multiply a 3 or 4 digit numbers by a single digit from a known multiplication table. - Use the vertical column method to multiply a 3 or 4 digit numbers by a single digit from a known multiplication table. - Use multiplication strategies to solve written problems.	- Use the vertical column method to multiply 2 digit by 2 digit numbers. - Use the grid method to multiply 3 digit by 2 digit numbers. - Use the lattice method to multiply 2 digit by 2 digit numbers. - Choose a preferred method to use as a written strategy for multiplication (by the end of the Year)	- Choose efficient strategy to solve problems (agility of understanding numbers and which strategy is most suitable). Learners may not be proficient in using all strategies but have a repertoire to choose from. - Use the vertical column calculation to multiply 3 digit by 2 digit numbers. - Use the grid method to multiply 3 digit by 2 digit numbers. - Use the lattice method to multiply 3 digit by 2 digit numbers.
Vocabulary		**Operation Vocabulary:** - repeated addition - multiply - groups of - times greater than - arrays - multiples - doubling **Multiplication Strategies Vocabulary:** - arrays - split strategy - grid method	**Operation Vocabulary:** - repeated addition - multiply - groups of - times greater than - arrays - multiples - doubling **Multiplication Strategies Vocabulary:** - arrays - split strategy - grid method	**Operation Vocabulary:** - repeated addition - multiply - groups of - times greater than - arrays - multiples - doubling - square numbers (in relation to Area) **Multiplication Strategies Vocabulary:** - arrays - split strategy	**Operation Vocabulary:** - multiply - groups of - times - greater than - arrays - multiples - doubling - known facts - basic facts - prime numbers - multiple

● vertical column method **Process Vocabulary:** ● regroup ● exchange ● partition ● split **Models and Tools:** ● Multiplication fact families ● Model bars ● Grids ● Number trees (Number Pyramid) ● Multiplication tables	● vertical column method **Process Vocabulary:** ● regroup ● exchange ● partition ● split **Models and Tools:** ● Multiplication fact families ● Model bars ● Grids ● Number trees (Number Pyramid) ● Multiplication tables	● grid method ● vertical column method. **Process Vocabulary:** ● regroup ● exchange ● partition ● split **Models and Tools:** ● Multiplication fact families ● Model bars ● Grids ● Number trees ● Multiplication tables	● factor ● square numbers (in relation to Area) **Multiplication Strategies Vocabulary:** ● arrays ● split strategy ● doubling and halving strategy ● proportional adjustment ● rounding and compensating strategy ● grid method ● vertical column method ● vertical column calculation ● lattice method **Process Vocabulary:** ● regroup ● exchange ● partition ● split **Models and Tools:** ● Multiplication fact families ● Bar models ● Grids ● Number lines ● Number trees ● Multiplication tables

Division

	Mental Strategies	Written Strategies

Mental Strategies	Written Strategies

Division — Mental Strategies

Column 1	Column 2	Column 3	Column 4
● Recognise and explain the relationship between multiplication and division. ● Recognise and explain through drawings and use of manipulatives that division is separating a quantity into equal parts. ● Use a number line to show the relationship between division and subtraction (eg. 20 - 5 - 5 - 5 - 5 = 0). ● Understanding that dividing by 2 is halving using numbers to 20. ● Solve 1 step word problems with division.	● Recognise and explain through drawings and use of manipulatives that division is repeated subtraction. ● Understand and explain the concept of 'remainders' when dividing numbers. ● Quick automatic recall of division facts in the 2, 3, 4, 5, and 10 multiplication tables. ● Division by 10 to leave a whole number. eg. (420 ÷ 10 = 42). ● Find half of the multiples of 10 (e.g. half of 50). ● Find half of the even numbers by partitioning with numbers 50. (eg. Half of 38 ... (eg. half of 30 + (half of 8) ● Explore, explain and use the divisibility rules for numbers within the 2, 3, 4, 5, 10 multiplication tables. ● Use understanding of inverse operation to solve division problems (through fact families). **For mental strategy development:** ● In the written form, find half of numbers below 100 when both tens and ones digit is an even number.	● Divide whole numbers by 10, 100, and 1,000 to leave a decimal to 2 dp. ● Know divisibility test for multiples of 3, 4, 6 and 9 and apply knowledge when dividing. ● Divide numbers mentally using split strategy and knowledge of grouping e.g. 39 ÷ 3 = (30 ÷ 3) and (9 ÷ 3) ● Use multiplication facts to solve mental division calculations e.g. 125 ÷ 5 (Split 125 into groups of 5. How many groups of 5 can be made) (20 groups of 5 = 100) (5 x 5 = 25) so 125 ÷ 5 = 25 ● Find Halve any 2 digit number. ● Find 1/4 of a number by halving and halving again.	● Choose an efficient strategy to solve problems (agility of understanding numbers and which strategy is most suitable). Learners may not be proficient in using all strategies but have a repertoire to choose from. ● ● Use split strategy to divide up to 3 digit numbers. ● ● Divide numbers by 10, 100, 1000 into decimals by shifting the digits, not the decimal point. ● ● Use tests of divisibility for multiples of 7 and 8 and review all others.

Division — Written Strategies

Column 1	Column 2	Column 3	Column 4
● Recognise and use a number sentence to show written division (eg. 24 ÷ 3 = 8).	● Recognise and use 3 different ways of expressing written division (eg. 24 ÷ 3 = 8 or in 'bus stop' form 3 ⌐24 or as a fraction 24/3) ● Use the 'short division' written method to divide 2 or 3 digit numbers by a single-digit in a known multiplication table to leave solutions with and without remainders. ● Use written division strategies to solve written problems in real-life situations. ● Use knowledge of multiplication and division to	● Use the long division methods of 3 digits by 1 digit to leave a remainder.	● Choose an efficient strategy to solve problems (agility of understanding numbers and which strategy is most suitable). Learners may not be proficient in using all strategies but have a repertoire to choose from. ● Use the long division written method of 4 digits by 1 digit to leave a remainder. ● Use the long division written method of decimal to 2dp to leave a remainder. ● Use the short division written method to divide

			test the reasonableness of solutions. (eg, 45 ÷ 3 = 15 so 15 x 3 = 45)		• 4 or 5 digit numbers. • Use the short division written method to divide 4 or 5 digit numbers and decimal numbers to 2dp.
Vocabulary		**Operation Vocabulary:** • repeated subtraction • share • equal sharing • times smaller • remainder = 'left over' • factors **Process Vocabulary:** • repeated subtraction • divisibility • inverse operation = opposite **Tools and Models Vocabulary:** • division fact families	**Operation Vocabulary:** • repeated subtraction • share • equal sharing • times smaller • remainder = 'left over' • factors **Process Vocabulary:** • repeated subtraction • divisibility • inverse operation = opposite **Strategy Vocabulary:** • 'short division' method = • 'Bus stop' method **Tools and Models Vocabulary:** • division fact families	**Operation Vocabulary:** • repeated subtraction • equal grouping - how many 'groups' can you make with.... • equal sharing • times smaller • remainder = 'left over' • factors **Process Vocabulary:** • repeated subtraction • divisibility • inverse operation = opposite **Strategy Vocabulary:** • 'short division' method = • 'Bus stop' method • 'long division' **Tools and Models Vocabulary:** • Division fact families	**Operation Vocabulary:** • repeated subtraction • equal sharing • times smaller • remainder = 'left over' • factors **Process Vocabulary:** • repeated subtraction • divisibility • inverse operation = opposite • digit slide **Strategy Vocabulary:** • 'short division' method = • 'Bus stop' method **Tools and Models Vocabulary:** • Division fact families
Fractions		• Name fractions by their images and explain what the numerator and denominator represent as an image (eg. ...out of....). • Understand how a whole can be represented in numbers and pictures (eg. 5/5, 8/8 = 1 whole). • Demonstrate an understanding by shading any proper fraction. (eg. 1/8, ½, ⅔, ¾ , ⅛, 1/10). • Order unitary fractions (1/2 , ⅓, ⅛) on a number line. • Order common fractions (ie. half, quarters and eighths) on a number line (up to 1). • Compare fractions with the same denominator using pictures and/or fraction wall (eg ¼, 2/4, ¾, 1, etc.). • Use manipulatives to demonstrate ½, ⅓, ¼, ⅛ of a group. • Compare, order and explain ½, ⅓, ¼, ⅛ using visual representation as needed.	• Show understanding of fractions by drawing and shading a fraction without a given template. • Compare, order and explain 'common proper 'fractions with different denominators using pictures. (eg. 1/8, 1/5, 1/2, 3/4, 7/8) • Understand and explain what an improper fraction represents in numbers, words and images. • Add and subtract simple fractions with the same denominators **using images**. (eg. 1/5 + 3/5) • Create an image of fractions to introduce the concept of equivalent fractions (eg. ½ = 2/4). • Use and explain visual and written methods of finding fractional parts of whole a • group (eg, ⅓ of 24 and 2/3 of 24). **Application:** • Find unitary fractional parts of quantities when using measurements (eg. 1/4 of 800g =) • Convert fractional parts of an hour to minutes when solving time problems.	• Count forwards and backwards in steps of 1/2, 1/4 1/10, • Recognise and create equivalent fractions (including 1/10s, 1/100s in preparation for percentages, eg: 10/50 = 20/100) • Compare two fractions by finding a common denominator e.g. 3/5 and 7/10 • Order a set of fractions with 2 different denominators e.g. 4/5, 2/10, 5/10 1/5 • Convert an improper fraction to a mixed number and vice versa. • Find a fraction of a set number when solving problems e.g. finding ⅔ of 42 • Place fractions on a number line (up to and beyond 1, eg: 8/5) • Add two fractions where one denominator is a multiple of the other e.g. 1/2 + 1/4 • Draw decimal fractions on 100 square and in 10 strips • Convert fractions with 10ths and 100ths to decimal numbers • Recall that quarter = 0.25 and ¾ = 0.75 • Recognise the percent symbol (%) and understand that per cent relates to 'number of parts per hundred', • Write percentages as a fraction with denominator of 100, and as a decimal. • Find simple percentages (10%, 50%)	• Count forwards and backwards in fractions of tenths, fifths, quarters, thirds. (eg. 1/4, 2/4, 3/4, 1, 5/4). (PF) • Say the number 1/10 more, 1/10 less. (PF) • Say the number 1/100 more, 1/100 less. (PF) • Find equivalent fractions by identifying a common denominator up to hundredths. • Order fractions by finding a common multiple as the denominator (eg. 3/10, 4/5, 5/20, 40/100) • Add & subtract fractions of common denominators. • Recall conversions between decimals, fractions and percentages with 1/2, 1/4, 1/3, 1/5 and 1/10. • Find fractions of sets (eg. 4/9 of 54). • Convert complex fractions to decimals (1/7, 1/8) using division strategies. • Convert simple fractions to percentages by finding equivalent fractions. • Find percentages of numbers (eg. 80% of 45). • **Application**: • Use the most appropriate fraction (mixed or improper) when responding to problem solving questions.
Vocabulary		• fraction • unit fraction (numerator = 1) • numerator • denominator • fractional part or a quantity	• fraction • unit fraction (numerator = 1) • numerator • denominator • fractional part or a quantity	• fraction • unit fraction (numerator = 1) • numerator • denominator • fractional part or a quantity • equivalent fractions	• fraction • unit fraction (numerator = 1) • numerator • denominator • fractional part or a quantity • equivalent fractions

		• equivalent fractions • out of • part/whole	• equivalent fractions • equivalence • out of • quantity / groups/ set	• equivalence • out of • common denominator • improper • mixed number • percent • percentage	• equivalence • common denominator • part whole • part(s) of • out of
Place Value of Decimals		• Understand that a decimal separates whole $ from part of the dollar (cents). • Add and subtract decimals in real life situations involving money. • Compare the amount of money from the written form and through coins (eg. $0.50 . $0.05). *(All of these learning objectives fall under measurement for reporting purposes)*			

Pattern and Function (see also P&F-related to number)	**Problem Solving Strategies**		• Identifying key words in a question or statement.
			• Construct a number sentence.
			• Use a variety of mathematical language to describe operations and processes.
			• Distinguishing between relevant and irrelevant information in a question.
			• Understand, explain, use and apply the following strategies to assist problem solving:
			  • 'Guess + Check' strategy.
			  • drawing information given in a problem to assist with finding a solution.
			  • use or create models to assist with solving problems.
			  • work backwards through a problem.
			  • use an example to assist with other similar types of problems.
			  • use a chart or diagram to organise information.
			• Choose a suitable strategy to solve a problem.
			• Order number operation or steps within a multi-step problem.
			• Orally explain the processes used to solve the problem.
			• Check solutions for their reasonableness.
			• Use knowledge of the properties of numbers to check reasonableness of solutions (eg. odd and even rules when adding, subtracting of multiplying numbers)
				• Identifying key words in a question or statement.
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					• Order number operation or steps within a multi-step problem.
					• Orally explain the processes used to solve the problem.
					• Check solutions for their reasonableness.
					• Use knowledge of the properties of numbers to check reasonableness of solutions (eg. odd and even rules when adding, subtracting of multiplying numbers)

Vocabulary			• estimate • approximate • predictions reasonable a quantity • calculations • model • solution	• estimate • approximate • predictions reasonable a quantity • calculations • model • solution	• estimate • approximate • predictions reasonable a quantity • calculations • model • solution