Progressions of Addition, Subtraction, Multiplication, Division and Algebra through NZC Phases 1 – 3 aligned with Numicon

Phase 1				
Must achieve during first 6 months	Must achieve during first year	Must achieve during second year	Progress outcomes by the end of the third year	Numicon
• join and separate groups of up to a total of 10 objects, and find the result by grouping and counting	recognise instantly the total number of objects in two patterns, each of up to five objects	• partition a pattern of up to 10 objects, instantly recognise the number of objects in each part, and confirm the total number in the pattern using the parts	I know that: Numbers can be composed and decomposed in different ways by using patterns.	Firm Foundations
	• partition and recombine sets of up to 10 in different ways • join and separate groups of up to a total of 20 objects, and find the difference between groups by grouping and counting	• group, partition, and recombine whole numbers up to 100 • add and subtract numbers up to 100 by grouping and using number patterns	I know how to • add and subtract two- and three-digit numbers	Numicon 1
				Numicon 2
	• multiply and divide by making equal groups and using grouping or counting	• multiply and divide by grouping and using number patterns	I know that: Multiplication and division involve recognising and working with groups, the number of groups, and the total.	Firm Foundations
			I know how to: • multiply two single-digit numbers or multiply a single-digit and a two-digit number • divide whole numbers with a single-digit divisor and no remainders	Numicon 1
				Numicon 2

ALGEBRA • copy, continue, create, and describe a repeating pattern with two elements	• copy, continue, create, and describe a repeating pattern with three elements, and identify missing elements in a pattern	• show that in an equation, both sides of the equal sign represent the same quantity • use both the unit of repeat and the ordinal position (e.g., first, second, and third) of a repeating pattern to predict further elements	I know that: The commutative property applies to addition (e.g., 2 + 5 = 5 + 2) and multiplication (e.g., 5 × 2 = 2 × 5). The additive identity is 0 (e.g., 4 + 0 = 4 and 5 − 0 = 5), and the multiplicative identity is 1 (e.g., 5 × 1 = 5 and 4 ÷ 1 = 4). The equal sign is relational; it shows that the two sides of an equation are the same. Patterns are made of numeric or spatial elements in a sequence governed by a rule. Identifying the rule of a pattern involves working out the unit of repeat. An algorithm is a sequence of rules that can be followed. I know how to: • recall addition facts to 20 and their corresponding subtraction facts • recall multiplication and corresponding division facts for twos, fives, and tens • solve true and false number sentences and open number sentences • use the additive and multiplicative identities and commutative property • find another element of a pattern, given part of it • describe a rule that explains how a pattern works • follow, and create patterns from, rules or simple algorithms.	Firm Foundations Numicon 1 Numicon 2
Phase 2				
Must achieve during Year 4	Must achieve during Year 5		Progress outcomes by the end of Year 6	Numicon
• use their recalled addition and subtraction basic facts to solve problems	• add and subtract whole numbers reliably and efficiently			Numicon 3

• add and subtract two- and three-digit numbers reliably and efficiently • add and subtract using the commutative property			Numicon 4
			Numicon 5
• use the relationship between multiplication and division to divide • recall multiplication and corresponding division facts for threes and fours	• multiply two-digit numbers using the distributive property • multiply reliably and efficiently • recall multiplication and corresponding division facts for sixes, eights, and nines	I know how to: • add and subtract whole numbers and decimal numbers to two places • multiply two- and three-digit whole numbers • divide whole numbers by one- or two-digit divisors • find factors of numbers up to 100	Numicon 3
			Numicon 4
			Numicon 5
ALGEBRA • solve addition and subtraction open number sentences using the relationship between the two sides of the equal sign	• solve open number sentences involving all operations using the relationship between the two sides of the equal sign	I know that: The associative property applies to addition and multiplication (e.g., 3 × (2 × 7) = (3 × 2) × 7). The distributive property applies to multiplication over addition and subtraction (e.g., 3 × (10 + 7) = (3 × 10) + (3 × 7)).	Numicon 3

		The equal (=) and inequality (<, >) signs show relationships. In a pattern, the relationship between the ordinal position (e.g., first, second, third) and the corresponding element is useful for finding the pattern rule.	Numicon 4
		Tables and XY graphs provide a way of organising the positions and elements of a pattern to reveal relationships or rules. An algorithm is a set of instructions for solving a problem. I know how to: • recall multiplication facts to 10 × 10 and corresponding division facts • use the distributive, commutative, and associative properties • solve open number sentences and true or false number sentences involving equality or inequality • use tables, XY graphs, and diagrams to find relationships between elements of growing patterns • develop a rule in words about a linear pattern • use a rule to make predictions • create and use algorithms for making decisions that involve clear choices.	Numicon 5

Phase 3

Progress outcomes by the end of Year 8	Numicon
I know that: • Multiplying a positive number by a number less than 1 results in an answer smaller than the original number. • Division can result in a remainder expressed as a whole number, fraction, or decimal. • Positive and negative numbers can be added and subtracted.	Numicon 5

I know how to: • divide whole numbers reliably and efficiently • add and subtract decimals to three places • add and subtract fractions with the same denominator • multiply fractions and decimals by whole numbers • add and subtract integers.	Numicon 6
ALGEBRA I know that: The inverse property applies to addition (e.g., 3 + −3 = 0) and multiplication (e.g., 3 × 31 = 1). Operations to both sides preserve the balance of an equation. The commutative, associative, distributive, and identity properties work the same for all numbers.	Numicon 5
A variable can be used to stand for any number. Functions are relationships or rules that uniquely associate members of one set with members of another set. Linear patterns and functions have a constant rate of change. They can be represented by ordered pairs, tables, XY graphs, and a rule (equation). Algorithms help solve problems in a systematic way. Their instructions are created, tested, and revised. I know how to: • identify and describe the properties of prime, composite, and square numbers and the divisibility rules for 2, 3, 5, 9, and 10 • use words and symbols to describe and represent the properties of operations (commutative, distributive, associative, inverse, and identity) • solve linear equations by trial and improvement and by applying inverse operations • use variables to represent a rule about a linear pattern, and use the rule to make predictions • represent and connect linear functions using tables, equations, and XY graphs • create and use algorithms to identify, interpret, and explain patterns.	Numicon 6